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NATURAL HISTORY COLLECTIONS

MADE IN

ALASKA

BETWEEN THE YEARS 1877 AND 1881

BY

EDWARD W. NELSON.

EDITED BY HENRY W. HENSHAW.

PREPARED UNDER THE DIRECTION OF THE CHIEF SIGNAL OFFICER.

No. III.

ARCTIC SERIES OF PUBLICATIONS ISSUED IN CONNECTION WITH THE SIGNAL SERVICE, U. S. ARMY.
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- ✓ No. II.—Contributions to the Natural History of Alaska. By L. M. TURNER. 1886.
- ✓ No. III.—Report upon Natural History Collections made in Alaska in the years 1877-1881. By F. W. NELSON. 1887.
- No. IV.—Report of the Expedition to Lady Franklin Bay. By LIEUT. A. W. GREELY. 1887.
- No. V.—Report of Observations made in Ungava and Labrador. By L. M. TURNER. 188-

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LETTER OF TRANSMITTAL.

WASHINGTON, *March 11, 1887.*

GENERAL: I have the honor to transmit herewith a report upon the Natural History Collections made in Alaska by Mr. E. W. Nelson, during the years 1877 to 1881, intended to form No. III of the Arctic Series of Publications of the Signal Office.

It seems proper to add a brief statement of the manner in which the volume has been prepared and my own connection with it.

Upon his return from Alaska in 1881, Mr. Nelson at once began work upon the ornithological portion of the present volume, intending later to take up reports upon his collections of Mammals and Fishes. The ornithological report was well advanced towards completion when failing health, directly traceable to exposure in the North, compelled an abrupt cessation of labor and an immediate departure of Mr. Nelson for the West, where he has since resided. Meantime the entire subject of the nomenclature of North American Birds has been revised, and a check list issued by the American Ornithological Union. In addition a number of reports upon, and partial lists of, Alaska birds have been issued. It thus seemed very desirable that Mr. Nelson's report upon Alaskan birds, covering, as was intended, the whole territory, should be revised and brought up to date.

At Mr. Nelson's request, and in accordance with the wishes of the Chief Signal Officer, the writer has undertaken to do this, and in addition to supervise editorially the whole volume. The chapters on Mammals and Fishes have been prepared by Mr. Frederick W. True and Dr. Tarleton H. Bean, both well known authorities upon their respective subjects, Mr. Nelson furnishing the field-notes in both cases. Mr. W. H. Edwards has added a chapter upon the Diurnal Lepidoptera collected by Mr. Nelson, an introduction to which is furnished by the latter.

The results of Mr. Nelson's investigation embodied in the present volume will prove, it is believed, a valuable contribution to our knowledge of the natural history of Alaska, both on account of the extent of his collections and the able and faithful manner in which his field observations were made.

It is greatly to be regretted that Mr. Nelson was unable to complete his reports as he intended, and to give the manuscript the final finishing touches, for the lack of which no editorial supervision, however careful, can fully compensate. Acting in his editorial capacity, the present writer has not hesitated to amend and change in the ornithological chapter wherever later and fuller information required, and thus he shares to a considerable extent the responsibility of authorship. The field observations and the general deductions have been left practically as Mr. Nelson wrote them.

H. W. HENSHAW.

CHIEF SIGNAL OFFICER, U. S. ARMY,
Washington, D. C.

NARRATIVE

On April 25, 1877, the writer embarked, at San Francisco, upon the Alaska Commercial Company's steamer *St. Paul* for Alaska. His instructions from the Chief Signal Officer were to proceed to Saint Michaels, in Norton Sound, and take charge of the signal station at that point. The first object of the trip was to secure an unbroken series of meteorologic observations, and, in addition, to obtain all the information possible concerning the geography, ethnology, and zoology of the surrounding region.

After a stormy passage of twelve days across the North Pacific, the Aleutian Islands were reached. The night before arrival a vague glimpse was caught of the islands just as darkness closed about. All night we moved slowly ahead at reduced speed, and at daybreak every one was on deck eager for the sight of land.

We were well repaid; the sun arose and revealed the line of islands extending away to the horizon on either hand in massive grandeur.

Not a breath of air fanned the glassy surface of the sea, which was only broken by the wake of the steamer and the circling ripples from the breasts of thousands of water-fowl. About the ship whirled and circled anks, gulls, and fulmars, as we moved through the pass of Akoutan to Unalaska Harbor. On both sides of the pass the barren, wind-swept, rocky slopes, marked in places by great patches of snow, came down to the sea in series of cliffs and sharp declivities. The seaward faces of the islands appeared desolate and gloomy enough, save where great flights of water-fowl clustered about some jagged point, or a picturesque waterfall formed a line of silvery spray down the face of a cliff on its way to the sea.

We were soon steaming by the rocky pillar called the "Priest," that guards the entrance of Unalaska Bay, and, passing a small fleet of Aleuts in their kyaks, cod-fishing, ran alongside the wharf at the village of Unalaska early in the morning. This town has been the central depot for the sea-otter trade and a general supply station ever since the Russians first located in the Territory. It is a small village, consisting of a score or so of native huts and the modern buildings of the fur company. It is built close to the water, on a sand-spit, at the head of the bay, and possesses one of the most disagreeable climates in the world. Here I passed a few weeks exploring the neighborhood while awaiting the departure of a vessel for Saint Michaels. During this time I accepted the opportunity for making a visit to Sanak Island, lying about 100 miles to the eastward of Unalaska. This island is the center of the most productive sea-otter-hunting-grounds in the Territory, and here thousands of the beautiful Emperor Geese pass the winter.

My excursion was made in a small schooner manned by a captain and two Aleut sailors. The hold was filled with Aleut hunters and their kyaks, on their way to the hunting-ground. We were scarcely clear of Unalaska Island when a violent gale overtook us and we ran for Akoutan Bay. For nearly half a day we beat back and forth under the storm-lashed cliffs, and were unable to bring the vessel about promptly enough, at the turn, to clear the reefs and gain the desired shelter.

The small crew was powerless to work the sails, and some of the Aleut passengers were called on deck to assist. They soon became so terrified by the tempest and the water that was shipped every few moments that they returned to the hold and refused to work. Fortune favored us at length, and a squall striking us just at the right moment carried us safely by the headland, so close

that a hat might have been tossed against the cliff, and a few minutes later we were lying under the shelter of the shore at the head of the bay. When the wind abated a little I went ashore for a short tramp along the beach.

I was surprised to hear the sweet notes of the Aleutian Wren rising cheerfully in the face of the storm.

A little later the notes of the Rock Grouse (*Lagopus rupestris nelsoni*) were heard; so it appears that in these storm-beaten islands a gale of sufficient power to drive to shelter every feathered inhabitant of more genial climates does not interrupt the ordinary course of life among the hardy land birds.

The next morning a fair breeze carried us speedily to our destination.

Sanak Island proved to be a low, wind-swept islet, surrounded by the numerous reefs and out-lying rocks about which the sea otter passes much of its time. A single fur trader was stationed here to gather the skins and to supply the hunters with a few necessary articles. None of the hunters are permanent residents, but live on other islands, some of them nearly a thousand miles to the westward, and are brought here in the small trading vessels by the fur companies. After a half a day passed in rambling over the island I went on board again and we returned to Unalaska.

Soon after my return I sailed on another small trading schooner for my final destination, Saint Michaels. We passed through a belt of dense fog which hung about the seal islands, and but for the great numbers of fur seals that swam playfully about us and the thousands of murre we should not have been aware of our proximity to this group. Thence on for nearly two weeks we were at the mercy of a series of vexatious calms. Off the Yukon mouth the sea was very muddy, and fragments of drift-wood, green pine branches, and blades of grass were plentiful more than 100 miles from the delta.

While lying from 30 to 40 miles off the mouths of this river we were in from 2½ to 4 fathoms of water, and the sea gradually becomes more shallow toward shore, until a vessel may easily run aground at low tide and yet not be within sight of land.

While we were becalmed in this shallow water we found that a strong offshore current with a heavy swell running in made a very disagreeable combination. The swell became extremely heavy and our little vessel pitched about in a most extraordinary manner, until it seemed that the masts must be suamped off at the deck. At times walking on deck became an impossibility, unless one could hold on by a rope or the rail.

At length a breeze arose, and during the pale twilight of the next midnight we forced a passage through a scattered ice-pack. During all of my later experience in this region I never saw equaled the gorgeous coloring exhibited on this night by sea and sky. Along the northern horizon, where the sun crept just out of sight, lay a bank of broken clouds tinged fiery red and edged with golden and purple shades. Floating about us in stately array were the fantastic forms of the sea ice, exhibiting the most intense shades of green and blue, and the sea, for a time nearly black, slowly became a sullen green, on which the white caps chased one another in quick succession. As the sun neared the horizon the rosy flush spread from the clouds to the sky all around and a purple tint touched the sea and ice into the most gorgeous coloring, which lasted for an hour. The rush of the waves among the fragments of ice and the grinding of the pieces among themselves and along the side of the vessel made a strange monotone that blended harmoniously with the mysterious brooding twilight and the rare coloring of sea and sky.

In a few hours we were clear of the ice and sailed into Saint Michael's Bay, where a joyful salute from some ancient ship cannons, relics of the Russian régime, and dating back to the end of the last century, expressed the feelings of the handful of white men who had been cut off from the civilized world for the preceding ten or eleven months.

Saint Michaels, one of the old Russian trading posts, is located about 65 miles north of the Yukon delta and nearly 200 miles south, by coast, from Bering Straits. It consists at present of six or eight buildings, forming a rectangle, and serving as the warehouses and other buildings of the Alaska Commercial Company's principal depot for the fur trade of the Yukon River district.

From June 17, 1877, the date of my arrival there, until the last of June, 1881, this place was my headquarters, and here I passed the greater part of my time. The chief object of my stay—

to secure an unbroken meteorologic record, was fully accomplished, and a record of nearly twelve thousand observations was brought back. During my residence as the guest of the Alaska Commercial Company the agents of this company very kindly volunteered to take my observations during various periods, thus enabling me to make a number of expeditions in different directions, by means of dog-sledges in winter and by kyaks in summer.

A few days after my arrival at Saint Michaels the fur traders from the Yukon arrived with their annual supply of furs from that region. These traders are of various nationalities, and are, as a rule, very hospitable and obliging in every way, as I had ample opportunity to learn.

The stations, or trading posts, on the Yukon extend from Kotlik, in the Yukon delta, to Fort Reliance, on the Upper Yukon, close to the British boundary, and about 1,500 miles from the sea-coast. There are eight trading posts in this distance, with one white man at each. The traders select their stock of goods at Saint Michaels each spring after the arrival of the annual supply vessel, and having loaded them into barges the latter are towed to their respective stations by a small steamer. The year is then passed in trading with the natives, and the succeeding spring they return to Saint Michaels with their boats laden with furs. As each trader brings a crew of natives from his station, all dressed in holiday finery, and the coast traders bring in their Eskimo employés, Saint Michaels becomes the center of an extremely picturesque and animated gathering for a few weeks during the last of June and first of July. After the Indian custom the representatives of each Indian tribe try to outdo their rivals in wrestling or other pastimes, and the period covered by these visits is a very animated one and full of interest even to the casual observer.

The brief holiday season is soon gone, the vessel leaves for San Francisco and the traders for their stations, and Saint Michaels is left to itself and the permanent residents. These latter, during my stay, consisted, besides myself, of from two to three agents of the fur company and the Russian workman, who cared for the dogs and kept us supplied with fire-wood from the drift along the beach. From time to time the arrival of a party of Eskimos, on a trading expedition, and in winter an occasional fur trader from the stations within a few hundred miles, afforded the only breaks in the sameness, except such amusements as we contrived to devise ourselves.

During the first year I explored the district lying immediately about Saint Michaels, and secured a considerable series of zoologic and ethnologic specimens in addition to the meteorologic work. The next year my investigations were extended over a wider field, and the 1st of December, 1878, in company with Charles Petersen, a fur trader, I left Saint Michaels with a sledge and team of eight Eskimo dogs. We traveled along the coast to the mouth of the Yukon, and up that stream to Andreovski, Petersen's Station, and the second trading post from the sea. Thence we proceeded southwest across the upper end of the Yukon delta, by the eastern base of the Kuslevak Mountains, and reached the sea-coast just south of Cape Romanzoff at a previously unknown shallow bay, which I have named in honor of Capt. C. L. Hooper, U. S. R. M. From this point we proceeded south along the coast, or near it, to Cape Vancouver. Just north of this cape lies a large shallow bay, previously unknown, which I named in honor of General W. B. Hazen, Chief Signal Officer. A high mountain capping the short range which extends out on Cape Vancouver I named Mount Robert Lincoln, and a large inlet back of the island upon which is situated Cape Vancouver I named in honor of Prof. S. F. Baird.

The island upon which Cape Vancouver and Mount Robert Lincoln are situated has been named in honor of the discoverer by the Chief of the Geographical Division of the Census Bureau, to whom these discoveries were first submitted.

A large shallow lake near the head of Baird Inlet I named in honor of Mr. W. H. Dall, of the Coast Survey, whose extensive investigations in this region are well known.

The second day beyond Cape Vancouver, Petersen, who had accompanied me thus far, said that the weather was too bad to travel further and turned back. From that point I proceeded, accompanied by an Eskimo, to the mouth of the Kuskoquim River. After traveling about 90 miles up its course we turned back toward the Yukon, which we struck about 100 miles above Andreovski. Turning up the river I then continued the journey to Paintut Village, the last Eskimo settlement on the Yukon. A few miles above this point is the first settlement of pure-blooded Indians, or Tinné. At Paintut I turned back again and retraced my steps down the river to the sea coast and along the coast to Saint Michaels.

This expedition thus completed a very successful reconnaissance of a region previously unknown both as regards its geographic and ethnographic features. A very fine series of ethnologic specimens was secured from the natives over the entire route traversed. Some of their curious winter festivals were witnessed and several vocabularies secured in addition to a tolerably correct sketch map of the district made from compass bearings taken each day. The winter fauna of the district was noted as carefully as possible during the expedition, and I reached Saint Michaels safely after an absence of about two months. The usual discomforts of Arctic winter travel were greatly heightened during this expedition by the unusually inclement weather.

The country in the region between the mouths of the Yukon and Kuskoquim is principally low and marshy, and during two weeks of the time spent in traversing it violent storms of snow, rain, and sleet accompanied by high winds prevailed. During this time my bedding became saturated with moisture, as did also my clothing, and day after day forced marches were made over a country covered with slush and water. At night a miserable shelter was improvised from our sledges or found in the underground huts of the natives. These were reeking with moisture and decaying filth which the warm weather had thawed out, so that the floor, forming our resting-place, was a soft mass of decaying filth of all descriptions and varying in depth from an inch or two to six inches. Each night I gave my gloves and socks with some of my outer garments to various members of the family present, and these, for a small present of tobacco, slept in the wet garments and partly dried them by the heat of their bodies ere morning. These storms finally culminated in a terrific gale as I approached the sea-coast south of Cape Vancouver, and just at sunset, by great good fortune, I reached a couple of huts built on a knoll about 5 miles from the coast. The best of them was flooded with water, leaving a space about 3 feet wide of bare ground around the sides, but in going out and in we were forced to wade through a foot of water all along the entrance passage. Here my interpreter and myself crouched against the wall in silent misery for two days, while one of the most violent tempests I ever witnessed swept over the desolate tundra. This wind was accompanied by a dense fog and, after two days, when we continued our journey to the coast, we found that the gale had caused an extraordinary high tide the previous day, and the rising sea, bearing a massive sheet of ice, had swept over all the low coast lands to the base of the small knolls where we had found shelter. Had we been delayed half an hour in reaching these knolls on the night of our arrival we must inevitably have missed them and been lost in the overwhelming mass of ice that covered the low land of all this district.

Such floods, covering the region along the Lower Kuskoquim at intervals of three or four years, usually raze some of the native villages, and in some cases people and all have been swept away. The last day of this expedition found me camped at Pastolik Village, at the Yukon mouth, and 60 miles from Saint Michaels. The incessant exposure of the preceding two months began to have effect, and I found it impossible to sleep, owing to a feverish condition, which the stifling atmosphere of the overcrowded room seemed to increase. About midnight I aroused my interpreter and a guide I had engaged the previous evening, and after making tea we loaded up and left the village at 1 a. m. We soon struck the sea ice, and at daybreak were over 30 miles on our way. At 10 a. m. we stopped at Cape Romanzoff for a meal made up of tea and dried fish with a few scraps that still remained in our bread-bag. Leaving this point we made slow progress, as the dogs began to show signs of weariness, but by continual urging and some pushing on the heavily-laden sledges upon our part we managed to reach Saint Michaels at 9 p. m., having made the 60 miles in about twenty hours of continued exertion.

As already noted, the results of this expedition were very valuable, but as a consequence of the attendant exposure, I suffered from an attack of pneumonia, after my return, the effects of which troubled me long afterwards. This expedition extended over about 1,200 miles in a nearly or quite unknown country.

On May 9, 1879, I started from Saint Michaels, with my workman, Alexai (who afterwards perished with De Long in the Lena delta), and a dog sledge, over the sea ice for the Yukon delta. This expedition was for the purpose of learning the habits of the breeding water fowl in that district, particularly of the Emperor Goose. After spending a few days at Kotlik, near the northern border of the delta, I secured a large three-man kyak and hired a native sledge driver to take us to the middle of the delta. We made camp just above high-water mark on a low island situ-

ated about midway on the seaward face of the delta. The driver was then sent back to Kotlik with the sledge, leaving us in camp with the kyak. Soon after this the ice became unsafe to venture upon in the network of channels that surrounded us and we were imprisoned upon our islet. Then followed about two weeks of the greatest misery it was my fortune to endure while in the north. Day after day the wind blew a gale from the ice-covered sea, and was accompanied by alternate fog, sleet, and snow. Without a fire, and with no shelter but a small light tent made of thin drilling and pitched on a bare marsh facing the sea, the Eskimo and myself crouched in our scanty supply of blankets, benumbed with cold, and unable to better our condition. Finally, the weather moderated, and the geese, ducks, and other water-fowl flocked to their breeding-ground. In a short time a fine series of skins and eggs of the Emperor Goose and other birds was secured, and as soon as the ice left the river we hired a native, who chanced along in his kyak, and, lashing his kyak firmly alongside of ours, we piled upon the deck thus improvised our boxes of specimens and camp equipage and returned to Kotlik. Leaving the specimens there to be brought to Saint Michaels by the fur trader, and hiring a second man to paddle, I started up the coast for Saint Michaels, about 70 miles distant. We had been unable to provide ourselves with gut-skin shirts to keep out the water, and after passing Cape Romanzoff, on the second day, the wind began to freshen to a gale. In a short time the sea became covered with white caps, that developed into huge rollers near shore and forbade our trying to land. We made for the mouth of the Pitmiiktalik River, about 10 miles up the coast, with the hope that we could reach there before the boat swamped.

The water was icy cold, and as nearly every wave dashed over us and added to the water in the kyak, we were soon wet to the skin and sitting in water constantly increasing in the bottom of the boat. All three worked desperately at the paddles, and just as I began to despair of our reaching the river in time a welcome break in the shore line showed its vicinity. The kyak was at once headed for this opening, and we were soon among the breakers. As we neared the mouth the breakers became heavier, until one huge roller caught the stern of the kyak and lifted it high in the air, while the bow cut the water in the trough of the swell advancing at terrific speed. The faithful Alexai dug his paddle into the water and strained every sinew to keep the boat head-on, but the cowardly fellow in the stern-hole lost his wits and with a cry dropped his paddle. Alexai and myself were barely able to prevent the boat broaching-to, and a few seconds later the roller broke with a roar behind us and we were safe in the smooth water of the river. The boat was run ashore among a large bed of drift-wood, and upon trying to get out I found that sitting in the icy water, which had covered my legs and hips for several hours, had deprived my lower limbs of the power of motion and of sensation. The men dragged me out and built a huge fire, before which I slowly thawed out and restored my circulation. The following day we reached Saint Michaels safely. The remainder of the year was occupied in continuing investigations about this place.

On February 9, 1880, in company with a fur trader and two Eskimos, I left Saint Michaels with two sledges. We proceeded up the coast of Norton Sound, and on the second and third day traveled in the face of a high wind with a temperature of -35° Fahr. The cold was very intense for the next two weeks, and for several days while we remained at the head of Norton Bay the mercury was frozen. The night of February 13 we stopped in a miserable little hut occupied by three families of Eskimos. This hut was not over 10 by 12 feet and 5½ feet high. Here sixteen people slept that night, including ourselves. The air was extremely bad, so much so that the candle I lit to write my journal by went out in a few moments, and matches when lit would flare up and go out as if dipped in water. Even our pipes would not stay lit, and we were soon in total darkness. I asked the owner of the house to remove the gut-skin cover from one corner of the smoke-hole in the roof, but he refused, saying it was too cold. When I finally threatened to remove the entire cover he complied and we managed to secure a good night's rest.

Following the coast line we passed around Norton Bay and thence past Golovina Bay, and around the coast to Sledge Island, situated just south of Bering Straits. We found the people on the point of starvation in all this district, and most of the dogs were already dead, while the others were fast becoming skeletons. We were the first white winter visitors to Sledge Island, and our arrival created considerable excitement. The lack of dog-feed made us hesitate to stop, but the

chief man of the village told us that they would try to gather a little food for the dogs and would give a dance in our honor that night if we would remain. We did so and the dog-food was forthcoming. The dance proved a very interesting one, performed mainly by the women. Here a fine series of ethnologic objects was secured, and our return trip began, as we learned from the natives that there was absolutely no dog-food to be had farther north. The return trip along the route followed in going was a very laborious one, owing to the condition of our dogs and the nearly incessant storms of wind and snow that prevailed, and the heavy loads of furs and ethnologica we were carrying. We finally reached Saint Michaels April 3, after having worn out three sets of dogs. Those in harness at the time of our arrival were barely able to crawl along, and left bloody footprints on the ice at nearly every step. The results of this expedition consisted of a fine series of ethnologic specimens from all the coast visited and vocabularies of four Eskimo dialects, besides geographic and other information of much value.

November 16, 1880, in company with a fur trader, Fredricks, I left Saint Michaels, and between that time and January 19, 1881, we crossed the mountains to the head of the Anvik River, down which we traveled to its junction with the Yukon. At this point is located the fur-trading station of Anvik, which is in charge of Fredricks. Bad weather delayed us here some days, but we finally got away, and traveling up the Yukon we crossed Shageluk Island and explored the country about the head of the Innoko River, returning thence to Anvik, and down the Yukon back to Saint Michaels. On the way I stopped and witnessed one of the great Eskimo festivals, in honor of the dead, at Rasboinsky. As was the case with the other sledge journeys mentioned, the main object in view was to study the ethnology of the districts visited, but the zoology and geography of the route were also attended to as closely as the time and means at my disposal would allow. The three main sledge expeditions mentioned, with numerous shorter ones, covered over 3,000 miles, and resulted in amassing a great number of specimens and a large fund of information on various subjects. After the close of this expedition, until the last of June, 1881, I was busily employed in completing my data and closing up my work at Saint Michaels.

The last of June, 1881, the revenue steamer Corwin called at Saint Michaels on her way north in search of the missing Jeannette. Through the courtesy of the Secretary of the Treasury, the commander, Capt. C. L. Hooper, was directed to take me on board as naturalist of the expedition. During the remainder of the season I was the guest of Captain Hooper and received many favors at his hands. We left Saint Michaels and sailed to Saint Lawrence Island, where the captain had been instructed to land me to investigate the villages there, which had been depopulated by some disease during the two preceding winters. The surf was too heavy to risk landing at the desired points on this visit, so we passed on to Plover Bay, on the Siberian coast. Taking on coal there, from a supply left by a Russian man-of-war, we passed north through Bering Straits, visiting on the way all of the islands in the straits, and leaving a party on one of the Diomedé Islands to take observations on tides and currents. Thence we coasted the shore of Siberia to North Cape, taking on board a sledge party which had been left there early in the season. We then returned to Saint Lawrence Island, where a landing was effected, and a fine series of Eskimo crania and other valuable specimens secured, after which we returned again to Saint Michaels. There my collections were transferred to the Alaska Commercial Company's steamer St. Paul, for shipment to San Francisco, and the Corwin once more returned to the Arctic. During the remainder of the season we visited all of the Arctic coast of Alaska from the straits to Point Barrow, including Kotzebue Sound. We were the first and only party to scale the cliffs of Herald Island, and were the first to reach the ice-bound shores of Wrangel Island, so long discussed by geographers as a probable extension south of an Arctic continent. The severe usage undergone by our staunch little vessel while in the ice-pack warned us to leave the Arctic before winter closed in upon us. The middle of September we left the Arctic and, after stopping for some necessary repairs at Unalaska, sailed for San Francisco. "Homeward bound" had a grateful sound to my ears after my long exile of four and a half years in the north, and the timbered hills of Mendocino, on the coast of California, were a welcome sight as we neared the coast the last of October.

The material secured during my residence in the north consists of a great number of specimens and a large amount of manuscript notes. In addition to the present volume I have published an account of the birds observed during the cruise of the Corwin in a volume of "Notes

and Observations" made during that cruise and issued by the Treasury Department. The geographical results of the expedition between the Yukon delta and the Kuskoquim have appeared, with a map, in the "Proceedings of the Royal Geographical Society and Monthly Record of Geography" for November, 1882, and are embodied with other information in the "Report on the Population, Industries, and Resources of Alaska," prepared by Ivan Petroff for the Census Office.

A report upon the meteorology of Saint Michaels, and vicinity, made to the Chief Signal Officer, and a series of illustrations and notes contained in the official report of the Corwin's cruise by Captain Hooper, have also been published.

The volume devoted to Alaskan ethnology, upon which the author is engaged at present, will complete the series.

In closing this brief outline of work accomplished I take pleasure in acknowledging my indebtedness for favors received from the Alaska Commercial Company and particularly from its officers at Saint Michaels, Messrs. Neumann and M. Lorenz. To their genial companionship I owe many pleasant hours during the wearying monotony of life in this isolated region; and without their kindly assistance it would have been impossible for my work to have been carried on so successfully. The fur traders, one and all, forwarded my work with voluntary assistance, and my thanks are particularly due to Messrs. L. N. McQuesten, Charles Petersen, Fredricks, and Williams.

My thanks are also due Prof. S. F. Baird for placing the material in the Smithsonian Institution and National Museum at my disposal and for aid extended in various other ways.

To Messrs. W. H. Dall, Robert Ridgway, and Dr. L. Stejneger I must also express my obligations for favors conferred since my return from the north. The latter gentleman has conferred valued assistance in the revision of the bird report.

Finally, I wish particularly to acknowledge the kind services of my friend, Mr. H. W. Henshaw, in connection with this report. He has revised the nomenclature of the ornithological portion in order to bring it into accord with the Check List of the American Ornithologists' Union, now the standard in this country, and has had editorial supervision of the entire volume.

E. W. NELSON.

SPRINGVILLE, ARIZ., *March* 3, 1886.

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PART I.

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BIRDS OF ALASKA,

WITH A

PARTIAL BIBLIOGRAPHY OF ALASKAN ORNITHOLOGY.

BY

E. W. NELSON.

BIRDS OF ALASKA, WITH A PARTIAL BIBLIOGRAPHY OF ALASKAN ORNITHOLOGY.

INTRODUCTION.

In view of the fact that the author's personal observations covered a large portion of the Territory, this report has been extended to include all the species of birds known to occur within Alaska. In addition to the territory personally visited, as detailed in the accompanying narrative, I received from one of the fur traders, Mr. L. N. McQuesten, about two hundred bird-skins collected along the valley of the Yukon, between the mouth of the Tanana River and the point where the Yukon crosses the British boundary line. By teaching intelligent natives how to prepare bird-skins, I also secured various specimens from the course of the Yukon below the Tanana and from the Kotzebue Sound region. The collection gathered by me amounted in all to over two thousand bird-skins and fifteen hundred eggs. To complete the report I have made free use of the skins contained in the Smithsonian collections, obtained by other collectors in Alaska, and the literature on that region has yielded many notes and facts of interest. The author's aim has been so far as possible to embody herein all of importance that is known concerning the birds of Alaska, but for unavoidable causes he has been compelled to curtail that portion relating to the swimming birds subsequent to the ducks and geese. To explain a lack of information concerning some species found, even in the districts best known to me, I may state that zoological work was done in hours snatched from confining official duties, or when relieved of these for a time by the co-operation of the fur company's agents, who frequently attended to my meteorological work for a day or two at a time in addition to occasional longer periods. An absence on my part, however, always entailed extra work upon my return. The month of June is the most favorable time for ornithological work in the north, but this is the season when our annual mail arrives, and the closing of the official records for the preceding year made it difficult to gain time for outside work.

Between June 17, 1877, and June, 1881, my time was passed at Saint Michaels or in exploring the surrounding region. For the ornithologist this is a rich field, and the varied attractions of sea and shore draw a great variety of species. This abundance of birds, however, is a characteristic feature during summer in high northern latitudes. Nordenskiöld has well remarked that it is not the larger animal forms, such as the seals, whales, and walrus, that first draw the attention of the voyager in Arctic seas, but the innumerable flocks of birds which swarm in the polar latitudes during the long summer day of the north. Around all of the rocky islands of Bering Sea and Straits the auks, gulls, and fulmars fill the air and cover the sea in myriads. This was also the case on Wrangel and Herald Islands, in the Arctic, which are perpetually inclosed by the ice-pack. These islands all reminded me of huge bee hives, only the bees perpetually swarming about them are in the shape of birds. If one stands on the beach under one of the bird cliffs and looks up toward the sky he soon feels giddy, from gazing at the circling throng.

The work of a naturalist in the north is one of almost continual hardship, yet the succession of novel experiences lends a peculiar zest to such a life. Many of the most enjoyable days of my life were passed on expeditions in which it was a constant struggle to obtain the bare necessities

of life. One speedily comes to disregard the discomforts of such a life, and the changing episodes attending each day, together with the strange and often beautiful scenes, are all that linger in his memory. The mysterious beauty thrown over land and sea by the twilight that covers the earth during the short time the sun remains below the horizon in midsummer cannot be described, and at such times the distant note of some restless gull or loon breaks the stillness with an uneasy effect. When camped on the coast in summer I frequently went out during these twilight nights, gun in hand, and wandered about in the deep silence, finding the water-fowl at rest in the hidden pools or on their nests.

The winters are long and severe at Saint Michaels, as they are elsewhere in this region. Spring opens late, and most of the cranes, snipe, geese, and ducks arrive while the ground is still mostly covered with snow and the muddy pools are covered with ice. At this time the birds feed upon the heath-berries, which the frost has preserved since the previous fall.

In 1880 we had cold, wintry weather at Saint Michaels, with scarcely a sign of spring, up to May 18, and only a few stray water-fowl had been seen; on the 18th and 19th, however, the temperature arose to 39° and 43°, and the loud cries of geese and the rolling notes of Sandhill Cranes were heard all about as though the birds had sprung from the ground. This was an unusually late season, since, in 1878, the flight of water-fowl was well under way by May 12, and was nearly over by the 29th. Indeed, by the latter date, many birds had already deposited eggs. The dates for the opening of spring on the coast do not correspond with those of the interior, where, along the Upper Yukon, in 1877, the snow had nearly disappeared by April 20, and ducks and gulls had already arrived. Although the Alaskan coast climate of Bering Sea is so much colder in spring than the climate of the interior, it is much milder than the Siberian coast climate of Bering Sea at that time.

On June 5, 1881, the vegetation about Saint Michaels was well advanced, scarcely a patch of snow was visible, the sea was free of ice, and the water along shore registered 55°. The birds had already nested and many had young.

Two days later, at Plover Bay, on the Siberian shore, and only a few miles further north than Saint Michaels, we found the season nearly a month later. The hills about Plover Bay were still nearly covered with snow banks, the water of the sea stood at 38°, and the inner bays along shore were still covered with ice. Only the hardiest plants had appeared and the birds were just nesting.

A similar difference in climate on the two shores of Bering Sea holds good throughout the summer, and is due, mainly, to the following causes:

Upon the Alaskan coast the sea is very shallow, and enormous quantities of warm, fresh water are discharged into the sea by the Yukon and Kuskoquim Rivers. The warm currents thus produced rot and carry offshore the winter ice, and consequently have a very marked effect on the coast climate. On the other hand, upon the Siberian coast, a deep, cold sea is in direct communication with the Arctic basin, along which the heavy Arctic ice gathers each winter. In addition there are no streams of any size flowing into the sea. These conditions result in a much more limited flora and a smaller number of birds on the Siberian coast of Bering Sea than is found on the opposite American shore. The cold Siberian coast compares favorably, however, in this respect with other Arctic lands. After coasting along all the northern shores of Europe and Siberia, Nordenskjöld writes that he found the birds fewer in number but with a greater variety of species on the Chukchi peninsula than upon Nova Zembla, Spitzbergen, or Greenland.

We must not lose sight of the fact, in this connection, that these last-named lands are Arctic islands, frequented by vast numbers of characteristic Arctic water-fowl, whereas the Chukchi peninsula is a barren portion of a continental mass with only parts of its shores sufficiently rugged to attract the cliff-loving sea-fowl.

From his winter quarters at Tapkan, on the North Siberian coast, about 100 miles north-west of Bering Straits, Nordenskjöld noted *Phyllopusseustes borealis*, *Plectrophenax nivalis*, *Eury-norhynchus pygmaeus*, *Tringa cuneis* (called *T. maritima*), *Crymophilus fulvicarius*, *Chen hyperborea*, *Philacte canayica*, *Clangula hyemalis*, *Somateria spectabilis*, *Somateria v-nigra*, *Euciconetta stelleri*, *Larus glaucus*, *Gavia alba*, *Rissa tridactyla pollicaris*, and *Rhodostethia rosea*, besides several species not named. The Snowy Owl, Raven, and a Ptarmigan were the only birds found wintering there, although the natives told him that the Murre and Black Guillemot winter in the open water off-shore.

By September 28 (1878) most of the birds had left the vicinity of the Vega's quarters there or were seen passing high overhead toward the southern entrance to Bering Straits, on their way south. From that date to October 19 an endless procession of birds moved by on this course, but by November 3 even the gulls became rare. This great flight of birds came from the north-west, toward the New Siberian, Wrangel, and the group of islands discovered by the Jeannette party. A number of species of birds are common to both shores of Bering Straits. Species of circumpolar distribution are, in a number of cases, represented by a dark form on the American continent and a light one on the Old World side, notably the Hawk Owl, Great Gray Owl, and the Rough-legged Hawk.

SIBERIAN, OR OLD WORLD, SPECIES KNOWN TO OCCUR IN ALASKA.

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|--|---|
| 1. <i>Cyanocitta stelleri</i> . | 11. <i>Aegialitis mongola</i> . |
| 2. <i>Saxicola cyanus</i> . | 12. <i>Charadrius dominicus fulvus</i> . |
| 3. <i>Phylloscopus borealis</i> . | 13. <i>Limosa baueri</i> . |
| 4. <i>Parus cinereus oblectus</i> . | 14. <i>Tringa acuminata</i> . |
| 5. <i>Budytes flavus leucostriatus</i> . | 15. <i>Eurynorhynchus pygmaeus</i> . |
| 6. <i>Anthus cervinus</i> . | 16. <i>Tringa ferruginca</i> . |
| 7. <i>Pyrrhula cassinii</i> . | 17. <i>Anas penelope</i> . |
| 8. <i>Utlula cinerea lapponica</i> . | 18. <i>Oidemia fusca</i> . |
| 9. <i>Sturnia ulula</i> . | 19. <i>Larus schistisagus</i> . |
| 10. <i>Archibuteo lagopus</i> . | 20. <i>Fulmarus glacialis glapishca</i> . |

SPECIES FROM THE COASTS AND ISLANDS OF THE PACIFIC.

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|-----------------------------------|-----------------------------------|
| 1. <i>Aphriza virgata</i> . | 3. <i>Numenius tahitiensis</i> . |
| 2. <i>Heteractitis incanous</i> . | 4. <i>Puffinus tenuirostris</i> . |

SPECIES KNOWN TO OCCUR ONLY IN ALASKA.

- | | |
|---|---|
| 1. <i>Parus atricapillus turneri</i> . | 5. <i>Melospiza cinerea</i> . |
| 2. <i>Troglodytes alascensis</i> . | 6. <i>Perisoreus canadensis fumifrons</i> . |
| 3. <i>Leucosticte griseonucha</i> . (This bird occurs also upon the Commander Islands, but its proper position is with the birds of this list.) | 7. <i>Lagopus rupestris nelsoni</i> . |
| 4. <i>Plectrophenax hyperboreus</i> . | 8. <i>Lagopus rupestris athensis</i> . |
| | 9. <i>Tringa ptilocnemis</i> . |
| | 10. <i>Sterna alautica</i> . |
| | 11. <i>Estrelata fisheri</i> . |

SPECIES HAVING THEIR CENTER OF ABUNDANCE WITHIN THE LIMITS OF ALASKA.

[Species having their center of abundance within the limits of Alaska, and upon which, to a great extent, rests the distinctive characteristics of the avifauna of that region. All of the species in this list are known to occur outside the limits of the Territory, and none of them have been named in the preceding lists.]

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|--|---|
| 1. <i>Leucosticte tephrocotis littoralis</i> . | 9. <i>Phalacrocorax pelagicus robustus</i> . |
| 2. <i>Melospiza fasciata rufina</i> . | 10. <i>Rissa brevirostris</i> . |
| 3. <i>Ammodramus sandwichensis</i> . | 11. <i>Verna sabinii</i> . |
| 4. <i>Picoides americanus alascensis</i> . | 12. <i>Fulmarus glacialis rogersii</i> . |
| 5. <i>Grus canadensis</i> . | 13. <i>Urinator adamsii</i> (provisionally in this list). |
| 6. <i>Branta canadensis minima</i> . | 14. <i>Simorhynchus pusillus</i> . |
| 7. <i>Philaeta canagica</i> . | 15. <i>Brachyrhamphus marmoratus</i> . |
| 8. <i>Arctinetta fisheri</i> . | |

Owing to the great extent of Alaska and the diversity of its topographic and climatic features, no generalizations of value can be made concerning the Territory as a whole. For this reason I have subdivided the Territory into its well-marked faunal areas, and have given the salient features of each under the following subdivisions:

GENERAL CHARACTER AND EXTENT OF ALASKA, WITH THE FAUNAL SUBDIVISIONS.

A.—GENERAL NOTES.

On most maps this Territory either occupies a small space by itself in one corner or projects as an insignificant spur from the main continental mass, so that it is difficult to appreciate the great area which it really covers. It extends north and south from Cape Kaigan, latitude $54^{\circ} 42'$, to Point Barrow, $71^{\circ} 27'$; in longitude from near the 140th to the 187th degree west from Greenwich. The limit thus assigned includes the westward extent of the Aleutian Islands and the narrow coast belt forming the southern end of the Territory. The actual land area within the Territory is estimated to be more than 580,000 geographical square miles. For about 2,000 miles its southern coast, including the Aleutian Islands, is washed by the warm current of the North Pacific. North of this nearly all of Bering Sea is inclosed between the Aleutian Islands and the mainland coast to Bering Straits, forming another stretch of coast of nearly 2,000 miles. North of the straits extends the Arctic coast, some 700 miles, to the vicinity of the Mackenzie River delta. The eastern boundary is formed by over one-half of the western side of British America.

This vast area, with its varied seas and great extent of latitude and longitude, also presents a great variety of topographical and other physical features.

As a natural result of the varied climatic and geographical conditions, several distinct faunal areas might be expected to occur. That such exist, and are well defined, I propose to demonstrate below. Commencing at the southern extreme, the districts are discussed in their geographical sequence.

B.—FAUNAL DISTRICTS.

(1) SITKAN DISTRICT.

Although the characteristic faunal and floral forms of this district are mainly those common to the coast regions of British Columbia, Washington, and Oregon, and as such have been grouped in what is termed the Northwest coast fauna, yet in the present connection I have considered it more convenient to distinguish it by the above term.

From the southern extreme of the Territory the main Rocky Mountain chain extends along, and parallel to, the coast, with its westward base reaching to the sea.

Thus extending northward along the coast, the mountains curve about Mount Saint Elias as a center, and thence extend in a westerly course along the peninsula of Alaska, and beyond their scattered elevations form the Aleutian Islands. Very rarely is the crest of the mountains 25 miles from the coast, and it is usually much nearer.

These mountains are very high, with many peaks rising from 10,000 to 15,000 feet, and culminating with Saint Elias, said to be about 19,000 feet above the sea. The western slope of the mountains is very abrupt.

From the west comes the warm water of the northern border of the Japanese current, which, flowing about Kadiak Island, bathes the coast thence east and south. The Sitkan district is strictly limited to the coast directly influenced by this current.

Accompanying this warm current of water is a warm, moisture-laden air current, which, striking the abrupt and rugged slopes bordering the shore, is precipitated in abundant fogs and rainfall, thus producing a climate of the same character and but a little more severe than that of the coast district of British Columbia, Washington, and Oregon. As a consequence the magnificent coniferous forests, which cover the more southern region named, extend in almost unbroken array northward to the vicinity of Sitka; thence northward and westward along the coast of this district the forest continues dense; but some species of trees are missing, while all gradually

diminish in size until they reach their limit on the coast about opposite Kadiak Island. This large island is included within the present district, and forms its western boundary. Strangely enough, although the eastern part of Kadiak is heavily wooded, the western part of the island is destitute of trees. The climate is somewhat drier and the winters colder in the Kadiak portion than elsewhere in the district.

The forests are almost wholly coniferous, and the *Abies sitkensis*, *A. mertensiana*, *A. canadensis*, and *Pinus contorta* are generally distributed and form the great bulk of the trees. In the region about Sitka and southward, the yellow cedar, *Cypripinus nutkatensis*, is a striking and handsome tree of great size, reaching 100 or more feet in height and 5 or 6 feet through at the base.

Taking the climate of Sitka as typical of this district, and bearing in mind that it becomes milder to the south and drier and colder to the north and west, we have, as the results of nearly fifty years' observations by the Russians, the following data: The maximum temperature during this period was + 87°, with a minimum of - 4°, the mean annual temperature being 43°.28. The mean annual rainfall during this period was over 80 inches, with the record for one year reaching 103 inches. The mean annual number of days on which rain and snow fell was 198, and it varies from 190 to 285, according to Mr. W. H. Dall.

To show the seasonal distribution of these factors I subjoin a table giving means for observations taken at Sitka during fourteen years between 1849 and 1862, inclusive:

	Thermometer.	Rainy days.	Rainfall, inches.
	50		
Spring.....	41.3	55	13.995
Summer.....	54.3	66	15.408
Autumn.....	44.2	72	30.814
Winter.....	31.9	57	22.591
Whole year.....	42.8	245	83.33

NOTE.—All of the temperatures in this report are according to Fahrenheit.

The enormous precipitation upon the seaward face of the mountains along this coast has produced a large series of some of the finest glaciers in the world, which extend to the sea in many of the bays. The effect of this damp climate and heavily-wooded region upon the animal life found there is so well known, as illustrated on the coast of Washington and Oregon, that it scarcely needs mention here. All of the colors of the birds and mammals resident here are intensified and are darker than those shown by the same or allied species resident elsewhere. Pale browns become rich rufous, or rusty-red, and grays become dark brown, with corresponding changes in other colors. The red on *Pinicola enucleator* and *Acanthis linaria*, in resident examples, is more intense; enough so to nearly produce recognizable races.

It is a well-known fact to fur traders that the furs of animals killed in this district are much darker or more intensely colored than elsewhere in the Territory. This holds good with both cinnamon and black bears, besides other species.

Sciurus hudsonius douglassi is the most familiar and striking example of this intensity of coloration. *Spermophilus empetra kodiaccensis*, described from Kadiak specimens and not known from other parts of the Territory, has the top of the head and middle of the back a much darker shade of brown than is exhibited by typical *empetra*, which occupies most of the surrounding region. Curiously enough, *kodiaccensis* exhibits, at the same time, a much paler or grayer color on the sides and below than is shown by *empetra*.

Among the birds of this district the effects of climatic influence are even more marked than among the mammals. In the following list are named the species showing this most plainly: *Turdus aonalaschka*, *T. ustulatus*, *Parus rufescens*, *Troglodytes hiemalis pacificus*, *Lewoostie tephrocotis littoralis*, *Melospiza fasciata rufina*, *Passerella iliaca unalaschensis*, *Cyanocitta stelleri*, *Megascops asio kennicottii*, *Bubo virginianus saturatus*, *Accipiter atricapillus striatulus*, *Dendragapus obscurus fuliginosus*, *Bonasa umbellus sabinii*, with *Acanthis linaria* and *Pinicola enucleator*, in which the intensification of color is apparent but not sufficient to warrant separation from the typical form. In addition to the foregoing species the following birds are only found in the Sitka

district, in Alaska, viz: *Corvus caurinus*, *Trochilus rufus*, *Empidonax difficilis*, and *Buteo borealis calurus*. The southern half of this district is occupied by the Thlinket Indians, who are gradually replaced by Eskimo in the western part of the district as the climatic and other conditions of life become more severe.

(2) ALEUTIAN DISTRICT.

Commencing at the Shumagin Islands and the western and southern coast of Alaska Peninsula, this district includes all of the great Aleutian chain of islands extending about 900 miles or more to the westward with the Pribylov, or Fur Seal group, included. These islands extend in a long curve, and divide the waters of the North Pacific from those of Bering Sea. Between the islands a swift tidal current runs back and forth, forming tide-rips about the reefs and islets. The Shumagins and the coast of the peninsula are low, but the general character of the islands is mountainous. The islands are not large as a rule, and the largest two of the group, Unimak and Unalaska, are only about 60 by 30 miles in their greatest extent. The shore line of the islands is much cut up by bays and projecting reefs, and on most of them the mountains begin to rise abruptly from the shore. The flanks of the hills are rolling, and an occasional valley or comparatively level plateau is found. The islands are of volcanic origin, and a number of volcanoes are still slightly active. The highest peaks in these islands are from four to eight thousand feet high.

The islands are entirely destitute of trees, and the only bushes are dwarf willows and a few others, which rarely reach 5 feet in height. The mild damp climate causes a luxuriant growth of grasses, flowering plants, and three or four species of ferns in dry situations along the lower valleys and sheltered places within two or three hundred feet of the sea level. Above this sphagnum mosses and other northern plants begin to predominate, and gradually become more scanty, until, according to Chamisso, the limit of vegetation is reached—2,450 feet above the sea. The snow line is about 3,500 feet above the sea. The climate is mild as compared with other regions in the same latitude, but the almost continuous cloudy or stormy weather and the extremely common occurrence of fierce gales, often accompanied by rain or snow, render the climate one of the most disagreeable in the world. Observations taken by the Russians at Unalaska Island for the five years ending in 1834 give an average annual temperature of 37°.8. The minimum temperature observed during that period was 0°, and 77° the maximum, or a total range of 77°. In 1828 the mean temperatures of the seasons were, spring, 36°.6; summer, 51°.5; autumn, 38°.7; winter, 36°.27. This mild temperature is due to the warm waters of the North Pacific, which inclose the islands at all seasons. Ice never forms except on the inner bays, and even at the Pribylov group sea ice rarely forms; in winter these islands form the southern limit of the ice-pack of Bering Sea, which never comes within sight of the Aleutian chain proper. Upon the Pribylov Island, St. Paul,—12° has been recorded, being the lowest temperature known to the writer as having been observed within the limits of this district.

The perpetual cloudy weather on the islands of this district can be best appreciated by reference to the following table, the result of seven years' observations at Unalaska.

The rainfall in this district has been placed at between 27 and 40 inches, but the high winds prevent a satisfactory determination:

Month.	Days all clear.	Days half clear.	Days all cloudy.	Month.	Days all clear.	Days half clear.	Days all cloudy.
January	11	111	95	July	0	118	99
February	9	86	103	August	5	106	106
March	3	112	102	September	2	107	101
April	4	104	102	October	2	115	100
May	2	105	104	November	2	98	119
June	6	95	109	December	6	116	95

The above table gives a total, in seven years, of 53 clear days, 1,263 partly clear days, and 1,235 totally cloudy days. Snow falls in all but one or two months in the year, but never remains long on the ground within 100 feet of the sea level.

During May and in October, 1881, while the Corwin lay in Unalaska Harbor, about fifty species of flowering plants were observed, mainly distributed among the following genera: *Emp-*

trum, *Vaccinium*, *Bryanthus*, *Pyrola*, *Arctostaphylos*, *Ledum*, *Cassiope*, *Lupinus*, *Geranium*, *Epilobium*, *Silene*, *Draba*, *Saxifraga*. Masses of *Empetrum nigrum*, a *Bryanthus*, and three species of *Vaccinium* tinge parts of the slopes with their colors.

The list of mammals peculiar to or having their center of abundance in this district is a short one, but all are notable species. The Sea Otter (*Enhydra marina*) and the Fur Seal (*Callorhinus ursinus*) are the two most valuable fur-bearing animals in America. The latter, with the Sea Lion (*Eumetopias stelleri*), are eminently characteristic of this district, where their breeding grounds are situated. The birds more or less characteristic of this district are not very numerous, as the bleak and rugged islands, swept by frequent gales and washed by two tempestuous seas, offer few attractions for land birds.

Widely separated from the mainland and surrounded by peculiar climatic conditions we would look for certain modifications of form among the resident land birds. This is the case in every instance, and *Troglodytes alascensis*, *Leucosticte griseonucha*, *Melospiza cinerea*, *Lagopus rupestris nelsoni*, and *Lagopus rupestris atkensis* are all resident and peculiar forms, with *Tringa ptilocnemis* and *Ammodramus sandvicensis*, similarly modified and breeding there, but which are known to winter to the southward.

The sea-fowl surrounding these islands, and having their summer, and sometimes winter, headquarters within the limits of this district, are *Rissa brevirostris*, *Larus schistisagus*, *Brachyrhamphus kittlitzii*, *B. marmoratus*, *Simorhynchus pygmaeus*, *Synthliborhamphus antiquus*, *S. scionizusumae*, *Dionedea albatrus*, *Oceanodroma furcata*, *Fulmarus glacialis rodgersii*, *F. glacialis glapishu*.

All of these water birds are known to extend their breeding range beyond the limits of this district, and *Larus schistisagus*, with *Fulmarus glacialis glapishu*, probably have their center of abundance on the Asiatic coast, but are common in Alaska only in this district.

In examining the land birds of this district, including *Arquatella ptilocnemis*, the most noticeable peculiarity of the insular varieties appears to be a more robust and stouter form as compared with their mainland congeners. There is also a difference in coloration, which is usually darker on the island forms, excepting the races of the Sitkan district. This darkening of the colors of birds on the Aleutian Islands is toward gray shades, in distinction from the rufous exhibited in the Sitkan district. The Aleutian land birds exhibit an increase in the length of the bill without a proportionate thickening of the same. The cause of the more robust physique of the land birds of this district as compared with their mainland relatives appears in the constant struggle for existence they must maintain in a most inclement climate and against the high winds that prevail. As to some extent illustrative of the conditions that attend bird life here I may cite the first view I had of *Troglodytes alascensis*. It was on Akoutan Island, and so fierce a gale was blowing that I had difficulty at times in keeping my feet; yet on the crest of a steep cliff-like slope, in the very teeth of the gale, one of these birds clung securely to a small dwarf willow and sang lustily at short intervals, unmindful of the fierce wind and wintry landscape about him. One of the weaker mainland relatives of this bird, in such a wind, must inevitably have been dashed from his perch and driven far out to sea to perish miserably, as do so many land birds each year.

The aborigines of this district are as characteristic as any of the faunal divisions. The natives are the Aleut branch of the Eskimos and are the most widely differentiated of any branch of that great family.

(3) ALASKAN ARCTIC DISTRICT.

This district covers the treeless coast belt, varying in width from 3 or 4 to 100 miles (except where the trees reach the coast at the head of Norton Sound), which extends from the peninsula of Aliaska through Bering Straits and around the Arctic shore to the mouth of the Mackenzie River, including the islands of Bering Sea and straits north of the Fur Seal group. To set forth the characteristics of this district more clearly, I have grouped the birds under two heads; first, those having their center of abundance and their breeding ground here; and second, those species which are found as stragglers from other regions but occur nowhere else in Alaska, or but rarely outside these limits. The islands of this district are low and rocky, except those in Bering Straits, which are small and rise precipitously from the sea; they are all barren and forbidding in appear-

ance, and their climate is much more severe than on the neighboring mainland. In winter they are surrounded by the pack ice, and the summers are short and cold. Their general characteristics, climate, and bird fauna really belong rather with the adjacent Siberian shore than the American.

The belt bordering the Alaskan coast of Bering Sea belonging to this district is mainly low, and much of it consists of broad marshy tracts but little above sea level. At intervals rise low mountainous masses a few hundred feet high, producing bald headlands when they occur on the coast. Near Bering Straits the coast becomes more uniformly hilly. The country between the mouths of the Yukon and Kuskosquim Rivers is the breeding resort of great numbers of water-fowl.

All of this district bordering on Bering Sea is barren of trees, but along the courses of the rivers and in sheltered spots on southern slopes of hills a more or less abundant growth of willows and alders is found, which reach 8 or 10 feet in height in the Yukon delta. Bushes are also large and plentiful about the head of Kotzebue Sound, but are more and more dwarfed and scattering north of this point.

The coast country south of Bering Straits is mainly rolling and covered with a mat of vegetation consisting of a bed of sphagnum mosses, interspersed and overgrown with various grasses and flowering plants. The low country near the Yukon mouth is cut up by tide creeks, lagoons, ponds, and small water-courses.

The bottom of the sea all along this part of the coast slopes very gradually from the shore, and is constantly being brought nearer the surface by the vast deposit of mud brought down each year by the Yukon and Kuskosquim Rivers. In consequence of the shallow sea and the enormous amount of warm fresh water poured from the rivers during the summer, the climate of the Bering Sea coast and Kotzebue Sound portions of this district is rendered much milder at this season than it would be otherwise. The shallow water, its warmth, and the amount of sedimentary matter contained in it, render these portions of Bering Sea and the Arctic Ocean unfitted for the swarms of small marine crustacea and other animals which fill the water of the clear, cold, and deep parts of the Arctic basins. This reacts upon the animal life, and various anks, fulmars, and whales that abound in the deep cold water of the Siberian coast of Bering Sea, and thence north in the Arctic Ocean, are rarely seen on the American coast of Bering Sea or Kotzebue Sound. The portion of this district lying north of Bering Straits, excepting the country about the head of Kotzebue Sound, is essentially Arctic in all of its features.

South of Bering Straits the coast country is more sub-Arctic in its general character, but to the north the results of a rigorous Arctic climate appear in both plant and animal life. The surface of the country in this part of the district is low and broken over much of its extent by rounded hills rising into low mountains in parts. The immediate coast line is low and barren, broken in places by bluffs and rocky promontories, the shingly beaches are backed in many places by lagoons, the rolling tundra extending inland and covered with a layer of moss and other Arctic vegetation. From 50 to 100 miles inland, low, straggling belts of spruces commence to appear along the water-courses.

South of Cape Lisburne the summer climate is mild and rather pleasant, but north of this raw, cold storms of rain, sleet, or fog are common. Along the coast of Bering Sea and Kotzebue Sound the sea is free of ice from June until October, but north of this it is subject to being covered at any time with drifting pack-ice, or it is open according to the force and direction of the prevailing wind. In winter, however, open water is rarely found along shore.

This entire district is underlaid by a layer of permanently frozen soil commencing near the surface and becoming deeper the higher the latitude. At Saint Michaels a shaft 30 feet deep failed to penetrate below this frozen soil. Over much of this district, except along the most exposed parts of the northern coast, a plentiful Arctic vegetation is found, and about the coast of Norton and Kotzebue Sounds grasses grow rankly—waist-high in places. Of course various mosses and other cryptogamic plants common to Arctic latitudes are found in abundance everywhere.

Saint Michaels, on the shore of Norton Sound, has a climate typical of this district, and below I give the results of four years' observations taken by myself at that point. During the seven years

preceding June, 1881, the temperature ranged from $+76^{\circ}$ to -55° , a total of 131° , with an annual average range for the four years preceding June, 1881, of $116^{\circ}.2$. For this latter period the average monthly temperatures were as follows:

Average monthly temperatures for the four years preceding June, 1881, at Saint Michaels.

Month.	Temperature.	Month.	Temperature.
January	-5	July	5
February	-6.5	August	53.1
March	9.5	September	43.3
April	22.1	October	28.0
May	32.8	November	18.3
June	45.2	December	8.9

The mean annual temperature is $25^{\circ}.5$. There are but two seasons in this district, a long cold winter, during which the sea is frozen over completely for many miles from shore, and a short summer.

As soon as the warm days begin in May the hardier plants begin to spring up, and a week of warm weather the first of June shades the hill-sides with green in sunny spots. A little later and the hills are covered with flowers.

The general arrival of birds is from May 15 to 25 in ordinary seasons. The land birds begin to move south by the end of July. The first geese arrive at Saint Michaels the last of April and the Barn Swallow about May 20. The last of September only a few water-fowl remain and by the middle of October the sea is freezing over. From the first to the middle of June each year the sea ice breaks up and is blown offshore. Snow lies on the ground from the first of October until the middle or last of May. The average annual rainfall is 18.36 inches. The following table shows the character of the weather for the four years already mentioned:

Months.	Days totally cloudy.	Days partly cloudy.	Days clear.	Months.	Days totally cloudy.	Days partly cloudy.	Days clear.
January	11.5	13.2	6.2	August	21.0	8.0	2.0
February	6.7	9.0	12.5	September	26.0	8.0	2.0
March	9.2	13.5	8.0	October	18.2	11.2	.5
April	18.2	8.0	3.7	November	13.7	13.0	3.2
May	17.5	11.5	2.0	December	9.7	13.7	7.5
June	16.0	12.2	1.71	Total	182.2	131.5	55.5
July	19.5	10.2	1.2				

From the northern portion of this district the only meteorological record we have is that of the Point Barrow Expedition.

As these observations were taken at the extreme northern portion of the district, I append a brief summary of them for the purpose of comparing the climatic conditions there with those of the southern portion of the same district. Although considerably farther north than Saint Michaels, and on the shore of the Arctic Ocean, yet there is comparatively little difference. Summer opens at about the same time at both points. The first bird arrivals occur at both localities in April, and by the end of May the migration is about over and birds have begun to nest.

The range of the thermometer during twenty-two months at Point Barrow was from $65^{\circ}.5$ to $-52^{\circ}.6$ or a total of $118^{\circ}+$. For 1882 the average monthly temperatures were as follows: January, $-15^{\circ}.49$; February, $-23^{\circ}.6$; March, $-4^{\circ}.55$; April, $-1^{\circ}.36$; May, $21^{\circ}.99$; June, $34^{\circ}.52$; July, $43^{\circ}.21$; August, $37^{\circ}.86$; September, $31^{\circ}.46$; October, $8^{\circ}.77$; November, $-7^{\circ}.12$; December, $-17^{\circ}.10$, with an average of $+8^{\circ}.83$ for the year.

The rainfall and melted snow amounted to 8.01 inches during this same year.

LIST OF THE MOST PROMINENT SPECIES OF PLANTS IN BLOSSOM OR WELL ADVANCED IN THE VICINITY OF SAINT MICHAELS IN JUNE, 1861.

<i>Linnaea borealis.</i>	<i>Oxytropis podocarpa.</i>
<i>Cassiopea tetragona.</i>	<i>Astragalus alpinus.</i>
<i>Andromeda polifolia.</i>	<i>Astragalus frigidus littoralis.</i>
<i>Loiselcuria procumbens.</i>	<i>Lathyrus maritimus.</i>
<i>Vaccinium vitis-idaea.</i>	<i>Arenaria lateriflora.</i>
<i>Arctostaphylos alpina.</i>	<i>Stellaria longipes.</i>
<i>Leclum palustre.</i>	<i>Silene acaulis.</i>
<i>Nardosmia frigida.</i>	<i>Saxifraga nivalis.</i>
<i>Saussurea alpina.</i>	<i>Saxifraga hircacifolia.</i>
<i>Senecio frigidus.</i>	<i>Anemone narcissiflora.</i>
<i>Senecio palustris.</i>	<i>Anemone parviflora.</i>
<i>Arnica angustifolia.</i>	<i>Caltha palustris asarifolia.</i>
<i>Artemisia arctica.</i>	<i>Valeriana capitata.</i>
<i>Matricaria inodora.</i>	<i>Lloydia serotina.</i>
<i>Rubus chamaemorus.</i>	<i>Tofieldia coccinea.</i>
<i>Rubus arcticus.</i>	<i>Armeria vulgaris.</i>
<i>Potentilla nivea.</i>	<i>Corydalis pauciflora.</i>
<i>Dryas octopetala.</i>	<i>Pinguicula villosa.</i>
<i>Draba alpina.</i>	<i>Mertensia paniculata.</i>
<i>Draba incana.</i>	<i>Polygonum alpinum.</i>
<i>Eutrema arenicola.</i>	<i>Epilobium latifolium.</i>
<i>Pedicularis svedetica.</i>	<i>Betula nana.</i>
<i>Pedicularis euphrasioides.</i>	<i>Alnus viridis.</i>
<i>Pedicularis langsdorffi lanata.</i>	<i>Eriophorum capitatum.</i>
<i>Carex laponica.</i>	<i>Carex vulgaris alpina.</i>
<i>Polemoium caeruleum.</i>	<i>Aspidium fragrans.</i>
<i>Primula borealis.</i>	<i>Woodsia ilrensis.</i>

Besides several small species of *Salix*, *Iris sibirica*, and others.

At the same season the following additional species were found on the shores of Golovina Bay:

<i>Spiraea betulifolia.</i>	<i>Gentiana glauca.</i>
<i>Trientalis europæa arctica.</i>	<i>Elymus arenarius.</i>
<i>Chrysanthemum arcticum.</i>	<i>Poa trivialis.</i>
<i>Artemisia vulgaris tilesii.</i>	<i>Carex vesicaria alpina.</i>
<i>Arenaria peploides.</i>	<i>Aspidium spinulosum.</i>

We landed from the Corwin at Cape Thompson, midway between Bering Straits and Point Barrow, on July 19, 1881, and found near the shore there a series of warm, sheltered little valleys and slopes. These were well drained and covered with a profusion of flowers. Within a mile of our landing-place we secured the following species:

<i>Phlox sibirica.</i>	<i>Ranunculus affinis.</i>
<i>Polemonium humile.</i>	<i>Caltha asarifolia.</i>
<i>Polemonium caeruleum.</i>	<i>Gewn glaciale.</i>
<i>Myosotis sylvatica alpestris.</i>	<i>Dryas octopetala.</i>
<i>Eritrichium nanum arctioides.</i>	<i>Polygonum bistorta.</i>
<i>Dodecatheon meadia frigidum.</i>	<i>Rumex crispus.</i>
<i>Androsace chamaejasme.</i>	<i>Boykinia richardsonii.</i>
<i>Anemone narcissiflora.</i>	<i>Saxifraga trienspidata.</i>
<i>Anemone multifida.</i>	<i>Saxifraga cernua.</i>
<i>Anemone parviflora.</i>	<i>Saxifraga flagellaris.</i>

Saxifraga divarica.
Saxifraga punctata.
Saxifraga nivalis.
Nardosmia frigida.
Erigeron muirii.
Taraxacum palustre.
Scenecio frigidus.
Artemisia tomentosa and *glomerata.*
Potentilla biflora.
Potentilla nivea.
Draba stellata nivalis.
Draba incana.
Cardamine pratensis.
Cheiranthus pygmaeus.
Parrya nudicaulis aspera.
Hedysarum boreale.
Oxytropis podocarpa.
Cerastium alpinum behringianum.

Silene acaulis.
Arenaria verna rubella.
Arenaria arctica.
Stellaria longipes.
Pedicularis capitata.
Papaver nudicaule.
Epilobium latifolium.
Cassiope tetragona.
Vaccinium uliginosum mucronatum.
Vaccinium citis-idea.
Salix polaris and two other undetermined willows.
Festuca sativa.
Glyceria — sp.
Trisetum subspicatum molle.
Carex variflora.
Carex vulgaris alpina.
Cystopteris fragilis.

About 100 miles further north on the coast, east of Cape Lisburne, although we had more time on shore, we found the flora much poorer than at Cape Thompson, and only secured the following species:

Lychnis apetal.
Androsace chamaejasme.
Geum glaciale.
Potentilla nivea.
Potentilla biflora.
Phlox sibirica.
Prinula borealis.
Anemone narcissiflora var.

Oxytropis campestris.
Erigeron uniflorus.
Artemisia glomerata.
Saxifraga eschscholtzii.
Saxifraga flagellaris.
Chrysosplenium alternifolium.
Draba hirta.

It should be stated that the plants taken during the cruise of the *Corwin* were identified by Prof. Asa Gray, so that the species named are well authenticated.

LIST OF BIRDS CHARACTERISTIC OF THIS DISTRICT.

Budytes flava leucostrigatus.
Plectrophenax hyperboreus.
Nyctea nyctea.
Grus canadensis.
Limosa uropygialis.
Tryngites rufescens.
Philactes canagica.
Branta canadensis minima.
Branta canadensis hutchinsii.
Branta nigricans.
Arctonetta fischeri.
Arctonetta stelleri.

Somateria spectabilis.
Somateria v-nigra.
Larus glaucus.
Larus nelsoni.
Larus brachyrhynchus.
Gavia alba.
Xema sabinii.
Rhodostethia rosea.
Sterna aleutica.
Stercorarius parasiticus.
Stercorarius longicaudus.
Urinator adamsii.

These species are all more numerous within the limits of this district than elsewhere in the Territory, and with very few exceptions their breeding ground and center of abundance is found somewhere within its limits.

In addition to the species of birds already named as characteristic of this area, a number of other species occur there during the latter part of summer, but are not known to breed within its limits.

Since these species are unknown, or are much rarer elsewhere in the Territory, they become characteristic of this district. They are as follows:

<i>Cyanecula suecica.</i>	<i>Tringa acuminata.</i>
<i>Phylloscopus borealis.</i>	<i>Egialitis mongola.</i>
<i>Charadrius dominicus fulvus.</i>	<i>Euryorhynchus pygmaeus.</i>
<i>Tringa couesi.</i>	

The characteristic mammals of this faunal area are—

<i>Ursus maritimus.</i>	<i>Rangifer tarandus groenlandicus.</i>
<i>Vulpes lagopus.</i>	<i>Odobanus obesus.</i>
<i>Myodes obensis.</i>	<i>Histiophoca fasciata.</i>
<i>Cuniculus torquatus.</i>	<i>Monodon monoceros.</i>

The people of this district are typical Eskimo, much more closely related to the Greenlanders than to their Alentian neighbors, although belonging to the same family.

(4) ALASKAN-CANADIAN DISTRICT.

This district is coincident with the distribution of timber on the Alaskan mainland north of the mountains bordering the south coast (the Alaskan Range).

Its southern point is near the head of Bristol Bay, in about latitude 53°, and its northern limit is about 69°, where the tree limit is reached.

Upon the south, as already noted, lie the Alaskan Mountains; the entire western and northern boundary is the inland border of the treeless belt of tundra which skirts the coast. In two places this district approaches the coast, first, at the head of Norton Sound, and next, at the head of Kotzebue Sound. The treeless coast belt gradually increases in width to the north until it becomes, in places, 100 miles wide.

On the east this district merges into other faunal areas in British America. In its southern half the country is mountainous, but the mountains become fewer and lower to the north, until the low, rolling plain bordering the coast is reached. The district lies almost wholly within the drainage basin of the Yukon and Kuskokwim Rivers, except its northern portion, which is drained into Kotzebue Sound and the Arctic by several small rivers. The greater portion of this region is covered with trees, but numerous tracts of open tundra and marshy plains like those near the sea-coast are found throughout its extent, and under much of it is a substratum of permanently frozen earth. This latter is less widespread and deep than it is on the coast. The White Spruce (*Abies alba*) is the most abundant tree, becoming dwarfed near the coast and at a few hundred feet elevation, but along the course of the Yukon it sometimes attains a height of 100 feet and measures 3 feet at the butt. It is ordinarily about one-half this size or less.

The birch (*Betula glandulosa*) reaches from 30 to 50 feet in height, and is sometimes 2 feet in diameter, but is usually very much smaller.

The poplars (*Populus balsamifera* and *P. tremuloides*) are abundant in lower parts of the river valleys, and the former species is particularly common on the sandy islands in the rivers. Several species of alders, including *Alnus viridis*, *A. incana*, and *A. rubra*, attain the size of trees; another birch (*Betula nana*) and several large willows (some of these growing 50 or 60 feet high), with the alders, are very plentiful along the streams. A small larch (*Larix* — sp.?) is found scattered over some of the partly-wooded uplands. From the accounts of the fur traders I am inclined to believe that other species of trees are found, but I cannot name them. All over this district a luxuriant growth of grasses and flowering plants covers the soil. In the bogs and other suitable places on the open barrens occur large areas of sphagnum mosses and an accompanying Arctic vegetation. We have few records of the climate from within this district, but all agree in crediting it with a dry and hot summer, much pleasant weather, and not uncommon thunder-showers at that season. The winters, on the other hand, are very severe. From 6 to 10 feet of snow falls, and the temperature frequently ranges to the vicinity of -60°.

Four fur traders living at Fort Yukon in 1875 or 1876 told me that the weather was intensely cold there for two months, and that for six weeks a small bottle of mercury hanging on a projecting log at the corner of the cabin was frozen solid most of the time. Mr. W. H. Dall once saw the thermometer standing at $+112^{\circ}$ at Fort Yukon in summer. From this same explorer I quote the following average temperatures for Nulato and Fort Yukon. Both these stations are in the midst of this district, and Fort Yukon lies under the Arctic Circle:

Mean temperatures.	Nulato.	Fort Yukon.
	°	°
Spring	+29.3	+14.22
Summer	+60.0?	+59.67
Autumn	+36.0?	+27.57
Winter	-14.0	-23.80

In a brief meteorological record kept for me in 1880-'81 at Fort Reliance (the point where the Yukon crosses the British boundary line), by Mr. L. N. McQuesten, I find the lowest winter temperatures were -63° and -67° on the 19th and 20th of November, 1880, but the thermometer recorded -50° and lower several times afterwards during that season, with long periods of minus temperatures. On May 16, 1881, the temperature arose to $+58^{\circ}$ and the ice in the Yukon broke up and began to move down.

Among other plants recorded from the Yukon by Dall are mentioned red and black currants, gooseberries, cranberries, raspberries, thimbleberries, salmon-berries, killikiniik berries, blueberries, bearberries, twinberries, dewberries, service-berries, mossberries, and the fruit of *Rosa cinnamomea*; certainly an abundance of small fruits.

The species of birds and mammals found in this district, and distinguishing it from the other faunal areas of Alaska, are numerous.

The mammals having their Alaskan center of abundance here and occurring rarely or very much less numerously elsewhere in Alaska are—

Lynx canadensis.

Canis occidentalis (the black variety).

Vulpes fulvus argentatus (Black Fox).

Mustela americana.

Gulo luscus.

Lutra canadensis.

Ursus horribilis.

Ursus richardsoni.

Ursus americanus.

Sciurus hudsonius.

Arctomys pruinosus.

Castor canadensis.

Synaptomys cooperi.

Erethizon dorsatus epixanthus.

Lepus americanus americanus.

Lagomys princeps.

Alces americana.

Tamias tarandus (a large dark variety).

Oris montana dalli.

Among birds, the following species appear to have their center of abundance in this district:

Parus cinctus obtectus.

Parus atricapillus turneri.

Parus hudsonius.

Perisoreus canadensis fumifrons.

Picoides americanus alascensis.

The birds common in other parts of the north, but not found in the other districts of Alaska:

Turdus alicia.

Merula migratoria.

Cinclus mexicana.

Helminthophaga celata.

Dendroica coronata.

Dendroica striata.

Sciurus noreboracensis.

Ampelis garrulus.

Clivicola riparia.

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Loxia curvirostra minor.

Loxia leucoptera.

Zonotrichia intermedia.

Junco hyemalis.

Passerella iliaca.

Pica pica hudsonica.

Perisoreus canadensis.

Sayornis saya.

Contopus borealis.

Dryobates villosus leucomelas.
Dryobates pubescens.
Colaptes auratus.
Ceryle alcyon.
Ulula cinerea.
Nyctala teugmatmi richardsoni.
Bubo virginianus subarcticus.
Surnia ulula caparoch.
Falco columbarius.
Falco islandus.
Dendragapus canadensis.

Bonasa umbellus umbelloides.
Pediocates phasianellus.
Totanus melanoleucus.
Totanus flaviceps.
Totanus solitarius.
Bartramia longicauda.
Fulica americana.
Olor buccinator.
Bernicla canadensis.
Larus philadelphia.

In addition to these characteristic species are a number of intrusive forms not sufficiently characteristic of this area to be classed other than as casuals. These are—

Hesperocichla nevada.
Pyrrhula cassini.
Zonotrichia coronata.

Junco hyemalis oregonus.
Bubo virginianus saturatus.

No doubt there are a number of others along the southern border.

The Rocky Mountain Goat (*Aploccrus montanus*) is numerous in the Alaskan Range near its southern border, but as its habitat lies between two of the faunal areas it cannot be classed justly with either. In this district, as will be noted, occurs a curious blending of the faunas of the Canadian and Hudson Bay districts with those of the west coast and the extreme north. In outlining the faunal areas here I have laid particular stress on the mammals and birds, but I may mention the fact that each district, as outlined, has certain essentially characteristic species of fishes; some butterflies also occur only in certain areas. In the coast districts, no doubt, other peculiar species of the lower forms of animal life will be found limited to or characteristic of the faunal areas as I have defined them.

BIRDS OF ALASKA.

COLYMBUS HOLBELLII (Reinh.). Holbøll's Grebe (Esk. *E-tū-tā-tūk*).

This species was not uncommon along the coast of Norton Sound in the fall, and a few isolated pairs nested each summer in the marshes. Along the course of the Yukon they are much more common, and breed in considerable numbers. They were taken also at Sitka by Bischoff, and they breed north to Kotzebue Sound at least. Selawik Lake, at the head of the sound just named, is the point of greatest abundance there. It is a rare straggler to the Commander Islands. In the vicinity of Saint Michaels they occur in fall from the end of August to the middle of October. In spring the species was first seen in June. Eggs from the Yukon measure from 2.10 to 2.35 in length by 1.25 to 1.45 in breadth, with the usual elongated form. The colors of bill and feet vary somewhat. Specimens taken the middle of October had the upper mandible greenish-black, the lower greenish-yellow; the legs and feet black on the outer side, and dull greenish-yellow on the inside; the toe-webs orange-yellow. Others taken the same season had the outside of feet and legs blackish; the inside of same of a more or less bright orange-yellow; greater part of lower mandible orange yellow, changing to greenish yellow on lower edge of upper mandible, and then to greenish-black along upper half of the same. Iris always bright yellow. The specimen of Grebe taken at Unalaska on December 14 and cited by Mr. Dall as *P. cooperi* is probably a young bird of this species.

The only specimen of Grebe taken upon the Fur Seal Islands by Mr. Elliott and identified by Dr. Cones as the true *grisigena* is really an immature specimen of the present species.

COLYMBUS AURITUS Linn. Horned Grebe (Esk. *E-tā-tā-tūk*).

Like the preceding bird this handsome species occurs along the eastern shore of Bering Sea in very small numbers during the breeding season, but is not rare in autumn.

It is also a common summer resident along the Yukon. It occurs rarely on the Commander Islands. One skin was secured for me at Fort Reliance, on May 14, and others were taken the same month lower down the river. The last ones were seen along the coast of Norton Sound the middle of October. At Nulato they were taken by Dall the last of May, and in June he secured a parent bird and two eggs from an Indian at Fort Yukon. The eyes of the specimens taken at Nulato contained the following brilliant colors: The ball of the eye white, a bright scarlet areola around the outer edge of the iris, which latter is defined by a white line. The iris proper is bright crimson, with its inner edge brilliant white shaded with pink. The pupil consists of a central black spot, with a broad ring of dark purple. In the National Museum collection is a skin of this bird taken at Sitka in the winter of 1882.

URINATOR IMBER (Gunn.). Loon (Esk. *Tā-hlī-j-ū-nūk*).

This Loon is less common on the shore of Bering Sea than either the Red or the Black-throated species, but it is far from rare at most places. They usually began to arrive about the shore of Norton Sound immediately after the ponds and marshy streams opened in spring, from the middle to 25th of May, and some passed still further north, while others remained to breed in the vicinity.

Their eggs are deposited on some islet in a secluded pond, and the young are led to a stream or to the coast as soon as they are able to follow the parent. In autumn the larger streams and bodies of water are their resorts, and they are rarely seen after the first of October. The skins of this bird are used by the natives in their bird-skin clothing, and are especially prized for tool-bags. The skin is removed, and the holes left by cutting off the head, wings, and legs are sewed up, and a slit made down the back as a mouth to the bag thus formed. The border of this orifice is commonly edged with a band of seal-skin provided with holes, by means of which the mouth is laced together.

Throughout the interior of the Territory this bird is a common summer resident, and was found breeding abundantly at the western extremity of the Aleutian Islands by Dall. As the same author found one in the eastern end of the chain on September 2 it may be safely asserted that the species is found throughout the chain. The Eskimo brought me a number of skins from Kotzebue Sound and Selawik Lake, and their skins were found among the natives wherever I went, so that their distribution may be given as covering the entire Territory.

URINATOR ADAMSI (Gray). Yellow-billed Loon.

This fine species, the largest and least known of the Loons, is a not rare summer resident in certain localities about the head of Kotzebue Sound. At Point Barrow this species is rather common: Mr. Murdoch states that they were not often noticed during the season of 1882, but in 1883 they were fairly abundant. They were first seen by him the last of May and first of June in the open "lead" offshore and flying thence inland. Later in the season they were found about openings in the ice along shore and in the adjacent lagoons, moving offshore, however, with the ice. These birds were generally silent, but he noted that their "laugh" was harsher than that of the Great Northern Loon. On the Commander Islands Stejneger took one specimen and saw another.

During my residence at Saint Michaels specimens were brought me by the Eskimo from there, and parts of the skins of quite a number of others were seen or obtained from the same region. All the natives from there seemed to be perfectly familiar with the bird, and assured me that they nest every summer in about equal numbers with *torquatus*, even outnumbering the latter in some places. Selawik Lake and the Kunguk River were the places that all seemed to claim as the points of greatest abundance. The shore of Norton Bay is a breeding ground for a few pairs, as is the low coast of Bering Straits from Golovina Bay to Port Clarence. During a sledge journey along this coast fragments of the skin were seen, usually comprising the skin of the neck divided and with the beak in front, and thus fastened as a fillet about the head, the long white beak projecting from the wearer's brow. Fillets made of this bird's skin in the same manner are commonly used by the natives of the coast just named and about Kotzebue Sound. They are worn during certain religious dances held in winter, and are esteemed highly by the natives from some occult power they are supposed to possess. On October 14 the only specimen secured by me at Saint Michaels was brought in by a native. It was in company with a mate, but the latter escaped. It measured 30 inches in length by 55 inches in extent, and had a dark hazel iris. The type of this species was secured on the Alaskan side of Bering Straits by Dr. Adams, of the British Navy, during the search for Sir John Franklin, and since that time, beyond the fact that the bird ranges over most of the northern circumpolar mainlands, little has been added to its history. From the comparisons I have made between my Alaskan specimens of *adamsii* and *imber*, the decision of Mr. Ridgway in recognizing the specific rank of the former appears to be justified. This species was first described in the Proceedings of the Zoological Society of London for 1859, on page 167.

URINATOR ARCTICUS (Linn.) Black-throated Loon (Esk. *Tūn-ū-chlik*).

This Loon is very common all along the American shore of the sea and about Kotzebue Sound. They are also numerous on the large streams and marshes of the interior, and their eggs have been taken at Fort Yukon. While Mr. Elliott resided upon the Fur Sea Islands a single specimen of this bird was found dead upon the beach by the natives, who were not familiar with the species. The skins of these birds, as of other heavily-plumaged water-fowl, are much used by the natives

from Saint Michaels south for clothing. The natives snare and spear them in the shallow ponds and lagoons where they breed, and Dall mentions having seen one dress containing the skins from over one hundred loons' throats.

In spring the Black-throated Loons arrive rather late, coming to the vicinity of the Yukon mouth from the 15th to 25th of May. They appear singly, and are soon after found scattered in pairs among the numberless ponds on the marshes along the coast. The eggs are usually placed on some small islet in a secluded pond. There is no attempt to make a nest, and frequently the eggs lie in a spot washed by water when the wind blows from the right quarter. In spite of this, however, the young are duly hatched, and by the 1st of July may be found swimming about with their parents.

When the young can follow their parents all pass to the coast, and during calm, pleasant weather, the last of July and in August, they are very common in all the shallow bays along shore. On one occasion downy young, not over one-fourth grown, were found on August 30. They were in a pond over 2 miles from any place where fish could be found, so that the parents must have flown 4 miles at least for each fish taken to them. One of the young birds had a half-digested tomcod about 6 inches long in its gullet, and one of the parents was seen coming in from the sea-coast 5 or 6 miles away with a fish of the same size crosswise in its beak. On one occasion I came suddenly upon one of these birds in a small pool, and the bird seeming to appreciate the uselessness of trying to dive, tried to take wing, but fell upon the grass only a few feet from the water. Hoping to capture the bird alive, I pursued it at full speed as it progressed toward a neighboring pond. The bird advanced by raising the fore part of the body by pressing downward with the wing-tips, and at the same time, by an impetus of wings and legs, threw the body forward in a series of leaps. In spite of my efforts, the bird distanced me in a race of about 30 or 40 yards, and launched into a larger pond.

After the 15th or 20th of September very few of these birds are found, but whether they migrate by way of the Yukon Valley and south through the interior, or down the west coast, is not known.

The eggs are dark olive, blotched with black spots, which are generally confluent at the larger end. Very frequently the spots are crowded into a black patch at the very apex of the larger end. They are generally of an elongated shape, but occasionally are somewhat oval. Extremes in size are 3.08 by 1.95 and 2.75 by 1.76.

URINATOR PACIFICUS (LAWR.). Pacific Loon (Esk. *E-tån-û-chîik*).

This Loon is very common at Point Barrow, according to Murdoch, where it was the only Black-throated species found by him. They arrive early in June and leave the end of September. It also breeds commonly on the Near Islands, according to Turner. Its habitat is limited to the North-west Pacific, where it appears to be generally common. It occurs as far south in winter as Cape Saint Lucas and Gualalupe Island.

URINATOR LUMME (GUNN.). Red-throated Loon (Esk. *Kûkk-khò-pé-yûk*).

Throughout Alaska the present bird is by far the most abundant species of Loon.

At Saint Michaels and the Yukon delta they arrive with the first open water from May 12 to 20, and by the end of this month are present in large numbers. Their arrival is at once announced by the hoarse, grating cries, which the birds utter as they fly from place to place or float upon the water. When the ponds are open on the marshes the Red-throated Loons take possession, and are extremely noisy all through the first part of summer. The harsh gr-r-gâ gr-r, gr-r-gâ, gâ, gr-r, rising everywhere from the marshes during the entire twenty-four hours, renders this note one of the most characteristic that greets the ear in spring in these northern wilds.

The Russian name *gégara*, derived from the bird's notes, is a very appropriate one.

From the first of June until the first of July fresh eggs may be found. The nesting-site chosen are identical with those of the Black-throated species. Like the latter species, also, the eggs, two in number, are laid directly upon the ground, and the spot chosen is frequently wet and muddy. One nest was found on frozen ground, and ice was floating in the pond. The young are led to the streams, large lakes, or sea-coast as soon as they are able to follow the parents, and they fall easy victims to the hunter until, with the growth of the quill-feathers, they attain some of the wisdom of their parents.

The end of August sees all upon the wing, except now and then a late bird, and from September 15 to 30 they gradually become more and more scarce, until only a very few can be found the first of October. The habits of this species and the Black-throated Loon are very similar in the north, and both agree in being far less shy than when in their winter homes.

The Red-throated Loon is one of the very few birds which raises its voice in the quiet of the short Arctic night. In spring, with cranes, they foretell an approaching storm by the increased repetition and vehemence of their cries.

At Anchitka, on the western end of the Aleutian chain, Dall found these birds breeding abundantly. A female surprised with a young one in a small pool sank slowly until only her neck remained in view, and the chick at once took position on the parent's back.

The species breeds at Point Barrow, where Murdoch found it common. It is also numerous and breeds upon the Commander Islands.

LUNDA CIRRHATA Pall. Tufted Puffin (Esk. *Kē-lāng ūk*).

This species has the same distribution as the next one, but is found in very small numbers as compared with the host of the other species. Their habits and migrations are also the same. A few individuals were seen at Cape Lisburne and Kotzebue Sound, in the Arctic, and they are known from there south to the Californian coast. In the Aleutian Islands they are much more numerous than farther north, but they are rather common in Norton Sound. It breeds abundantly on the Near Islands, where it does not winter. They are extremely abundant about the Commander Islands, where the natives capture them in hand-nets. The skins of both this and the following species are used by the Eskimo of the coast and islands for clothing, and the silky tufts of cirrhata are sewed into ornamental work by the Aleuts.

This bird lays a single rough grayish-white egg, measuring about 2.80 or 2.85 by 1.90 or 1.95.

The egg is usually laid in a small depression in the damp earth at the bottom of a crevice in the rocks. The young when taken in hand try to bite, and peep loudly. When kept together in a box I found the young birds, over half grown, very quarrelsome, and they were also voracious eaters. The two largest ones were continually quarreling, and seizing each other by the beak they would pull and tumble about until separated. Two young birds soon became very tame and enjoyed petting, but a half-grown *corniculata* always remained vicious. The last survivor of this party was a half-grown *cirrhata*, which I kept as a pet in one corner of my room in a box open at the top.

This bird never liked to be handled, but enjoyed being near me, and would follow me from one room to the other with the most absurd expression of gravity. At daybreak each morning "Dick" would climb out of his box and come into my room and stand in front of my bed, looking up first with one eye and then the other; if no notice was taken he would soon compose himself to sleep until I got up and gave him his breakfast.

In December the bird was not over two-thirds grown and still wore its first plumage, while its bill was still without a sign of its proper spring-form. "Dick" was given in charge of a native during my temporary absence, and before my return was killed by a dog.

A young bird taken at sea by an Eskimo on October 10 still had down attached to the feathers. The feet and legs of this bird were dingy olive, the bill blackish at base, changing to dull yellowish on the outer two-thirds, with an underlying orange shade. Iris, dark hazel. The basal third of the bill is sheathed in a leathery membrane, which marks the portion which is moulted by the adults.

For a detailed account of the bill moult of this species see Stejneger (*loc. cit.*).

FRATERCULA CORNICULATA (Naum.). Horned Puffin (Esk. *Kū tūkk-pūk*).

From Cape Lisburne, on the Arctic coast, to the southern point of the Alaskan shore, including all the islands of Bering Sea and other adjacent waters, the presence of rugged cliffs, or rocky slopes from the sea, are enough to attract numbers of this odd bird to breed in the shelter thus afforded. They breed abundantly on the Near Islands, but are not resident there. They are resident

from the Aleutian chain south, but are summer residents thence north. They are equally abundant along both shores of Bering Sea, and south they are found on the coast of California and that of Japan. They also occur on the Commander Islands. Thousands of them breed on every rocky island, and whenever a vessel nears land in this region the clumsy form of the Puffin soon becomes a familiar sight. Sheltered fjord-like bays or the surf-washed shores of exposed islands are equally chosen as the birds' haunt, and they are equally abundant in the shallow waters of the Alaskan coast of Bering Sea and the deep cold waters of the Siberian shore.

At the Fur Seal Islands these birds arrive about the 10th of May, in pairs, but near Saint Michaels I have never seen them before the 10th of June and rarely before the 20th of that month. At the latter place and at other northerly points their arrival is governed by the date when the ice leaves the coast for the summer. The young take wing in August at the Seal Islands, but north of that point they are rarely fledged before some time in September.

On September 9, 1879, I visited a small islet a few miles from Saint Michaels, where the Puffins were breeding in great numbers. The islet arose about 25 feet above the sea and was a mass of rugged basaltic boulders. Among the crevices hundreds of the Puffins were breeding. Both species were here, but the tufted species was in very small numbers compared with the host of the other kind. The young were mostly about half grown, but many only just from the shell and some not even yet hatched were found. The young could be easily located under the stones by the thin metallic piping note they kept uttering during the parents' absence. As we walked about the old birds could be heard scuttling about below, uttering a hoarse, snuffing, rattling note, which sounded at a short distance like a low growling noise. With a slipping noose on the end of a ramrod it was an easy matter to capture any number of them by simply walking about and peering down into the crevices, and when a bird was seen pass the noose over the bird's bill and drag the captive out. They would scratch and bite viciously and utter their usual note in a loud hoarse key.

During our stay the air was full of birds circling about, and often passing within a few feet of us. The young were easily captured by removing the stones, and they also fought when taken. The loose rocks were surrounded by a network of passages, and if it had not been for the birds' stupidity they could have easily avoided capture. As we began removing the stones overhead, young or old would scramble forward and thrust their great beaks into the first crevice which offered, although not an inch wide, and then they would push and struggle desperately to force their way through until taken in hand. Even when they managed to escape after being dragged out they would frequently scramble back to the same place again. It was a common occurrence for them to strike among the rocks with a thud as they tumbled off their perches towards the water, and then scramble over the rocks with laughable haste and finally plunge under water and make off, or go flapping desperately along the surface until exhausted. Overhead circled hundreds of the birds, nearly all of which carried fishes in their beaks for their young. These fishes were sticklebacks and sand-lances. Some of the birds carried from three to five small fishes at once; the latter were all placed side by side crosswise in the bird's bill.

At this time the bill-moult was just commencing. The first evidence of this process is shown by the wearing away of the lower mandible on the under surface at the angle. This wearing appears to be brought about by the friction of this point on the rocks, as the birds use the projecting angle as a hook to aid them in climbing—as I frequently saw them do. The wearing of the lower edge of this mandible leaves a horny scale-like plate on each side of the mandible, with its lower edge free and easily scaled away in small fragments. The inclosed angle of the mandible is now a soft cartilaginous projection, which shrivels and reduces the size of the beak at that point. Next the horny, bead-like rim along the base of the upper mandible gradually loosens at each end below, and at the same time becomes freed from its attachment to the mandible, leaving a deep sulcus between, exactly as if done by a skillful cut with a scalpel. This bead-like rim now forms a part of the skin of the head and moves as such perfectly independent of the beak. Then the narrow piece of sheath between the nares and the cutting edge of bill loosens and scales off. The entire base of the mandible is now in an exfoliating state and scales away, working toward the point of the beak. The narrow piece along the frontal line is pitted—each pit marking the position of a feather, as is shown in many cases where minute feathers are present. When this horny

cover is removed a callous membrane bearing feathers is exposed, and these feathers extend up and pierce the fallen scale. The basal angle of the lower mandible becomes pliable before the horny cover breaks, and a dark suffusion shows as though a watery fluid had exuded between the horny sheath and the cartilage.

A bird taken the middle of September had the bill only a little over one-half the size usual in spring and the beak was soft and pliable. When these birds are at rest the membranous horns over the eyes are soft and incline inwards over the top of the head, but when the bird becomes excited they are erected and stand stiffly upright over the eyes.

From the island already described a number of these birds, both young and old, were taken home alive, and kept in a pen for some time. They fed upon the fragments of fish thrown to them, and but for the cold weather could have been retained for months. They were awkward-appearing birds and would sit blinking in the same spot for hours at a time. The moment they caught sight of a person, however, they became panic-struck and would rush to the darkest corner of the pen, where every bird tried to hide its head in the corner. When first taken they were extremely vicious, biting and using their long sharp claws with considerable effect. Although bitten by them dozens of times yet they never drew blood, but when they secured a good hold they could pinch pretty hard.

Young and old leave their northern breeding grounds about the 20th of September. A small island in Kotzebue Sound is a resort for thousands of these birds in summer. Eggs of this bird measure about 2.75 by 1.75, and are white, more or less soiled, and indistinctly marked with fine reddish-brown specks.

CERORHINCA MONOCERATA (Pall.). Rhinoceros Auklet.

Bischoff secured nine specimens of this bird at Sitka during the Telegraph Explorations. Since that time nothing additional concerning the habits and distribution of this species in Alaska has been learned.

PTYCHORAMPUS ALEUTICUS (Pall.). Cassin's Auklet.

This species occurs on the coast of the North Pacific from the Aleutian Islands to Lower California.

CYCLORRHYNCHUS PSITTACULUS (Pall.). Paroquet Auklet.

In the passes among the Aleutian Islands these birds were common in May, 1877, and on June 17, the same season, they were again seen off the eastern end of Saint Lawrence Island. We were on our way to Norton Sound, when, during the day mentioned, we became beset by the pack-ice and held for about a day. When the ice opened and allowed us to escape, the water became covered by thousands of these strange little birds. The sun was just rising after its brief disappearance below the northern horizon when we made sail from our unsafe berth and made slow progress through the moving ice. The cakes were of every shape and size, and were rendered still more fantastic by the peculiar light. The ice showed beautiful shades of blue and green topped in dazzling white. The sea was almost black, except where it reflected the vivid crimson of the sky. Far off to the west arose the tall cliffs on the shores of Saint Lawrence Island. A thin white mist formed and vanished over the ice, which the rising wind began to force on before it. The grinding of ice-cakes, one against the other, and the low but increasing roar of the waves as they gained power among the separating fragments, all united to render this one of the most grand and impressive scenes witnessed during my northern experience. The only sounds of animate creatures heard as the vessel made its perilous way in a zigzag course, every now and then coming in contact with a piece of ice so as to wrench everything on board, were the low whistled notes of the Parrot and the Crested Auks, which now surrounded us by thousands. For some hours, in fact until we had left the ice well behind, these birds were all about swimming buoyantly from side to side or skurrying away from the bow of the vessel. The following day a few were seen off the Yukon mouth, but my subsequent experience showed that this bird is very rare along the east coast of Bering Sea. Like a number of other species they appear to have a strong preference for deep water and the islands situated in it.

During the cruise of the *Corwin* in 1881 I found the Paroquet Auklet breeding in extreme abundance on the islands in Bering Straits, and great bunches of them were brought on board by the Eskimo. Being without fresh meat we bought them and they were served up on the cabin table for some time, but were fishy and could only be tolerated. This was in July, and they were nesting in crevices among the masses of loose stones along the sharp slopes on the islands and the high cliffs. From our anchorage thousands of them could be seen flying about and the surface of the sea was dotted with them for miles.

They are found for a short distance north of the straits on the American shore, but along the Siberian coast they were found for nearly 200 miles northwest of the straits. They are abundant summer residents along the same coast south to Plover Bay at least. In Plover Bay they were common its entire length, some 18 miles inside the heads; they are also abundant about Saint Lawrence and Saint Matthew's Islands.

Wherever we found these birds during our cruise they were always observed feeding offshore, and at Plover Bay every one shot had its crop distended with small crustaceans, and as these latter animals swarm in all the waters of this bird's haunts it is only reasonable to suppose that they form its usual food. Brandt's idea that the peculiarly shaped bill is used to pry open bivalves is not well founded. The deep water and very abruptly sloping beaches where these birds are most numerous render it impossible for them to find a supply of bivalves, and the bird's beak is altogether too weak to be used in the manner indicated. Mr. Dall suggests that the peculiar bill is used for picking crustacea out of crevices in the rocks and from under round stones. The idea that the peculiar recurved bill of this bird must have some unusual office is not unnatural, but my observations of the bird's habit of invariably feeding some distance offshore and rarely in water less than 10 to 20 fathoms deep, render any such use highly improbable if not impossible.

On the Fur Seal Islands they breed in abundance, arriving there early in May, and nest on the cliffs, where its eggs, one to each bird, are laid on the bare ground at the bottom of the crevices. They have a low, sonorous, vibrating whistle and do not fly in flocks like most other auks. This peculiarity was also noted at the breeding places in Bering Straits. Mr. Elliott's observations, like my own, are that "it feeds at sea, flying out every morning, returning in the afternoon to its nest and mate." They frequently sit dozing for hours at the entrance to their nest. In Bering Straits a large number of eggs were easily secured. They were fresh in July and were white. Those taken by Elliott on the Seal Islands measured from 2.25 by 1.50 to 2.35 by 1.45.

At the Seal Islands the young take wing about the middle of August. Old and young leave the islands by the first of September. At Amichitka Island, at the western extremity of the Aleutian chain, Dall found these birds rather common, and in the Shumagins, in July, 1880, Dr. Bean found them abundant, so their breeding ground appears to extend the entire length of the Aleutian Islands.

For the bill-moult of this species see Stejneger (*loc. cit.*).

SIMORHYNCHUS CRISTATELLUS (Pall.). Crested Auklet (Esk. *Tū-gi-ūk*).

This strangely ornamented bird has a range almost identical with that of the preceding species, and I do not recall a single instance in which the Paroquet Auklet was seen in any numbers where the present species was not found. A few were observed in the passes near Unalaska in May, and the 13th of June a single pair were seen off the Seal Islands. This bird breeds plentifully on the Near Islands, but does not winter there. They also breed on the Commander Islands. The night of June 17, like *C. psittacus*, they were extremely numerous among the ice off Saint Lawrence Island, and off the Yukon mouth the next day they outnumbered the other species. They were in pairs and small flocks, and either sat in the water and stared wonderingly at us as we passed, scarcely getting out of our way, or flew about with a buzzing flight like a heavily-laden bee. They continually uttered a chirping note, and were very conspicuous by reason of their bright-colored bill. One bird fell upon deck.

On October 13, 1879, an Eskimo brought me a young bird of the year taken by him at sea off Saint Michaels. The bird measured 9 inches in length by 19 inches in extent. The iris comprised a broad outer ring of greenish white and a narrow ring of slate-blue, bordering the pupil, both sharply defined. The bill was dark horn color, the feet and tarsi blue. Specimens were also brought me in spring from the north coast of Norton Sound.

In Bering Straits, and about Saint Lawrence and Saint Matthew's Islands, this species and *C. psittaculus* have the same habits and are found in equal abundance. They choose the same nesting sites, and each lays a single white egg upon the bare rock or ground.

Along the Siberian coast *S. cristatellus* is much less numerous than *C. psittaculus*, the Diomed Islands in the straits being the center of abundance of both.

Upon the Fur Seal Islands they also breed in great numbers, occupying the cliffs with the other auks. They arrive there in May, and deposit their eggs so deep down in the crevices that Mr. Elliott had much trouble to secure four specimens. On the Diomedes I secured a considerable number with but little difficulty. Elliott credits these birds with a loud "clanging honk-like sound" during the breeding season, and as being silent at other times.

The eggs taken on these islands are chalky white in color, and measure 2.31 by 1.61 largest, and 2.06 by 1.50 smallest. The young are fully fledged about the 10th or 15th of August. At this time, and until late in fall, the crest is scarcely to be detected, except as a slight ruffling of the feathers late in the season. The food of this species consists of crustacea and other small sea animals, which swarm in the North Pacific and Bering Sea.

Unlike *C. psittaculus* this species is very rarely found in bays, preferring the open water outside, where they frequently gather upon the water in close bodies, covering acres. At other times they gather in long lines to feed about a tide-rip. They are resident and breed in great abundance about the entire Aleutian chain and thence east to Kadiak, at least.

The small rounded palpebral ornaments of these birds are used by the Eskimo of Bering Straits to ornament their fishing-lines, and the crests and bright-colored bill ornaments are also much used by the same people and the Saint Lawrence islanders as ornaments for their water-proof coats.

The bill-moult of this species occurs the last of August and during September, and leaves the bill strikingly changed and reduced. Birds taken by us in Bering Straits in September were in the midst of this change, and the bright-colored corneous parts about the base of the bill were removed with the greatest ease by the thumb and fingers.

SMORHYNCHUS PYGMEUS (Gmel.). Whiskered Auklet.

Concerning this species I have no original observations. It breeds abundantly on the Near Islands but does not winter there. It also breeds on the Commander Islands. The young was described as a species by Coles under the name of *cassini*, but its true relationship has been known for some time.

In Dall's list of the birds of the Territory this species is only mentioned in recording the capture of a specimen of "*cassini*," which flew on board their vessel while becalmed in Unemak Pass, near Unalaska, on August 3, 1866. The species is unknown from the Fur Seal Islands, and we have no knowledge of its numbers and distribution in the Aleutian chain. It is quite possible that it may have been overlooked, being taken for the next species which abounds everywhere.

SMORHYNCHUS FUSILLUS (Pall.). Least Auklet.

Of all the water-fowl of Bering Sea this trim little bird is the most abundant. The 1st of May, 1877, they were extremely abundant in large flocks in the passes about the eastern end of the Aleutian chain, and as we passed the Fur Seal Islands, the middle of June, they were again seen in great numbers. During my four years at Saint Michaels only a single specimen was secured. This was taken near that place the last of June, and measured 7 inches in length by 13 inches in extent; its pupil was very small, surrounded by a broad white iris, shaded with rose color on its outer border.

Like the Paroquet and Crested Anklets, this species has a great preference for the deep western half of Bering Sea, except along the Aleutian chain. During the summer of 1881 we found them breeding upon the islands in Bering Straits in great abundance, especially about the Diomedes and King or *Okecek* Island. As we lay at anchor close under the Big Diomedes the cliffs arose almost sheer for hundreds of feet. Gazing up toward one of these banks we could see the air filled with minute black specks, which seemed to be floating by in an endless stream. The roar from the rush of waves against the base of the cliffs was deadened by the strange humming chorons of faint cries from myriads of small throats, and, as we landed, a glance upward showed the island standing out in bold, jagged relief against the sky, and surrounded by such inconceivable numbers of flying birds that it could only be likened to a vast bee-hive, with the swarm of bees hovering about it. The mazy flight of the birds had the effect several times of making me dizzy as I watched them. Breeding there were several species of Auks and Guillemots. Our first visit was made about the middle of July, and most of the birds, including the present species, had fresh eggs.

The Least Auklet lays a single small white egg in a crevice on the cliff or under loose boulders. Measurements are 1.68 by 1.18 and 1.60 by 1.12. Although the birds nesting on these islands had eggs at the time of our visit, yet the millions flying about were nearly all in pairs, which always kept close together and rarely joined with any others of their kind. Like the other Auklets, they are not at all shy, and are snared by thousands by the Eskimo on these islands. They sometimes wander into the Arctic to the north, and a single pair was seen about 30 miles north of Cape Lisburne, well within the Arctic Circle.

I do not think they breed north of the straits, except, perhaps, on some of the cliffs along the Siberian shore. They were common along the Siberian coast to the south of the straits, except in the bays.

On Saint Lawrence and Saint Matthew's Islands they are abundant summer residents, and upon the Fur Seal Islands they are found in equal abundance. From Mr. Elliott's observations we make the following notes concerning the habits of the species on these islands. They are the most characteristic species breeding on this group.

The first arrivals appear about the first of May in small flocks of a few hundreds or thousands. They appear to be in a frolicsome spirit, and hover over the water, alighting now and then, and continually uttering a low chattering note. The first of June they are in full force, and prepare to nest by millions upon both islands. They frequent loose masses of boulders and the cliffs upon both islands, but are most numerous on Saint George's, an area of over 5 square miles of basaltic shingle on this island being a favorite resort. While walking over their breeding ground the notes and noises made by the birds under foot are very amusing, and the birds pop in and out with an odd manner and bewildering rapidity.

Like the other Auklets, they go off to sea every day to feed upon small crustacea.

The downy young is grayish black, and the first plumage darker than that of the adult.

This species is abundant on the Near Islands, where it breeds on Agattii, but does not winter there. Stejneger found them about the Commander Islands in winter, but does not think they breed there.

SYNTILIBORAMPHUS ANTIQUS (Gmel.). Ancient Murrelet.

During the explorations of the Telegraph Expedition this species was taken at Saint George's Island of the Fur Seal group in the Aleutians, near the peninsula of Alaska, and at Sitka. In the summer of 1880, on June 9, Dr. Bean secured several specimens at Sitka. It breeds abundantly on the Near Islands, where a few are resident. They breed also on the Commander Islands. On June 2, 1872, Mr. Dall found these birds breeding abundantly at the Chieca Islets, in Akoutan Pass, near Unalaska. The birds were caught sitting on their eggs in holes in the banks similar to those used by the Fork-tailed Petrel. Two eggs were found in a nest. The same naturalist found this species abundant the entire length of the Aleutian chain, and states that, although they congregate in great flocks offshore, they frequent the bays and harbors much more than the other small Auklets.

The last of May and first of June, 1877, the writer found these birds rather common in the bays about Unalaska. They were in pairs and not shy. When one was shot the survivor would fly about in a circle, frequently alighting in the water and uttering a low, plaintive whistle.

SYNTHLIBORAMPHUS WUMIZUSUME (Temm.). Temminck's Murrelet.

The present species has been credited to the northwestern coast of America, and I mention it here merely to call attention to the fact that no explorer has found it in the region covered by this paper.

18. BRACHYRAMPHUS MARMORATUS (Gmel.). Marbled Murrelet.

Large numbers of this Murrelet were taken at Sitka by Bischoff in both the winter (or *crangeli*) and the summer plumage. They have been found in the Aleutian Islands by Dall, and during the summer of 1880 Dr. Bean took them at Sitka, where they were in small flocks about June 9. They were found near Unalaska in May, 1877, by the writer, and they probably reach their northern limit in this chain, where they breed.

There is a fine field in these islands to study the habits and distribution of the Auklets, Murrelets, and Guillemots of the North Pacific. Although the ground has been visited, yet no systematic work has ever been attempted.

BRACHYRAMPHUS KITTLITZII Brandt. Kittlitz's Murrelet.

The first example of this rare bird known to exist in any American museum was secured by the writer in Unalaska Harbor the last of May, 1877. The birds were in company with *S. antiquus* and *B. marmoratus*, and like the latter were not shy. Their habits appeared to be the same, all feeding upon small crustacea. These three species kept about the outer bays all the last half of May, but about the first of June became scarce, as they sought their breeding places. Since my capture Mr. Turner has taken another specimen in the Aleutian Islands, and the species may be found more common there when the islands have been more thoroughly explored.

CEPPHUS MANDTI (Licht.). Mandt's Guillemot.

This species occurs on the Arctic and Bering Sea coast of Alaska and about the islands in these waters, but its relative abundance, as compared with that of the following species, I am unable to give. As but one of the naturalists who have visited this region within the last fifteen years mentions it in his paper, it has probably been confounded with *columba*. Murdoch found these birds in the open water offshore at Point Barrow in the fall up to December, when the sea closed.

CEPPIUS COLUMBA Pall. Pigeon Guillemot (Esk. *Chig-ü-rik*).

Among the larger water-fowl of Alaska this is one of the most numerous. They occur in great abundance wherever the coast is bordered by bold headlands or where there are precipitous islands. They are numerous about Sitka, Kadiak, the Shumagins, and all that portion of the Territory, as well as along the entire length of the Aleutian chain. Throughout the region just named the birds are resident. They breed commonly on the Near Islands, but are not resident. They also breed abundantly on the Commander Islands. Dall found their eggs in the Shumagins on June 24. They were two in number, laid at the bottom of a hole under the rocks near the water's edge. Young in down were taken on Unga Island the middle of July. Their bright red legs and white wing-patches render these birds very conspicuous.

During May, 1877, I found them very common in the bays about Unalaska and frequently watched them as they swam about quietly feeding. They are graceful swimmers, and as they move about frequently put their heads under water and paddle along some distance in this position. Whether this was for the purpose of looking for food beneath the surface or not could not be determined. When approached in a boat they frequently came circling close by, as if to examine us more closely. Their common note is a low piping whistle, and Dr. Bean heard them uttering calls like the chipping of a sparrow.



KITTLITZ'S MURRELET.

Brachyramphus kittlitzii.

(SUMMER PLUMAGE.)

They nest upon the Fur Seal Islands, and are especially numerous on the Diomedes in Bering Straits, where we secured fresh eggs the middle of July, 1881. They are not common on the east coast of the sea, where the water is shallow, and are scarce also in Norton Sound for the same reason.

A few pairs of a black Guillemot, which at the time I took to be this species, were seen in Kotzebue Sound and others at Cape Lisburne, but the deep bays and deep water on the Siberian coast of Bering Sea and the adjacent Arctic afford them a favorite summer resort, and they find an abundance of breeding places on the cliffs there. The red feet of these birds are used by the Eskimo of the straits for ornaments on some of their clothing, and the skins are used for clothing. In winter their plumage changes to a pied mixture of black and white, and when hunting far out at sea the Eskimo of Norton Sound find them late in November about the holes in the ice.

A specimen in this mottled dress was brought me on August 24 one season at Saint Michaels. It measured 13 inches in length by 22.50 inches in extent. Its beak was dark horn-colored, except a streak of light flesh color along the culmen over the nostrils. The iris was hazel and the feet and legs dirty flesh color. In spring, the last of March and first of April, they are again found among the open spaces at sea by the native hunters.

URIA TROILE CALIFORNICA (Bryant). California Murre (Esk. *Āthl'pā*).

An abundant resident along the entire Aleutian chain and the mainland coast of the Pacific.

Birds and eggs have been taken at Sitka and Kadiak, and they occur throughout this region. On the Fur Seal Islands Elliott found them to occur in small numbers. They breed on the Commander Islands. They swarmed about Herald Island when we visited there August 12, 1881, and the downy young, small black balls of down, only a day or two old, were taken there. When we landed upon the unknown shores of Wrangel Island we found them breeding on the cliffs there, but in smaller numbers. While we were scaling the cliffs on Herald Island these Guillemots would scarcely make way for us, and a few feet away sat almost bolt upright and stared at us with a conical expression of amazement. Their close resemblance to the next species with which they were associated rendered it impossible to distinguish them except at very close quarters. A party of about fifty was seen on the cliff of Saint George's Island on one occasion, but they were more common in twos and threes.

URIA LOMVIA ARRA (Pall.). Pallas's Murre (Esk. *Āthl'pā*.)

Wherever the coasts and islands of Alaska are bordered by rugged cliffs and rocky declivities this bird is found in great abundance. They occur at Kadiak and along the adjacent coast from Sitka to the peninsula of Alaska. The precipitous shore lines of the Aleutian Islands afford them a favorite resort during the breeding season, and the surrounding waters make their wintering place. They were extremely plentiful in great flocks in the passes near Unalaska during May, 1877, and storms forced them to find shelter in the deep bays. The middle of June, the same season, they were seen in large numbers off the Fur Seal Islands and off Saint Lawrence Island. It is an abundant resident of the Near Islands. At Point Barrow it is reported by Murdock to be an occasional visitor, usually in the broken ice offshore. The Eskimo sometimes found a stray individual off Saint Michaels the first of May, but they were rarely seen until the last of this month.

During June they gathered about their nesting places in Norton Sound as the ice disappeared, but several seasons fresh eggs were brought in the last of July and first of August. Cape Denbigh and a long cliff west of Cape Darby, on the north shore of Norton Sound, are noted breeding resorts, the latter place being called *Āthl'pāl' ĭ git* (or Murre Place) by the Eskimos. All the islands of Bering Sea are frequented by myriads of them in summer, their abundance about the Fur Seal group and the Diomedes Islands in the straits being specially noticeable. They breed in small numbers on Chamisso Islet, in Kotzebue Sound, and on the cliffs near Cape Lisburne, but were not seen by us north of that point. They are very numerous on the Siberian coast, and were the most numerous birds on Herald and Wrangel Islands. They breed abundantly on the Commander Islands, according to Stejneger. Whenever we approached these islands during the sum-

mer of 1881 small parties of these birds invariably came off to us when we were within a few miles, and, circling about the ship with outstretched necks and inquiring eyes, seemed to demand the cause of this first intrusion into their solitudes. On the Fur Seal Islands they breed in countless multitudes, and although they do not begin to lay until the 18th or 25th of June, yet on mild winters some of the birds never leave the vicinity of these islands.

They lay their eggs as thickly as they can be crowded together on the points and narrow shelves of the cliffs. Each female deposits a single egg. They quarrel desperately, and Elliott, from whose observations we take these notes, records the fact that hundreds of dead birds are found along the bases of the high cliffs on Saint George's, these birds having fallen and been dashed upon the rocks while clinched in combat. Incubation lasts about twenty-eight days, and the young attain their first plumage about six weeks later.

On Saint George's Island, towards the end of June, when the females begin to set, the males fly around the island in great files and platoons, always circling against or quartering on the wind at regular hours in the morning and evening, *making a dark girle of birds more than a quarter of a mile broad and 30 miles long.* They utter a peculiar growling or hoarse chattering note when on the cliffs. The birds are very stupid, and pay but little attention to the presence of a person near their nests.

I have frequently amused myself by approaching the birds within 10 or 15 feet, as they sat almost bolt upright on their single egg, and tossing stones at them. They stared at me without any sign of fear, only ducking their heads to avoid the stones.

In spring they are found scattered over much of the North Pacific and all of Bering Sea. Wherever these birds occur abundantly in the north they are of great value to the Eskimo, as their flesh and eggs are easily obtained for food, and their skins afford very warm and durable clothing.

The most common outer garment worn in Saint Lawrence and the Diomed Islands in Bering Straits is made of murre skins.

STERCORARIUS POMARINUS (Temm.). Pomarine Jaeger (Esk. *Ā-kūlūh-tay-yū-līk*).

Strangely enough, although this bird is a common species about the Yukon mouth and along much of the coast north to Point Barrow, where, according to Murdoch, it is the least common of the Jaegers, yet until Dr. Bean's recent paper (*loc. cit.*) none of the later explorers in that region had noted it, with the single exception of the record by Elliott that it is a rare visitant to the Fur Seal Islands.

The earliest arrival of this bird in spring was May 13 at the Yukon mouth, where the writer found it searching for food along the ice-covered river channels. They became more common, until, by the last of the month, from a dozen to twenty might be seen every day.

They are clumsy and cowardly as compared with their smaller relatives. When one of this species chances to cross the path of the smaller species, the latter almost invariably gives chase and beats its clumsy antagonist off the field by repeatedly darting down from above. This attack embarrasses the large bird so that it flinches and dives, and often alights and watches an opportunity to escape from its nimble assailant. One that was driven to alight in the river thrust its head under water at every swoop of its assailant, and exhibited the most ludicrous terror. When on the wing they usually ward off an attack from one side by a half closed wing, and if above, both wings are raised, forming an arched shield above the back.

While camping at the Yukon mouth in May my tent was pitched directly on the river bank, and I frequently amused myself by throwing pieces of flesh upon the ice, some 20 yards away, and thus attracting the Jaegers. On several occasions the smaller species drove the larger ones off and proceeded to devour the spoil.

The large bird has a low, harsh, chattering cry when feeding with its companions. They measure about 22 inches long by 48 inches in spread of wing, and have a hazel iris; beak dark horn color on distal third, and light horn color on the remainder. The feet and legs are either uniform black or are mottled with a varying amount of livid blue, the latter sometimes covering over half

the surface. Off the Yukon mouth they are abundant in spring, but at all seasons they are rare near Saint Michaels. During the cruise of the *Corwin* I found them abundant about Saint Lawrence Island and everywhere in Bering Straits.

Along both shores of the Arctic in the north they were very numerous, and to a great extent replaced the other two species. They are especially common along the border of the ice-pack and about the whaling fleet, where they fare abundantly. They go south as winter closes in, and undoubtedly occur at the latter season in large numbers along the Aleutian chain and the adjacent parts of the North Pacific.

The peculiar twist to the long tail-feathers of this species renders it conspicuous and identifiable almost as far as seen.

STERCORARIUS PARASITICUS (Linn.). Parasitic Jaeger (Esk. *Ā-kūkh-tai-yū'ūk*).

This tyrannical bird occurs about the entire coast line of Bering Sea, but it is most numerous along the low, marshy coast of Norton Sound, and thence south to the Kuskoquim River. Its breeding range covers the entire region from the Aleutian Islands north to the extreme northern part of the mainland. Upon the Aleutian Islands Dall found them in summer and winter. They were taken during the breeding season on Kyska and Aukutka, near the western end of the chain. They have been taken at Kadiak, and are plentiful from the Yukon mouth up to Nulato and probably above. Elliott found them occurring as stray visitors on the Fur Seal group, and the writer noted them in the Bering Strait vicinity during the summer of 1881.

During summer these Jaegers show a much greater preference for marshes and the low barren grounds so common in the north than they do for the vicinity of the sea-coast. At the Yukon mouth and near Saint Michaels they arrive with the first open water from the 10th to the 15th of May. The snow still lies in heavy drifts on most of the open country, but the Jaegers take possession and feed upon the shrew-mice and lemmings, which are common on this ground. By the last of May they are very common, and twenty or thirty may be seen in a day's hunt.

Birds in the black plumage are rare in spring, but are sometimes seen, and at the Yukon mouth on May 31 I found a pair in this plumage mated. The eggs are laid upon the mossy knolls or uplands in their haunts about the 5th of June. The nest is merely a depression in the moss containing two eggs, indistinguishable from those of the next species, and measuring from 2.40 by 1.70 to 2 by 1.50 inches.

The young are on the wing by the end of July and early August. The last birds move southward or keep out to sea after the 20th of September. On cloudy days, or in the dusky twilight, these birds have a habit of uttering loud wailing cries, interspersed with harsh shrieks, which are among the most peculiar notes heard in the northern breeding grounds.

At all times the Jaegers are given to wandering, and one is likely to find them almost anywhere along the coast. They are not infrequently seen harrying terns or gulls to make them discharge fish just caught. If successful they dart down and rising under the falling morsel catch it in their capacious mouth. This robbery is often performed by two birds in unison, but whether the birds alternate in disposing of the spoil or not could not be learned.

When a Jaeger is wounded others of its kind show much concern, and I have secured several birds in succession which were drawn within range by the cries and struggles of their companion. The habits in general of this and the following species are extremely similar along the coast region of Bering Sea, and both breed abundantly on all that broad belt of low barren plains and marshy country bordering the coast along the entire northern end of the continent. This is a common species about Spitzbergen and Nova Zembla, where it breeds, laying two eggs on the bare ground, on low, unsheltered, and often wet islets or headlands. When surprised near its nest it creeps along the ground with flapping wings to decoy away the intruder.

They are very greedy, and frequently swallow so much that they are unable to fly until a portion is disgorged. Nordenskjöld, from whom the preceding is taken, writes that the Pomarine and Long-tailed Jaegers are more common farther east towards Bering Straits.

This species is more common than *pomarinus* at Point Barrow where, like the latter, it was not found breeding by Murdoch. This species occurs on the Commander Islands, and is common on the Near Islands, where they breed on Agattú.

26. STERCORARIUS LONGICAUDUS Vieill. Long-tailed Jaeger (Esk. *Yūng-ūk*).

This graceful and handsome bird is the most common of the Jaegers on the Alaskan coast and vicinity, and especially about Saint Michaels. They arrive in this vicinity about May 12 or 15, but are not numerous until ten days or more later. They are first found quartering the marshes in small parties of from two to six or eight. They have a shrill *phēū-phēū-phēū phēō*, uttered while they are flying, and when the birds are quarreling or pursuing one another the ordinary note is often followed by a harsh *quā*. At other times they have a rattling *kr-r-r-r*, *kr-r-r-r*, *kr-r-r-r*, *kri*, *kri-kri-kri*, the latter syllables shrill and querulous and sometimes followed by the long-drawn *phēū-phēū-phēū* in the same tone. They appear to be much more playful than the other Jaegers, and parties of six or eight may be seen pursuing one another back and forth over the marsh. The long, slender tail-feathers and extreme grace on the wing of these birds render them very much like the Swallow-tailed Kite.

The mating occurs with a great amount of noisy demonstration on the part of several rivals, but once paired the birds keep by themselves and early in June deposit their eggs in a depression on the mossy top of some knoll upon rising ground. In one instance, on June 16, while I was securing the eggs of a *Macrorhamphus*, a pair of these Jaegers kept circling about, uttering harsh screams and darting down within a few feet. As I approached the spot where the snipe's eggs lay I had noticed these birds on a knoll just beyond, but had paid no attention, but as the birds kept leaving me to hover over the knoll and then return to the attack, I examined the spot, and there, in a cup-shaped depression in the moss, lay two dark greenish eggs marked with an abundance of spots. During the breeding season these birds and the preceding species have a cunning habit of tolling one away from their nest by dragging themselves along the ground and feigning the greatest suffering. They roll about among the tussocks, beat their wings, stagger from side to side, and seem to be unable to fly, but they manage to increase the distance from their starting point at a very respectable rate, and ere long suddenly launch forth on the wing.

After a successful hunt the Jaegers of this and the last species alight upon some prominent knoll and snuff themselves, their white breasts showing for a long distance. They are very curious at times, and I have called them within gunshot on several occasions by tossing some conspicuous object into the air as the birds were passing. On one occasion I saw a Jaeger swoop down at a duck paddling quietly on the surface of a pond, and the latter went flapping away in mortal terror while the Jaeger passed on, probably highly pleased at giving the duck such a fright.

Their taste is omnivorous and they harry the marshes for mice and lemmings, and feast upon the dead fish and other animal matter cast up by the sea, or search the hillsides for berries. The arrival of a vessel in their neighborhood calls them about to secure the offal thrown overboard. The Eskimo say that they eat just what men like, hence the name given them, derived from the word *yūk* or man.

Up to the present date they are not known from the Aleutian chain. Elliott saw but two on the Fur Seal Islands, and this was the last of July, and the birds were evidently stragglers. They are abundant along the low coast to Bering Straits, but, except about Kotzebue Sound, they are not common to the north of that point. It is also found on the east coast of Siberia, and I am led to believe, from accounts brought me by natives, that it breeds also on the Upper Yukon.

All the Jaegers are very destructive to the eggs of other birds, and in spring nests of various water-fowl are often destroyed by them.

Like the other Jaegers, this species moves south during September. The long-tailed species is less frequently found at sea than the last, and is rarely found about the ice-pack north of Bering Straits.

The swiftness and dexterity with which they pursue gulls and force them to disgorge is a beautiful sight to witness, and while either of the small terns or gulls can drive the Jaegers from the vicinity of their nests yet the latter rob them of their prey at pleasure. While I was camping at the Yukon mouth a pair of these birds made their haunt in the vicinity of my tent and fed upon the offal thrown upon the ice a few yards from the door. They soon became very familiar and were always on hand hovering close overhead when we came in from a hunt. They would stand about within a few yards and watch us with wistful eyes ready to pounce upon any morsel



Fig. 1



Fig. 2



Fig. 3



Fig. 4.



Fig. 5.

HALF NATURAL SIZE

COLORED FROM NATURE BY E. W. NELSON.

FIG. 1
PACIFIC KITTIWAKE
Rissa tridactyla pollicaris.

FIG. 2
RODGERS'S FULMAR
Fulmarus glacialis rodgersi.

FIG. 3
WHITE-CRESTED CORMORANT, in winter
Phalacrocorax dilophus cinctatus.

FIG. 4.
HORNED PUFFIN, in summer.
Fraterecula corniculata.

FIG. 5.
TUFTED PUFFIN, in summer
Lunda cirrhata.

tossed them, and if a fragment was held up in the hand they would hover a few feet over it, although not daring to come closer. They also soon became used to our shooting and scarcely noticed it even when near by. Unfortunately our companionship lasted only about ten days, when I broke camp, and so lost the opportunity of gaining their complete confidence. After the first few days they seemed to appropriate the camp and made a fierce attack upon any others of their kind that chanced near.

This is the common Jaeger at Point Barrow, where Murdoch did not find it breeding. It appears to be rare on the Near Islands, where Turner saw only two.

GAVIA ALBA (Gunn.). Ivory Gull.

Specimens of this little known species were seen on several occasions by the naturalist of the Jeannette, Mr. R. L. Newcomb, during the long imprisonment in the icy sea to the west of our northern coast. Murdoch noted it as a rare visitor at Point Barrow, and in addition these birds have been noted by various expeditions among the network of channels north of British America, especially by McClintock at Cape Krabbe, in latitude 77° 25'. From the region north of Europe we have most of our knowledge concerning the Ivory Gull's habits.

Malmgren found them nesting abundantly on the limestone cliffs in Murchison Bay, Spitzbergen, latitude 82° north. This was on July 7, 1861, and their nests were in clefts and niches midway on the cliffs, and above them were nesting Kittiwake and Glaucous Gulls. The nests contained one egg each, and consisted of shallow depressions, in loose soil on the rocks, lined with a few dry plants, grass, moss, and feathers. On July 30 the eggs contained large young. These birds have the habit of watching about seal-holes in the ice, waiting for the seal, whose excrement the gull devours.

RISSA TRIDACTYLA POLLICARIS Ridgw. Pacific Kittiwake (Esk. *Pi-lak*).

The entire coast line of Alaska with all its numerous islands, both near the mainland and far out at sea, are inhabited by this beautiful gull. The explorers of the Telegraph Expedition found it abundant from Sitka to Bering Straits.

On the Near Islands Turner records this gull as not abundant and not known to breed. On the Commanders it breeds abundantly. The writer's first acquaintance with them was in the Aleutian Islands in early May, 1877, when they were common, and again the same season, on June 13 and 16, they were found migrating off the Fur Seal Islands and the Yukon mouth. At Saint Michaels each year they arrive from the 10th to the 18th of May, and were first seen searching for food in the narrow water-channels in the tide cracks along shore. As the open spaces appeared they congregated there until in early June when the ice broke up and moved offshore. At this time the Kittiwakes sought the rugged cliffs along the shore of the mainland or the precipitous islands dotting Bering Sea and the adjoining Arctic. Although nesting abundantly at the head of Norton Bay none were found near Saint Michaels after the migration until toward the end of July or 1st of August, when they were found again about the outer points and rocky islets offshore. They are very gregarious and fly to and from their feeding grounds in long straggling flocks. During the middle of the day they were usually found gathered in a large body on the rocks.

By August 5 or 10 the young, conspicuous by their black nuchal area, were found in considerable numbers with the adults. When one of their number is shot the others circle about for a short time, but when a second or third is killed the rest make off, usually straight out to sea, and do not return for hours. From the end of August they frequent the inner bays and mouths of small streams, and are often seen in large parties feeding upon the myriads of sticklebacks which are found along the coast at this season.

They pursue their prey in the same graceful manner as the terns, by hovering over the water and plunging down headforemost. It is an extremely interesting sight to watch a large flock passing over calm water in this manner. They are limited strictly to tide-water and rarely ascend even the Yukon delta over a few miles.

They are resident upon the Aleutian Islands and breed in great abundance upon all the islands of Bering Sea, the Straits, and along the Arctic coast to Cape Lisburne.

In Kotzebue Sound, during August, 1881, I saw hundreds of them nesting on the granite ledges of Chamisso Island, and found them very unsuspecting. Although the young were able to fly I caught one upon the nest and knocked others off the ledges with stones before they would take wing. The nests were composed of matted fragments of moss and grass gathered on the adjacent slopes or were mere hollows in the loose dirt. The other occupants of the islet were puffins.

The cliffs on the ice-bound shores of Herald Island also were occupied by them, and we found them about the edge of the ice from this island to Point Barrow during the Corwin's cruise. In autumn they kept about Saint Michaels until the middle of October each year, when the ice forming over the bays forced them away.

Mr. Dall secured the nest, eggs, and young in down of this species on Unga Island, in the Shumagins, on July 11. There he found the birds nesting in great numbers, and writes that the nests at first appeared as if fastened to the perpendicular face of the cliff. A close examination showed that two parallel strata of metamorphic sandstone were weathered out so as to project from 1 to 4 inches from the cliff, and upon the ledges thus afforded the birds had managed to fasten their nests, although the latter projected over the edge of the support more than half their width. The nests were built of dry grass, which was fastened together and to the cliff in some peculiar manner. The depression in the nest containing the two eggs was very shallow and the surroundings were very filthy. The birds were unconcerned at his approach, only those nearest him leaving their nests, and one bird which had lost a nest with two young flew uneasily about the spot a moment, and as he rowed away the bird began a violent assault upon her next neighbor as if attributing her loss to her. They had a shrill, harsh cry when disturbed and a low whistle when communicating with each other. In the western part of the Aleutians these birds are far less numerous than in the eastern half.

Throughout its range this species has considerable curiosity and comes circling about any strange intruder to its haunts. In the bay at Saint Michaels they were frequently seen following a school of white whales, evidently to secure such fragments of fish or other food as the whales dropped in the water. It was curious to note how well the birds timed the whales and anticipated their appearance as the latter came up to blow.

Upon the Fur Seal Islands Mr. Elliott found them breeding in great numbers with the following species. He found the color of the chicks to be similar to those of *brevirostris* until two or three weeks old.

RISSA BREVIROSTRIS (Bruch). Red-legged Kittiwake.

The writer's only experience with this beautiful gull was limited to a single day, May 26, at Unalaska, where they were seen in considerable numbers about the inner harbors. They glided silently from place to place, hovering for a moment or plunging into the water at times, but, continually passing on, each party was quickly lost to sight.

Mr. Dall does not include this bird in his Aleutian Island lists.

It is an abundant summer resident in both the Near and Commander Islands.

The possible variety which Mr. Dall mentions, in his list of Alaskan birds, as being in the Smithsonian collection and marked by having yellow legs, is the ordinary form—the "rich coral, vermilion, or lake-red legs drying straw-yellow."

The Fur Seal Islands form the great gathering place for these birds in summer, and they congregate there by thousands, giving a preference to the precipitous shores of Saint George's Island. They are unknown, so far as I have learned, north of this group, and from Mr. Elliott I quote all we know concerning its habits during the summer on its breeding ground. They come to the cliffs on these islands for the purpose of breeding by the 9th of May, and desert the place with their fully-fledged young early in October. Their nests are prudently located on almost inaccessible ledges and shelves, so that they can rarely be reached except by a person lowered on a rope over a cliff.

They commence nest-building early in May and usually complete the structure about the last of June. They use dry grass and moss cemented with mud, which they gather at the margin of the small fresh-water sloughs and ponds scattered over the islands. Two or three eggs are laid, usually the former number, and if they are removed the female deposits another set within ten days. Incubation occupies from twenty-four to twenty-six days, and the male assists in the work. The downy young is pure white with whitish-gray bill and feet. The natives make pets of the young, but when the fall migration occurs the birds grow restless and soon fly away to the south with their kind.

LARUS BARROVIANUS Ridgw. Pacific Glaucous Gull (Esk. *Kā-kīsh-w-aeūk*).

The Glaucous Gull of the Pacific coast, having proved to be distinct from the Atlantic coast species, has been described by Mr. Ridgway under the above name. (Auk, July, 1886, 330.)

References by earlier authors to the Pacific coast bird under *glaucus* will be understood to apply here.

The solitary islands of Bering Sea and all its dreary coast-line are familiar to this great gull. In summer it occurs from the Aleutian Islands north to the farthest points reached by the hardy navigators in the Arctic Ocean adjoining. It is numerous at Point Barrow, according to Murdoch. At Saint Michaels they appeared each year from the 12th to 30th of April, following the leads in the ice as they opened from the south. They are the first of the spring birds to occur in the north, and their hoarse cries are welcome sounds to the seal-hunter as he wanders over the ice-fields far out to sea in early spring. They become more and more numerous until they are very common. They wander restlessly along the coast until the ponds open on the marshes near the sea, and then, about the last half of May, they are found straying singly or in pairs about the marshy ponds, where they seek their summer homes. Here they are among the noisiest of the wild fowl.

They have a series of hoarse cries like the syllables *kū-kū-kū*, *kū-kū-kū*, *kū-lēē-ōō*, *kū-lēē-ōō*, *kū-lēē-ōō*, *kū-kū-kū*, *kū-kū-kū*. The syllables *kū-kū* are uttered in a hoarse nasal tone, the rest, in a shrill, screaming cry, reaching the ear at a great distance. These notes are used when quarreling or communicating with each other, and when disturbed on their breeding ground. At Unalaska, during May, 1877, I found them about the cliffs on the outer face of the island, and they protested vigorously against our presence as they glided back and forth overhead or perched on craggy shelves.

In the Yukon delta also, on May 13, 1879, I found them common, and although they were not yet seeking their breeding places their shrill cries were heard on all sides. At this date they had bright almost waxy orange-yellow bills with a pale horn-colored shade at point and a bright vermilion spot on the angle of lower mandible. Their iris was light hazel, and feet and legs livid flesh color.

On June 4 their first nest was found. It was placed on a small islet, a few feet across, in the center of a broad shallow pond. The structure was formed of a mass of moss and grass piled up a foot or more high, with a base 3 feet across, and with a deep central depression lined with dry grass. There was a single egg. The female, as she sat on the nest, was visible a mile away, and not the slightest opportunity was afforded for concealment on the broad surrounding flat.

On June 15, near Saint Michaels, another nest was found, an equally conspicuous structure. Like the majority of their nests found by me, it also was located on a small islet in a pond. It was 2 feet high, with a base from 3 to 4 feet long by 2 wide, and measured about 18 inches across the top. In the apex was a depression about 5 inches deep and 9 inches in diameter. This bulky structure was made up of tufts of moss and grass rooted up by the birds' beaks. The ground looked as though it had been rooted up by pigs in places near the nest and on the outer edge of the pond, and while I was examining the nest, which contained three eggs, one of the old birds came flying up from a considerable distance, carrying a large tuft of muddly grass in its beak and dropped it close by on seeing me. One of the eggs taken was white without a trace of the usual color marks. While I was securing the eggs the parents swooped down close to my head, uttering harsh cries.

The young are hatched the last of June or first of July and are on the wing early in August. At this time the young of this species, in company with those of *glaucescens*, are found quartering the marshes, tide-creeks, and sea-coast in every direction and are very unsuspecting and curious, following every boat or kyak they come across. Their note is like that of the adult. At this time the feet, legs, and base of bill of the young are pale flesh-color, outer third of latter dark horn color, iris hazel.

The last of August and September forms the moulting season of the adults, and their iris becomes golden yellow, the gape, ridge of culmen, and a bar across the mandible where occurs the vermilion patch in spring, are yellow, the rest of bill dull flesh-color. Feet and legs pale flesh-color. The wing-feathers of these gulls are lost in pairs, one from each wing, and fall in rotation from the innermost secondary to outer primary. The tail feathers are dropped in rapid succession, but the wing-moult extends over weeks.

These are among the last birds to quit the marshes, and are found very numerous along the coast until the last of October, when the ice closes the water.

The fur traders secured young birds from the Upper Yukon at Fort Reliance on September 28 and October 18, the river being frozen over on the latter date. They occur at intervals along the entire Yukon.

Mr. Dall records the capture of the young (under the name of *hutchinsi*) as taken at Fort Yukon by Mr. Lockhart.

During the cruise of the *Corwin* in the summer of 1881 the writer found this fine bird everywhere along the coast of Bering Sea and the Arctic Ocean visited by us.

They nest upon all the Aleutian Islands, although not enumerated by Mr. Dall in his lists of the birds found there, he doubtlessly including both this species and *glaucescens* under the latter name.

Upon the Fur Seal group both species occur and breed, but in his list of the birds found on these islands Mr. Elliott only mentions the "Burgomaster." Although the latter are very commonly seen circling over these islands, they nest almost exclusively upon Walrus Island, a detached rocky islet, where the birds have no fear of the depredations of foxes, which swarm on the larger islands.

They nest the first of June, laying, as on the mainland, three eggs. In three weeks the young appear, covered with a white, downy coat, soon giving place to the brownish gray first plumage.

Mr. Elliott thinks there were about five or six hundred nests on Walrus Island in 1872.

This fine bird also nests on Saint Matthew's, Saint Lawrence, and the Diomedé Islands in this sea.

Their habits vary with the locality. At one part of the coast they nest on small islets in marshy lakes, and at others they place their nests overhanging the breakers on some rugged cliff, and again the upland on some sea-girt isle is the chosen spot.

Except about their breeding places or about a great feeding resort the Burgomaster is inclined to be suspicious and does not allow a near approach. The young require at least three years in which to acquire their full plumage.

North of Europe and Asia Nordenskjöld found the Glaucous Gull nesting on the Bear Islands, Spitzbergen, Nova Zembla, and the New Siberian Islands.

LARUS LEUCOPTERUS Faber. Iceland Gull (Esk. *Kū-kizh-ū-wōk*).

This is, perhaps, the most abundant gull along the coasts and about the islands of Bering Sea, thence along the adjoining Arctic coasts. It was found abundant on the Yukon, from Anvik to the sea, by Mr. Dall, who secured its eggs there from the 5th to 10th of June. The eggs were laid in small depressions in the sandy beaches of the islands in the river.

Along the marshy stretches of the coast it also frequents the ponds and sluggish streams and nests on small islets exactly as does its larger relative, *barrovianus*. At many points they nest upon the cliffs of the bold islands or the rocky coast line. Their habits are almost identical with those of *barrovianus*. The first leads in the ice at sea during the last of April or first of May brings these gulls about and they remain until forced south by new ice the last of October.

LARUS GLAUCESCENS Naum. Glaucous-winged Gull (Esk. *Kū-kizh-ū-wōk*).

During May, 1877, these birds were abundant about Unalaska and also upon Akoutan and Sanak Islands, to the east. The adults had lemon-yellow bills with a large orange-yellow spot on the angle of lower mandible; their feet were flesh-colored. By May 20 they had reoccupied their old nesting-places along the cliffs, and although they had no eggs yet they resented, by loud cries and great restlessness, any intrusion into their haunts.

It breeds abundantly on the Near Islands and also on the Commanders.

At Saint Michaels they arrive early in May with *barroviannus* and remain until the end of October, when forced south by the newly-formed ice.

This bird has a more southern distribution than *barroviannus* or *leucopterus*. It is found on the Pacific coast from California north. During the Telegraph Explorations they were taken at Sitka and Kodiak. Throughout the Aleutian chain Mr. Dall found this a very abundant resident species, although most numerous in the eastern half of the group. He secured nearly-fledged young at Kyska early in July. From the same author I quote the following interesting notes.

The habit of this and other species in breeding on isolated rocks and small islands, is accounted for by the immunity thus gained from the ravages of foxes on the eggs and young brood.

On the 2d of June, 1873, many eggs in a pretty fresh condition were obtained on the Chica Rocks and islets in the Akutan Pass. The eggs were very abundant, more than three being rarely found together, and were laid on almost any little depression of the ground, with little or no attempt at a lining. About the 15th of July, on the Shumagins, at Coal Harbor, on a peculiar high, round island, abundance of eggs were found, but most of them pretty well incubated. In this case, the island being covered with tall rank grass, the nests were almost concealed, and, either from the dead grass naturally occurring in the depressions, or otherwise, all of them had more or less dry grass in and about them. The gulls built solely on the top of the highest part of the island, in the grass, and never on the lower portion, near the shore, nor on the shelves of the rocky and precipitous sides. The young, in down, were obtained July 16, and the iris of these specimens, as well as the beak and feet, was nearly black. The iris of the adult bird is a clear gray, the bill chrome-yellow with a red patch anteriorly, and the feet flesh-color.

The usual nesting-places of this species are the faces of rugged cliffs, at whose base the waves are continually breaking and the coast exposes its wildest and most broken outline, the locations described by Mr. Dall being exceptions to the rule. All about the coasts and islands of Bering Sea this gull is a common summer resident, but it is not by any means common north of the straits, where it is replaced almost entirely by *barroviannus* and *leucopterus*. The habits of these two species are almost identical where they are found together in Bering Sea and they are not easily distinguished until very near or unless the two chance to be side by side. We have no record of its occurrence in the interior, although it may frequent the Lower Yukon with *leucopterus*.

The center of abundance of this species in summer may be located along the Aleutian chain, *leucopterus* having its center of abundance along the northern shores of Bering Sea, and *barroviannus* north of the straits. In winter the two latter frequent the Aleutian chain, while many of the *glaucescens* move south.

LARUS NELSONI Hensh. Nelson's Gull.

Since the description of this species in the Auk for July, 1884 (p. 250), nothing whatever has been added to our knowledge respecting it, and the type specimen remains unique. Its resemblance to several of the larger gulls is likely to keep us in ignorance of its range and habits for a long time to come, or until it is made the object of special attention by the naturalists visiting Alaska. The type specimen was captured by Mr. Nelson at Saint Michaels June 20.

The immature gull taken by Murdoch at Point Barrow and mentioned in Report of the International Polar Expedition, 1885, p. 123, under *L. kumlienii*, is too immature, as Mr. Ridgway now informs me, to be satisfactorily identified, though believed at the time to be that species. The record of the *L. kumlienii* from Alaska is therefore to be canceled.—H. W. H.

LARUS SCHISTISAGUS Stejn. Slaty-backed Gull.

In September, 1880, Capt. C. L. Hooper, of the Corwin, took the first example of this bird known from the west coast of America. It was secured at the Diomed Islands, in Bering Straits, and is in the National Museum collection.

The first record of its capture was of the specimen taken by Dr. Bean on October 1, the same season when a young bird was taken at the head of Chernofsky Bay, Unalaska. The birds were abundant there at the time, feeding at the mouth of a small river flowing into the bay.

Further work in this region may show that this specimen is of regular and common occurrence at many points on the Alaskan coast, although it was not noted by myself nor by any previous explorer there.

Stejneger found it an abundant breeding species near Petropaulski, Kamchatka, and an occasional visitor to the Commander Islands. From these records it appears that this is a widely distributed species in Bering Sea and the adjacent parts of the Pacific.

It is probable that the gull taken by Captain Moore, of the British ship Plover, in 1849, at Choris Peninsula, and identified by Mr. Harting as the *Larus occidentalis*, is the *L. affinis*, though it may possibly be the present species. Mr. H. remarks that it is of the same size as *argentatus*, but with shorter wings and a darker mantle.

LARUS ARGENTATUS SMITHSONIANUS Coes. American Herring Gull (Esk. *Nã-gõ-yũkk-lik*).

Like the preceding, the Herring Gull has but a limited known distribution in the Territory. Mr. Dall found it abundant on the Upper Yukon, replacing there the *leucopterus* of the lower river. The same author records its arrival before the ducks, by May 2, and found it breeding on islands in the river, laying its eggs in small depressions on the bare ground. Hartlaub records it as not numerous at Schutlichroã May 30.

36. LARUS CACHINNANS, Pall. Pallas's Gull (Esk. *Nã-gõ-yũkk-lik*).

This gull occurs along the Siberian coast of Bering Sea, but just how commonly is not known. It also reaches the Alaskan shore from Kotzebue Sound to the Yukon mouth, at least during the summer, and probably breeds on our shore. They were somewhat common in Plover Bay, East Siberia, the summer of 1881, where they are also recorded by Dall under the name of *L. argentatus*, and were also seen in Bering Straits.

During my residence at Saint Michaels I saw a number of gulls at long intervals, which were probably of this species, but I was not able to make a positive identification. October 16, 1880, a native secured and brought me a fine specimen of this gull. The *L. borealis*, recorded by Dall as not uncommon at Saint Michaels and as plenty at Plover Bay, is the present species.

LARUS BRACHYRHYNCHUS Rich. Short-billed Gull.

This elegant gull is an abundant species over a large part of the Alaskan mainland. During the Telegraph Expedition it was secured at Sitka and Kadiak, and was recorded by Dall as abundant along the Yukon from Fort Yukon to the sea. This author obtained the eggs in large numbers at the Yukon mouth, and noticed there a variety of the bird with a bright yellow bill. He secured the young in downy plumage near Fort Yukon.

Although perhaps occurring as a straggler on the Eastern Aleutian Islands during the migrations, it is nearly or quite unknown on the other islands of Bering Sea, except those closely bordering the shore line.

It is a marsh-loving species, and is rarely found near the bold promontories and capes which delight the Kittiwakes. Frequenting all the flat marshy country of the coast and interior, they are found nesting from the peninsula of Alaska north to the head of Kotzebue Sound, and from this sea-coast region they breed interiorly over Alaska and Northern British America.

At the Yukon mouth and Saint Michaels May 14 is the earliest date they were noted in spring. As a rule they are rare until the 20th or 25th of May, about which time they find the ponds and sluggish streams open in the coast country. They undoubtedly reach interior localities earlier in the season, as the spring is considerably earlier there.

In the breeding season specimens taken at the Yukon mouth in May had the iris light hazel, bill and feet gamboge yellow, with a shade of green on the legs and toes, the corner of gape red, with a narrow red membranous ring around the eye.



3

ROSS'S GULL.
Rhodostelgia rosea
(YOUNG OF THE YEAR)

They show considerable curiosity upon the appearance of an intruder, and very frequently follow one for some distance, uttering a sharp, querulous "kwew," "kwew." When one or more are shot the others circle about a few times, but show very little solicitude over the fate of their companions.

All the examples shot by me in May were extremely handsome, the soft, white plumage being shaded with a delicate rose color. Adult birds taken at Saint Michaels the last of August had a silver gray iris mottled with lavender; bill yellow at tip and dingy yellow at base; feet dingy olive greenish or yellowish. The young of the year at the same season have a hazel iris, dark horn-colored bill, dull flesh-colored at the base, and pale flesh-colored feet and legs. Upon their first arrival in the north these birds seek the vicinity of their summer resorts and are found in the same vicinity until the young are able to fly.

They nest, like the Glaucous Gull, upon small islets in ponds and lakes.

Along the coast of Bering Sea they feed upon sticklebacks and other small fry which abound in the sluggish streams and lakes. A bulky nest is prepared of grasses and moss early in June, in which two or three eggs are laid.

From the 18th to 25th of July most of the young are able to fly, and early in August old and young gather along the courses of streams or near the larger lakes. From this time on many of the birds are found also about low spits and mud flats along the coast.

The young frequently follow boats for long distances on a stream or near shore, and they are so unsuspecting that they may almost be knocked down with a paddle.

The old birds pass through the fall moult the latter half of August, and by the middle of September they are in the new dress, and gradually disappear from the north until by the end of this month they become rare.

In September they fraternize more commonly with the Kittiwakes than at any other season, in the bays and along the coast.

LARUS PHILADELPHIA (Ord). Bonaparte's Gull (Esk. *Ā-tūng-āt*).

On the coast of Bering Sea this is one of the rarest of the gulls. At the Yukon mouth on June 4 a single specimen in the immature plumage was secured while feeding in some shallow ponds in company with numerous Sabine's Gulls and Arctic Terns. This was the only spring bird seen by me in the north, and being in the winter plumage was probably a barren bird straying beyond the usual range at this season.

On September 19 and 20, 1879, I found them numerous in flocks along the tide-channels near Saint Michaels. They were hovering in parties with many Short-billed Gulls close to the surface of the water and feeding upon the schools of sticklebacks. They were only seen once again near the locality named and that was at about the same date the succeeding fall.

Near Sitka specimens were taken by Bischoff, and my native collectors brought me specimens from the vicinity of Nulato, and reported it as occurring about the lakes near the head of Kotzebue Sound.

Dall found it rather common on the marshes along the Yukon, and notes that they are numerous and breed on the Kaiyuh River near Nulato. Eggs have been taken near Fort Yukon.

RHODOSTETHIA ROSEA (Macgill). Ross's Gull.

It is with great pleasure that I add this rare and elegant species to our west-coast fauna. The only specimen secured by me, and the only one seen, was a young bird of the year in its first plumage taken near Saint Michaels, Norton Sound, on October 10, 1879. The Eskimo to whom I showed the bird always insisted that it was a young Sabine's Gull, and could not give me the slightest information concerning its occurrence, although it may be more or less frequent near Bering Straits. This specimen measured in the flesh 12.5 inches in total length by 29 inches in extent of wings: Wing, 9.5 inches to carpal joint; tail, 4 inches; bill, .6 inch along culmen. The tail contained ten feathers and was emuncate. Bill, black; iris, hazel; feet and legs dull fleshy purple.

Since the above was written the Ross's Gull has been reported by Murdoch as abundant at Point Barrow in the latter part of September and in October, 1881. None were seen in spring or summer. "They appeared in large, loose flocks, coming in from the sea and from the southwest, all apparently traveling to the northeast." It is not known where they breed or where they winter.

The species was first discovered north of British America, and all the specimens known up to the date of the capture of nine were secured about the Arctic coast and islands north of Europe and on the opposite American coast.

A specimen is recorded from between Nova Zembla and Franz-Josef Land by Payer in the English edition of "New Lands within the Arctic Circle," Vol. II, p. 91.

Three specimens of this gull were brought home by the naturalist of the ill-fated *Jeannette*. During the long drift of this vessel in the ice northwest of Bering Straits a number of these birds were seen and secured, but during the long journey over the ice only three examples were kept. In spite of this and the length of time since the birds were killed, their plumage still glows with a beautifully rich and delicate shade of rose color. While cruising in the *Corwin* off Wrangel Island, in search of the *Jeannette* during August, 1881, the writer saw a small gull in immature plumage, which at the time was identified as a young *Xema*. The bird kept at some distance from the vessel and was fishing in the water between the floating ice. Since my return to Washington I have examined the Saint Michaels bird carefully and am convinced that my so-called *Xema*, off Wrangel Island, was in reality a young *Rhodostethia*.

During Parry's adventurous journey over the ice north of Spitzbergen it was seen several times and was also noted in Waygatzt Straits.

XEMA SABINII (Sab.). Sabine's Gull (Esk. *Nä-yüthV-nä-ük*).

All the marshy coast districts on both shores of Bering Sea are chosen resorts for this beautiful gull during the breeding season. It is especially numerous along the Alaskan coast from the Kuskokwim mouth to Kotzebue Sound, and on the Siberian side from Plover Bay to beyond the Straits, but they occur more as birds of passage along the latter coast than as summer residents. It occurs in small numbers on Saint Lawrence Island, but is unknown from the other Bering Sea islands and the Aleutian chain. They undoubtedly winter along the eastern part of the latter group, and thence south to some undetermined point along the Pacific coast.

It is rather numerous about Point Barrow in summer, and Murdoch thinks they breed there.

The earliest arrival noted by me at Saint Michaels was on May 10, 1878, and the latest date in fall was October 10, 1879.

My acquaintance with this bird began on my first excursion near Saint Michaels on June 26, 1877. We were caught by a head-tide at the mouth of the "canal," some 15 miles from the fort, and tied up to the bank to await the change. We stopped soon after midnight, and taking my gun I strolled off across the marshes in the soft twilight. For some time only the hoarse cries of distant loons or the rolling note of a crane broke the silence. The whole scene was desolate in the extreme; not a living thing could be seen, and the bleaching fragments of drift-wood scattered among the numberless ponds were all that broke the wide extent of level marsh. About 1.30 a. m. the sky became brighter, and the rich tones of the swans, mellowed by the distance to a harmonious cadence, came from the larger lakes, while various other inhabitants of the marsh from time to time added their voices to the chorus. In a few minutes a long, straggling train of small gulls was seen passing over the ponds in silent procession. Approaching them they were found to be busily engaged in feeding on the small fishes and various small larvæ found in these pools. Their motions and appearance were much like those of Bonaparte's Gull, when seen at a distance, but they rarely plunge into the water like the latter, as the *Xemas* have the habit of hovering gracefully close over the water to pick up a morsel, or of alighting for an instant in the water and rising again on the wing so lightly that scarcely a ripple is made on the surface. Ten or a dozen beautiful specimens were shot without difficulty as the birds flew about.

During succeeding seasons I found these birds to be among the most numerous of the gulls, and the main body of arrivals came in spring, as the ponds and small tide creeks were nearly

free from snow and ice, dating from the 15th to 25th of May. At this season they wander in company with the Arctic Tern, but the last of May or first of June they congregate about the parts of the marshes selected for their nesting ground.

Their food throughout the season consists of sticklebacks at times, but mainly of such small larvæ and crustaceans as occur in brackish ponds.

The feet and legs of the adults are black, but are frequently mottled with light patches, as are the feet of *Stercorarius*.

The eggs are rarely deposited earlier than on June 5, and generally some days later.

The first young are on the wing about the 15th to 20th of July, and they are very common by the 10th of August.

As August draws to a close, young and old forsake the marshes to a great extent, and the rest of the season are found scattered along the coast feeding at the water-line on the beaches. On a number of occasions I have mistaken the young of these gulls for plover or other waders as they sought their food along rocky beaches. In such cases they run out with each retiring wave and back before the incoming one with all the agility of a wader.

A young of the year taken August 24 measured 13 inches in total length by 32.5 in spread of wings. Its iris was hazel; bill dark bluish horn color along culmen; fleshy horn color along gape and base of lower mandible; feet and legs dull livid flesh color.

Toward the end of September they become more and more scarce until only a comparatively small number are found at the beginning of October, but the last ones remain until the 8th or 10th of this month, and these birds are usually young of the year.

Sabine's Gull has a single harsh, grating, but not loud note, very similar to the grating cry of the Arctic Tern, but somewhat harsher and shorter. When wounded and pursued or captured it utters the same note in a much higher and louder key, with such a grating file-like intensity that one feels like stopping his ears. It has the same peculiar clicking interruptions which are so characteristic of the cry of a small bat held in the hand. A low, chattering modification of this is heard at times as the birds gather about the border of a favorite pool, or float gracefully in company over the surface of some grassy-bordered pond. The same note, in a higher key, serves as a note of alarm and curiosity as they circle overhead or fly off when disturbed. When one of these gulls is brought down the others of its kind hover over it, but show less devotion than is usually exhibited by the terns.

On June 13, 1880, about 20 miles from Saint Michaels, while eggng in company with some Eskimo, we found a pond some 200 yards across, in the middle of which were two small islands. A gunshot caused at least one hundred of these gulls to rise like a white cloud over the islet, and showed us that we had found a breeding place. As we stood on the shore a few birds came off, and circling close about us for a few moments, but rarely making any outcry, returned to the island, where the others had already settled again and appeared to be sitting upon the ground. The water of the lake we found to be about waist-deep, under which lay a solid bed of ice of unknown depth.

The smallest island lay nearest, and sending one of my men out to it he found a set of two eggs of the Black-throated Loon, one set of the Arctic Tern's eggs, and two of Sabine's Gull. Proceeding to the next island he found a set of *Aythya marila nearectica* eggs as he stepped ashore, and a moment later cried out that the ground was covered with gulls' eggs. At the same time he answered with chattering teeth that the water in the lake was very cold. Having never seen the nest of this gull I called my man back and he transported me upon his back to the island after narrowly escaping several falls on the way. The island was very low, and the driest spots were but little above the water. Built on the driest places were twenty-seven nests, containing from one to three eggs each, and as many others just ready for occupancy. Four or five nests were frequently placed within 2 or 3 feet of each other. In about one-half the cases the eggs were laid upon the few grass blades the spot afforded with no alteration save a slight depression made by the bird's body. In the majority of the other nests a few grass blades and stems had been arranged circularly about the eggs, and in the remainder only enough material had been added to afford the merest apology for a nest.

While I was securing my prizes the birds hovered overhead in great anxiety, although they rarely uttered their grating cry, and in the very few instances when a bird darted down at us it was in perfect silence. While we were on the island several Glaucous Gulls and Jaegers passed by, and in every case they were attacked by several of the Xemas and driven hastily away. Two nests had been despoiled either by these birds or a muskrat, as the broken shells showed. When the eggs were secured a large and fine lot of the gulls were obtained, and we then made our way back to camp heavily laden with spoils. Solitary nests were afterwards found either on islands like the last or on the border of a pond. In one instance the female left her eggs when I was over 100 yards away and flew directly away until she was lost to sight.

STERNA TSCHEGRAVA Lepech. Caspian Tern (Esk. *Tū-kīlth-koī-yūkh-pūk*).

This great Tern occurs as an occasional visitant to the coast of Bering Sea, from the Yukon mouth to Saint Michaels at least, and is undoubtedly found still more frequently south to the known haunts of the species along the Pacific coast. It is well known to the Eskimo in the vicinity, who call it by the same name as they do the Arctic Tern, simply adding a suffix meaning "the big." Several were seen during my residence both at Saint Michaels and the Yukon mouth, but none were obtained. These birds occur also along the east coast of Asia, and are found in India in winter.

STERNA PARADISEA Brünn. Arctic Tern (Esk. *Tū-kīlth-koī-yūk*).

Throughout all Northern Alaska, both on the coast and in the interior, the Arctic Tern is an abundant summer resident, breeding wherever found. Near Saint Michaels they arrive about the same time as Sabine's Gull, the first arrival noted being on May 10, but the main body of the birds come between the 15th and 25th of this month, when the ponds and streams on the coast open. By the latter date they are common, but the first eggs are not laid till about the 5th of June, though the date varies with the season. One set was found on the island, close to the nests of the Sabine's Gulls, on June 13, and but for the difference between the eggs could not have been separated from those of the latter. The young are rarely on the wing before July 20, and I have secured both fresh eggs and downy young the 29th of July.

The last of August and during September these terns seek the coast and mouths of streams, and become rather scarce about their breeding grounds, and by the 20th of September very few are to be found, although single individuals are sometimes seen until the 1st of October.

When these terns first arrive the ground is still partly covered with snow and the birds keep in flocks of various size. When the snow disappears the flocks break up and they breed in scattered pairs. On June 12 I found a nest upon a small wet islet in a pond. The islet was covered with short grass, and my attention was drawn to the spot from seeing the parents continually attacking the passing gulls and jaegers. When I drew near they swooped at me and circled about without a cry until both were shot. The nest was lined with a few dry grass stems and contained two eggs, and the female bore another ready to deposit. Another nest similarly situated was lined with material procured within a few feet, and the ground was turned up in small spots all about where the birds had uprooted the grass, many small bunches of grass being half uprooted and left, the task proving too heavy.

The middle of August the young are very common on the marshes, and follow an intruder about from place to place, uttering an odd squeaky imitation of the notes of the adult birds. They heedlessly hover close overhead, and the expression of innocent wonder in their soft black eyes makes them amusing little creatures to watch.

Toward the end of August the young have a dark hazel iris; feet and legs varying from dull orange-reddish to dingy orange-yellow. Bill dark horn color at tip and along culmen; basal half under nares dull orange-red or dull lake; gape orange. Some specimens have the bill nearly all blackish horn color.

On the Aleutian Islands Dall found these birds abundant and breeding on the Shumagins and at Amchitka. It occurs on Saint Lawrence and Saint Matthew's Islands, where it breeds, and although not mentioned by Elliott as occurring on the Fur Seal group it must occur there in the migrations, at least.

During the cruise of the *Corwin* in 1881 we found these graceful birds on both the Alaskan and Siberian shores as far as we went. It arrives at Point Barrow about June 10 and leaves about the end of August. It breeds in that vicinity. It is numerous on the Near Islands, breeding on Semichli. They breed sparingly also on the Commander Islands.

Along the Yukon Dall found these birds very common in large flocks, and found the downy young on June 22, near Fort Yukon. They frequently followed his boat long distances, and were seen sitting on sticks of drift-wood or hovering over the river.

During Collinson's famous voyage to the north coast of Alaska he found these birds at sea north of Point Barrow in latitude $75^{\circ} 30'$ north, the most northern point reached by any explorer in this region except the *Jeannette* crew.

During Nordenskjöld's voyage they were found common on Spitzbergen but scarce on Nova Zembla, and were seen about the New Siberian Islands, and during the cruise of the *Corwin* the writer saw them over nearly all the Arctic basin north of Bering Straits.

At the points visited by the first named explorer the birds' eggs were found on the bare sandy or pebbly ground.

STERNA ALEUTICA Baird. Aleutian Tern (Esk. *Īġ i-lūġ-ñ-ná-għūk*).

Among the results of the Telegraph Explorations in Alaska was the discovery of this geographically narrowly limited Tern. From the time of its discovery upon Kadiak Island, by Bischoff, who also secured a single egg, nothing has been published adding to the bird's history up to the present date. In 1875-'76 the Smithsonian Institution received specimens taken in the vicinity of Saint Michaels by Mr. L. M. Turner, thus adding much to the bird's known distribution. During the writer's residence at Saint Michaels he found these birds to be regular and common summer residents in certain restricted localities where they nested. They extend their range to the head of Norton Bay, and also reach the Siberian coast of Bering Straits, as shown by their presence in Saint Lawrence Bay, where Mr. R. L. Newcomb, naturalist of the *Jeannette*, found them in 1879.

The facts given above comprise all we know at present of this interesting bird's history, and from it we see that they breed throughout their known range, and undoubtedly winter in the vicinity of Kadiak and the coast of the Northern Pacific adjacent thereto. This species is strictly limited to the sea-coast, and breeds upon small dry islands on the coast. They reach Saint Michaels from May 20 to 30, rarely earlier than the first date, and are found scattered along the coast in company with the Arctic Tern for a short time, but early in June they gather about the islands where they nest.

One of these islands is about a mile from Saint Michaels, in the mouth of a tide-channel known as the "canal." This island is nearly half a mile across, rises about 30 feet from the beach in a sharp incline, and has a rather level top covered with a thick mat of grass, moss, and other vegetation. The upland is dry, and here the birds breed, laying their eggs directly upon the moss, with no attempt at a lining, which would be entirely unnecessary there. Some 18 miles to the eastward, along the coast, and less than a mile from the Eskimo village of Kogiklutowik, is another island in a bay, presenting almost the same characteristics as the one first described, and upon the higher portions the birds nest even more commonly, for as against the twenty pairs or so nesting on the first island some thirty or forty pairs occupied the latter island both seasons when it was visited by the writer. From the proximity of native villages, and owing to the persecution received at the hands of Turner and myself, the birds on these islands were very shy, and it was no easy task to secure specimens.

On each island they were in company with about an equal number of Arctic Terns, but while the latter were darting down at our heads or circling back and forth within easy gunshot, the other species kept at an elevation of some 40 yards, and after one or two were taken the rest arose out of gunshot and passed back and forth overhead in safety.

They can be distinguished from *arctica*, even when out of gunshot overhead, by their darker under surface and their slightly slower wing-strokes. The old birds have a black bill with slight horn-colored tip, and black feet and legs. Both old and young have the iris hazel.

The eggs are rarely laid before June 5 or 10, and I found one egg with an embryo two-thirds grown on September 1, but this is very unusual. When partly fledged the young have pale, dingy, orange-yellow feet and legs; tip of beak and culmen dark horn color; gape and rest of beak pale orange-yellow.

The young in any stage may be readily distinguished from the young of *paradisaea* by the deeply cleft toe-web, whereas the web of the latter is nearly full. The young of *aleutica* are hatched from the last of June until September, and the first ones are on the wing by the last of July. The old birds stray along the coast after the first of July and until about the middle of September, after which none are seen until the following season.

On September 1, 1879, I visited the island near Kegikhtowik and found from sixty to eighty adults of this species haunting the vicinity and circling in graceful flight all about the island. When we landed and passed over the island the birds showed considerable anxiety and continually uttered a thin, clear, trilling whistle. With the exception of some broken egg-shells and the old depressions showing the nesting sites, nothing but a single egg was found there, but as we walked out on a low cape, covered with large scattered rocks, we put up, one after the other, a considerable number of young birds just able to fly, and a goodly number were secured. When they arose they had a queer, erratic, dazed kind of flight, reminding me of the flight of an owl suddenly disturbed in the daytime. The old birds kept flying in toward the point with small fishes in their beaks, but although we concealed ourselves in the rocks others of the party evidently warned them, so that only two or three of the adults were taken. One young bird was fired at and missed and flew wildly out to sea, when it was joined by an old bird which kept close to it, and as the young bird became tired and turned toward shore the parent met it and forced it to turn back. This maneuver was repeated over a dozen times, until the young bird was forced off to sea out of sight. This was one of the most striking instances of bird sagacity I met with in the north.

The downy young of this species appear to be distinguishable from the young of all other species. The color above is a grayish buff, profusely blotched with black. The black of the chin and throat extends somewhat to the upper portion of the breast. The breast is pure white, shading into a very dark gray on the belly and sides. There is considerable difference in individual specimens, some being of a light buff above.

As compared with the downy young of *paradisaea* from Labrador, these birds are darker above, buff instead of a light fulvous, and with more black blotching. The black of the under parts in *paradisaea* is limited to the chin and throat, while the belly is of a much lighter color.

The young when just on the wing have the occiput blackish brown, the head above spotted with same. The feathers of back, wing coverts, and tertiaries are edged with bright ochraceous, which also tips the tail feathers. The secondaries are broadly tipped with white, making a conspicuous wing-band. Under parts white, the breast washed with smoky brown. Upper mandible black, lower yellow. The rump is *ashy* instead of *white*, as in the corresponding stage of *paradisaea*.

HYDROCHELIDON NIGRA SURINAMENSIS (Gmel.). Black Tern.

The only record of this bird's occurrence in Alaska is that given by Mr. Dall, who obtained a single specimen with an egg from an Indian at Fort Yukon. Both bird and egg were taken in the marshes near that place in June.

DIOMEDEA NIGRIPES Aud. Black-footed Albatross.

The day after we left San Francisco on our way north, April 26, these birds first appeared, and on the third day out about thirty kept in our wake. On the eighth day only a few were left, and when two days from the Aleutian Islands none were to be seen. On our way south from the Aleutians in October, 1881, these birds first appeared about 150 miles south of the islands, and only disappeared when Cape Mendocino came in view. Through all the ten days of continuous gales we experienced, which were so fierce as to do our vessel much damage and force us to lay to for several days, the buoyant forms of these birds were visible. As night hid the face of the Pacific they were seen upon motionless wings gliding along our wake or cutting across the bow, and early dawn showed them continuing apparently in the same position, until it seemed as if they had never quitted us through all the gloomy night.

At times thirty or more are gathered close about the vessel, and again only two or three are visible far off toward the horizon. A few scraps of food thrown overboard is sure to attract the nearest ones, and the others take the cue from them and hurry in from all sides. They have a curious guttural note as they quarrel over the food and a whining cry when on the wing.

When taking wing they half spread their wings and paddle rapidly along as if running on the water, until they gain sufficient impetus to glide easily up. In rough weather they rise easily from the crest of a wave as though impelled by some unseen force, but in a calm they rise with much more difficulty. Like other albatrosses the flight of this bird is a marvelous exhibition of grace and ease. Their wings are exceeding thin and sharp, as viewed on either edge, and the tips appear sensitive to every breeze and ripple in the air.

In Mr. Dall's notes upon this species in his several papers he credits them with being able to distinguish a discolored spot in the water a yard across at least 5 miles away. The same naturalist learned from Capt. George Holder that these birds nest, during the winter months, on the coral island of Gaspar Rico, near the equator. This gentleman was on a voyage in search of new guano islands, and found these birds nesting as described. They are not known to nest anywhere on our coast, nor on the adjacent islands.

According to Dr. T. H. Bean the fresh birds measure nearly 80 inches in extent by 28.50 in length, with a bill from 3.75 to 4.31 inches long. The iris is amber-brown, and the base and tip of bill black, the remainder plumbeous.

The naturalist just quoted considers latitude 51° north as the northern limit of *nigripes*.

DIOMEDEA ALBATRUS Pall. Short-tailed Albatross.

From latitude 50° in the North Pacific this fine bird becomes more or less numerous, and thence north nearly or quite replaces the preceding species.

During May, 1877, I found them very common between the islands east of Unalaska.

The birds were very conspicuous from their white plumage and great size. During calm days they were most numerous, and ten or fifteen were frequently in sight at a time. Unlike the Black-footed Albatross these birds do not appear to follow vessels, and, in fact, are so shy that as a rule they give a wide berth to any species of sailing craft.

They were found throughout the Aleutian chain by Dall, who observed the carcass of a very young one on Attu in August. They are resident about the islands, and in the ancient shell-heaps their bones are of common occurrence. Elliott states that they were numerous about the Fur Seal Islands thirty years ago when the whale-fishery was carried on in that part of Bering Sea. Since the decline of this the birds have become more and more uncommon there. They rarely visit Norton Sound, but the writer found them common about Bering Straits in summer. A number were seen about the Diomed Islands, and others about Saint Lawrence Island and the opposite Siberian shore. A number of their beaks were found in some deserted Eskimo villages on the latter island.

During his summer cruise Dr. Bean found these birds around the Gulf of Alaska, but considered the mouth of Cook's Inlet and the vicinity of the Barren Islands as their favorite resort. He also found them shy and difficult to secure. The Kadiak Eskimo call them "Kay-mah-rye-er-k." The natives of Alexandrovsk sometimes spear them from their kyaks. A bird secured by Dr. Bean measured in the flesh 88 inches in extent; wing, 21; tail, 6.75; bill, 5.19; tarsus, 3.87; middle toe and claw, 5.12.

Turner reports this species common about the Near Islands in March.

In about latitude 40° 30' N., and longitude 142° 23' W., Dr. Bean observed an albatross which his notes indicate to be *Diomedea melanophrys*. This brings the bird within the range of *nigripes*, and it is barely possible that it may reach the Aleutian chain. The colors, as noted, were: Head, neck, lower parts, and rump, white; under surface of wings light colored; elsewhere the bird is dark gray, like *nigripes*. (Proc. U. S. Nat. Mus., v. 170, 1883.) It is slightly smaller than the latter species. The bill is light, and a dark streak extends from the bill behind the ear.

FULMAREUS GLACIALIS GLUPISCHA Stejn. Pacific Fulmar.

This is the common Fulmar of the North Pacific. A number of specimens are in the National Museum collection from Unalaska.

From the account of the voyage of the Vega we learn that *F. glupischa* occurs on Bear Island, Spitzbergen, and Nova Zembla, being more common on the two former groups.

They nest abundantly on Bear Island, choosing sloping cliffs not difficult of access. On May 28, 1866, their eggs were found upon the bare ice which covered the rocks. At one place a bird was found, by one of the early explorers, frozen fast by one leg, as it sat on its eggs, in August. On the north part of Nova Zembla, Barents found some Fulmars nesting upon a piece of ice covered with a little earth.

In the Cruise of the Corwin (p. 113), I state that "as we approached Unalaska in September, large numbers of dark-plumaged Fulmars were also seen in company with the common species (*rodgersii*), but then, as before, it was impossible to secure specimens. The intensity of the dark coloring in many of these specimens seemed to preclude the idea of their being referable to Rodgers's Fulmar." A number of these dark birds were also seen north of Bering Straits on two occasions. As Dr. Stejneger has already suggested, I think these birds may be safely referred to his recently described form.

Turner records these birds as rare on the Near Islands, occurring most frequently on Semichi, and this record, with my observations, as noted, covers all the information at hand concerning the presence of the form in Alaska.

On the Commander Islands it breeds in the greatest abundance on high cliffs and promontories rising from the sea. The eggs are dull-white. On these islands Stejneger found both a dark and a white phase, the latter being far less numerous.

FULMAREUS GLACIALIS RODGERSII (Cass.). Rodgers's Fulmar.

The type of this form was secured in the North Pacific by Stimpson, during Rodgers's Expedition into that region.

All of the Bering Sea islands situated offshore and north of the Aleutian chain are frequented by these Fulmars during the breeding season. During the summer of 1877 they were found very common north of the Aleutian Islands and about the Fur Seal group. As we neared the western shore of Bering Sea and came into shallow water the Fulmars disappeared, and during the four years passed at Saint Michaels only a single specimen was taken. This was secured on October 15, 1879, and measured 17.50 inches in length by 41 inches in extent. The bill was of a varying shade of greenish-yellow and bluish-green; the iris very dark hazel; feet and tarsus livid bluish.

During the summer of 1881 we found this Fulmar very numerous in Bering Straits and about Saint Lawrence Island and the west coast of the sea. North of the straits they were also found abundant along the Siberian coast and northward, but rare on any part of the Alaskan shore. They were common off Herald Island, where they were breeding in August, and also off the south shore of Wrangel Island.

The flight of these birds, like that of all their kindred, is full of grace and buoyancy, and the birds form almost the only object of interest on a large part of their range. Their wandering habits lead them from one place to another, so that on some of our passages through the straits they were abundant, on others they were very scarce.

The food of this bird consists of the small fragments of animal matter the surface of the sea affords. They gather about a whale's carcass, and drink the large globules of oil which cover the sea, sometimes for miles, about a decaying cetacean. In Plover Bay, Siberia, on one occasion, we noticed the oil thus floating about in the morning, and in the afternoon a Fulmar was shot from which ran a considerable quantity of putrid oil when the bird was taken up by the feet.

They rarely follow vessels for any length of time, although they gather about any food thrown overboard, if they happen to be near, and quarrel over it.

Upon the Fur Seal Islands Mr. Elliott found these Fulmars breeding, and tells us that they are the only species of the petrel kind found about this group. They reach these islands very early in

the season and repair to the cliffs, especially on the south and east shores of Saint George's Island, where, selecting some rocky shelf on the face of the cliff, safe from all enemies except man, they deposit a single egg upon the bare rock and proceed at once with the incubation. They are very devoted to their eggs, and our author states that they may even be pelted to death with stones before they will desert their charge. The eggs are laid by the 1st to the 5th of June, and measure about 2.90 by 1.90. The color is soiled white; the shell is rather rough, and the egg is scarcely more pointed at one end than the other.

The natives of the islands obtain the eggs, which are said to be very palatable, by lowering one of their number over the cliffs on a rope or raw-hide thong. "The chick comes out a perfect puff-ball of white down, gaining its first plumage in about six weeks. It is a dull gray, black at first, but by the end of the season it becomes like the parents in coloration, only much darker on the back and scapularies." The writer saw young birds in both the stages just mentioned, in September and October, 1881. During September Fulmars were seen about the Straits, and in October they were extremely numerous off the harbors in the Aleutian Islands, and so fat that they could scarcely rise from the water during calm weather; whether they were of this or the foregoing species it is impossible to say. The Fulmars taken about Spitzbergen are said to have a reddish-orange suffusion in the white plumage during spring.

PUFFINUS TENUIROSTRIS (Temm.). Slender-billed Shearwater (Esk. *Mük-lök ting-ü-mé-ük*).

During the Telegraph Explorations Mr. Dall secured a skin of this bird from an Eskimo. The bird was killed in Kotzebue Sound, and the natives called it the "Müklok ting-myuk," or Seal Bird, and said that it followed the seals in their migrations. This record extends the bird's range through Bering Straits to the Arctic Circle.

The writer saw no bird which could be referred to this species on the eastern side of Bering Sea, but just northwest of the straits, the last of August, 1881, quite a number of dark-plumaged birds were seen, with many Rodgers's Fulmars, which appeared to differ in size and appearance from the latter, and which I am inclined to think belonged to this species. Many young dark-plumaged Fulmars were seen at the same time.

Again, the last of September, as we approached the harbor of Unalaska, many of the same birds were seen in the same company.

As the single specimen secured by Dall is the only one taken north of the Aleutian chain, the species must be regarded as very rare there. It is reported from Sitka by Schlegel, and also from Japan and the Kurile Islands.

By a slip, my notes upon this bird in the Cruise of the *Corwin* were given under the name of *Prionocella tenuirostris* (Aud.).

In addition to the single specimen of this bird taken by Dall in Kotzebue Sound, one was taken at Unalaska, August 31, 1828, by von Kittlitz, and a third specimen, from Sitka, is said to be in the Leiden Museum (cf. Stejneger, *Auk*, July, 1884, p. 234). Another specimen has been taken recently on Kadiak Island by Mr. W. J. Fisher.

ESTRELATA FISHERI Ridgw. Fisher's Petrel.

This species was described from a specimen taken on Kadiak Island by Mr. Fisher. (See Proc. U. S. National Museum, 1882, pp. 656-658.) Nothing distinctive is known of its habits.

OCEANODROMA LEUCORHOA (Vieill.). Leach's Petrel.

In May and October I found this petrel abundant in the passes through the Aleutian chain and for some distance on each side of the islands, rarely, however, passing 100 miles to the north, although being found everywhere on the North Pacific, even hundreds of miles offshore. They are always more common, however, near land.

Bischoff found them abundant near Sitka, and Dall found them breeding on the rocky islets near Attu and on the highlands of Kyska and Amchitka, all near the western end of the Aleutian

chain. The male is said to assume a large part of the duties of incubation. A single white egg is usually laid in the end of a burrow from 6 inches to a foot deep. The burrow is usually in a turfy bank and is rarely straight. They disgorge a reddish, oily fluid when handled, which has a strong, musky odor. The birds are largely nocturnal in their habits during this season. Fresh eggs were taken from June 10 to the end of July. Our author also states that birds from the islands are darker than those from Sitka. Upon these islands they are summer residents, arriving in May and going south in winter.

These birds breed all along the coast to Southern California and are probably the species which breeds on the Mendocino County coast, and are called "musk-birds" by the people there. They breed also on the Commander Islands according to Stejneger.

OCEANODROMA FURCATA (Gmel.). Fork-tailed Petrel (Esk. *Ök-irik*).

The Aleutian Islands form the main home of this elegant bird. It is seen in the North Pacific for one or two hundred miles south from the islands, but the passes and waters within a few miles of the outer shores afford them their most frequented haunts. The middle of June, 1877, they were common offshore west of Nunivak Island, in Beriug Sea, and they are frequent autumnal visitants to all parts of this sea. I obtained several specimens at Saint Michaels usually during October. The Eskimo find them even after the sea is covered with ice. At such times they are usually near an air-hole, and in several cases were captured alive, being too weak from starvation to escape. They are also sometimes found on the Lower Yukon, and, strangely enough, one was captured about 75 miles up the Tanana River, where the bird was found sitting on the ice near an air-hole late in November. In the flesh they measure about 8.75 inches long by 18 in extent.

During the cruise of the Corwin, in 1881, these petrels were seen on several occasions in Bering Straits and about Saint Lawrence Island, and in Plover Bay, Siberia.

Two specimens were taken in Kotzebue Sound by the Eskimo during my residence at Saint Michaels, so its range reaches the Arctic Circle. They never pay the slightest attention to a vessel, and have the same style of flight and habits at sea as Leach's Petrel. They were found breeding upon the Chica Rocks in Akoutan Pass, near Unalaska, on June 2, by Mr. Dall. The nests were on the edge of a steep bank near, but 10 or 12 feet above, the shore. They were in holes extending obliquely downward and back and about a foot deep. In the bottom was a little dry grass and fine roots. The eggs were white and but one in a nest. The same naturalist afterwards found these birds breeding from the pass named west to the end of the chain. The soft delicate colors of this petrel render it one of the most elegant of the northern water-fowl and especially marked among the other petrels. When caught on the nest they eject the musky, oily contents of their stomachs. Their habits seem to be very much like those of Leach's Petrel.

Stejneger found this bird breeding on Copper Island, one of the Commander group. The eggs were deposited singly in holes, three or more feet deep, among the basaltic rocks. Both male and female birds were found incubating. The eggs are dull white, with fine spots of lilac and dark color about the larger end.

OCEANODROMA HORNEYI (Gray). Hornby's Petrel.

While on my way to and from the Aleutian Islands a petrel conspicuous by its white collar and under surface was seen repeatedly, and, although none were secured, yet it was identified by its peculiar pattern of coloration.

These birds were seen both in May and in October while crossing a part of the Pacific some 500 miles broad bordering the Aleutian chain.

[NOTE.—It is highly probable that the birds referred to are the *O. fisheri*, recently described by Mr. Ridgway.—H. W. H.]

At least three additional species of petrels were seen while in this same part of the North Pacific, but as none could be secured their identity remains unknown.

Two species of *Puffinus* were also seen but not identified. A thorough examination of the Aleutian chain will undoubtedly add one or more species of this family to our fauna.

PHALACROCORAX DILOPHUS CINCATATUS (Brandt). White-crested Cormorant.

Two specimens of this species are recorded (as *dilophus*) by Dall as having been taken at Sitka by Bischoff during the Telegraph Explorations.

Turner records it as an abundant resident of the Near Islands.

55. PHALACROCORAX PELAGICUS Pall. Pelagic Cormorant.

According to Stejneger true *pelagicus* occurs upon the Aleutian and Commander Islands, and is replaced along the coast of the Alaska mainland by the following variety. This, then, is the cormorant I found abundant in the Aleutian Islands in May of 1877, and in the fall of 1881, where, also, it has been reported by others. Turner reports it as abundant on the Near Islands.

PHALACROCORAX PELAGICUS ROBUSTUS Ridgw. Violet-Green Cormorant (Esk. *A-gá-zhük*).

This is the most abundant species of cormorant found in the Territory. It occurs everywhere on the coast, from Norton Sound to Sitka, and breeds on almost every rocky promontory. Like the other species of cormorants they are inquisitive, and frequently circle about boats and vessels which approach their haunts.

A female taken on July 8 had a brown iris and a carunculated and coral-red gular sac, with a nearly black mandible. Another, taken on July 26, had a dark-green iris; otherwise similar. Although these birds nest abundantly on the cliffs about the north shore of Norton Sound, and a few near Saint Michaels, yet they are never very numerous about the latter place. They usually arrive there with the first open water from the 5th to 10th of June, and are found in small numbers until the ice forces them away the middle of October. They rarely enter the inner bays, except early in spring or just before ice forms in fall. One taken October 12 had a livid, flesh-colored gular sac, and a horn-colored bill. They keep about the rocky points and islets on the outer face of the islands or on bold cliffs facing the open sea, and although shy about Saint Michaels they are much less suspicious when about their breeding places.

The Eskimo on the Aleutian Islands, and thence north to the Straits, make use of cormorant-skins for clothing, and the filamentous white feathers of the flanks are used in ornamental work as fringes.

PHALACROCORAX URILE (Gmel.). Red-faced Cormorant (Esk. *Män-üh-käl-ik*).

In the Fur Seal Islands this is a resident species. A male and female taken by Mr. Dall on Amchitka the last of July showed respectively the following points of coloration: Iris olive-brown; base of mandible dull ashy blue, with a narrow orange border to the naked membrane.

The female had a pale olive-brown iris; base of mandibles and culmen bright blue; remainder of naked space scarlet. In his report upon the birds of the Fur Seal Islands (*loc. cit.*) Dr. Coes makes the following pertinent notes:

In the adult plumage it is readily recognized by the naked red skin which entirely surrounds the base of the bill, and the blue base of the under mandible. Eggs taken by Mr. Elliott have the chalky incrustations common to the eggs of cormorants, and are of the usual shape, measuring about 2½ inches long by 1½ wide. Concerning the bird's habits on these islands I take the following notes from Mr. Elliott: It comes under the cliffs to make its nest and lay before any other species, and two eggs were taken from a nest on a reef at Saint Paul Island, June 1, 1872, over three weeks in advance of the nesting season of the majority of the other water-fowl. The nest is large, carefully rounded, and built upon some jutting point or narrow shelf along the face of a cliff. In its construction sea-weeds, grasses, and a cement, largely made up of the bird's excrements, are used. The eggs are usually three, sometimes four in number, and are small as compared with the size of the bird. They are of a whitish gray, green, and blue color, but become soiled very soon, as the birds are very filthy about their nests. The young appear after three weeks' incubation, and are without feathers and almost bare even of down. They grow rapidly and are fed by the old birds ejecting the contents of their stomachs, composed of small fish, crabs,

and shrimps, over and around the nest. At the end of six weeks they equal their parents in size and are ready to take wing. Not until the beginning of the second year do they get the bright glossy plumage and bright colors on the gular sac. This shag is a stupid and very inquisitive bird, and utters no sound whatever except when flying over and around a boat or ship, which apparently has a magnetic power of attraction for them. At such times they sometimes utter a "low, droning croak." In their stomachs our author found the remains of small fish and coils of parasitic worms.

As this bird is found during the whole winter, in spite of severe weather, perched on the sheltered bluffs, the natives (of these islands) regard it with a species of affection, for it furnishes the only supply that they can draw upon for fresh meat, soups, and stews, always wanted by the sick; and were the shags sought after throughout the year as they are during the short spell of intensely bitter weather that occurs in severe winters, driving the other water-fowl away, they would certainly be speedily exterminated. They are seldom shot, however, when anything else can be obtained.

Upon Saint Matthew's and Saint Lawrence Islands, as well as upon the cliffs on both shores of Bering Straits and the islands in the middle of the pass, this cormorant is a more or less common summer resident. It is rather common about the cliffs at the head of Norton Sound, and is seen at long intervals near Saint Michaels, and nests on Cape Vancouver, Nelson Island, and Cape Romanzoff. Unfortunately my opportunities for studying the species of this genus in Bering Sea were very limited, but I may note here that these birds offer an inviting field of investigation for such naturalists as may visit the Territory in the future.

MERGANSER AMERICANUS (Cass.). American Merganser.

Not a single individual of this species was seen by the writer during over four years' residence in the Territory. Records of its occurrence in this region are furnished by Mr. Dall. It was taken at Sitka by Bisehoff and at Fort Yukon by Lockhart. The same writer secured the heads of several specimens killed in the outer bay at Unalaska the 20th of December after a severe storm. He considered it as an accidental visitor, although he was informed that it occurs about the Fur Seal Islands in winter. Hartlaub records the capture of a male at Chilcat April 26. It has also been recorded from Alexandrovsk Island, Kenay by Finsch, from Kadiak by Bean, who took a female July 30, 1880, and from Chilcoot by Hartlaub. (Stejneger, *Orn. Expl. Kamtsch.*, 1885, p. 177, footnote.)

MERGANSER SERRATOR (Linn.). Red-breasted Merganser (*Esk. Pat-yikk*).

This species is recorded from Amchitka Island, in the Western Aleutians, by Dall, who found it breeding. Specimens were taken by Bisehoff at Sitka and Kadiak, where they breed. It is a common resident of the Near Islands and occurs on the Commander Islands. On an island in the Yukon delta Dall found six nests of this bird. They were all carefully concealed under dead leaves and were generally sheltered by a log of drift-wood, and in a small hollow lined with down from the parent's breast. They contained from six to ten rich cream-colored eggs.

At Unalaska, on June 5, 1877, I found a small flock of these birds near the mouth of a creek at the head of a bay, and was led to suppose they were nesting in the vicinity. They are not recorded from the Fur Seal Islands, where they undoubtedly occur in the migrations.

During the summer of 1881 I found them breeding upon Saint Lawrence Island and along the Siberian coast from Plover Bay to Cape North through Bering Straits. On the Alaskan coast they breed everywhere in suitable places from Sitka north to Icy Cape and perhaps to Point Barrow. They are rather numerous about the head of Kotzebue Sound and the adjacent Selawik Lake. At the Yukon delta and Saint Michaels they generally commence to arrive with the open water about the middle of May and some seasons even as late as the 25th. The first eggs are laid early in June, and the site for the nest on the marshes is ordinarily the same as that chosen by other species of ducks with the usual foresight as to concealment and proximity to a pond.

Fresh eggs were secured by me up to August 3, and on the 6th the downy young only a few days old were found. This bird is extremely gregarious and arrives in flocks of from ten to

seventy-five birds in spring, and during the entire summer it is a common occurrence to start up a party of from five to ten or more. In the brackish ponds and tide creeks of the marshes they find an abundance of food in the myriads of sticklebacks which swarm in these waters.

As fall approaches, early in September, the stray parties commence to unite into flocks of from a dozen to nearly one hundred, and are found everywhere from the sea-coast up to the bases of the mountainous back of the marshes. They are not shy, and fly in compact flocks, which a single discharge will often decimate. They remain late, being found until the 10th of October, unless the season is early.

The first of August, one season, I surprised a female with young only a few days old in a pond not over 25 yards in diameter, near Saint Michaels. The pond was bordered by smooth muddy banks, and there was not the slightest chance for concealment, so the old bird marshalled her brood to the farther side of the pond, as I drew near, uttering frequently a low, distinct, but husky, *khā-khā-khā*. Desiring the young I fired some five or six shots until several were killed, yet, meanwhile, the distressed parent showed not the slightest care for her own safety, but after each shot swam uneasily to and fro among her young, uttering her call, and trying to urge them to gather about her. She was so absorbed in her maternal feelings that she did not heed me in the slightest, even when I advanced to the water's edge and splashed the water and shouted. Throughout the interior of the Territory, except in the most mountainous districts, this is a common summer resident.

LOPHODYTES CUCULLATUS (Linn.). Hooded Merganser.

This species is introduced here on the authority of Dr. Bannister, who states that he saw a flock at Saint Michaels in October, 1865, and shot one, but the lack of a boat prevented the specimen being secured.

ANAS BOSCHAS Linn. Mallard (Esk. *Uk-shūk-puk* or *Yū-gūkh-puk*).

This is one of the least common of the ducks found on the Alaskan shore of Bering Sea. A few were noted during the migration on the Near Islands, and it breeds on the Commander Islands. At Unalaska, in the Aleutian Islands, I saw a single specimen, a male, in a fresh-water pond on May 19, 1877. Mr. Dall does not mention this among the species found by him west of Unalaska in these islands, but notes it as one of the most abundant winter residents at Unalaska, where it is numerous by October 12, and remains until April and May.

Mr. Elliott found them as occasional visitors on the Fur Seal Islands, and notes a pair which reared their young on Saint Paul Island during the season of 1872. In the interior, on the mainland, the Mallard is a common, and in some places abundant, summer resident. Dall found them among the first ducks to arrive at Nulato, on the Yukon, in spring, generally coming about the 1st of May with the "Butter-ball."

This naturalist found a set of eight eggs of the Mallard laid on the rotten wood in the hollow top of a stump about 6 inches from the ground. They were concealed under a layer of leaves and feathers. They are more numerous in suitable districts higher up the Yukon than on the lower part of its course.

Bischoff found them at Sitka, and I found them breeding within the Arctic Circle along the north shore of Kotzebue Sound in 1881.

In the vicinity of Saint Michaels they usually arrive from the 10th to the 15th of May, and remain until the last of September, and sometimes until the first few days of October. They are never common on the marshes in this district nor on the lower part of the Yukon delta, although they are generally distributed, and breed wherever found.

I rarely hunted a day on these marshes, however, without hearing the loud, familiar note of this bird. The Indians and Eskimo save the bright green scalps of the males for ornamenting clothing or for making small work-bags and pouches.

ANAS PENELOPE Linn. Widgeon.

During two years spent upon the Fur Seal Islands in Bering Sea, Mr. Elliott obtained or saw a few individuals of this species. They were never in pairs, and the few seen were supposed to be

wind-bound or astray. Mr. Dall obtained a specimen at Unalaska October 12, 1871, and notes it as not uncommon among the ducks brought in there by the Aleuts. He gives it as a winter visitant, migrating about May 1, but as it has never been found along the coast of the mainland to the north I am inclined to believe that it breeds in the Aleutian chain, merely seeking more secluded quarters on the approach of spring.

It was not noted by me either on Saint Lawrence Island or the coast of Siberia during the summer of 1881, although it might have been present, as our short visits at each place gave but little time for a thorough survey.

It is a numerous but irregular visitant to the Commander Islands.

ANAS AMERICANA Gmel. Baldpate.

The present species may be considered among the least common of the ducks which breed on the marshy flats bordering Bering Sea. They arrive at Saint Michaels from May 5 to 10, in spring, and remain until the frosty nights of late September and early October send them off with the other water-fowl. They were so uncommon about Saint Michaels and the Yukon mouth that I learned nothing about their habits in the mating season. Their first eggs are laid the last of May, in situations exactly like those chosen by the Pintail.

A brood of half-grown young was found in a pond the middle of August, and small ducklings were seen on several occasions during July. Old and young are on the wing by the 1st of September. I once came suddenly upon a female widgeon, with her brood of ten or a dozen little ducklings, in a small pond. As I approached the parent uttered several low, guttural notes and suddenly fluttered across the water and fell heavily at my feet, so close that I could almost touch her with my gun. Meanwhile the young swam to the opposite side of the pond and began to scramble out into the grass. Willing to observe the old bird's maneuvers, I continued to poke at her with the gun as she fluttered about my feet, but she always managed to elude my strokes until, just as the last of her brood climbed out of the water, she slyly edged away, and suddenly flew off to another pond some distance. I then ran as quickly as possible to the point where the ducks left the water, yet, though but few moments had elapsed, the young had concealed themselves so thoroughly that, in spite of the fact that the grass was only 3 or 4 inches high and rather sparse, I spent half an hour in fruitless search.

Mr. Dall found these birds more common at Nulato than on the coast, and I had specimens brought me from Fort Yukon and other points in the interior, and from the coast north to the north shore of Kotzebue Sound, where they breed.

This duck is a summer visitor to the Near Islands. Bean took a specimen in Kotzebue Sound the last of August, and Stejneger took a single specimen on the Commander Islands.

ANAS CAROLINENSIS Gmelin. Green-winged Teal. (Esk. *Ting-shūng-i-á-gūk*).

This species, the smallest, as it is one of the most richly-colored of the Alaskan ducks, is found widely spread and rather common over the mainland, and is a resident the entire length of the Aleutian chain.

At Unalaska Mr. Dall found it a plentiful winter resident, the majority moving north the first of May. The same author afterwards found it a resident throughout the Aleutian Islands, as far west as Kyska, and casual in summer at Attu. This species was one of two or three which supplied their table while at work in these islands; he found the young ones abundant at Amehitka in July.

On the Yukon, Dall notes it as one of the first arrivals in spring, and one of the first to lay its eggs. One set of eggs was taken from a nest of dry grass in a sedge tussock, on May 20, at Nulato. Bisehoff found them at Sitka and Kadiak, and the writer saw them several times about Kotzebue Sound.

In spring the Green-winged Teal reaches Saint Michaels by May 10, in early seasons, and remains until the 1st to 7th of October. It is very sociably inclined, and is commonly found in flocks, except when the breeding season has scattered them about the marshes.

The fur traders brought me specimens taken at Fort Reliance, on the Upper Yukon, May 3, and other records go to prove it to be one of the hardiest ducks.

At the Yukon mouth and near Saint Michaels they nest the last of May, and choose a dry knoll near a small pond, where their eggs, numbering from eight to a dozen or more, are laid on a bed of grass stems and feathers.

Toward the end of August, old and young may be found dabbling in the mud along the bank of some secluded tide creek or the grassy margin of a marshy pool. They are the least suspicious of the ducks, probably because the Eskimo usually consider them too small to waste a charge of powder and shot upon.

ANAS DISCORS Linn. Blue-winged Teal.

In his list of Alaskan birds Mr. Dall reports this handsome duck as being found sparingly at Fort Yukon and the Yukon mouth, but he did not see it at Nulato, where, however, it undoubtedly occurs.

Captain Smith secured its eggs at Cape Romanzoff, just south of the Yukon mouth.

In the paper just quoted, Mr. Bannister records it as "not very abundant, but not uncommon" at Saint Michaels where several specimens were seen by him in the hands of the hunters in early spring.

During the four years passed at Saint Michaels by the writer he failed to even see a single individual of this species, although during that time thousands of dead ducks were examined, not to mention the numbers seen in the field; neither did any of my various collectors along the coast and along the course of the Yukon bring me a skin. From this negative evidence we must consider this species as of great rarity on the coast of Bering Sea, at least north of the Kuskoquim River. It is doubtfully recorded as a winter visitant at Unalaska Island by Dall, but this is undoubtedly erroneous.

SPATULA CLYPEATA (Linn.). Shoveller.

Like the preceding species the present bird is one of the least common ducks found on the shore of Bering Sea. It was found on the Commander Islands and in Kamchatka by Stejneger. The Shovellers usually arrive in the vicinity of Saint Michaels about the 11th or 20th of May and are usually found in pairs or singly. They breed on all the marshes with the other water-fowl from Kotzebue Sound to the mouth of the Kuskoquim.

The eggs are deposited the last of May and first of June in a dry spot near some pond or stream, and the nest is usually lined with grass and feathers, the latter from the parent's breast.

Mr. Dall considered it rather rare along the Yukon, but skins were brought me from Fort Yukon and Nulato, where it was reported to me as being a rather common species. Although not common along the sea-coast, yet one could rarely take a day's hunt in spring or fall without seeing one and often several of these birds. It is also found on the coast in the Sitkan region, but neither Dall nor Elliott mention it among the birds of the Fur Seal and Aleutian Islands.

DAFILA ACUTA (Linn.). Pintail (Esk. *Ēk-shūk-ūk*).

The Pintail is one of the most common, if not the most common, of the ducks which breed along the Alaskan shore of Bering Sea. On one season it reached the vicinity of Saint Michaels April 29, and the ordinary date is from the 1st to 5th of May. One spring a small party was found about a small spring-hole in the ice on the sea-shore the first of May, while a foot of snow still covered the ground and the temperature ranged only a few degrees above zero. As snow and ice disappear they become more and more numerous, until they are found about the border of almost every pool on the broad flats from the mouth of the Kuskoquim River north to the coast of Kotzebue Sound.

They are summer residents on the Siberian coast in suitable locations, and we found them also upon Saint Lawrence Island in the summer of 1881. Neither Elliott nor Dall mentions them as occurring on the Fur Seal and Aleutian Islands, although they are certainly found on the latter group. Bischoff found them at Sitka and Kodiak.

Along the Yukon, Dall found them very abundant, and noted their arrival at Nulato about May 1. There they began nesting about May 20, placing their eggs in the sedge and lining the nest with dry grass and feathers, and, as is a common habit with water-fowl, covering the eggs with feathers and grass when leaving them unprotected.

As the young are hatched they are led to the small creeks and rivulets, where the birds remain until the young take wing, after which all pass to the great marshes, where they grow fat feeding upon the roots of the horsetails (*Equisetum*). I take the preceding from Mr. Dall's paper, as it shows several differences between the bird's habits in the interior as compared with the same on the sea-coast, where my observations were made.

As the numerous ponds on the marshes open about the middle of May, the flocks in which the Pintails have thus far kept company disband, and the birds scatter over the country. They are shy at this season, but while lying in a blind in the midst of their haunts, I have witnessed many of their odd habits.

With the exception of the Old Squaw Duck (*Harelda*), the habits of the Pintail are more peculiar than those of any of the ducks I am familiar with breeding in the region. Once, on May 17, while sitting overlooking a series of small ponds, a pair of Pintails arose and started off, the male in full chase after the female. Back and forth they passed at a marvelously swift rate of speed, with frequent quick turns and evolutions. At one moment they were almost out of view high overhead, and the next saw them skimming along the ground in an involved course very difficult to follow with the eye. Ere long a second male joined in the chase, then a third, and so on until six males vied with each other in the pursuit. The original pursuer appeared to be the only one capable of keeping close to the coy female, and owing to her dextrous turns and curves he was able to draw near only at intervals. Whenever he did succeed he always passed under the female, and kept so close to her that their wings clattered together with a noise like a watchman's rattle, and audible a long distance. This chase lasted half an hour, and after five of the pursuers had dropped off one by one the pair remaining (and I think the male was the same that originated the pursuit) settled in one of the ponds.

This is about the first of the water-fowl to commence nesting. The date when the first eggs are laid varies from May 18 to 25, according to the season. As a consequence the young are hatched early in June and are on the wing early in August, before any of the other species. The eggs are placed in a depression on some tussock or among the grass and other vegetation beside a pool, usually where it is pretty well concealed. The eggs number from six to a dozen in a set. They are rather small, and are usually pale olive-green when fresh. The nest is lined with grass-stems and feathers. When the young are hatched the parents lead them to the adjacent pool, and they keep in the most secluded parts of the marsh until able to take wing. In fall the Pintails feed upon the various berries growing on the hill-sides until they become extremely fat, and a young bird at this season is the most delicious of the water-fowl found in the north.

In spring, during the mating season, it is common to see a female Pintail accompanied by two males. After repeated observations I was led to believe the females of this species to be polyandrous to a certain extent. On one occasion a female was seen flying along preceded by two males. Every few rods the former halted slightly, and drawing her head back uttered a sonorous nasal "quack," as if to encourage her escort. It is also common to see a female, when pursued by several males, plunge under water at full speed followed by her pursuers, and all suddenly take wing again from the water a few yards beyond. The Old Squaw Duck is the only other species I have seen do this.

In summer the Pintail has a low mellow whistle, which is used as a call to its mate, in addition to a loud "quack," much like but less sonorous than that of the Mallard. They have also a harsh rolling note, which may be imitated by rolling the end of the tongue with the mouth ready to utter the sound of "K."

During the mating season they have a habit of descending from a great altitude at an angle of about 45 degrees, with their wings stiffly outspread and slightly deurved downward. They are frequently so high that I have heard the noise produced by their passage through the air from fifteen to twenty seconds before the bird came in sight. They descend with meteor-like swiftness until within a few yards of the ground, when a slight change in the position of the wings sends the bird gliding

away close to the ground from 100 to 300 yards without a single wing-stroke. The sound produced by this swift passage through the air can only be compared to the rushing of a gale through tree-tops. At first it is like a murmur, then rising to a hiss, and then almost assuming the proportions of a roar as the bird sweeps by.

Toward the end of August they unite in flocks of from five to fifty or more, and the end of September finds but few remaining of the large number of a few weeks previous. A few remain until the 8th or 10th of October, and then the wintry blank follows.

This duck is not common at Point Barrow, where they are seen mostly during the migrations. They are numerous on the Commander Islands in summer, according to Stejneger.

AYTHYA VALLISNERIA (Wils.). Canvas-back.

The Canvas-back is recorded by Dall as a common species in the vicinity of Fort Yukon, breeding there in abundance. He did not observe it elsewhere in the Territory, nor did I find any evidence of its presence anywhere along the west coast.

The Fort Yukon record places the breeding limits of the Canvas-back within the Arctic Circle. It should be looked for on the marshes about Nulato.

AYTHYA MARILA NEARCTICA Stejn. American Scaup Duck (Esk. *Ā-hlig-ū-nūk*).

Everywhere, in suitable locations, over all the mainland portions of Alaska, this is a common and frequently an abundant summer resident.

Dall found it a common species along the course of the Yukon, and Biscoff obtained many specimens from the Sitka region.

From the Yukon mouth to the northern shore of Kotzebue Sound, I found it plentiful. This species is a common resident of the Near Islands. Dall rightly records it as an early arrival in spring, as a specimen taken May 1 at Fort Reliance, on the Upper Yukon, was brought me by a fur trader. At Saint Michaels and the Yukon delta the season is later, and they rarely arrive before the 8th or 10th of May. From May 13 to 16 they generally become numerous, and are found scattered over the marshes, usually gathering in parties on the larger ponds until the end of this month they divide into pairs and set about their nesting. In fall they remain late, the last ones leaving from October 7 to 15, just as severe weather sets in.

The nesting sites chosen are such as the Pintail and most other ducks choose—a dry, grassy tussock or knoll close to some pond—the only difference being that the present species appears to desire a position nearer the water, if anything, and the nest is frequently at the point of some small jutting cape and so near the water that the parent can swim to and from the nest.

The eggs are large for the bird and rarely exceed eight in number. The nest is composed of dry grass stems, gathered close at hand, and a large fluffy bed of down plucked from the parent's breast. The first days of June is the time usually chosen for depositing the first eggs, and some are not laid until nearly a month later. On August 16, 1878, several broods of young, from one-half to two-thirds grown, were seen, and on August 30, half-grown young were found in company with the female, whose primaries and secondaries were just starting after her summer moult.

In the north as in the south these birds show a predilection for the larger bodies of water, and at once after the young are hatched they are marshaled off to the largest pond in the vicinity, so that it is a common occurrence to find a pond with six or eight broods of these ducks united in a large flock, whereas the other fresh-water ducks keep in the smaller pools and more than a single brood in a pond is the exception.

AYTHYA AFFINIS (Eyt.). Lesser Scaup Duck.

This species is recorded by Hartlaub, from Portage Bay, near Chileat River, May 23.

In his paper upon the birds of the Territory, Mr. Dall records the Little Scaup Duck (*A. affinis*) as not uncommon at the Yukon mouth, where he also writes that he secured its eggs. This record is extremely doubtful, since during my visit to the Yukon mouth the spring of 1879, and my long residence only 60 miles north of there, not a single example of this bird was obtained or seen, nor

did any of my collectors in various parts of the Territory secure it. Among hundreds of the large species killed during my residence at Saint Michaels, a few of the smaller species must certainly have occurred if they reached that region.

AYTHYA COLLARIS (Donov.). Ring-necked Duck.

This species is resident, but not common, on the Near Islands, according to Mr. Turner.

GLAUCIONETTA CLANGULA AMERICANA (Bonap.). American Golden-eye (Esk. *Yä-sikk*).

In the Aleutian Islands this bird is a winter resident, as observed by Dall, and the same author records it as the first duck killed at Nulato, May 3, 1868, and as always being one of the first arrivals along the Yukon.

It is a common duck along the rivers of the interior and reaches the sea-coast at the Yukon mouth in the breeding season.

Dall bought a skin of this bird from Indians on the Yukon, near Mission; it was stuffed and ornamented with beads, but instead of being used as an ornament for the lodge, as recorded, it is really a child's toy, as are the Harlequin Duck-skins mentioned in the following pages.

On the coast of Bering Sea the Golden-eye is an extremely rare duck, occurring merely as a straggler. The last of September, 1880, I found a party of four birds of the year in a pond near Saint Michaels and secured three of them.

During over four years collecting from the Yukon mouth north along the coast of Bering Sea and the Arctic to Point Barrow these four birds were the only ones of their kind seen by me, excepting a few skins brought from the interior by my collectors.

It is not known from any of the islands in Bering Sea north of the Aleutian chain, although likely to occur upon all of them.

GLAUCIONETTA ISLANDICA (Gmel.). Barrow's Golden-eye.

Specimens of this species were obtained at Sitka by Bischoff during the Telegraph Explorations; and Dall notes it as rare occurrence upon the Yukon.

Hartlaub records adult birds from Portage Bay January 4, February 21, and young at Chileat April 24.

74. *CHARITONETTA ALBEOLA* (Linn.). Butter-head.

Like the preceding species the Butter-ball is an extremely rare bird on the coast of Bering Sea, but is rather common along the river courses of the interior. Bischoff found it at Sitka, and at the Yukon mouth. Dall notes them as abundant and probably breeding.

During my visit to the latter point, extending through the last half of May and the first half of June, not a single individual was seen, nor was it found by me along the coast farther to the north.

Skins were brought me from several places in the interior, however, and it appears to increase in abundance as the Upper Yukon is approached. They remain late in the fall, as a specimen was taken at Fort Reliance on October 7; and the spring of 1877, before my arrival at Saint Michaels, a specimen was said to have been killed about the middle of May.

Hartlaub records it as numerous at Portage December 28 to March 1.

Bean found this species rather common about Unalaska Island the first of October, 1880.

It is a winter visitor to the Near Islands. In January, 1883, Stejneger obtained a single specimen on one of the Commander Islands, making the first record for the species on the Asiatic side of the Pacific.

CLANGULA HYEMALIS (Linn.). Old Squaw (Esk. *Äh-ti-hlä gük*).

The Old Squaw is the first Duck to reach high northern latitudes in spring, and along the Alaskan coast of Bering Sea is one of the most abundant species during the summer.

At Point Barrow this is one of the commonest ducks, arriving the middle of May and leaving only when the sea freezes over completely. December 9 is Murdoch's latest date. On the Near Islands it breeds sparingly and is abundant in winter. It is a resident on the Commander Islands. The fall of 1791 Saner noted the arrival of this duck at Unalaska the 1st of October and records it as wintering there.

The seal hunters find them in the open spaces in the ice off Saint Michaels from the 1st to the 20th of April, and the first open water inshore is sure to attract them. After their arrival it is no uncommon occurrence for the temperature to fall to 25 or 30 degrees below zero, and for furious storms of wind and snow to rage for days, so the first-comers must be hardy and vigorous to withstand the exposure.

In fall they retreat before the ice and by the 15th or 20th of October they are either on their way south or well out to sea. The great majority of these ducks, however, do not come inshore to their nesting ground until the ponds and tide creeks are pretty well open, somewhere from the 12th to 25th of May and most of them resort to the sea-coast during the month of September. Most of the birds reaching the marshes after the middle of May are paired.

The winter plumage is frequently retained through the nesting season, and I have shot males close to their nests in full winter dress, although it was in mid-June. Between the two plumages, that of winter and summer, is every imaginable gradation, and it was a very difficult matter, as I found, to procure specimens in perfect summer dress. In the breeding season the males have a pinkish flesh-colored bar across the top of the bill. The earliest set of eggs secured by me numbered five and was taken on May 18 at Saint Michaels. From that date until the end of June fresh eggs may be taken, but the majority of the young are out by the last of this month.

From the Yukon delta along the coast in each direction their nests are almost invariably placed in close proximity to a pond or tide creek—the sloping grassy bank of the ponds being a favorable location. The parents always keep in the immediate neighborhood and swim anxiously about in the nearest pond when the nest is approached. An unusual amount of dry grass stems and down plucked from the parent's breast composes the nest, and if the eggs are left they are carefully hidden in the loose material.

The young are found the middle of August about the ponds and marshy lakes, some only a week or so from the shell and others already trying their wings. As fall approaches young and old are most common along the shores of the inner bays and among the tide-creeks.

They are among the least suspicious of the ducks, and are easily approached within gunshot, but their poor flesh and great dexterity in diving render them scarcely worth the amount of ammunition required to obtain them.

During all the spring season until the young begin to hatch, the males have a rich musical note, imperfectly represented by the syllables *A-léédle-á, á-léédle-á*, frequently repeated in deep, reed-like tones. Amid the general hoarse chorus of water-fowl at this season, the notes of the Old Squaw are so harmonious that the fur traders of the Upper Yukon have christened it the "Organ Duck," a well-merited name. I have frequently stopped and listened with deep pleasure to these harmonious tones, while traversing the broad marshes in the dim twilight at midnight, and while passing a lonely month on the dreary banks of the Yukon delta I lay in my blankets many hours at night and listened to these rythmical sounds, which with a few exceptions were the only ones to break the silence. These notes are somewhat less common during the day. The male is often seen swimming rapidly about the female, his long tail-feathers raised to an angle of about 75 degrees and vibrating rapidly from side to side as he passes before the female, uttering the love-note at short intervals. If he becomes too pressing in his suit, the female suddenly dives and is instantly followed by her partner, and then a moment later they appear and take wing, and a playful chase ensues, the two diving at full speed and flying above or below in rapid succession until they are tired. It is common for two or three males to join in this follow-the-leader kind of game after the female, and in the end the latter usually flies to some secluded pool with her choice, while the discomfited suitors move off in search of some easier prize. Several males often continue to utter their musical notes while chasing a female, and make a very pretty chorus.

Although these birds are far more numerous along the coast of Bering Sea and the Arctic than they are in the interior, yet they are also rather common summer residents along the Yukon and

other large streams. As a rule they are less gregarious than most other ducks, although often congregating about a good feeding ground. It is a resident along the entire Aleutian chain and about all the other islands of Bering Sea during summer. I found them also along the coast of the Arctic to Point Barrow. They breed upon the Fur Seal Islands.

Sauer mentions this species as arriving about Unalaska the 1st of October, the season Billings's expedition passed there, and remaining all winter.

HISTRIONICUS HISTRIONICUS (Linn.). Harlequin Duck (Esk. *Ti-ti-tsiik*).

Among the host of water-fowl which flock to the distant breeding grounds of Alaska in spring this elegantly-marked bird is the most graceful and handsomely colored. As if conscious of its beauty, the Harlequin Duck leaves the common-place haunts sought by the crowd of less noble fowls, and along the courses of the clear mountain streams, flowing in a series of rapids into the larger rivers, they consort with the Water-ouzel, Swainson's Thrush, and such other shy spirits as delight in the wildest nooks, even in the remote wilderness of the far north. Dark lichen-covered rocks, affording temporary shelter to the broad-finned Northern Grayling or the richly-colored salmon trout as they dart from rapid to rapid, steep banks overhung by willows and alders, with an occasional spruce, forming a black silhouette against the sky, and a stillness broken only by the voices of the wind and water, unite to render the summer home of these birds, along the Yukon, spots devoted to nature alone, whose solitude is rarely broken, and then only by the soft footsteps of the savage in pursuit of game. At times, however, the sharp prow of a birch-bark canoe cuts the surface of the stream and is forced far up among the hills. All the denizens of the waters are alarmed; Ouzel, Thrush, and fish take refuge in the first shelter, and the Harlequins rise, and, circling behind the intruder, settle anew in some quiet eddy or pool, where the current is less violent. Perchance the occupant of the canoe tries to get a shot at some of the ducks ahead, but he is rewarded by seeing his would-be victim disappear under water like a flash to reappear and take wing a moment later, and, to add to his discomfiture, the current whirls him down stream at a pace difficult to control. The hunter's reward comes, however, when after a sufficient distance is gained the boat is turned about and allowed to glide rapidly down-stream. Before long a pair of the ducks, so shy before, but now unwarned, are seen paddling idly about or preening themselves upon some convenient rock. The boat glides silently within range, and at the report the ducks float dead or wounded upon the water. This is repeated until the larger stream is reached and perhaps a dozen birds fall victims.

It was found at Sitka and Kadiak by Biscoff; in the Aleutian Islands by Dall; on the Fur Seal group by Elliott, and from the Yukon mouth to Kotzebue Sound, through Bering Straits, by the writer. At Saint Michaels they were rarely detected before the 1st of June, and were seen about the inner bays at rare intervals from then until fall. They are much more common there during September, and a male young of the year, taken October 16, was just changing its first plumage for the dress of the adult male. The examples found on the coast there are merely stragglers from the inland breeding places.

A male taken June 4 had its toes and tarsi dark olivaceous brown; webs black; bill, bluish-black, with a dull bluish horn colored tip; eyes hazel.

As an illustration of the variation in the habits of this bird in different surroundings, the following notes from the Fur Seal and Aleutian Islands are to the point:

While at Unalaska, during the last of May and first of June, 1877, I found the Harlequin Ducks very numerous. During May they were found in flocks of various sizes about the heads of the inner bays, usually close to the mouth of some fresh-water stream. They were also found, but in smaller numbers, about the outer bays and in the passes between the islands. On June 5 they had united into several very large flocks, numbering several hundred each, and, as earlier in the season, were very shy, taking flight at the first alarm and moving off with a confusion of low gabbling and chattering notes.

They undoubtedly breed among these islands, and Mr. Dall found them remaining later in spring than most ducks. He found them also not rare at the Shumagin Islands, near the peninsula of Alaska, in summer. Mr. Elliott found them common on and around the shores of the Fur

Seal Islands. There they were in the habit of "idly floating amid the surf in flocks of fifty or sixty, or basking and preening on the beaches and outlying rocks." "It may be seen all the year around, excepting only when forced away by the ice-floes."

This author was confident that the birds breed upon these islands, but he never found the nests, nor did the natives know of its nesting place. The natives killed many of them in fall and spring, and they are said to be not shy there and to be remarkably silent, the author quoted never having heard a note from them during the whole year. As in the Aleutian Islands, they are very gregarious. It is possible that many or all the birds which pass the summer about these islands are barren, and hence do not seek the breeding grounds with the rest of their kind. North of the islands mentioned these ducks seek the streams of the interior for nesting places, and if the birds found about the rock-girt shores mentioned remain there to breed the contrast in habits is indeed striking.

The Indians of the Yukon, from Nulato down, stuff the skins of the males of this species and ornament them with small strings of beads and bright-colored cloth, and give them to the children as toys.

This duck is a very abundant resident on the Near Islands. On the Commander Islands it is also a common resident, but Stejneger does not think that the birds found there in summer breed, being, apparently, barren.

UNICUNETTA STELLERI (Pall.). Steller's Duck. (Esk. *Ū-nō-gōk lāk*).

The coasts and islands of Bering Sea may be given as the eastern range of this fine duck. Westward from there it breeds by tens of thousands along the north coast of Siberia, and reaches the northern coast of European Russia.

While in the Aleutian Islands, the last of May, 1877, I found these ducks rather numerous in the quiet waters of sheltered bays and fiords. They were extremely shy, however, and in spite of all my efforts not a single one was secured. The residents of these islands told me that in winter they are very abundant in the portions of the bays not ice-bound, and a great many of them are killed for the table.

Throughout the Aleutian chain Steller's Duck is a common resident, very abundant in winter but less numerous in summer. It was taken at Kadiak Island by Bischoff, and from the papers of Mr. Dall we learn that they winter in great numbers on Sanak Island, near the eastern end of the chain. It is also a resident on the Shumagin group in the North Pacific, near Kadiak, and I have been informed that they abound in great flocks on the north coast of Alaska Peninsula in summer.

Dall found them gregarious in winter and associating with the King Eider, but keeping away from other species. The pairing commences the first of May, and thence through the mating season they are found in pairs.

The same author states that if a nest is visited the birds abandon it at once. He found a nest May 18, 1872, on a flat part of a small island near Unalaska. It was built between two tussocks of dry grass, and the depression was carefully lined with the same material. The nest was entirely concealed by overhanging grasses, and was revealed only by the bird flying out at his feet. The nest contained a single egg. He noted the following variation of the iris of this bird at different seasons: November 21, dark-brown; December 18, pale-brown; May 18, red-brown. In May, 1872, this species and the Pacific Eider were abundant at Unalaska, whereas in May, 1873, although the season was later, not a single one of either species could be found, a good illustration of the variation in distribution of these birds in different seasons.

Upon the Fur Seal Islands this duck occurs as a straggler during the migration. In Elliott's report upon these islands Dr. Coes mentions an egg of this species, in the Smithsonian collection, which came from Kamchatka, and measures 2.20 by 1.60, and is like the egg of the common eider in shape, color, and texture of shell.

On Saint Lawrence Island we found Steller's Duck breeding in small numbers during the summer of 1881, and along the coast of Siberia from Kamchatka north it is a regular summer resident, moving south to the Aleutian and Kurile Islands on the approach of winter.

During our several visits to the north coast of Siberia in the summer of 1881 we found enormous flocks of these birds frequenting the broad river mouths and lagoons of this coast, northwest of Bering Straits.

In autumn, as they pass south, stray individuals and parties are found in Norton Sound. Those taken there are usually young of the year. The earliest date of their capture at Saint Michaels, during my stay, was on September 21, and the latest on October 15, just as the bay began to freeze over. They are more numerous about this latter date. Six specimens, all young of the year, taken on the date named, had dark-blue bills and slaty-olive feet and legs, with irides dark hazel.

Their dimensions when fresh were from 16 inches in length by 27 inches in extent of wings to 17.25 by 29.

When found at Saint Michaels they usually frequented outlying rocky islets and exposed reefs, and fed in the small tide-rips.

The shallow, turbid water of Norton Sound seems to be offensive to the majority of these birds, as their chosen haunts are along coasts where the water is clear and deep close to the shore.

This duck is rather common at Point Barrow, where they arrive early in June and leave by the middle of August. Although Murdoch found small parties of these birds scattered over the tundra there in the breeding season he found no nests. The majority of the breeding birds appeared to go to some distant breeding ground. The males assume a brown plumage after the breeding season, according to this naturalist.

It is abundant in winter on the Near Islands, where they breed sparingly. On the Commander Islands they winter in great abundance, arriving about November 1 and leaving toward the end of May.

ARCTONETTA FISCHERI (Brandt). Spectacled Eider (Esk. *Ung-á*).

The Spectacled Eider has until recently been credited with a very restricted range on the Bering Sea coast of Alaska. It has been ascertained, however, to be a regular but rather rare summer resident at Point Barrow, where it breeds. Murdoch took a female there with an egg in the oviduct, ready for laying, on June 19, and the nearly grown young were taken the last of August. They arrive at the point, with the last of the other Eiders, in spring. The bird's occurrence here greatly extends its known range, as does Turner's note of the species as a common breeding resident on the Near Islands. These two records nearly double the extent of the known habitat of the species.

Its restricted range has, up to the present time, rendered this bird among the least known of our water-fowl. Even in the districts where it occurs it is so extremely local that a few miles may lead one to places they never visit. Although living so far north yet it is one of the last among the water-fowl to reach its breeding ground at the Yukon delta and the coast of Norton Sound. My observations show this species to be strictly limited to the salt marshes bordering the east coast of Bering Sea, and thus favoring the shallow, muddy, coast waters, which appear to be so distasteful to Steller's Eider.

In Mr. Dall's paper upon the birds of Alaska he limits the breeding ground of the Spectacled Eider to the marshes between the island of Saint Michaels and the mainland. This, with the statement made to him by natives that they are never found north of Saint Michaels, is not borne out by my observations, for these Eiders breed from the head of Norton Bay south to the mouth of the Kuskoquim, at least. Saint Michaels may be noted as the center of abundance. They were not seen by me in Kotzebue Sound, although, from the natives, I was led to expect them there. Strangely enough, we have no positive information regarding their winter habitat, and can only surmise that they frequent the Alaskan coast of the North Pacific.

It was named by Mr. Dall by the Aleuts at Unalaska as a winter visitant, and he notes that it migrates early in May for its northern breeding grounds. It was not noted by Elliott among the birds of the Fur Seal Islands, nor is it known to have been taken at Kadiak Island. It is very likely to occur on this latter island in winter.

In the vicinity of Saint Michaels they rarely begin to arrive before the 15th of May. The season of 1879 they were first seen by me at the Yukon mouth on this date, but the main body of the migration did not take place until the 25th

They fly in small compact flocks, rarely exceeding fifty birds in a flock, and skim close along the surface of the ice or marsh with a flight very similar to that of other heavy-bodied sea-ducks. Very soon after reaching their destination the flocks disband and the birds quietly pair, but the first eggs are rarely laid earlier than the first days of June.

Most of my eggs were taken fresh between the 10th and 20th of this month, and I obtained the young just out of the egg on July 23. The middle of August young birds are frequently seen from a few days old to those nearly ready to take wing. During this month the adult birds pass through the summer moult, and with the half-grown young desert the marshes and tide-creeks for the sea-coast and outlying rocky islands.

By September 1 scarcely a single individual can be found on the marshes, and by the 20th they are scarce along the coast.

Their food in summer consists of small crustacea, grass, seeds, and such other food as the brackish pools afford.

When first paired the birds choose a pond on the marsh, and are thenceforth found in its vicinity until the young are hatched. Their love-making is very quiet. I have never heard any note uttered except by the female while conducting her brood out of danger. As the grass commences to show green and the snow and ice are nearly gone, although the other denizens of the marsh are already well along in their house-keeping, these ducks choose some dry, grassy spot close to the pond, and making a slight hollow with a warm lining of grass, they commence the duties of the season.

One nest found on June 15 was on a bed of dry grass within a foot of the water on the border of the pond, and when the female flew off the single egg could be seen 20 yards away. Tussocks of dry grass, small islands in ponds, and knolls close to the water's edge are all chosen as nesting places, and as a rule the nest is well concealed by the dry grass standing about. If the nest contains but one or two eggs the female usually flies off and remains until the intruder is gone; but if the set is nearly completed or incubation is begun she will soon return, frequently accompanied by the male, and both circle about, showing the greatest uneasiness. The female will sometimes alight in the pond, within easy range, and both parents may be obtained by watching near the nest. The male is rarely seen after the young are hatched, but the female shows the greatest courage in guarding her brood, as the following incident will show: A brood was swimming away from me, and the female tried to protect them by keeping between the young and myself. I fired two charges of No. 12 shot, killing all the young, yet, in spite of the fact that the parent received a large share of the charge each time, she refused to fly, and kept trying to urge her dead offspring to move on, until a charge of larger shot mercifully stretched her among her offspring. Upon removing the skin her back was found to be filled with fine shot, and her desperate courage in defense of her brood shows the strength of parental feeling. Other similar instances attest the courage and devotion of this species.

The eggs usually number from five to eight or nine in a set and are small for the size of the bird. Extremes measure 2.82 by 1.81, 2.60 by 1.87. In color they are of a light olive drab.

During August the fall moult takes place, and the males assume a plumage much like that of the female.

The iris and pupil of these ducks are very small, with a broad ring of bright milky blue surrounding the iris; to a casual observer this blue ring appears to be the iris. The spring male has the eye as just described, the feet and legs dull olive brown, except scales on front of tarsus and toes, which are dingy yellowish. The bill is dull orange. The bill of the female is dull blue, feet and tarsi dull yellowish brown.

The young of the year in fall have eyes like the adults; dark olive-brown bills, with dull yellowish, shaded with olive-brown, legs and feet. The males and females are very nearly of the same size, and average from 20 to 22.5 inches in length by 34 to 36.5 inches in spread of wing. They are heavily built, like all Eiders; they are considerably smaller than the Pacific Eider, but as much larger than Steller's Duck, which latter has more the build and shape of a Gadwall, and is the least clumsy of its kind. The Spectacled Eider is so restricted in its range and so local in its distribution, even where it occurs, that, like the Labrador Duck and the Great Auk, it may readily be so reduced in numbers as to become a comparatively rare bird. A species limited in the breeding

season to the salt marshes between the head of Norton Bay and the mouth of the Kuskoquim River occupies but a very small territory, and a glance at the map will show this coast line not to exceed 400 miles, even following its indentations. The width of the breeding ground will not exceed 1 or 2 miles, and there are long stretches where it does not breed at all.

In addition to the natural struggle for existence, the species has to contend against thousands of shotguns in the hands of the natives. The diminution in all the species of water-fowl breeding along the coast is more and more marked each season, and while this may mean a desertion of one region for another in the case of the great majority of geese and ducks, yet for such narrowly-limited species as the Spectacled Eider, and to a less extent the Emperor Goose, this diminution is but the beginning of extermination; moreover the present scarcity of large game along the coast is having great effect in causing the natives to wage a continually increasing warfare upon the feathered game.

SOMATERIA V-NIGRA Gray. Pacific Eider (Esk. *Mut-khák*).

Along the coast of the North Pacific, both shores of the Aleutian Islands, and all the islands of Bering Sea, and the coast of the adjoining Arctic Ocean to the northern limit of the mainland, is the broad area over which the breeding range of this bird extends. The shores and islands of Bering Sea form their great breeding resort, although they are common outside these limits in many places. Including the Aleutian Islands and thence south they are residents wherever found, but probably most numerous in winter.

In the Aleutian Islands Dall found them to be resident and to winter abundantly, although in summer they were much more abundant toward the western end of the chain. Although Elliott did not note them in his list of the Seal Island birds, yet they undoubtedly occur there during summer, as it is in their direct line of flight to the north from the Aleutians.

The species is very abundant at Point Barrow in summer, and breeds in great numbers along the coast east of that place. According to Murdoch, Bean found it breeding at Cook's Inlet, and it is a common resident on the Near Islands. On the Commander Islands Stejneger found it breeding. Murdoch tells us that the whalers call these birds "canvas-backs." The last of May, 1877, I found them rather numerous about Sanak Island and the adjacent reefs. They were frequently seen sunning themselves on projecting rocks or islets near shore, but were rather shy and took to the water or flew off at the first alarm. They were seen in Unalaska Harbor a few days later, and the same season, from June 16 to 18, as we lay off the Yukon mouth and approached Saint Michaels, especially about 10 or 15 miles offshore from the latter place, we passed through flocks numbering hundreds of the males of this species.

The sea was rather rough as we drew near the shore, and the heavy-bodied eiders were in most instances unable to raise themselves from the water, and the approaching vessel caused them to flap along the water until, as if animated by a single purpose, dozens of them would dive, only to reappear a few moments later and struggle off again.

The Eskimo there sometimes find them offshore among the ice-floes the last of April or first day or two of May, but this is not common. In ordinary seasons they are first seen near shore at Saint Michaels and the Yukon mouth from May 10 to the 20th, according to the state of the ice. During the last ten days of May the ponds and tide creeks on the marshes open and the eiders proceed to choose their summer homes.

The first eggs are rarely deposited before the first of June, and I have found fresh ones until the first of July. Their courtship must be conducted before the birds reach the breeding ground, as I have never seen any demonstrations such as are usual among mating birds. The small flocks seen at first give place at once to solitary pairs, which resort to the salt marshes. The nesting site is usually a dry spot close to a small pond or a tide creek and not often in close proximity to the sea-shore. The moss-grown slope of some small knoll, a grassy tussock, or a depression made on an open flat, but hidden by the thin growth of surrounding vegetation, are all chosen as nest sites.

The first evening after my arrival at Saint Michaels I walked back on the flat about 200 yards from the fort and put up a female from five fresh eggs. The nest was thickly lined with down and concealed by dwarf willows and other low Arctic vegetation. This was the only instance

noted by me where the nest was so near human habitations. The nest is usually lined with dead grasses and sometimes fragments of moss when the first egg is laid, and the down is added as the eggs multiply. The male is a constant attendant of the female until her eggs are nearly all deposited, when he begins to lose interest in family affairs, and dozens of them may be found at all hours sunning themselves upon the long reefs about shore, and if we are behind the scenes on the marshes they may be seen flying silently back to their partners as the dusky twilight of night approaches from 8 to 10 in the evening. As the males congregate about the reefs they have a low guttural note, which is the only one I have heard this species utter.

From the 15th to the 20th of June nearly all the males desert their partners and are thenceforth found at sea or about outlying reefs and islands in large flocks, as already described.

Toward the end of June the first young appear, but the majority are not hatched until the first of July. As the young are hatched they are led to the nearest large pond or tide-creek, and thence to the sheltered bays and mouths of streams on the sea coast. About this time the females lose their quill feathers, and, like the young, are very expert in diving at the flash of a gun.

At this time the Eskimo amuse themselves by throwing spears at the young, but the latter are such excellent divers that they are rarely hit.

As a rule the young do not fly before the 10th of September, and broods with the female are often seen unable to fly even later. The female has dingy olivaceous yellow feet and tarsus; the bill dull greenish yellow, paler at the nail; iris dark hazel.

As the end of September approaches they become more and more scarce, and thence on until the cold weather forces them south are only found off the outer reefs and islets.

The male appears to assume a plumage very similar to that of the female in fall, but in spite of my efforts I could not secure a single individual in this dress. In May, 1877, while 400 miles off the Aleutian Islands in the Pacific, an eider, apparently this species, was seen heading north.

During the cruise of the *Corwin* these ducks were found nesting along the Bering Sea coast of Siberia, but becoming rare along the Arctic shore. Northwest of the Straits, east of Point Barrow to the mouth of the Coppermine River, this species occurs in great abundance.

The considerable difference in breeding habits between the Pacific Eider and its North Atlantic relative is very striking, the *S. mollissima* nearly always nesting in colonies, even so far north as Spitzbergen. The walrus hunters in the latter region credit the females with the habit of stealing eggs from one another, and say that the male stays near and gives the alarm on the approach of danger.

In color the eggs of the *v-nigra* are very similar to those of the Spectacled Eider, being, like them, of a light olive drab. They are usually of a decided oval, and measure from 3.12 by 2.01 to 2.87 by 2.03.

SOMATERIA SPECTABILIS (Linn.). King Eider (Esk. *Gud-hlik*).

On the Yukon, near the rapids, several hundred miles from its mouth, Mr. Dall found a specimen of this handsome bird lying dead on the river bank, this forming the only inland record in the Territory. The set of eggs from Saint Michaels, doubtfully identified as of this species by the same author, probably belong to some other species.

The same naturalist found it a not uncommon winter resident in the Aleutian Islands at Uualaska, and it undoubtedly occurs along the entire chain at this season and far southward along the Pacific coast. He records the color of the iris as varying from a pale clay-brown to a light warm brown. At Saint Michaels I found the King Eider a very rare bird, and although it is well known to the Eskimo they say it is nearly always found at sea far offshore. Two specimens, young of the year, were brought me on October 12, 1879, and were the only ones taken during the four years of my residence there. In Bering Straits, especially on the Siberian side, and on Saint Lawrence Island they were common. This was particularly the case in Saint Lawrence Bay, where large flocks were seen. Along the low coast northwest of Bering Straits, near Waukarem and Tapkan, they were extremely abundant in company with Steller's Eider and formed immense flocks.

During the same months, July and August, they were found in large numbers also near the ice-fringed coast of Alaska from Icy Cape to Point Barrow and thence eastward. The birds seen

there were males, the females being with the young among the ponds inshore. The males were not shy, and many were killed by the natives with slings as the birds flew in compact flocks overhead. At Unalaska, from May 18 to 30, 1877, there were large flocks of these birds about the outer harbors. They were just assuming the breeding dress and were not shy, for I rowed within gunshot of a flock, in an open boat, several times the same day. The middle of September, 1881, as we came south through Bering Sea, we passed many flocks of this and the Pacific Eider. The skins of all the eiders, but especially of this species and the Pacific Eider, are used in making clothing by the Alaskan Eskimo, and the skin of the female, split down the back, with head, legs, and wings removed, is a very common article of foot-wear; it is used inside of the seal-skin boots, and is very comfortable in winter. South of the Yukon mouth *Somateria v-nigra* plays an important part in some of the religious festivals, which come off in December each year—a kind of Eskimo "harvest-home."

Mr. Murdoch names this as the most abundant bird found at Point Barrow, where it occurs in enormous numbers during the migrations, but only breeds there in comparatively small numbers, the great body of these eiders nesting along the coast to the eastward of the point. They arrive at the point from April 27 to May 5, according to the season, and a few linger in autumn until the sea is frozen over—until December 2, in 1882.

My own observations agree perfectly with Murdoch's, that the male eiders lose their light-colored plumage after the breeding season and assume a brown plumage, somewhat similar to that of the female, except that the male retains one or two pairs of white patches, by which it can be distinguished at a distance from the female. Although I did not secure specimens to illustrate this yet I saw thousands of the birds in this plumage in Bering Sea and the Arctic, particularly during the summer of 1881. The males seen during August and September of that season were, almost without exception, in the brown plumage, and included all the species of eiders found in that region, namely, *Somateria spectabilis*, *S. v-nigra*, *Euiconetta stelleri*, and *Arctonetta fisheri*.

This bird is said to nest sparingly upon Spitzbergen and to be common in summer on Nova Zembla.

ODEMA AMERICANA Sw. & Rich. American Scoter (Esk. *Kū-kām-zhā-ghūk*).

Along the Alaskan shore of Bering Sea and of Kotzebue Sound in the Arctic, these scoters are common or abundant summer residents. It breeds on the Near Islands, and is plentiful there in winter. It occurs sparingly on the Commander Islands. It was among the species found wintering in the Aleutian Islands by Dall, who saw it also in the Shumagins. It has not been noted on the Fur Seal Islands, but was seen by me about Saint Lawrence Island and both shores of Bering Straits during the summer of 1881.

At the Yukon mouth Dall found a nest of this species on June 17. The nest contained two white and rather large eggs, and was in a bunch of willows on a small island, and was well lined with dry grass, leaves, moss, and feathers.

At Saint Michaels these ducks are never seen in spring until the ice begins to break offshore and the marshes are dotted with pools of open water. May 16 is the earliest date of arrival I recorded. Toward the end of this month they leave the leads in the ice and are found in abundance among the salt and fresh water ponds on the great marshes, from the Yukon mouth north and south. The mating is quickly accomplished, and a nesting site chosen on the border of some pond. The spot is artfully hidden in the standing grass, and the eggs, if left by the parent, are carefully covered with grass and moss. As the set of eggs is completed, the male gradually loses interest in the female, and soon deserts her to join great flocks of his kind along the sea-shore, usually keeping in the vicinity of a bay, inlet, or the mouth of some large stream. These flocks are formed early in June and continue to grow larger until the fall migration occurs. Males may be found in the marshes with females all through the season, but these are pairs which breed late. A set of fresh eggs was taken on August 3, and a brood of downy young was obtained on September 9.

The habits of these flocks of males are very similar to those of the male eiders at this season. They are good weather indicators, and frequently, ten or twenty hours in advance of a storm, they



Fig. 1.



Fig. 2.



Fig. 3.



Fig. 4.



Fig. 5.

HALF NATURAL SIZE.

COLORED FROM NATURE BY E. W. NELSON.

Fig. 1.
SPECTACLED EIDER, male.
Arctonetta fischeri.

Fig. 2.
PACIFIC EIDER, male.
Somateria v-nigra.

Fig. 3.
WILLOW PTARMIGAN, male in summer.
Lagopus lagopus.

Fig. 4.
AMERICAN SCOTER, male.
Oidemia americana.

Fig. 5.
SURF SCOTER, male.
Oidemia perspicillata.

come into the sheltered bays, sometimes to the number of a thousand or more. At such times they show great uneasiness, and frequently pass hours in circling about the bay, sometimes a hundred yards high and again close over the water, the shrill whistling of their wings making a noise which is distinctly audible nearly or quite half a mile. Until the young are about half grown the female usually keeps them in some large pond near the nesting place, but as August passes they gradually work their way to the coast and are found, like the eiders of the same age, along the reefs and about the shores of the inner bays until able to fly.

From the 10th to 15th of October the last ones leave the coast and move southward. This species rarely ascends the Yukon, even to Nulato, and is more strictly a sea-shore species than either of the two following.

OIDEMIA DEGLANDI Bonap. White-winged Scoter.

This is less common in Alaska than either the *O. perspicillata* or *O. americana*. The last of May, 1877, I saw a few of them about Unalaska Harbor, and during the succeeding seasons they were found as not rare visitors to the vicinity of Saint Michaels, where they breed in very small numbers. As fall approaches they become more common there, and are found in company with the Velvet Scoter about the seaward face of the islands. During the last of September, and up to the time the formation of sea-ice forces them away, they are rather common all along the coast.

I found nothing in their habits differing from those of the allied species with which they associated.

Several specimens were brought me from Nulato and the Lower Yukon, taken during the breeding season.

Bischoff secured this species with its eggs at Sitka during the Telegraph Expedition, and during the cruise of the *Corwin* I found them on both shores of Bering Straits and in Kotzebue Sound, where they breed. A few were also seen along the Siberian coast northwest of the straits.

The scoter taken at Bristol Bay by McKay and announced by Mr. Ridgway in the Proceedings of the U. S. National Museum as *Oidemia fusca*, the European Velvet Scoter, proves, as he now informs me, to be the present species.

The notes under *Melanetta fusca* in the Cruise of the *Corwin* really belong under *deglandi*.

OIDEMIA PERSPICILLATA (Linn.). Surf Scoter (Esk. *Tá-tá-ik*).

In company with the *O. americana* these birds first appear in the vicinity of Saint Michaels about the middle of May. Although not rare during the breeding season on the marshes of the Yukon delta and about Saint Michaels, yet it is very much less common than the latter.

It breeds commonly on the marshes along the Yukon, even above Fort Yukon. A considerable number of specimens was brought me from the latter point and from Nulato. Dall procured the downy young below Fort Yukon on June 23, and records that they were found abundant at Sitka by Bischoff.

In the Aleutian Islands they are winter residents. It was found breeding at Sitka by Bean, and Turner reports it as a common resident in the Near Islands. During the summer of 1881 I found them common about the head of Norton Sound, on both shores of Bering Straits, and in Kotzebue Sound.

Although I did not find these birds nesting commonly near Saint Michaels, yet from about the last of June or first of July, until autumn, immense flocks of males frequented the shores of Saint Michaels and the adjoining Stewart Islands. The seaward shores formed the ordinary haunts of these birds until the approach of a gale forced them to seek the lee of the islands or the sheltering bays. From the fact that these flocks are formed exclusively of males it is evident that the females assume the duties of incubating the eggs and rearing the young.

The main breeding ground of this species remains unknown to me, for, although females and young were not rare in summer, yet they were never numerous enough to account for the vast numbers of males to be found.

On August 23, 1878, I visited Stewart Island, about 10 miles to the seaward of Saint Michaels. As I neared the island in my kayak I found the water literally black with the males of this species,

which were united in an enormous flock, forming a continuous band around the outer end of the island for a distance of about 10 miles in length, and from one-half to three-fourths of a mile in width. As the boat approached them those nearest began to rise heavily by aid of wings and feet from the glassy surface of the gently undulating but calm water. The first to rise communicated the alarm to those beyond, until as far as could be seen the water was covered with flapping wings, and the air filled with a roar like that of a cataract. The rapid vibrations produced in the air by tens of thousands of wings could be plainly felt.

In all my northern experience among the water-fowl which flock there in summer I never saw any approach to the number of large birds gathered here in one flock, nor shall I soon forget the grand effect produced by this enormous body of birds as they took wing and swept out to sea in a great black cloud and settled again a mile or so away.

The following year early in September I found a similar congregation at the same place. On October 9 or 10 each year both young and old, which have joined in small flocks, are common all along the coast, and are found until the new-formed ice forces them away a week or so later.

It was common in summer to see males in the *bimaculata* plumage among the large flocks.

At Unalaska, May 10, 1877, I secured a male as it swam alongside the steamer as we lay at the wharf, and later in this month they became numerous about the bays in that vicinity. In the mating season they have a low, clear whistle for a call note, and may be readily decoyed within gunshot by imitating it from a blind. They are very curious also at this time, and I have seen a flock rise and come up within a few yards of me as I was trying to creep within gunshot of them. The white iris and bizarre coloration of the head of the male render it a very odd and striking species.

CHEN HYPERBOREA (Pall.). Lesser Snow Goose (Esk. *Kūng-ū*).

The handsome Lesser Snow Goose is uncommon on the coast of Norton Sound and about the Yukon mouth. It arrives in spring from the 5th to the 15th of May, according to the season, and after remaining a very short time passes on to its more northern summer haunts. In the vicinity of Nulato, on the Yukon, Dall found them arriving about May 9, on their way up the Yukon; "they only stop to feed and rest on the marshes during the dusky twilight of the night, and are off with the early light of an Arctic spring." According to Murchoch they are occasionally seen at Point Barrow in spring. This is all seen of these geese in spring throughout Alaska, except perhaps on the extreme northern border, for south of this none breed, and none are found after about May 25. They are far less numerous in spring than in fall along the coast of Bering Sea, and their spring migration is over so quickly that they are rarely killed at that season. Dr. Adams, while at Saint Michaels in 1851, noted the arrival of these birds from the south in spring and their departure to the north in fall, agreeing with my own observations, as noted elsewhere.

On September 2, 1878, flocks began to come south, and up to the 10th of that month they were common. From the unusually early date of this arrival the natives predicted an early approach of winter. They ordinarily arrive from the 5th to the 15th of September, and some remain until the 7th or 10th of October in some seasons. At this season they are in flocks of from twenty to one hundred or more, and do not mix with other geese on the feeding grounds, but keep by themselves. They feed upon the same flats as the other geese, and have no peculiar habits.

The young are frequently in their grayish immature plumage even when they leave for the south in October.

There is no record of this bird from any of the Bering Sea islands nor from the southeastern coast, although it must occur in the latter region during the migrations.

The extraordinary abundance of these geese in California during winter is equaled by the myriads which pass north along the western shore of Hudson's Bay in spring. Hearne rates them as the most abundant bird found at the northern part of this bay, and states that during the height of the season when they settle to feed the ground appears as if covered with snow. The same author records the killing of from five to six thousand birds during one spring at Fort Churchill. This was before 1725, and in view of the continual slaughter these and the other geese are forced to undergo annually, it appears strange that they should continue to exist in such great numbers.

These birds seek a nesting ground along the course of the Lower Anderson River and the neighboring region along the Arctic coast.

ANSER ALBIFRONS GAMBELI (Hartl.). American White-fronted Goose (Esk. *Lök-hük*).

In early seasons the first White-fronted Goose reaches the Yukon mouth and the vicinity of Saint Michaels by April 27, as in 1877, but the usual time is from the 5th to the 8th of May. From about the 10th of May they are very common, and remain to breed in considerable numbers all along the Alaskan shore of Bering Sea and on the Arctic coast of Point Barrow, where they are plentiful, arriving the last half of May. It was taken on the Commander Islands by Stejneger. During the summer of 1881 a number were found feeding upon Saint Lawrence Island, and they also nest on the Siberian shore in the vicinity of Bering Straits. During the migrations they occur at various points along the Aleutian chain, but are not known to breed there. Dall found their eggs all along the Yukon, from Fort Yukon to the sea, and it is well known as a widely-spread species, breeding all around the Arctic mainland portions of America.

Over the northern part of most of the Old World is found a closely-related race of this bird distinguished by a slightly smaller bill and darker colors. When the White-fronted Goose first arrives in the north the lakes are but just beginning to open and the ground is still largely covered with snow. The last year's heath berries afford them sustenance, in common with most of the other wild fowl at this season. As the season advances they become more numerous and noisy. Their loud call-notes and the cries of the males are heard everywhere.

The mating season is quickly ended, however, and on May 27, 1879, I found their eggs at the Yukon mouth. From this date on, until the middle of June, fresh eggs may be found, but very soon after this latter date the downy young begin to appear. These geese choose for a nesting site the grassy border of a small lakelet, a knoll grown over with moss and grass, or even a flat, sparingly covered with grass. Along the Yukon Dall found them breeding gregariously, depositing their eggs in a hollow scooped out in the sand. At the Yukon mouth and Saint Michaels they were found breeding in scattered pairs over the flat country. Every one of the nests examined by me in these places had a slight lining of grass or moss, gathered by the parent, and upon this the first egg was laid; as the complement of eggs is approached the female always plucks down and feathers from her breast until the eggs rest in a soft warm bed, when incubation commences. The eggs vary considerably in shape and size. Some are decidedly elongated; others are as decidedly oval. In color they are of a dull white, but ordinarily present a dirty brown appearance from being stained in the nest.

The following measurements show about the extent of the variations in size. The eggs measured are from a very large series taken in the vicinity of Saint Michaels: Maximum, 3.45 by 2.28; minimum, 2.98 by 2.10. Within these limits there are innumerable gradations.

The young are pretty little objects, and are guarded with the greatest care by the parents, the male and female joining in conducting their young from place to place and in defending them from danger.

The last of June, in 1877, I made an excursion to Stewart Island, near Saint Michaels, and while crossing a flat came across a pair of these geese lying prone upon the ground in a grassy spot, with necks stretched out in front and their young crouching prettily all about them. Very frequently during my visits to the haunts of these birds the parents were seen leading their young away through the grass, all crouching and trying to make themselves as inconspicuous as possible.

At Kotzebue Sound, during the Corwin's visit, in July, 1881, old and young were very common on the creeks and flats at the head of Escholtz Bay.

The downy young has the middle of the crown and entire back, including the upper surface of the wings and outer side of thighs, sooty-brown with an olive shade. From the bill a band extending back through the eye is of a slightly darker shade than surrounding feathers. Nape and back of neck olive yellow. Entire lower surface rich lemon-yellow washed with lighter on the abdomen. A full grown young of the year, taken the 1st of September, is much like the adult, except in lacking the white at the base of the bill and the dark mottling on the breast. About

the base of the bill the feathers are mixed blackish and brown. Head and neck pale brown, lightest on the neck. Back ashy brown, feathers edged with grayish brown. Rump dark brown. The entire surface below is nearly uniform pale dingy-brown, much darker on the sides. The bill is dull yellowish, bordered around the gape, nostrils, and along the ridge of culmen by dark horn-color. The iris is dark hazel, surrounded by a dull yellow membrane. Feet and tarsi dingy yellowish.

During August and September the geese and many other wild fowl in the north feed upon the abundant berries of that region and become very fat and tender. All through September, old and young, which have been on the wing since August, gather in larger flocks, and as the sharp frosts toward the end of September warn them of approaching winter, commence moving south. The marshes resound with their cries, and after some days of chattering, flying back and forth, and a general bustle, they suddenly start off in considerable flocks, and the few laggards which remain get away by the 7th or 8th of October.

BRANTA CANADENSIS HUTCHINSII (Sw. & Rich.). Hutchins's Goose (Esk. *Tu-talk-ko-chik*).

The history of the present bird is but little known, and most authors, since the time of the original description, have referred to it under the name *leucopareia*. This must have been done in every case from lack of proper material, as I hope to show in the following notes. Although this bird is one of the commonest species on the Lower Yukon, yet, strangely enough, in their paper upon the birds of Alaska, Messrs. Dall and Bannister did not record it from there, but simply note: "Two specimens obtained by Bischoff at Sitka." These specimens are really *occidentalis*. At the Yukon mouth and in the vicinity of Saint Michaels, I found this species arriving with the smaller *minima* at the same dates and in about equal numbers at the Yukon mouth, but much less common at Saint Michaels. From my observations I should decide the center of abundance of this species to be along the Lower Yukon and thence south to the Kuskoquim. Its distribution appears to be less general than that of the smaller form, whose habits it shares. In examining the National Museum series of geese I find examples from Northern Illinois which are identical with the specimens of *hutchinsii* from Alaska. In order to show the differences between the three forms as plainly as possible, I give below a brief diagnosis of each, with measurements appended:

Canadensis.—A typical specimen from Northern Illinois. The well known, large, white cheek-patches and black head and neck need only be referred to; the entire back, including exposed feathers of folded wings, is dark grayish brown edged with lighter. The rump is black with white upper tail-coverts, which form a ring about the tail by joining the white of abdomen. The dark color of the back reaches forward to the sharply-defined edge of the black on the neck. Entire lower surface from the edge of the black on the neck in front to the white of abdomen, pale-grayish brown, pretty well defined posteriorly by the white area which occupies the abdomen and under tail-coverts. Tail-feathers, 16.

Hutchinsii.—A series from Alaska, California, and Northern Illinois. The main difference between this form and *canadensis* is the smaller size of the former. The color variations are mainly limited to the abdomen and throat. The dorsal surface of *hutchinsii* is like that of *canadensis*, with no point of variation I can observe. In *hutchinsii* the black of head and neck tends to assume a glossier black, and the dark color very commonly encroaches upon the white cheek-patches, frequently separating them by a broad, black throat-band. The main distinction, however, besides the smaller size, is in the much lighter color of the lower surface. The white abdominal area extends forward and almost incloses the thigh in some cases, and almost invariably there is no definite line of demarcation between the white and brown areas. In addition, the grayish brown of the breast is very light, and the encroachment of the white upon its posterior border gives a mottled gray and white surface. In some instances the white of abdomen extends anterior to the middle of the body. There is rarely any sign of a white collar at the base of the black on the neck either in this or the preceding. Tail feathers, 16.

Minima.—Series from Alaska. Black of head and neck as in the preceding. The black encroaches upon the white cheek-patches even more extensively than in *occidentalis*, and the black line along the throat is sometimes very broad. The back is usually somewhat darker than in

the two preceding forms, and the light edgings of the feathers more sharply contrasted with the general color. These characters are not always to be trusted, however. Very frequently the neck at the base of the black is surrounded by a ring of white, varying from a single series of feathers to a band half an inch broad. Whether this white ring is present or not the feathers surrounding the base of the neck are much darker than the rest of the back or breast; and, in case the white ring is absent, the black neck area shades gradually into the color of the back and breast in place of the sharp limit seen dividing the colors in the other two forms. The color of the entire under surface, except the abdomen, is very much darker than in either of the other two forms, and the feathers are edged and glossed with a dull burnt-umber shade, giving a peculiar tint not seen on the others. In consequence of the dark colors on the lower surface of *minima* the contrast between the abdominal white and the dark brownish of the breast is striking. Tail-feathers, 16. There is no difference in the number of tail-feathers so far as I have been able to find after examining over one hundred birds of the various forms.

	Wing.	Tail.	Tarsus.	Culmen.	Height of bill at base.
<i>Canadensis.</i>					
April —, Chicago, Ill.	17.50	5.40	3.15	2.00	.92
<i>Hutchinsii.</i>					
♂ May 15, Yukon mouth.	16.15	5.19	2.85	1.43	.70
♂ May 6, Nulato, Alaska.	16.10	5.45	2.86	1.45	.76
♂ Chicago, Ill.	14.50	4.75	2.64	1.30	.75
♂ Washoe Lake, Nevada.	15.35	4.95	2.99	1.90	.83
<i>Minima.</i>					
♀ Saint Michaels, Alaska.	14.40	4.70	2.48	1.10	.66
♂ Saint Michaels, Alaska.	13.90	4.50	2.65	1.11	.72
♀ Yukon mouth.	13.20	4.62	2.40	1.09	.65
♀ California.	14.70	5.09	2.63	1.25	.78

The last specimen measured in the *minima* series presents a combination of the characters of that form and *hutchinsii*, but is nearest *minima*. A specimen in the National Museum collection, taken at Sitka in May, which is one of the two specimens cited by Dall from that locality under the name *occidentalis*, only agrees with this form in having a slightly smaller bill than is usual in *canadensis*. It measures as follows: Wing, 18; tail, 5.80; tarsus, 3.15; culmen, 1.62; depth of bill, .88.

In his paper on the birds of the Western Aleutian Islands, Mr. Dall, under the heading of *Bernicla nigricans*, gives some interesting observations concerning this bird. He informs us that it does not breed east of Amchitka Island, but some nest on Amchitka, Kyska, and other islands there.

They choose the hill-tops for their breeding places, according to the naturalist quoted, and he secured eggs on June 15 and the unfledged young July 10.

The nesting habits, notes, and general mode of life of Hutchin's Goose are identical with those of *minima*, so they need not be specially referred to here. Eggs of this bird taken at the Yukon mouth in June, 1879, measure 3.02 by 2.10, 3.08 by 2.11, 3.04 by 2, 3 by 2.11, 2.90 by 2.07.

So great is the variation in size in the eggs of this bird and those of *minima*, that unless the eggs are identified on the spot it is a hopeless task to try and separate them afterwards. By the test of measurements alone the same difficulty would be experienced in separating the birds themselves as they grade insensibly from one to the other, but removing *hutchinsii* and the two extremes are found in the other two forms.

BRANTA CANADENSIS OCCIDENTALIS (Baird). White-cheeked Goose.

During my residence on the coast of Bering Sea this bird was not seen, and as hundreds of the two other related forms were examined both at Saint Michaels and the Yukon mouth, it appears evident either that the White-cheeked Goose proper never reaches this part of the Territory, or, if at all, merely as a very rare straggler.

Mr. Dall records specimens at Sitka during the Western Union Telegraph Expedition.

BRANTA CANADENSIS MINIMA Ridgw. Cackling Goose (Esk. *Lūk-hūk-hā-ghūk*).

This is the most common and generally distributed goose found breeding along the Alaskan coast of Bering Sea. From the sea-shore its breeding ground extends along the courses of the great rivers far into the interior. During the summer of 1881 they were found in abundance about the head of Kotzebue Sound, and were seen at various points along the Arctic coast to the vicinity of Point Barrow; so there is no doubt that its breeding ground reaches thus far.

In Dall and Bannister's paper the notes upon *leucoparvia* and *hutchinsii* are to be united under the above heading, since they unquestionably refer solely to the present bird. While descending the Yukon, Dall found their eggs laid upon the bare sand-banks, as were those of the White-fronted species.

It is recorded by Elliott as an occasional visitant to the Fur Seal Islands during the migrations, but is not known to breed. In the vicinity of Saint Michaels and the Yukon mouth these are the first geese to arrive in spring; the first come from the 25th to the 30th of April, but the main body do not arrive until from May 5 to 20, according to the season. The first geese of the season is hailed with delight by both natives and white residents, who set at work repairing their guns and making ready for the welcome change from a diet of fish eaten all through the winter to geese, which soon becomes the staple.

As May advances and one by one the ponds open, and the earth looks out here and there from under its winter covering, the loud notes of the various wild fowl are heard, becoming daily more numerous. Their harsh and varied cries make sweet music to the ears of all who have just passed the winter's silence and dull monotony, and in spite of the lowering skies and occasional snowsqualls every one makes ready and is off to the marshes.

The flocks come cleaving their way from afar, and as they draw near their summer homes raise a chorus of loud notes in a high-pitched tone like the syllable "lūk," rapidly repeated, and a reply rises upon all sides, until the whole marsh re-echoes with the din, and the new-comers circle slowly up to the edge of a pond amid a perfect chorus raised by the geese all about, as if in congratulation.

Even upon first arrival many of the birds appear to be mated, as I have frequently shot one from a flock and seen a single bird leave its companions at once and come circling about, uttering loud call-notes. If the fallen bird is only wounded its mate will almost invariably join it, and frequently allow itself to be approached and shot without attempting to escape. In some instances I have known a bird thus bereaved of its partner to remain in the vicinity for two to three days, calling and circling about. Although many are mated, others are not, and the less fortunate males fight hard and long for possession of females. I frequently amused myself, while at the Yukon mouth, by watching flocks of geese on the muddy banks of the river, which was a favorite resort. The females kept to one side and dozed, or dabbled their bills in the mud; the males were scattered about, and kept moving uneasily from side to side, making a great outcry. This would last but a few minutes, when two of the warriors would cross each other's path, and then began the battle. They would seize one another by the bill, and then turn and twist each other about, their wings hanging loosely by their sides meanwhile. Suddenly they would close up and each would belabor his rival with the bend of the wing, until the sound could be heard two or three hundred yards. The wing-strokes were always warded off by the other bird's wing, so but little damage was done, but it usually ended in the weaker bird breaking loose and running away. Just before the males seize each other they usually utter a series of peculiar low growling or grunting notes.

The last week of May finds many of these birds already depositing their eggs. Upon the grassy borders of ponds, in the midst of a bunch of grass, or on a small knoll these birds find a spot where they make a slight depression and perhaps line it with a scanty layer of grasses, after which the eggs are laid, numbering from five to eight. These eggs, like the birds, average smaller than those of the other geese. The following series of measurements, taken from a large series of eggs, shows about the average sizes: 3 by 1.85, 2.90 by 1.90, 2.80 by 2, 2.75 by 2, 2.70 by 1.92.

As the eggs are deposited the female gradually lines the nest with feathers plucked from her breast until they rest in a bed of down. When first laid the eggs are white, but by the time

incubation begins all are soiled and dingy. The female usually crouches low on her nest until an intruder comes within a hundred yards or so, when she skulks off through the grass or flies silently away, close to the ground, and only raises a note of alarm when well away from the nest. When the eggs are about hatching, or the young are out, both parents frequently become perfectly reckless in the face of danger.

The young are hatched from the middle of June until the middle of July.

The old birds moult their quill feathers from the 20th of July until late in August, and flocks begin forming as soon as the birds are on the wing again. From that time until the last of September and first of October, when they migrate, they are found scattered over the country, feeding on various berries, which are ripe on the hill-sides.

One season, at 10 p. m., on the 29th of September, an immense flock of these birds, with other geese, was heard leaving the marshes, although the darkness was intense. The following day four inches of snow fell and winter set in, thus affording an excellent example of what true weather-seers these birds are.

From the time the young are hatched until the moult, these and the allied geese may be tolled within gunshot, as they fly from place to place, by the hunter merely lying or kneeling on the ground and swinging his cap and making an outcry or imitating their note. I have seen this done again and again by the Eskimo, and have done it often myself.

The first plumage of this bird is a dull grayish umber-brown; the head and neck almost uniform with the rest of the body and without any trace of the white cheek-patches. As is common to the young of many water-fowl, the feathers of head, neck, and much of the rest of body are bordered with a lighter shade than the main part of the feathers.

BRANTA NIGRICANS (LAWL). Black Brant (Esk. *Lök-hlög-ü-nük*).

Each season, as the chilling storms and gloomy weather of middle May begin to give place to a softer temperature and other proofs of approaching summer, the Black Brant first makes its appearance on the east coast of Bering Sea. It is rarely found at the Yukon mouth before May 15, and it usually arrives from the 18th to the 22d of this month. The week or ten days following the arrival of these birds in spring includes the bulk of their migration, after which none are seen until fall, unless it may be an occasional pair which stop to nest in the marshes from the Yukon mouth north to Kotzebue Sound. This is a very rare occurrence, however, as my own experience and that of the Eskimo goes to prove.

In autumn there is a striking difference in the number taking the coast of Bering Sea as a pathway to the south, and in place of the myriads which pass north in spring along this coast, only a few scattered parties and stray birds make their appearance between the 1st and the 15th of October. The cause for this is not known, but it may be due to the fact that in spring the birds are forced to keep along the shore to find food on the exposed flats, whereas in fall they can find more or less food in passing across the sea from one point to another. The main flight of the other geese has passed, and many of those which remain to breed have already paired when the height of the Brant flight occurs.

The weather has become just mild enough to render camping somewhat comfortable by this time, and at Saint Michaels we counted, each spring, upon a few days' sport with these birds as the cream of the shooting season. The nights during the last half of May are scarcely darker at Saint Michaels than early twilight in lower latitudes, and the air, frosty and bracing between sunset and sunrise, renders camping at this season doubly attractive. The soft, hazy outlines of the landscape, and the solemn silence brooding over all, make the night scenes impressive. The early sun pours its rays in long bars of light through the mountain defiles upon the marshes and awakens to life the noisy multitude which has congregated about the opening pools and bare spaces. A speedy toilet made through the icy rim of a pool, and a hasty breakfast, quickly disposed of, and one who wishes the best of the Brant shooting must soon gain his station. A rubber blanket spread on the wet moss allows a comfortable place to lie upon at full length, until, as the sun begins to make itself felt, the birds take wing from their resting-places about the borders of the countless ponds and slough-holes on the broad stretch of marsh. In flocks of from ten to

several hundred birds they come gliding along close to the ground, almost invariably drawn out in single file, flying abreast, and with continuous and gracefully sinuous undulations. These undulations are produced by the birds successively rising or lowering a foot or two, the motion commencing at one end of the flock and passing successively along.

The wing-strokes of this species are much more rapid than those of the others, and their flight is also more swift, so that it takes a quick eye and sure hand to stop them as they dart over one while he lies upon the ground. Many a charge of shot has the writer sent on a fruitless errand at these birds, until he has gained a lasting memory of their prowess on the wing. During the winter residence of this Brant upon the shore of California it is noted for its pertinacity in following the outline of the coast as it passes from place to place. In the north this habit still clings to them, and although they frequently pass over broad, marshy flats, yet a low ridge, but a few yards high above the general level, is sufficient to turn their course and send them skimming along its base and around the obstacle rather than over it. For this reason our best shooting was usually found near the end of a ridge crossing their line of flight.

While upon the ground or in flight they have a low guttural note something like the syllables *gr-r-r-r-r*. When alarmed this note, repeated often and with more emphasis, was the only cry heard.

They are very gregarious, at least during the spring migration, at which time my knowledge of them was gathered; single individuals were rarely seen, and these always hurried to join the first flock they fell in with, while small flocks very commonly united with larger ones. I regret that I had no opportunity to study this interesting bird during the nesting season. Their breeding ground, however, lies considerably to the north, for, during the cruise of the *Corwin*, in the summer of 1881, we first met them in the vicinity of Point Barrow, where the Eskimo brought many of them on board. This was in August and their quill-feathers had been moulted and they were sorry-looking objects.

Some old whaling captains assured me that they have frequently seen these birds coming from over the ice to the north of Point Barrow in fall; and to the hardy navigators of these seas this is strong evidence in support of the theory that bodies of land lie beyond the impenetrable icy barrier which heads off their advance in that direction. Perhaps it was the droppings of this bird which we found on the dreary shores of Wrangel Island, when our party from the *Corwin* were the first human beings to break in upon its icy solitude.

Above the Yukon delta the Black Brant is a rare straggler, but it is taken at times up to Nulato. Dall took one there the 29th of May, and informs us that they are also found at Fort Yukon on the headwaters of the river. There, in spring, they are as numerous for a few days, as on the coast. Strangely enough the same author was informed that these geese are not seen at Fort Yukon in fall, and as the same is virtually the case on the coast of Bering Sea at that season, the query arises as to the path taken by the myriads which pass north during a week or two in spring.

Mr. Dall writes that on his return to the coast of California in the latter part of October enormous flocks of these birds were seen about 100 miles offshore. They were flying south and frequently settled in the water near the ship. The author just quoted notes eggs and young said to be of this species taken on the Western Aleutian Islands, but I am induced to believe that these eggs and young really belong to *B. minima*, as the latter bird is the only one said to breed upon these islands, if the statements of residents can be relied upon. While at Uvalaska on my way to San Francisco I saw a flock of the *B. minima*, domesticated, and upon inquiry learned that they came from the western end of the chain, where the natives are in the habit of rearing the young and using them for food in winter. Elliott does not include the Brant among the visitants to the Far Seal Islands, nor did I see it elsewhere in Bering Sea during my cruise the summer of 1881.

For some points of interest upon this bird not mentioned here I must refer those interested to an article by the writer in the Bulletin of the Nuttall Ornithological Club, where some of their habits are treated more in detail.

Mr. Bean (*loc. cit.*) saw flocks of these birds migrating south along the Arctic coast near Cape Lisburne on August 22, and on the 25th of the same month found them very abundant about the brackish lagoons along shore near Icy Cape.



EMPEROR GOOSE.
Phalacrocorax carolinensis

At Point Barrow, according to Murdoch, these birds arrive at the end of the water-fowl migration in spring, as they do in Norton Sound. They leave the former place for the south by the end of September. A few breed there and lay from four to six eggs in a marshy place.

A young female of the year has the white nuchal collar of the adult indicated by a sprinkling of white feathers in front and on sides of neck, but not behind. The feathers of the back are edged with brown. There are two white bands across middle of wing, and the secondaries and tertiaries are tipped with white. The feathers of abdomen are tipped with grayish, but the broad, white neckings along the sides and flank of the adult are wanting.

90. PHILACTE CANAGICA (Sevast.). Emperor Goose (Esk. *Nā-chaiñ-thlak*).

Among the various species of birds more or less peculiar to Alaska this goose is perhaps the most noteworthy. The limited area covered by it in its migration, its narrow range, reaching only across the area bounded by the Aleutian Islands on the south, and the vicinity of Bering Straits on the north, and the little known concerning its life-history, all joined to render this bird one of the principal objects of my attention at Saint Michaels.

The Aleuts call these birds "beach geese," from their habit of frequenting the beaches, on these islands, at low tide, to feed. On Sanak and other of the Eastern Aleutian Islands, on the Pacific side of the chain, these birds winter in extraordinary abundance, and are found at times the entire length of the chain, Mr. Dall's statement (*Proc. Cal. Acad. Sci.*, February 8, 1873, and March 14, 1874) of the absence of these birds on the western half of the Aleutian Islands being based upon erroneous information. They are far more numerous, however, on the eastern half.

Elliott records them as stragglers on the Fur Seal islands, where they sometimes land in such an exhausted condition that the natives eaten them in open chase over the grass. Dr. Adams found them at Port Clarence, in Bering Straits, in the summer of 1851. While lying becalmed off the Yukon mouth, June 17, 1877, I saw three of these birds heading across the sea towards Saint Lawrence Island, where, during the summer of 1881, they were found abundant on the southwest coast. They were also found there by Elliott some years previously, thus showing them to be regular summer residents.

Upon the north coast of Siberia, just west of Bering Straits, Nordenskjöld found them in early summer, so there is little question that they breed thus far north at least, although I did not find a single specimen during my visits to the same shore in the summer of 1881. On the Alaskan side it is not very rare in Golovina Bay and Port Clarence, both near the Straits, and thence south it is found more commonly, although still scarce, until the Yukon delta is reached; here, upon the seaward part of this series of islands and along the marshy coast to the south, between the Yukon and Kuskokwum Rivers, they find their most congenial breeding ground, and here they occur in great numbers, not, however, to the exclusion of the other geese, as Mr. Dall's informant told him was the case on the Kusievak mouth of the Yukon, a statement I did not find verified on my visit to that part of the delta.

As an important part of this bird's history I include here some extracts from the *Nova Acta Acad. Petropol.*, where, in Tome XIII, pp. 340 to 351, is the original description based upon a specimen secured by Billings on his voyage to our coast near the close of last century. This specimen was described on October 8, 1800, at the Imperial Academy of St. Petersburg, as quoted above. It is stated that this example was obtained upon the isle of Canaga, or Kyktak, one of the Aleutian islands nearest the American coast, and situated behind the Cape Abaska: "Et que le nom de l'espèce, c'est à dire 'Canagica, a été imposé à cet oiseau du nom de la première isle, on de celui des principaux habitans de l'isle Kyktak, appelée Caniagues on Canagues, qui peut-être ayant apprivoisés cet oiseau l'ont rendu domestique." Which latter is a rather naïve surmise on the part of our worthy author, not sustained by subsequent investigation. A miserable woodcut accompanies this description. I have been to considerable trouble to locate the island whence the original specimen came, but have been unable to find it under the names given on any English, Russian, or American chart I have examined.

Up to the time of the Telegraph Expedition but little was known of these geese, and the little information secured by the explorers at that time served to draw the attention of ornithologists to this hyperborean species.

During my residence at Saint Michaels, stray parties of Emperor Geese were seen now and then, being more common in fall than earlier in the season. Toward the end of September or first of October each fall, a few are taken by Eskimo on the broad marshes about 10 or 15 miles south of Saint Michaels. At this season they are in flocks of from ten to fifty or more, and are rather shy. During the last of May and first of June, 1879, the writer camped on a lonely islet in the middle of the Yukon delta for the purpose of gaining some knowledge regarding the habits of these geese and the other water-fowl. There, under the chilling snow-squalls of a backward spring, the coming of these fine birds was impatiently awaited.

On May 22 my Eskimo hunter brought in the first one, a magnificent male in fine plumage. From that time on they became more common daily until the first of June, when they had arrived in full force, and their form and notes became as familiar as those of the White-fronted and White-collared Geese (*gambelii* and *minima*). The river was still under a firm sheet of ice, and heavy snow-banks covered half the earth when the first arrivals appeared and sought a feeding place on any muddy flat just appearing from its spovy covering.

The early-comers were more shy than those later in the field, and in spite of continued effort the number of skins in my box did not increase rapidly. It was not long before they began to arrive in flocks, and were less shy. They were easily distinguished at a long distance by their heavy bodies, short necks, and short, quick wing-strokes, very much like those of the Black Brant. Although not as agile on the wing as the latter bird, nor, in fact, as the other geese, yet when under way they are swift flyers.

While passing from one feeding ground to another they commonly utter a deep, rather hoarse, and strident clá'-há, clá'-há, clá'-há, which is very different from the note of any other goose with which I am familiar. At times, though rarely, a flock may be brought within gunshot by imitating this note.

Soon after their arrival they began to pair, and were seen flying about in couples, keeping close to the ground, rarely flying over 20 or 30 yards high, and often barely keeping clear of the surface. The males are extremely jealous and pugnacious, never allowing one of their kind to approach within a number of yards without making an onslaught upon the intruder. The same belligerent spirit is shown to the other species of geese should one of them chance to draw too near.

While a pair is feeding the male keeps moving restlessly about, with eyes constantly on the alert, and at the first alarm they draw near together and just before they take wing both utter a deep, ringing ñ-lúgh, ñ-lúgh. As in the case of the call-note, this has a peculiar, deep hoarseness, impossible to describe.

The first of June they began depositing their eggs on the flat, marshy islands bordering the sea. At low tide the broad mud-flats on the shore were thronged with them, and after feeding until satisfied they congregated on bars until the incoming water forced them to disperse. They nested most abundantly on the salt marshes adjacent to these feeding grounds, and the eggs were often placed among fragments of drift-wood below the mark of the highest tides. Stray pairs were found nesting further inland on the marshy meadows, also frequented by the other species of geese, but on the salt flats, near tide water, the Emperor Geese held undisputed possession.

On June 5 a female was found setting upon her eggs on a little knoll, with a small fragment of bleached drift-wood within a few yards of her, and as she lay with extended neck, although the ground was almost bare, my Eskimo and I passed within a few feet of her on either side, without seeing her. We were about 20 steps beyond when she left the nest with a startled cry, thus drawing our notice. The three eggs were in full view when we turned. They rested in a depression with no sign of a lining. The same ruse caused us to pass other nests, but the birds betrayed them each time by flying off with a loud outcry almost as soon as our backs were presented.

The majority of the nests found contained from three to five eggs, the full complement usually ranging from five to eight. The eggs are absolutely indistinguishable from those of the White-fronted Goose, and in form and measurements present a wide range of variation. Thus some are much elongated, while others are slightly pyriform. As usually taken from the nest they are of a dirty-brownish white, but when fresh are of a nearly pure white. They vary in size from 3.25 by 2.22 to 3.03 by 2. As the complement of eggs approached completion, the parent made a soft bed of fine grass, leaves, and feathers plucked from her own breast. As a rule, when driven from

her eggs, the female flew straight away and alighted at some distance, sometimes half a mile from the nest, showing very little concern. The male was rarely seen in the vicinity of the nest. The young are hatched the last of June or first of July, and the adult birds undergo the summer moult from the last of July to the middle of August.

During this season the Eskimo set long lines of nets across the marshes and make drives of water-fowl which have moulted their quill feathers. The slaughter is enormous; the wasteful savages render it still worse by killing thousands of young birds which are entrapped, saying that they will thus prevent their being in the way during the next drive.

Tens of thousands of geese are annually killed in the drives from the Yukon mouth south to the Kuskoquim. In fall, as these geese regain their wings, they gather along the sea-coast and seek their food from place to place until the approach of winter sends them a few hundred miles south to the Aleutian Islands.

The natives south of the Yukon use the skins of the Emperor Goose for making clothing, as they also use the skins of the other water-fowl. They are more difficult to kill than the other geese, and I have repeatedly knocked them down with a charge of shot and seen them make off apparently unhurt a moment later.

The first plumage is known by the black or dark spots sprinkled over the white hood. In this stage the feet and legs are dusky olive-yellow, the iris dark hazel; lower mandible horn-black, as is the lower border of the upper mandible. The upper surface of the latter is blotched with dark horn color on a livid purplish ground color, tinged the dark mottling. After careful examination I found the adult males and females to be absolutely indistinguishable, although there is considerable individual variation. A fine adult female taken at the Yukon mouth May 22 (No. 1067) had its iris hazel; lower mandible dark horn-color, with a white spot on each side of the rami; membrane about nares livid-blue, the rest of upper surface of bill pale purplish or fleshy white; edge of nail dark horn color—rest of same white; inside of mouth mottled black and white; feet and legs a bright, rich orange-yellow. The following measurements, taken from the fresh birds, will show the length and spread of wings:

Number.	Sex.	Length.	Spread.	Number.	Sex.	Length.	Spread.	Number.	Sex.	Length.	Spread.
1114	♂	26	42	1129	♂	27	51	1123	♂	27.5	53
1115	♂	26.5	50.5	1121	♂	27	53.5	1126	♂	27	52
1117	♂	26	49	1122	♂	26.5	51	1127	♂	27.5	50.5
1118	♂	27.63	53	1123	♂	26.63	51	1128	♂	28	54.5
1119	♂	27	51.5	1134	♂	25.6	49.6	1129	♂	28	56.5

During Billings's Expedition to the Aleutian Islands, about 1790, the Emperor Goose was described by Sauer, who noted its arrival at Unalaska August 31 and its departure the 18th of the following April. It winters abundantly on the Near Islands.

The latest contribution to its history is by Mr. C. H. Townsend, who records the capture of an Emperor Goose on Humboldt Bay, Northern California, by Mr. Charles Fiebig, in the winter of 1884, and the latter stated that these geese occur there at long intervals.

OLOR COLUMBIANUS (Ord). Whistling Swan (Esk. *Kög-ü-shük*).

This fine bird arrives on the shore of Bering Sea in the vicinity of Saint Michaels early in May, and in some seasons by the 27th of April, as in 1878, when several were seen on that date about a spring-hole in the ice. At this time the ground was clothed with over a foot of snow, and the sea covered, as far as could be seen, with unbroken ice. During the next few days a terrible storm of wind and snow swept over the country, but did these birds no harm, as was seen directly after the storm ceased by their presence at the water-hole as usual. Mr. Dall records their arrival on the Yukon about May 1, and notes the fact of their descending that stream in place of going up the Yukon, as most of the geese do at this season.

The birds arrive singly or in small parties on the coast, and directly after scatter to their summer haunts. At Nulato, Dall found them laying their eggs by May 21, but on the sea-coast May 30 is the earliest date I have of their eggs being taken. Dall states that they lay two eggs, but

this must refer to a single nest, for the ordinary number is from three to six. The nest is usually upon a small island in some secluded lakelet, or on a rounded bank close to the border of a pond. The eggs are deposited in a depression made in a heap of rubbish gathered by the birds from the immediate vicinity of the nest, and is composed of grass, moss, and dead leaves, forming a bulky affair in many cases.

On June 14, 1880, a swan was seen flying from the side of a small pond on the marsh near Saint Michaels, and a close search finally revealed the nest. The eggs were completely hidden in loose moss, which covered the ground about the spot, and in which the bird had made a depression by plucking up the moss and arranging it for the purpose. The site was so artfully chosen and prepared that I passed the spot in my search, and one of my native hunters coming close behind, called me back, and thrusting his stick into the moss exposed the eggs. I may note here that whenever the Eskimo of Norton Sound go eggng on the marshes they invariably carry a stick 3 or 4 feet long, which they thrust into every suspicious tussock, bunch of grass, or spot in the moss, and if a nest is there it is certain to be revealed by the stick striking the eggs. They are very expert in detecting places likely to be chosen by the ducks and geese. I have seen my hunters examine the borders of a lake, after I had given it what I considered a thorough search, and unearth in one instance three geese-nests and one duck's. This was after I had acquired considerable skill in finding eggs, so it may readily be seen that the birds are very unning in placing their nests. There is some variation in the eggs of this swan, but the following measurements show the average, the specimens measured being taken near Saint Michaels in June: 4.15 by 2.85, 4.05 by 2.74, 3.96 by 2.66.

The last of June or first of July the young are hatched, and soon after the parents lead them to the vicinity of some large lake or stream, and there the old birds moult their quill-feathers and are unable to fly. They are pursued by the natives at this season, and many are speared from canoes and kyaks. Although unable to fly, it is no easy task single-handed to capture them alive. The young men among the Eskimo consider it a remarkable exhibition of fleetness and endurance for one of their number to capture a bird by running it down. The feat is performed as follows: The man removes his clothing except his trousers and a pair of small, light skin boots, and then he starts after the bird, which may be plainly visible a hundred yards or more away, trying to conceal itself in grass 2 or 3 inches high. The moment the swan sees its enemy approach it rises and starts off at full speed, using its featherless wings as balances and to aid in progression. The bird takes to every shallow pond it sees, and by the aid of feet and wings makes very rapid progress. The man must rush straight on in the track of his game, through water and mud, and if he has good speed and wind he may hope to capture the bird in the course of fifteen or twenty minutes. During the visit of the Corwin to Kotzebue Sound, in July, 1881, I saw several swans with their quills moulted, but, as I had no ambition to gain fame as a runner, I did not try to secure them.

About 20 miles from Saint Michaels, toward the Ynkou mouth, is a small, shallow lake, about one-fourth of a mile in diameter, which is grown up with "horse-tails" (*Equisetum*). This lakelet forms a general rendezvous for all the swans of that vicinity during the summer and fall. During the breeding season they gather there to feed, and the males make it their home. In autumn, as the old birds regain their wing-feathers and the young are able to fly, all congregate here, so that I have rarely passed this place without seeing from one hundred to five hundred swans gathered in this small area. Their combined cries can be heard for 3 miles or more, and make a grand and melodious concert.

I have frequently sat and listened with the keenest pleasure to the organ like swell and fall in their notes, as they were wafted on in rich, full harmony, then sank to a faint murmur, not unlike that of running water. A series of low hillocks afforded a cover by which the lake could be approached, and it was a majestic sight to lie here on a mossy knoll and gaze on the unsuspecting groups of these graceful birds as they swam back and forth, within rifle-shot, not suspecting our presence. Their snowy bodies and beautiful forms, as I hast saw them in this far-away spot, will linger long in my mind as one of the most unique and interesting sights of my experience in the north. The report of a rifle is sufficient to change the scene into wild confusion. A chorus of confused cries and the heavy beating of hundreds of mighty wings is heard. A cloud of white

risers, breaks into numerous fragments, and the birds scatter over the wide flats on every side. On one occasion a pair of old birds, with four young, was standing on the grassy margin of this lake, and I approached to within about 100 yards, beyond which the ground was perfectly open. Preparing myself, I suddenly started and ran at full speed towards the birds, which gazed at me with great curiosity as they walked slowly toward the water, their heads turned back, to get a fuller view, until they stumbled into the lake. Then they started to take wing, but I was already within range, and choosing two young birds secured both of them.

Toward the end of September these birds begin to gather into flocks, preparatory to migrating, and from the last of this month to the 6th or 8th of October all leave for the south, the exact date varying with the season. When they start they move off in flocks of from ten to seventy-five or more, and keep up a continual noise, as though bidding farewell to the hospitable marshes which have sheltered them during the summer. With the geese these birds pass to the east from Saint Michaels, crossing to the Yukon at once, along which, according to Dall, the swans make their road of migration.

This swan is rare at Point Barrow in summer and an occasional visitor to the Near Islands in winter. Stejneger took a single specimen of this bird on the Commander Islands on November 3, 1882, an immature bird of the year.

There is no record of this bird from the Siberian shore of Bering Sea nor from any of the islands in the same water. Mr. Dall reports their occurrence on Sanak Island, in September, 1872, although they are not known from any other of the Aleutian Islands. It is found common and nesting along the entire course of the Yukon, and in suitable places over all the remainder of the Territory, except upon the islands.

The young birds of the year frequently retain the immature plumage until the last of September. A specimen in this plumage, taken on September 19, had its bill purplish flesh-color, the nail and a border along the gape black; the iris hazel, and the feet and tarsi livid flesh-color. The plumage of this bird, which is now before me, is sooty brownish with a plumbeous shade about the top and sides of the head; neck and throat all around dull plumbeous ashy of a light shade; back, tertials, and wing-coverts dull plumbeous ashy with a silvery gray luster, especially upon the wings. Rump white, lightly washed with ashy, which increases to dull plumbeous ashy on the tail-coverts and rectrices. Quills white, heavily mottled with ashy gray on their terminal third, but almost immaculate toward bases. Under surface white, washed with dingy gray.

From the *Fauna Boreali-Americana* we learn that these birds nest within the Arctic Circle, on the northern border of the British fur countries. As quoted by Richardson (*op. cit.*), Captain Lyon, who accompanied Parry on his second voyage, describes its nest as built of moss-peat and nearly 6 by 4½ feet in area, with a height of 2 feet and a cavity 1½ feet in diameter. When first laid the eggs of this bird are white like those of geese, but become soiled in a very short time.

OLOR BUCCINATOR (Rich.). Trumpeter Swan.

A specimen of this little known swan is noted by Mr. Dall as having been secured, with its eggs, at Fort Yukon, by Mr. Lockhart, thus rendering it an Alaskan species. There is no further record of its presence in the Territory. This is owing, undoubtedly, to the fact that the interior remains almost unexplored, so far as its summer birds are concerned. There is no reason to suppose this swan ever reaches the shore of Bering Sea, where it appears to be entirely replaced by the other species. There is no record of either bird being found on the south-eastern coast of the Territory, where, however, both are likely to be found during the migrations. Richardson gives this species a breeding range from latitude 61° north to well within the Arctic Circle. Hearne tells us that both species of swans usually breed on the islands in the lakes northwest of Hudson's Bay, and the eggs of the larger species (or the Trumpeter) are so big "that one of them is a sufficient meal for a moderate man, without bread or any other addition." The same author notes the arrival, about Hudson's Bay, of this species earlier than any other species of water-fowl. Some years they arrive in March, before the ice is broken in the rivers, and they are forced to gather about the open water, near falls and rapids, where the Indians secure large numbers of them. He adds, furthermore, that "the flesh of both is excellent eating, and, when roasted, is equal in flavor to young heifer beef, and the eggs are very delicate."

ARDEA HERODIAS Linn. Great Blue Heron.

This heron was found by Bischoff at Sitka, where it is rare. It is also recorded from Portage Bay, in the southeast part of the Territory, by Hartlaub. Facts obtained by me indicate that it may possibly occur up to Nulato, on the Yukon, and the Kuslevak mouth of this stream. For the last two references I am indebted to the natives and fur traders. An old native woman told me that several times she had seen, at Nulato, cranes of a different kind from those so numerous at Yukon mouth (*G. canadensis*), and that those seen at Nulato always perched on the tops of high trees. This was corroborated by another native from the same place. The Kuslevak record is somewhat more doubtful, as the bird was found dead upon the snow early in April, and was seen by a Russian fur trader, who bought it from the natives for me, but the warm weather, setting in soon after, spoiled it and it was thrown away. From the description given, the bird could not be anything else, so far as I could see, though there is a chance that the describer made unreal characters the base of his description.

GRUS CANADENSIS (Linn.). Little Brown Crane (Esk. *Lõt-shük*).

This species is a rare straggler to Point Barrow, but from the Eskimo Murdoch learned that it is abundant on the Arctic coast east of Colville River. On the Near Islands it is a very rare fall visitor and Dean saw cranes flying across Bering Straits, heading for the American shore, on August 18. Skins of this species are in the National Museum collection from Kadiak Island, Saint Michaels, and the Yukon, in Alaska, thence east to the Anderson River.

The habitat of the well known *mexicana* is limited to the middle latitudes, where it is common, extending over the entire United States and into the southern parts of British America. In winter the two forms to some extent mingle in the south.

Several instances are known of the capture of *canadensis* in its winter home, one of these being Cassin's type, taken by Möllhansen in October, 1853, at Albuquerque, N. Mex., and the second, taken on the Rio Verde, Mexico, February 23, 1879, is now in the Museum of Comparative Zoology at Cambridge, Mass. Several specimens have been taken in Colorado in fall. The chief reason for its apparent scarcity in the south is that owing to its close resemblance to *mexicana* it has been mistaken for that species and overlooked, while in addition its wariness has rendered it very difficult to secure.

Nothing is known of its habits or movements after it leaves its northern home, but while in its summer haunt on the shores of Bering Sea the writer has enjoyed abundant opportunities for studying it and purposes to detail some points of interest regarding it.

At Saint Michaels it sometimes arrives by May 7, when there is yet scarcely a bare spot of ground, and one season these early-comers had to endure some severe weather, and several inches of new snow, over which they stalked glum and silent, showing little of their usual roosting spirit. As a rule they are not seen until from the 10th to the 15th of the month, when the ground is usually half bare and the cranes can search every hill-side for last year's heath-berries, which, with an occasional lemming or mouse, constitute their food at this season.

They come from the south toward the Lower Yukon, and on mild, pleasant days it is a common sight to see the cranes advancing high overhead in wide circuits, poised on motionless wings, and moving with a grace unexpected in such awkwardly-formed birds. As the weather gets warmer they become more and more numerous, until the drier parts of the wide flats and low, rounded elevations are numerously populated by these odd birds. The air is filled with the loud, hard, rolling *kr-roo*, *kr-r-r-roo*, *kä-kr-r-roo*, and either flying by, with trailing legs, or moving gravely from place to place, they do much to render the monotonous landscape animate. The end of May draws near, and the full tide of their spring-fever causes these birds to render themselves pre-eminently ludicrous by the queer antics and performances which the crane's own book of etiquette doubtless rules to be the proper thing at this mad season. I have frequently lain in concealment and watched the birds conduct their affairs of love close by, and it is an interesting as well as amusing sight. Some notes jotted down on the spot will present the matter more vividly than I can describe from memory, and I quote them.

On May 18, I lay in a hunting blind, and was much amused by the performances of two cranes, which alighted near by. The first comer remained alone but a short time, when a second bird came along, uttering his loud note at short intervals, until he espied the bird on the ground, when he made a slight circuit, and dropped close by. Both birds then joined in a series of loud rolling cries in quick succession. Suddenly the new-comer, which appeared to be a male, wheeled his back toward the female and made a low bow, his head nearly touching the ground, and ending by a quick leap into the air; another pironette brings him facing his charmer, whom he greets with a still deeper bow, his wings meanwhile hanging loosely by his sides. She replies by an answering bow and hop, and then each tries to outdo the other in a series of spasmodic hops and starts, mixed with a set of comically grave and ceremonious bows. The pair stood for some moments bowing right and left, when their legs appeared to become envious of the large share taken in the performance by the neck, and then would ensue a series of stilted hops and skips which are more like the steps of a burlesque minuet than anything else I can think of. Frequently others join and the dance keeps up until all are exhausted. By the 26th to the 30th of May they are mated, and are seen scattered all over the flats from Cape Vancouver north to Kotzebue Sound, or, perhaps, farther along the Arctic coast.

They are summer residents upon Saint Matthew's and Saint Lawrence Islands, and were found nesting by Nordenskjold in considerable numbers at Seniavine Strait, just south of Bering Straits, on the Siberian coast, July 28, 1879. Eggs containing small embryos were brought me on May 27, 1879, but the two eggs, which this bird always lays, are generally deposited the last few days of May or first of June. The site for the nest is usually on the grassy flats, where the drier portions or the slight knolls afford them suitable places. The spot usually has an unobstructed view on all sides, and it is common to see the female's long neck raised suspiciously at the appearance of the distance of anything unusual. If one approaches, the head sinks lower and lower to avoid being seen, but if the person, even though 150 or 200 yards away, should stop and look toward the bird, she will generally rise and skulk away, her neck close to the ground, wings hanging loosely by the sides, and legs bent, so as to avoid being seen. When she is 100 yards or more from the nest she straightens up and stalks anxiously about, uttering her loud call-note incessantly, and is generally joined by the male; but it is rarely that either can, even then, be approached within gunshot. In one case the female was about 75 yards from the nest, and as we drew near she staggered from side to side with trailing wings, looking as if in death agony.

The nest is frequently a mere hollow in the ground, and is commonly lined with more or less coarse grass-stems and straws. In one instance a nest was found on a bare flat, and was lined with a layer of straws an inch deep, all of which must have been brought for some yards; this is unusual, however. The eggs vary in ground-color from pale greenish clay color to buffy brown or warm brownish, and the entire surface is irregularly marked with spots and blotches of chocolate-brown, rather sparsely distributed at the small end, but numerous about the large end of the egg, chiefly at the very apex. The size varies from 3.70 by 2.40; 3.72 by 2.40; 3.71 by 2.41, representing the maximum, to 3.26 by 2.28; 3.40 by 2.35, 3.33 by 2.21 representing the minimum in a series of twenty-five specimens.

The last of July, and during August, the cranes frequent the hill-sides, and feast upon the berries growing there, and early in September the small flocks, which have been trooping about from one feeding ground to another, join into larger companies, until toward the last of the month—from the 18th to 30th—they pass to the south, making the air resonant with their guttural notes as they file away toward the Yukon. The Eskimo say that once, very long ago, a pretty woman was out picking berries, when a great flock of cranes gathered near, and circling about suddenly closed about the unfortunate girl, and taking her upon their broad backs, soared away toward the sky, where they vanished, drowning the girl's cries meanwhile by their own hoarse chorus. Since then the girl has never been seen by man, but the cranes to this day retain their habit of making a loud outcry, and soaring in flocks, in autumn, as a reminiscence of this abduction.

On August 18, 1880, Dr. Bean saw cranes of this species crossing Bering Straits from the Siberian to the Alaskan shore.

DESCRIPTION OF ADULT BIRD, WITH NOTES UPON VARIATIONS EXHIBITED IN A SERIES OF EIGHTEEN SPECIMENS FROM SAINT MICHAELS, NORTON SOUND, ALASKA.

My examples of this bird are mainly spring specimens; yet they show every gradation from the nearly uniform dull rusty seen in the young bird to the dull ashy of the adult. In only two or three instances is the rusty wanting on the back, and taking one of these birds as typical of the perfect plumage I present the following description:

Lores and crown to nearly half an inch back of eye bare and finely carunculated, and encroached upon by a median extension of the feathers along vertex to a point opposite the posterior half of orbit, thus forming a bare area. In life this bare area is dull livid red, sometimes irregularly mottled with yellowish. Feathers of chin, throat, and cheeks, reaching bare area of crown just back of eye, are dingy yellowish white. Rest of head and neck rather dull uniform ashy. Back, scapulars, tertials, and wing-coverts with clear ashy bases, and tipped for about quarter of their length by pale dingy brown on the back, and becoming almost a rusty brown on the upper tertials. Lower tertials, and secondaries ashy at base with blackish ashy tips, and pale brown on outer web of secondaries. Inner primaries ashy brown with dark tips; outer five quills blackish with paler brown shafts. Rump ashy; tail ashy with a wash of brown, and darkening at the tips. Entire under surface ashy, marked on the breast by brown edges to feathers. Under wing-coverts and axillaries clear ashy. Iris usually a bright, dark orange yellow, varying to plain orange yellow or even pale orange red.

In No. 1948, a bird at least two years old, as shown by its plumage, there is a broad band of pure white running along the length of the primary shafts, disappearing near the tip. This white line is so narrowly bordered on each side with a dark line that it requires a close examination to determine the fact. On the under surface of quill the white line is present, but very much reduced in breadth. In some birds the forward extension of the median point of the feathers on crown reaches only opposite posterior border of the orbit, and in birds of the previous year the bare crown area may be sparsely feathered to the base of the bill. There is an appreciable difference in size between the males and females, as exhibited in the appended measurements, but this is the only character by which they can be separated.

A young bird, a little over half grown, taken at Saint Michaels in September, presents the following characters: Naked space on top and sides of head in adults is covered at this age with short plumbeous gray feathers, slightly sprinkled and mottled with rusty. The rest of crown and nape bright rufous or rusty, becoming intermingled with ashy feathers, and much less marked along the rest of the back of the neck. Neck below still more ashy; the latter color is nearly uniform on the chin. Feathers of the back, including dorsum, scapulars, and tertials, broadly tipped with a bright, rich, rusty red. Bases of these feathers clear ashy. Rump and tail ashy, with scarcely a trace of rufous; quills as in adults. Abdominal surface dull ashy, with a feather here and there tipped with rusty. Bill fleshy at base, lighter at tip.

A specimen of *Grus* from the Great Slave Lake has the quills white as in ordinary *mexicana* and the following measurements:

Wing, 19; tail, 7.50; tarsus, 8.16; culmen, 4.18; height at base, .63.

Adult *G. mexicana* shows the following proportions:

Locality.	Sex	Date.	Wing.	Tail.	Tarsus.	Culmen.	Height of bill at base.
Missouri River	Ad.	?	20.60	8.60	10.00	4.80	.79
Colorado River	Ad. ♀	?	21.85	9.20	10.50	5.40	.83
Fort Cook, Cal.	Ad. ♂	Apr. 20	21.85	8.50	10.35	5.38	.85
			21.43	8.57	10.28	5.19	.82

A specimen of *canadensis* from Kenai, Alaska, May 4, 1860, measures—wing, 19.80; tail, 8.10; tarsus, 8.20; culmen, 3.80; height of bill at base, .70. This bird has the bare crown area about equal to that of the average *mexicana* and the white wing-shafts are dull colored.

Measurements of *Grus canadensis*.

Catalogue number.	Locality.	Sex.	Point of bill to end of tail.	Between tips of outstretched wings.	Wing from carpal joint.	Tail to base of tailfeathers.	Tarsal joint.	Bill above.	Base of bill at nostril.
1945	Saint Michaels, Alaska.....	♂	36	67	18	6.75	7	3.33	.60
1946	.....do.....	♂	37.5	73	19.3	7	7.15	3.72	.70
1947	.....do.....	♂	37.5	73	19.25	6.60	7	3.78	.72
1948	.....do.....	♂	37	72	18	6	7.6	3.77	.75
1949	.....do.....	♂	34	64	17	6.75	6	3.10	.66
1959	.....do.....	♂	39	75	19.5	7	7.5	3.84	.76
1951	.....do.....	♂	34	66	17.25	6.5	6.65	3.52	.72
1943	.....do.....	♂	38.5	72	19	7.3	7.5	3.40	.66
1939	.....do.....	♂	40	72.5	19	6.75	7.80	3.70	.75
1931	.....do.....	♂	36	70	19	6.5	7.20	3.52	.70
1922	.....do.....	♂	35	67	17.50	6	7.10	3.33	.68
1923	.....do.....	♂	36	66.5	17.5	6	7.50	3.69	.62
			36.7	70	18.3	6.6	7.2	3.55	.69

95. *FULICA AMERICANA* Gmel. American Coot.

A single bird taken at Fort Yukon by Mr. McDougal represents the known record of this species within the Territory. The most northern point at which this bird has been recorded is Greenland.

CRYMOPHILUS FULICARIUS (Linn.). Red Phalarope (EsK. *Ai-nūg-i-nūK*.)

This handsome Phalarope arrives at the Yukon mouth and adjacent parts of the Bering Sea coast during the last few days of May or first of June, according to the season. It is a common summer resident at Point Barrow, where it arrives early in June and remains till the sea closes late in October; it is an abundant summer visitant on the Near Islands, and breeds abundantly on some of the Commander group. It is much more gregarious than its relative, and for a week or two after its first arrival fifty or more flock together. These flocks were very numerous the 1st of June, 1879, at the Yukon mouth, where I had an excellent opportunity to observe them. In the morning the birds which were paired could be found scattered here and there, by twos, over the slightly-flooded grassy flats. At times these pairs would rise and fly a short distance, the female, easily known by her bright colors and larger size, in advance, and uttering now and then a low and musical "clink, clink," sounding very much like the noise made by lightly tapping together two small bars of steel. When disturbed these notes were repeated oftener and became harder and louder.

A little later in the day, as their hunger became satisfied, they began to unite into parties until fifteen or twenty birds would rise and pursue an erratic course over the flat. As they passed swiftly along stray individuals and pairs might be seen to spring up and join the flock. Other flocks would rise and the smaller coalesce with the larger until from two hundred to three or even four hundred birds were gathered in a single flock. As the size of the flock increased its movements became more and more irregular. At one moment they would glide straight along the ground, then change to a wayward flight, back and forth, twisting about with such rapidity that it was difficult to follow them with the eye. Suddenly their course would change, and the compact flock, as if animated by a single impulse, would rise high over head, and, after a series of graceful and swift evolutions, come sweeping down with a loud, rushing sound to resume their playful course near the ground. During all their motions the entire flock moves in such unison that the alternate flashing of the under side of their wings and the dark color of the back, like the play of light and shade, makes a beautiful spectacle. When wearied of their sport the flock disbands and the birds again resume their feeding.

When the Red Phalaropes arrive in spring its preference is for the flat wet lands bordering the coast and rivers, where it remains to breed. They are not usually found on the sea at this season, but on June 10, 1878, a number were found swimming among the floating ice in the bay of Saint Michaels. Very early in June the females have each paid their court and won a shy and gentle male to share their coming cares. The eggs are laid in a slight depression, generally on the damp flats, where the birds are found. There is rarely any lining to the nest.

Toward the end of June most of the young are hatched and, by the middle of July, are on the wing. The sites chosen for this bird's nest are very similar to those taken by *P. lobatus*, except that the latter may pick drier situations. One Red Phalarope's nest was found June 8, within six feet of a small brackish pool, the eggs being deposited upon a nest of dried leaves under a dwarf willow. Soon after the young take wing these birds gather in flocks and frequent the sea. They breed all along the Arctic shores of Alaska and Siberia, wherever suitable flats occur, and even reach those isolated islands, forever encircled by ice, which lie beyond. It is not rare in Spitzbergen, where its eggs have been found laid upon the bare ground. During the cruise of the Corwin, in the summer of 1881, we found this and the Northern Phalarope abundant wherever we went on the Alaskan or Siberian shores of the Arctic, and their pretty forms, as they flitted here and there over the surface of the smooth sea, now alighting a moment and gliding quickly right and left, pecking at the minute animals in the water, then taking wing for an instant, appeared in ever-changing groups. They were also seen among the ice off Wrangel Island and along the adjoining low Siberian coast, and through the Straits into Bering Sea where they were found nesting on Saint Lawrence Island. On the Seal Islands Elliott found it only as a migrant, passing north early in June and south from the 15th of August to some time in October. Although a few gray feathers begin to appear in July the winter plumage is still imperfect in many birds so late as October 6.

These Phalaropes, with *Tringa catesi*, are the last waders found on the coast of Bering Sea in autumn and they remain until October 12 to 17. It is a less abundant and less generally distributed breeding bird on the Alaskan coast than *P. lobatus*, and, like the latter, probably does not nest south of the mouth of the Kuskoquim River. It is also more restricted to the sea-coast regions, but occurs in the interior, as I have a specimen from Fort Reliance, on the Upper Yukon, taken September 12. It is known to breed on nearly every one of the circumpolar islands yet visited by explorers.

As with the other Phalaropes, the female is larger than the male, and the following measurements show the average amount of difference:

Date.	Locality.	Sex.	Wing.	Tail.	Tarsus.	Culmen.	Catalogue number.
May 27	Saint Michaels	♀	5.30	2.80	.92	.92	1073
28	do	♀	5.30	2.73	.95	.90	1074
28	do	♀	5.30	2.75	.94	.95	1075
June 20	do	♂	5.25	2.65	.86	.86	1775
20	do	♂	5.12	2.52	.87	.80	1774
20	do	♂	5.10	2.54	.80	.83	1776

The most striking difference appears in the deep chestnut of the lower surface and sides of head of the female and the dull color mixed with white on the same parts of the male. In spring the bill is waxy yellow with a jet black tip. The feet and tarsus are dull yellowish. There is, perhaps, even greater variation in the eggs of this bird than in those of the following species. The measurements run from 1.15 by .85 to 1.28 by .80. The ground color runs through the same tints as appear in the eggs of *P. lobatus*. The markings average much darker and larger in *fulvicaeus*, and about the large end it is common for the spots to be so large and numerous as to become confluent and hide much of the shell. The color of the spots is from pale chocolate to deep, bright amber brown.

The main distinction between these eggs and those of *P. lobatus* consists in the generally much coarser and more deeply colored markings on eggs of *fulvicaeus*.

Among the whalers of Bering Sea and the adjacent part of the Arctic Ocean these Phalaropes are called "bow-head birds," from the fact that they feed upon the same minute animals as does the bow-head or right whale (*Balaena mysticetus*), and consequently both birds and cetaceans of that species are generally found most numerous in the same locality. On the fishing-banks off Newfoundland they are called "sea geese," though the name is less apt than the foregoing. In winter these birds pass south and occur along the coasts of the Pacific on both shores, reaching the south coast of India on the Asiatic side.

PHALAROPUS LOBATUS (Linn.). Northern Phalarope (Esk. *Chip-i cháng-ik*).

As summer approaches on the Arctic shores and coast of Bering Sea, the numberless pools, until now hidden under a snowy covering, become bordered or covered with water; the mud about their edges begins to soften and through the water the melting ice in the bottom looks pale green.

The ducks and geese fill the air with their loud resounding cries, and the rapid wing-strokes of arriving and departing flocks add a heavy bass to the chorus which greets the opening of another glad season in the wilds of the cheerless north. Amid this loud-tongued multitude suddenly appears the graceful, fairy-like form of the Northern Phalarope. Perhaps, as the lunter sits by the border of a secluded pool still half covered with snow and ice, a pair of slight wings flit before him, and there, riding on the water, scarcely making a ripple, floats this charming and elegant bird. It glides hither and thither on the water apparently drifted by its fancy, and skims about the pool like an autumn leaf wafted before the playful zephyrs on some embosomed lakelet in the forest. The delicate tints and slender fragile form, combining grace of color and outline with a peculiarly dainty elegance of motion, render this the most lovely and attractive among its handsome congeners.

The first arrivals reach Saint Michaels in full plumage from May 14 to 15, and their number is steadily augmented until, the last few days of May and 1st of June, they are on hand in full force and ready to set about the season's cares. Every pool now has from one to several pairs of these birds gliding in restless zigzag motion around its border, the slender necks at times darting quickly right or left as the bright black eyes catch sight of some minute particle of food. They may be watched with pleasure for hours, and present a picture of exquisite gentleness which renders them an unfailing source of interest. The female of this bird, as is the case with the two allied species, is much more richly colored than the male and possesses all the "rights" demanded by the most radical reformers.

As the season comes on when the flames of love mount high, the dull-colored male moves about the pool, apparently heedless of the surrounding fair ones. Such stoical indifference usually appears too much for the feelings of some of the fair ones to bear. A female coyly glides close to him and bows her head in pretty submissiveness, but he turns away, pecks at a bit of food and moves off; she follows and he quickens his speed, but in vain; he is her choice, and she proudly arches her neck and in mazy circles passes and repasses close before the harassed bachelor. He turns his breast first to one side, then to the other, as though to escape, but there is his gentle wooer ever pressing her suit before him. Frequently he takes flight to another part of the pool, all to no purpose. If with affected indifference he tries to feed, she swims along side by side, almost touching him, and at intervals rises on wing above him and, poised a foot or two over his back, makes a half dozen quick, sharp wing-strokes, producing a series of sharp, whistling noises in rapid succession. In the course of time it is said that water will wear the hardest rock, and it is certain that time and importunity have their full effect upon the male of this Phalarope, and soon all are comfortably married, while *mater familias* no longer needs to use her seductive ways and charming blandishments to draw his notice. About the first of June the dry, rounded side of a little knoll, near some small pond, has four dark, heavily-marked eggs laid in a slight hollow, upon whatever lining the spot affords or, more rarely, upon a few dry straws and grass-blades brought and loosely laid together by the birds. Here the captive male is introduced to new duties, and spends half his time on the eggs, while the female keeps about the pool close by. In due time the young are hatched and come forth, beautiful little balls of buff and brown.

During incubation, if the nest is approached, the parent usually flies off the eggs when the intruder is some yards away, and proceeds to feed about the surface or edge of the nearest pool, as though nothing unusual had occurred. At times the parent shows a little anxiety, and swims restlessly about the pool, uttering a low, sharp, metallic "pleep," "pleep." When a bird leaves the eggs it is usually joined at once by its mate. In one or two instances the parent bird came gliding stealthily through the grass to the nest while I was occupied in packing the eggs in my basket. Fresh eggs are rarely found after June 20, and by the middle to 20th of July the young are fledged and on the wing. By the 12th to 15th of July a few of the ashy feathers of the autumnal plumage appear, and soon after old and young begin to gather in parties of from five to a hundred or more,

and seek the edges of large ponds and flats or the muddy parts of the coast and borders of tide creeks. During August and September they are found on the bays, and the last are seen about the last of September or first of October.

Murdoch found it a rare summer visitant at Point Barrow, where it was noticed only once. They breed on all the islands of Bering Sea, the north coast of Siberia, and we saw them common about Herald and Wrangel Islands in July and August, 1881. It is plentiful throughout the interior of Northern Alaska, as well as on the salt marshes of the coast. Dall saw it all along the Yukon, and found a nest with two eggs at Pastolik, near the Yukon mouth.

The usual number of eggs is four, which vary considerably in exact coloration. The ground-color in the very large series before me, obtained in the vicinity of Saint Michaels, shades by every degree from greenish-clay color to warm, buffy, olive-brown. The spots and markings are very irregular in size and shape, but are usually larger about the large end of egg. These spots and blotches, which are rarely confluent, occupy about one-half the surface, and are from dark chocolate to very dark umber-brown. These eggs measure, taking extremes, 1.20 by .85; 1.16 by .87; 1.12 by .80: within which measurements will fall most of the eggs of this species. Like the Red Phalarope this species extends its winter range far south on the coasts of both continents. It is known among whalers and fishermen by the same name as its relative, and both unite in giving animation to many an otherwise lifeless and forbidding scene along our northern shore.

GALLINAGO DELICATA (Ord). Wilson's Snipe (Esk. *Kū-kū-kurik*).

This is a rather uncommon but widely-spread species in Alaska along the mainland shore of Bering Sea. I found it both at Saint Michaels and on the Lower Yukon in small numbers, making its presence known in spring-time by its peculiar whistling noise as it flew high overhead. It nests wherever found in the north, and is a rather common species along the entire course of the Yukon, extending thence north to within the Arctic Circle, but its limit in this direction is not definitely known. It was found at Sitka and Kadiak by the Western Union Telegraph explorers, but is not known from any of the Bering Sea Islands, nor from the coast of Siberia, but it is to be looked for from the latter region, at least.

The nesting range of this bird is widely extended, reaching from Northern Illinois, where I have found it in the breeding season, to well within the Arctic Circle. The first of June, 1879, while at the Yukon mouth, several of these birds were heard uttering a loud peculiar note, which may be represented by the syllables *yák-yák-yák-yák*, in quick, energetic, explosive syllables. This note was uttered singly or repeated several times, and appears to be a kind of call-note of the male during the breeding season. At the time when the bird is uttering its note, it flies along within a short distance of the ground with a peculiar jerky movement of the body and wings as every note is uttered. On one occasion, in the same vicinity, a Short-eared Owl and one of these snipe were flushed from a grassy marsh within 3 feet of each other, flying up almost simultaneously as I came upon them. I carefully examined the tail-feathers of twelve specimens of this bird in the National Museum collection and found sixteen feathers in all but one, and this had fourteen. This character is of little value, according to Mr. Ridgway, and varies frequently with the individual.

MACRORHAMPHUS SCOLOPACEUS (Say). Long-billed Dowitcher (Esk. *Kāi à-gièukh-tā-lík*).

This is one of the most common waders on the shore of Norton Sound in summer, and is also present in smaller numbers all along the Yukon, where suitable locations occur. It is a rather scarce summer resident about Point Barrow, according to Murdoch. In spring, the middle of May, as the snow disappears, and the first pale leaves of grass begin to thrust their spear-points through the dead vegetable mat on the ground, or as early as the 10th on some seasons, this peculiar snipe returns to its summer home. At the Yukon mouth I found them on May 12, when they were already engaged in love-making, though the ground was still, to a great extent, covered with snow, and only here and there appeared a thawed place where they could feed. Toward the end of this month they are plentiful, and their curious habits and loud notes make them among the most com-

spicuous denizens of the marshes. At the Yukon mouth, on May 28, I came across a female busily at work, preparing a little hollow in a tussock for her eggs, and as I drew near she moved a little to one side, and uttered a sharp, querulous note, as if protesting against the intrusion. We took the hint and left her; but a second visit, some days later, showed the spot deserted. These are very demonstrative birds in their love-making, and the last of May and first of June their loud cries are heard everywhere about their haunts, especially in morning and evening.

Two or three males start in pursuit of a female and away they go twisting and turning, here and there, over marsh and stream, with marvelous swiftness and dexterity. At short intervals a male checks his flight for a moment to utter a strident *péet à wéet*; *wéé-tóó*, *wéé-too*; then on he goes full tilt again. After they have mated, or when a solitary male pays his devotions, they rise 15 or 20 yards from the ground, where, hovering upon quivering wings, the bird pours forth a hissing but energetic and frequently musical song, which can be very imperfectly expressed by the syllables *péet-péet*; *péé-ter-wéé-too*; *wéé-too*; *péé-ter-wéé-too*; *péé-ter-wéé-too*; *wéé-too*; *wéé-too*. This is the complete song, but frequently only fragments are sung, as when the bird is in pursuit of the female.

June 16, while crossing a tussock-covered hill-top, over a mile from any water, I was surprised to see a female of this species flutter from her nest about 6 feet in front of me, and skulk off through the grass with trailing wings and depressed head for some 10 or 15 yards, then stand nearly concealed by a tuft of grass and watch me as I pillaged her home of its treasures.

The eggs, four in number (set No. 299), rested in a shallow depression formed by the bird's body in the soft moss and without a trace of lining. These eggs measure respectively 1.80 by 1.21; 1.70 by 1.20; 1.69 by 1.20; 1.72 by 1.23. A second set of four (No. 328), taken on lower ground, June 20, the same season, measure 1.80 by 1.22; 1.72 by 1.23; 1.87 by 1.24; 1.83 by 1.25, and set No. 222, from a boggy flat, but with no nest, except the dead grass naturally found on the place occupied, was taken June 13, the same season, and measures 1.73 by 1.23; 1.72 by 1.23; 1.70 by 1.22; 1.72 by 1.22. The ground-color varies from a greenish clayey olive to a light grayish or clay color. The spots are large, well defined, and scattered sparsely, except about the tip of large end, where they are crowded. These spots are dark amber-brown, and present a striking contrast to the ground-color. All the eggs mentioned above were fresh, but the young are full grown and on the wing with their parents the last of July, and the first of August finds the adults rapidly changing their breeding-dress for that of winter, and gathering into flocks. By the first of September they are in perfect winter dress, and frequent muddy flats, the edges of tide creeks, and other places, exactly as they do in their passage south or north in middle latitudes. They have the same unsuspecting ways here as there, and may be shot at again and again, as they keep about their wounded comrades. Not long after *griseus* and *scolapaceus* were first distinguished many ornithologists reunited the two as inseparable, but lately Messrs. Ridgway and Lawrence, in the Nuttall Ornithological Club Bulletin, for July, 1880, have adduced proof which must go far toward convincing the most skeptical of their difference.

Having occasion in the preparation of this article to compare my Alaskan series with the specimens from various parts of the country in the National Museum collection, I find there is not the slightest difficulty in distinguishing the two birds except in very rare instances. In the considerable number of skins from both sides of the continent the following points appear almost invariably diagnostic: In the breeding plumage of *griseus*, a dull, pale buff shade extends over all the under surface of the body in richly-colored specimens, but is very pale on the throat and abdomen. In average specimens the middle of the abdomen and throat are generally much washed with dingy white. The throat may or may not be maculated in either form. In *griseus* the maculations, commencing as fine markings, extend over the breast, where they are most numerous, and then are scattered irregularly over the abdomen. On the breast and abdomen the spots tend to assume a rounded form in *griseus* with transverse barring on the flanks, which latter sometimes shows faintly on the abdomen. The dorsal colors of breeding *griseus* average darker than in *scolapaceus*, and the light edgings of the feathers are less distinctly marked.

In *scolapaceus* the entire under surface is a uniform rich buff or reddish brown, in its lightest phase scarcely so light as in the darkest examples of *griseus*. The throat is commonly immaculate, as invariably are the lower half of the breast and entire abdomen. The maculations of the lower

surface are confined to a pectoral band having about the same distribution as the band on *Actodromas maculata*. On the sides of the breast these markings have a decided tendency to assume the form of a black bar across the feather in contrast to the oval or rounded markings of *griseus*; and in many cases these bars extend in a series across the upper breast, and they are always found sparingly along the sides and flanks, but never extend to the feathers on abdomen.

The deep color of lower surface and restricted amount of maculations form the main characters of this bird as distinguished from *griseus*, and not the comparative length of the beak, which was formerly erroneously supposed to be the main difference, but which in fact is only of very slight if of any value in separating the birds. The young and fall birds are much more difficult to distinguish, and the lack of sufficient material from the Atlantic coast prevents a presentation of the differences which probably exist.

TRINGA CANUTUS Linn. Knot.

Dall found this bird rare at the Yukon mouth, and in his list of the birds of the Territory records a single specimen taken at Sitka. During my residence at Saint Michaels, I secured a single example of the young of the year, on August 14, 1877, but the bird was not seen again during my residence there. Murdoch found it to be a rare summer resident near Point Barrow. Although it is found throughout most of the circumpolar parts of the northern hemisphere it is rare in the region under consideration. Farther east, about Hudson's Bay and north to Melville Peninsula, it appears to be more or less common. During Parry's second expedition it was found breeding at the last named place, and was said to have laid eggs upon a tuft of withered grass with no attempt at a nest. It rears its young along the coast of Hudson's Bay south to the fifty-fifth parallel. The eggs are reported to be of a dun-color, thickly marked with reddish spots, as described by Mr. Hutchins. In the Auk for July, 1885 (pp. 312, 133), Dr. Merriam describes an egg taken at Fort Conger, in latitude $81^{\circ} 44' N.$, from notes furnished by Lieutenant Greely. The egg measured 1.10 by 1 inch, and was a light pea-green color, closely spotted with brown specks about the size of a pin-head. It extends its range well to the north, and specimens are reported from high latitudes by different exploring parties who have penetrated this region.

During winter its southern range equals its summer range to the north, and it is taken in New Zealand and Australia. A specimen is mentioned by Gould which was taken on the latter continent, September 2, as it was just assuming its summer plumage. An interesting question arises whether this bird was a resident of the southern hemisphere or a migrant from the north. In the latter place it must have been preparing for a second nidification, thus having a breeding-season in both hemispheres. During the late English Arctic Expedition of 1875-76, Captain Fielden found a Knot on the northern coast of Greenland. On August 25, 1875, he observed several of these birds near the water's edge in Discovery Bay, latitude $81^{\circ} 44' N.$ The marshes were frozen at the time, and the birds were feeding along the shore on the small crustaceans which are found abundantly in the Arctic Sea. In pursuit of this food they ran breast-high into the water. On June 5, 1876, in latitude $82^{\circ} 33' N.$, a flock of fourteen or more were seen circling over a hill-side, alighting on the bare patches, and feeding eagerly on the buds of *Saxifraga oppositifolia*. Specimens of this bird were met with in considerable numbers, but they were wild and very difficult of approach.

The cry of the Knot, Captain Fielden remarks, is slight and something like that of the curlew. Immediately after they arrived in June they began to mate, and he saw two males following a single female. At this season they soar in the air like the common snipe, and when descending from a height they beat their wings behind their backs with a rapid motion, which produced a loud whirring noise. After repeated search for the nest they were compelled to abandon the hope of securing any eggs, but later in the season the parents with young were obtained. The following description of the newly-hatched birds is presented by the naturalist just quoted: Iris black; tip of mandible dark brown; bill dark olive; toes black; soles of feet greenish yellow; back of legs the same; under part of throat satin white; back beautifully-mottled tortoise-shell.

A young bird of the year secured by me at Saint Michaels, on the date already mentioned, has the crown and back to the rump, including the wings, grayish ashy, darker on the primaries, where it is ashy brown. A pale grayish superciliary stripe extends back from the base of the



ALEUTIAN SANDPIPER.
Tringa coltsi.
(SUMMER PLUMAGE)

upper mandible on each side. Feathers of the crown have dark centers, producing a streaked appearance. Edges of feathers of back and wing coverts, including the tertials and secondaries, have light borders. These edgings are gray on the back and narrow, but are broader and become white on the tips of secondaries; rump grayish white, each feather edged with a subterminal dark band. Tail pure ashy, tipped with a slightly darker border followed by a fine white edging. Sides of the head, neck, and the under side of the throat and neck dull grayish ashy, thickly streaked with a narrow dark shaft-line on each feather. The grayish becomes darkest on the breast, where the streaking changes to white in the center with a grayish border, the division between the two colors being marked by a fine dark line inclosing the white. Abdomen grayish white; sides of flanks pale fulvous ashy, transversely barred with vermiculated lines formed by the broken and irregular markings of the feathers.

TRINGA COUESI (Ridgw.). Aleutian Sandpiper (Esk. *Tsnät-gāk*).

One of the most interesting results of the recent investigations into the zoology of Alaska is the determination of this and the following species. They appear to be among the most narrowly limited of waders in their range, and are, like a number of other species, peculiar to this region, the product of the strange and unusual surroundings.

Since the naturalists of the Russian-American Telegraph Expedition entered the country, until the present day, the species forming the subject of this article has been under observation. At first it was supposed to be identical with its relative, the common Purple Sandpiper of the Atlantic and portions of the Arctic coasts of the two continents. Nordenskjöld found the latter species scattered over the north coast of Europe and Asia in his famous voyage, but his record of *T. maritima*, from the region of Bering Straits, where he wintered, must be referred to *couesi*, according to our knowledge of the latter's distribution. This bird was confused in Mr. Dall's paper with *T. maritima*, where he gives some interesting notes on its distribution. He found a single specimen of *A. couesi* near Nulato, and another at Pastolik, and tells us that Bischoff found it abundantly at Sitka and at Plover Bay, Siberia. From Pallas's description of his Kurile Island *T. arquatella* it seems very certain that he referred to the bird now known as *A. couesi*, as Mr. Ridgway has already pointed out. (See Bull. N. O. C., July, 1880, p. 160.)

Steller also noted this bird upon the Bering Islands, as Pallas affirms (*loc. cit.*). In case this is true we have an additional record, which must undoubtedly be referred to this bird, for the "*T. maritima*" found by Nordenskjöld at his winter quarters, just northwest of Bering Straits, undoubtedly agrees with those found directly south on the coast of Siberia, at Plover Bay, and beyond to the Kurile Islands.

There are some curious facts regarding the breeding range of this bird which are at present unaccountable. It nests throughout the Aleutian chain, from the westernmost island east to the Shumagin group, south of Alaska. Beyond this we have no knowledge of it at this season. On May 15, 1877, I visited Sanak Island, one of the easternmost of the Aleutians, and first met this bird. A pair were found feeding on a series of bare, jagged rocks, over which the spray flew in a dense cloud as every wave beat at the foot of the rocky shore. I shot one of them and the survivor merely flew up and stood eyeing me silently from the top of a low cliff 20 or 25 feet overhead, until it, too, fell a victim. Later in the day another was seen near the border of a small lake in the interior of the island. It ran nimbly on before me, over the mossy hillocks, stopping every few feet and half turning to watch my movements, just as a Spotted Sandpiper would do under the circumstances. When driven to take wing, it flew a short distance, with the same peculiar down-curved wings and style of flight as has the Spotted Sandpiper. While on the wing it uttered a rather low, but clear and musical *teeo-teeo-teeo*. When feeding it had a note something like a call of the *Colaptes auratus*, and which may be represented by the syllables *clā-clā-clā*.

From this time until the 1st of August I did not meet this bird again, and meanwhile I had gone further north to Saint Michaels, on Norton Sound. Early in August, however, I was pleased to find it abundant in parties of from five to thirty or forty about outlying rocky islets and along rugged portions of the shore. During each of the four succeeding seasons the same experience

was repeated, and the last of July or first of August I was certain to find numbers of them in the situations mentioned, where earlier in the season not one was to be found. They always remained until the middle of October, when the beaches became covered with ice and they were forced to seek a milder climate.

The first of October, as the first snow-storms begin, these birds desert the more exposed islets and beaches for the inner bays and sandy beaches, where their habits are like those of other Sandpipers in similar situations. They are never shy, and a party may be fired into, again and again, by following them along the shore. The natives of Norton Sound call them "shore," or "beach birds" (*Tsna-guk*), and do not know their nesting ground, so it is safe to say—as confirmed by my own observations—that this bird does not nest on the Alaskan mainland north of the Yukon at least.

On the Commander Islands it is a permanent resident. There, as elsewhere, it frequents rugged beaches. The following notes on the breeding and other habits of this bird I quote from Stejneger's excellent report on the birds of the Commander Islands: The last of March great flocks of five hundred or more swarm along the shore line of these islands. About a month later the flocks make up and are distributed over the islands from the shore to the high plateaus. At this time, about the middle of April, they assume their bright summer dress. It has, in common with many other Sandpipers, the habit of uttering a melodious song while upon the wing, and Stejneger saw one alight upon a tussock, and, "sitting there with puffed plumage and pendant wings, it produced a loud bleating," very much like the "bleating" of *Gallinago gallinago*. The first eggs found on these islands were taken the middle of May, and chicks on the 17th of June.

In its autumnal wanderings it extends all along the eastern shore of Bering Sea and even north along the coast of the Arctic. Its winter range includes the Aleutian Islands and the coast of Kadiak Island, with the mainland south to Sitka and probably farther. Its range on the Asiatic coast is less known, but from its absence during the summer of 1881 at various points of this coast, where I landed, from Plover Bay to East Cape, and around to west of Kointelin Bay, its breeding range is probably limited to the Kurile, and perhaps Bering, Islands and the adjacent coast. On the east coast of Bering Sea these birds begin the fall moult the last of August or first of September, and the ashy winter-dress becomes more and more marked until it is completed the first part of October.

Description.—Iris, hazel. Feet, legs, and base of bill dark greenish-yellow; the outer two-thirds of bill black or very dark horn color. The feet and legs are light olive-yellow in some instances.

Adult in breeding plumage.—Feathers of crown black or blackish-brown, narrowly edged with dull rusty. Feathers of dorsum and scapulars black, broadly edged about the tip with rusty yellowish or buffy, varying to bright deep ferruginous; this latter color usually brightest at base of tertials, but covering the entire dorsum in some cases. The buffy shade is usually most marked on the tertials and lower back. Rump and tail-coverts black; middle tail-feathers very dark; the outer ones light grayish. Primaries dark brown. Coverts olive-brown, narrowly edged with whitish. Secondaries mainly white. Sides of head marked by a dull whitish superciliary line from bill and a broad plumbeous line from gape back along lower border of eye to neck. Throat dingy white. Feathers of lower neck and upper breast with dark bases and a narrow shaft-line of black through the broad white tip, giving a streaked appearance, which gradually changes on the sides of neck to the rufous markings of the back. On both sides of the breast, and frequently across all the breast in a uniform area, are two dull irregular black patches. The rest of under surface is white, each feather with a well-marked black shaft-line.

Winter plumage.—Entire head and neck uniform plumbeous, with a whitish throat area on which the dark markings are limited to the tips of feathers. The centers of feathers on crown and back, including tertial-coverts, have dark blackish-brown centers with a plumbeous ashy edging. Primaries, rump, and tail apparently a little darker than in breeding season. The wing-coverts are much more broadly white-edged than in summer. Feathers of breast dark with white and ashy edges, the dark frequently inclosing a subterminal light area. The black-breast area of summer is lacking, but the dark shaft-markings on the sides and flanks are ordinarily larger and broader than in summer.

Young in first plumage.—Crown dark brown with a plumbeous shade on sides; feathers narrowly edged with dull rusty; back, scapulars, and tertials blackish, edged with narrow borders of pale, rusty shading to grayish and dull buffy, the latter shades most marked on the wing coverts and scapulars. Throat and upper neck and sides of head like winter adult; feathers of upper breast with blackish centers, producing a streaked appearance, which gradually changes to spotting on lower breast and sides. This is caused by the increased amount of white, unbroken near end of feather except by an ovate subterminal dark spot.

There is every gradation from the summer to the autumnal plumage of the adults in my series.

A considerable number of these birds measured in the flesh range from 8 to 9 inches in total length, and 15 to 16 inches in spread. The measurements of a series of ten specimens from Saint Michaels are given in the following table:

Date.	Sex.	Wing.	Tail.	Tarsus.	Culmen.
1879.					
Sept. 6	♂	4.80	2.35	.89	1.10
Aug. 24	♂	4.90	2.30	1.01	1.08
Aug. 25	♂	4.82	2.25	.99	1.12
Aug. 25	♀	4.90	2.40	1.00	1.21
Aug. 21	♂	4.80	2.35	.85	1.16
Aug. 15	♂	4.83	2.30	.82	1.05
Aug. 21	♂	4.98	2.10	.83	1.19
July 29	♂	4.96	2.35	.92	1.23
Aug. 15	♂	4.99	2.28	.90	1.08
Oct. 12	♂	4.96	2.32	.92	1.30

The downy young, from Kyska Island, June 30, 1873, is bright rusty fulvous above, irregularly marked with black; the ornamental, velvety flecks coarser, and not so white as in *maritima*; head, light fulvous, marked as in *maritima*; sides of lower parts fulvous.

The downy young both of this species and of *ptilocnemis* are strikingly different from the young of *maritima*. The difference lies in the rich, light buffy or fulvous tints which so richly color the two first, in contrast with the dark, dingy buffy and grays forming the main colors on young *maritima* at the same stage.

TRINGA PTILOCNEMIS COUES. Pribilof Sandpiper.

Nearly all the information we possess concerning this species is from the observations of Mr. H. W. Elliott, whose specimens furnished the types. He found them abundant as summer residents upon the Fur Seal Islands and later upon Saint Matthew's Island. A single pair was found nesting on the south shore of Saint Lawrence Island by myself, in June, 1881. Krause secured a specimen of this bird at Portage Bay on the 27th of December and two others on January 27, but saw no large flocks until the end of April; he did not find it there in summer. Portage Bay is on the mainland near the mouth of Chilcat Peninsula, and as these birds winter there sparingly and appear in flocks in spring, it is safe to locate the main wintering ground of this species east and south along the coast, perhaps to British Columbia. It arrives upon the Seal Islands early in May and breeds on the dry uplands and mossy hummocks back from the shore.

The nest is a mere depression in the dry moss or grass, where four darkly-blotched pyriform eggs are laid. By the 10th of August the young are on the wing, and, with the old birds, gather in flocks and frequent the beaches until early in September, when they leave the islands for their unknown winter home. It is said to be a devoted parent, and hovers about the intruder, uttering its low piping note by the hour, if its nest is near. The single set of eggs obtained by Mr. Elliott on Saint George's Island, June 19, 1873, is still unique. The eggs, four in number, closely resemble those of *A. maritima*, according to Dr. Coues, and measure 1.55 by 1.08, 1.52 by 1.05, 1.50 by 1.08, 1.48 by 1.05. "The ground is nearly clay-color, with an appreciable olivaceous shade. The markings are large, bold, and numerous, of rich burnt-umber brown, of varying depth, according to the quantity of pigment." These markings occur over the entire shell except at the point, and become confluent and massed about the larger end. There are also gray and purplish shell markings scattered over the light spaces. The male of the pair seen by me on Saint Lawrence

Island in June kept flying up some 10 or 15 yards, its wings beating with a rapid vibrating or tremulous motion, while the bird thus poised trilled forth a clear, rather musical and liquid but hard, whistling note, which is probably the same note which Elliott likens to the trill of the tree-frog. The short song ended, the musician glides to the ground upon stiffened wings and resumes his feeding or stands silently for a time on a projecting rock or knoll. On Saint Lawrence Island the pair was in possession of a bare, desolate wind-swept hill-top, where the vegetation consisted mainly of small lichens and stunted Arctic plants hugging close to the earth for shelter from the raw fog-laden winds. The damp climate of summer on the islands of Bering Sea seems to possess an attraction for this narrowly-limited species, which appears to be absolutely restricted to a series of four small islands within a linear distance of 500 miles, and is, thus far, totally unknown from the adjacent coast upon either side, where, however, a closely allied form occurs. In addition to its greater size this bird is separated from *cousi* by the much lighter colors of the breeding plumage.

Description of the summer plumage (specimen from the Seal Islands, June, 1872, Elliott).—Crown dark brown, edged with pale fulvous rusty. Nape and sides of neck dull plumbeous ashy, approaching white on latter area. Feathers of back and scapulars with black centers, with a broad edging of pale buff anteriorly, and tinged with a shade of rusty-red posteriorly. The feathers just over the bend of the wing are rusty-red of a lighter shade than in *cousi*. The tertials and wing-coverts are all edged with silvery gray. The rump and tail are lighter than in the smaller bird, and the primaries a paler brown. The ear-coverts of *piloceemis* are dusky brown with a dark shade extending thence forward under the eye to the lores, but rarely reaching the gape even by shading. The base of bill is entirely surrounded by white, which occupies a large area on the throat and sides of upper neck, and thence down the breast and entire abdomen, only broken by a scattered pectoral band of dark penciling produced by the dark centers to the feathers. This changes on lower breast to an ill-defined area of dingy blackish-brown, shaded with grayish and fuscous in some instances. In some specimens this dark area is divided into a spot on either side imperfectly separated, or forms an unbroken patch, but in any case it is much lighter in color and less extended than in *cousi*. The dark shaft streaks on flanks are nearly obsolete.

Sex.	Locality.	Date.	Wing.	Tail.	Tarsus.	Culmen.
♂	Saint Paul . . .	June 29, 1872 . .	5.50	2.45	.98	1.38
♂	Saint George . .	June	5.15	2.55	1.02	1.49

TRINGA ACUMINATA (Horsf.). Sharp-tailed Sandpiper.

On September 16, 1877, near Saint Michaels, I had the pleasure of securing a handsome young female of this bird, thus adding the species to our fauna. The bird was shot on the muddy bank of a tide-creek as I was passing in a kyak. Later in the season others were seen, and during each of the three succeeding autumns they were found to be one of the most common species of snipe about Saint Michaels, frequenting the borders of brackish pools and tide-creeks, in company with *T. maculata*, the Red-breasted Snipe, and several other species.

They were nearly always associated with *maculata*, whose habits they shared to a great extent. When congregated about their feeding places they united into flocks of from ten into fifty, but single birds were frequently flushed from grassy spots. Their motions on the wing are very similar to those of the latter, and they were rarely shy. On October 1, 1880, they were found scattered singly over the marsh, and arose 30 to 40 yards in advance, and made off with a twisting flight, uttering at the same time a short, soft, metallic "pleep," "pleep," and, pursuing an erratic, circuitous flight for a time, they generally returned and settled near the spot whence they started.

A single bird taken at Port Clarence, Bering Straits, September 9, by Bean, is the only instance of its occurrence there. On the Commander Islands it occurs during the migrations. I do not think the bird breeds on the American side.

On the north shore of Siberia, near North Cape, we found these birds very common, scattered over damp grass flats near the coast, the 1st of August, 1881. The ground was covered with

See previous page
found on Chukot-
peninsula !!



SHARP-TAILED SANDPIPER,
Tringa acuminata
(YOUNG OF THE YEAR.)

reindeer tracks, and among these the Sharp-tailed Snipe were seen seeking their food. They were very unsuspecting, and allowed us to pass close to them, or circled close about us. From their movements, and other circumstances, I judged that this district formed part of their breeding grounds, whence they reach the neighboring coast of Alaska in fall.

They usually make their first appearance on the shore of Norton Sound the last of August, and in a few days become very common. They sometimes remain up to the 12th of October, and I have seen them searching for food along the tide-line when the ground was covered with 2 inches of snow. When feeding along the edges of the tide-creeks they may almost be knocked over with a paddle, and when a flock is fired into it returns again and again. Its exact range is still undetermined, but it is known to cover the east coast of Asia and adjacent islands.

The 1st of September, 1880, Capt. C. L. Hooper, of the United States steamer Corwin, took a single specimen within the Arctic Circle at Hotham Inlet, Kotzebue Sound, Alaska, making the farthest northern record yet known, and on the 9th of September, the same season, Dr. T. H. Bean took a second specimen at Port Clarence, Bering Straits, and these, with the large number of specimens taken at Saint Michaels by the writer, complete the American history of this bird up to the present time.

Description of fall specimens.—Iris hazel; bill black at tip, changing to dull greenish-yellow or dirty horn color on basal third of lower mandible. The basal portion of the upper mandible lighter than outer part and dull greenish-yellow in some specimens. Feet and tarsus greenish yellow, rather dull. Twenty specimens measured in the flesh ranged from $8\frac{1}{2}$ to $9\frac{1}{4}$ inches in length by 16 to 18 inches in extent of wing.

The general pattern of coloration in this bird is very much like that of *T. maculata*, but *acuminata* may be distinguished at a glance by the rich buff and rufous shading and markings. The feathers of the crown have broad black shaft-lines with borders of bright rusty. On the back of the neck the black shaft-lines persist, but are bordered with dull rusty fulvous brown. On the back, scapulars, and tertials the black central part of feathers are proportionately larger, and the edgings are lighter colored than on crown. The edges of dorsal feathers are rusty red, dull, and shaded with buffy, and the scapulars and a portion of the tertials are tipped with white. The edgings of scapulars and tertials are a bright dark rusty red, approaching the shade of the crown, but lighter. The rump, upper tail-coverts, and inner tail-feathers are blackish-brown, edged with rusty red, shading through fulvous to white on the outer tail-feather. Wing-coverts pale-brown, heavily bordered with pale fulvous brown and yellowish-white. Primaries dark-brown. Chin and upper throat occupied by an area of dingy white. Extending across the throat, just below this area is a heavily buff shaded collar extending over the entire breast. The dark shaft-lines of feathers on the sides of the neck extend across the throat below in a series of fine pencilings, which never extend down over the breast, as in *maculata*, nor are they so heavy as the markings on the breast of the latter bird. A dull buffy or yellowish brown wash extends along the sides and tinges all the lower surface. There is considerable variation in the intensity of the bright rusty-red edgings on the crown and back, but the color does not approximate the dingy brownish or buffy yellow of *maculata*. There is a distinct whitish superciliary stripe finely penciled with black, and the dingy white of sides of head and cheeks is thickly penciled by fine dark shaft lines. The breeding plumage of this bird differs from its autumnal dress.

An adult male in the National Museum collection obtained at Sydney, Australia, November 16, 1871, by J. E. Harting, differs much from fall birds from Alaska, as the following description will show: Feathers of the crown with a dull black shaft-line occupying half the feather and reaching the tip. Along each side of this is a broad border of dull rusty red. The entire back of neck, dorsum, scapulars, tertials, and wing-coverts have blackish or dark-brown centers, each feather broadly bordered with ashy-brown, producing a pattern and coloration which may be almost duplicated in dull-colored breeding females of *maculata*, the principal difference being the larger size of the dark centers to feathers on the nape and the lighter color of the ashy edging in *acuminata*. As in the fall specimens, the pectoral band is much narrower than in *maculata* and in the adult male consists of a pale dingy or buffy brown shade, with a few scattered dark shaft-lines mainly on each side of the neck from the base of bill to the breast, the side of head and neck thus appearing very similar to that of *maculata*.

The measurements are as follows: Wing, 5; tail, 2.10; tarsus, 1.15; culmen, .99.

No.	Locality.	Date.	Sex.	Wing.	Tail.	Tarsus.	Culmen.
1254	Saint Michaels...	Aug. 29	♂	5.50	2.36	1.20	1.02
1881	...do	Sept. 12	Juv. ♂	5.40	2.30	1.18	.99
1882	...do	Sept. 12	Juv. ♂	5.44	2.37	1.19	1.02
508	...do	Sept. 16	Juv. ♀	5.43	2.33	1.11	.98
1880	...do	Sept. 12	Juv. ♂	5.26	2.28	1.18	.88
1343	...do	Aug. 29	♀	5.00	2.12	1.10	1.00
1352	...do	Aug. 29	♀	5.50	2.40	1.24	.99
1351	...do	Aug. 29	♀	5.24	2.23	1.19	1.00
1435	...do	Sept. 11	♂	5.50	2.40	1.21	1.04
1437	...do	Sept. 29	♂	5.43	2.40	1.19	1.00

TRINGA MACULATA Vieill. Pectoral Sandpiper (Esk. *Āwóók-kí-üg-í-shá-l-á gúk*).

A single specimen of this bird was taken at Sitka, by Bischoff, during the Telegraph Expedition. During my residence in the Territory I found it an extremely common bird at the Yukon mouth, where the low, grassy flats afford it a much-frequented breeding ground.

According to Murdoch, it breeds abundantly at Point Barrow, where it arrives the last of May or first of June. They breed during June and July, and move south by September. On the Near Islands, according to Turner, it is an abundant summer resident.

It arrives on the shores of Bering Sea, near Saint Michaels, from the 15th to the 25th of May, and after lingering about wet spots where the green herbage just begins to show among the universal browns of the tundra, they pair and seek their nesting places. It is a common but never very abundant bird during both migrations near Saint Michaels, but it is rare there during the breeding season. This is difficult to account for, as they are extremely common at the latter period on the low, flat islands in the Yukon delta and are common also at other points on the coast. Dall found it at Plover Bay, East Siberia, and I found it common on the north coast of Siberia the last of July, 1881, where, like the Sharp-tailed Sandpiper, it was evidently upon its breeding ground. They arrive on the east coast of Bering Sea before the ground is entirely free from snow, and during September, in company with *A. acuminata*, are numerous about small, brackish pools and the banks of tide creeks. October, with its frosty nights and raw, unpleasant days, soon thins their ranks until, by the 10th or 12th, the last one has gone.

The last of May, 1879, I pitched my tent on a lonely island in the Yukon delta and passed several weeks in almost continual physical discomfort owing to the cold rain and snow-storms which prevailed. However, I look back with pleasure upon the time passed here among the various water-fowl, when every day contributed new and strange experiences.

The night of May 24 I lay wrapped in my blanket, and from the raised flap of the tent looked out over as dreary a cloud-covered landscape as can be imagined. The silence was unbroken save by the tinkle and clinking of the disintegrating ice in the river, and at intervals by the wild notes of some restless loon, which arose in a hoarse reverberating cry and died away in a strange gurgling sound. As my eyelids began to droop and the scene to become indistinct, suddenly a low, hollow, booming note struck my ear and sent my thoughts back to a spring morning in Northern Illinois, and to the loud vibrating tones of the prairie chickens. Again the sound arose nearer and more distinct, and with an effort I brought myself back to the reality of my position and, resting upon one elbow, listened. A few seconds passed and again arose the note; a moment later and, gun in hand, I stood outside the tent. The open flat extended away on all sides, with apparently not a living creature near. Once again the note was repeated close by, and a glance revealed its author. Standing in the thin grasses 10 or 15 yards from me, with its throat inflated until it was as large as the rest of the bird, was a male *A. maculata*. The succeeding days afforded opportunity to observe the bird as it uttered its singular notes under a variety of situations and at various hours of the day or during the light Arctic night. The note is deep, hollow, and resonant, but at the same time liquid and musical, and may be represented by a repetition of the syllables *tóó-ú, tóó-ú, tóó-ú, tóó-ú, tóó-ú, tóó-ú, tóó-ú, tóó-ú*. Before the bird utters these notes it fills its œsophagus with air to such an extent that the breast and throat is inflated to twice or more its natural size, and the great air-sac thus formed gives the peculiar resonant quality to the note.



PECTORAL SANDPIPER

Fringilla monticola

(ADULT MALE IN SUMMER WITH CROP INFLATED)

The skin of the throat and breast becomes very flabby and loose at this season, and its inner surface is covered with small globular masses of fat. When not inflated, the skin loaded with this extra weight and with a slight serous suffusion which is present hangs down in a pendulous flap or fold exactly like a dewlap, about an inch and a half wide. The œsophagus is very loose and becomes remarkably soft and distensible, but is easily ruptured in this state, as I found by dissection. In the plate accompanying this report the extent and character of this inflation, unique at least among American waders, is shown. The bird may frequently be seen running along the ground close to the female, its enormous sac inflated, and its head drawn back and the bill pointing directly forward, or, filled with spring-time vigor, the bird flits with slow but energetic wing-strokes close along the ground, its head raised high over the shoulders and the tail hanging almost directly down. As it thus flies it utters a succession of the hollow booming notes, which have a strange ventriiloquial quality. At times the male rises 20 or 30 yards in the air and inflating its throat glides down to the ground with its sac hanging below, as is shown in the accompanying plate. Again he crosses back and forth in front of the female, puffing his breast out and bowing from side to side, running here and there, as if intoxicated with passion. Whenever he pursues his love-making, his rather low but pervading note swells and dies in musical cadences, which form a striking part of the great bird chorus heard at this season in the north.

The Eskimo name indicates that its notes are like those of the walrus, hence the term "walrus talker." Since my return from the north my attention has been called to a note in the Proceedings of the Zoological Society of London (1859, p. 130), where it appears that Dr. Adams noted the peculiar habits of this bird years ago when he passed a season at Saint Michaels. These Sandpipers were beginning to nest when I left the Yukon mouth, and in one instance a female was seen engaged in preparing a place for her eggs in a tuft of grass, but the spot was afterwards abandoned. The nests taken by Mr. Murdoch each contained four eggs of the usual pyriform shape. They vary in size as follows: 1.58 by 1.06; 1.44 by 1.11; 1.42 by 1.08; 1.54 by 1.02 inches. They have a drab ground color, with a greenish shade in some cases, and are spotted and blotched with amber-brown, varying in distribution on different specimens, as is usual among waders' eggs. In autumn its habits in the north are precisely those so familiar to all who know the bird in its southern haunts.

The young birds in fall have the feathers of crown and entire upper parts edged with rusty and buff; some of the feathers have white tips which, although generally duller and less marked than in the ordinary *acuminata*, renders it very difficult to distinguish the birds by this character alone. The larger bill and broad pectoral band of shaft markings and brown form the two most distinct characters.

For the purpose of comparison with *acuminata* I append the following list of measurements of five specimens of *maculata* from Saint Michaels:

No.	Date.	Sex.	Wing.	Tail.	Tarsus.	Culmen.
1361	Aug. 29	Juv. ♀	5.70	2.40	1.69	1.12
1362	Aug. 29	Juv. ♀	5.75	2.41	1.21	1.28
1363	Aug. 29	Juv. ♀	5.80	2.42	1.18	1.17
1364	Aug. 29	Juv. ♀	5.15	2.05	1.19	1.05
1879	Sept. 12	Ad. ♂	5.40	2.16	1.17	1.16
1943	June 2	Ad. ♂	5.70	2.62	1.15	1.10

TRINGA FUSCICOLLIS Vieill. White-rumped Sandpiper.

Rare at Point Barrow, where Murdoch took two specimens. It breeds abundantly in the Mackenzie River region, but the present record is the first we have of its presence in Western Alaska.

TRINGA BAIRDII (Cones). Baird's Sandpiper.

A single specimen of this species, a young bird in its first plumage, brought me in August, 1877, is the only instance known to me of its occurrence at Saint Michaels during my residence there.

During the summer of 1881, in August, I found them at several places along the Arctic coast north of Kotzebue Sound, and at Point Barrow they were very numerous about the small pools of water near the shore. Murdoch found it to be a common summer resident here, arriving about the end of May.

A specimen is recorded from Sitka by Dall and others from Kadiak Island and from Amak Island north of the peninsula of Alaska. On the Yukon Dall found it not rare, and the collections obtained along the Arctic coast of British America and adjacent region show it to be a common breeding bird there; its summer range probably includes all the Arctic coast of America west of Hudson's Bay.

I regret my lack of opportunity to observe this little known species on its breeding ground; if it extends to the Yukon mouth, it must breed there rarely. As recorded in the Birds of the Northwest, by Dr. Coles, the eggs of this bird, obtained in June on the Anderson River by Macfarlane, have a ground color of clayey, shading to gray or buffy, and are spotted with rich amber and chocolate browns with paler shell markings. The markings are usually fine and of varying shape, larger, and sometimes massed, about the large end.

Three eggs measure 1.30 by .90; 1.35 by .94; 1.28 by .92.

My single specimen was secured near Saint Michaels in August, 1877, and by the latter part of this month it is found south to British Columbia along the Pacific coast. In the National Museum series there is a specimen of this bird in the first plumage taken on the Siberian shore of Bering Sea near the straits.

TRINGA MINUTILLA Vieill. Least Sandpiper (Esk. *Livc-i-livc-lá-ák*.)

I did not meet this species in the course of my work on the Alaskan coast, and can merely record facts gleaned by others.

A male was secured on May 14 at Nulato, by Dall, where, however, he states that the bird is not common, although he took other specimens. His remark that the bird is rather more common at the Yukon mouth was not verified by my observations during May and June at that locality. It was also found in May at Sitka by Bischoff and on the Shumagins in June by Dall. Hartlaub records it from Portage Bay May 5, and at Chiletat May 12. A single specimen was brought me from Nulato in June, 1878, and, with the preceding records, show that it is generally distributed on the mainland of Alaska, but is not abundant anywhere near the sea-coast. There is no record of its occurrence on any of the islands in Bering Sea. Bean found them at Belkovsky in July and at Plover Bay, Siberia, the middle of August.

TRINGA ALPINA PACIFICA (Coles). Red-backed Sandpiper (Esk. *Chó-ghó-mü-ghük*.)

An abundant summer resident at Port Barrow, according to Murdoch, arriving the end of May and leaving about the end of August or first of September. Bean found it common along the coast north of Kotzebue Sound, the last of August. It occurs on the Commander Islands during the migrations, and Stejneger finds his specimens from there to be like typical American birds.

In early seasons the first of these birds reach the Yukon mouth and the shores of Norton Sound by the 10th of May, and by the 25th of this month they are in full force. They arrive in full breeding dress, and are generally in small flocks, which soon break up, and the birds scatter in twos and threes over the moss and grass-grown "tundra" to pair and attend to their summer duties. They nest from the first of June to the first of July, and I secured a set of four fresh eggs on the third of this latter month in 1877.

The young are mostly on the wing toward the end of July, and the birds begin to gather into flocks along the muddy edges of the brackish pools and the banks of tide creeks. Very soon after this they begin to lose their summer plumage, and the moult continues until the last of September or first of October. During the first of October they are very common in flocks and singly among

the lakes and streams; a little later and the borders of these situations are edged with ice, and most of the birds leave for the south, but some of the hardier ones betake themselves to the seashore, where they join with Cones's Sandpiper, and remain as late as the 12th or 13th of the month.

Soon after they arrive in spring they are engaged in pairing, and the males may be seen upon quivering wings flying after the female and uttering a musical, trilling note, which falls upon the ear like the mellow tinkle of large water-drops falling rapidly into a partly filled vessel. Imagine the sounds thus produced by the water run together into a steady and rapid trill some five to ten seconds in length, and the note of this Sandpiper is represented. It is not loud, but has a rich, full tone, difficult to describe, but pleasant to hear among the discordant notes of the various water-fowl whose hoarse cries arise on all sides. As the lover's suit approaches its end, the handsome suitor becomes exalted, and in his moments of excitement he rises 15 or 20 yards, and, hovering on tremulous wings over the object of his passion, pours forth a perfect gush of music, until he glides back to earth exhausted, but ready to repeat the effort a few minutes later. The female coyly retreats before the advances of the male, but after various mishaps each bird finds its partner for the summer and they start off house-hunting in all the ardor of a rising honeymoon. They generally choose some dry knoll, or other slight elevation, overlooking the neighboring lakes and pools. Here, upon a bed of last year's grasses, but without the trouble of arranging a formal nest, the female deposits three or four large eggs of a pale greenish varying to pale brownish clay color with dull chocolate and umber brown spots and blotches.

In some specimens the markings are rather small and numerous over the entire shell, but in all cases the larger end has the usual predominance of blotching. In other specimens the markings form blotches or large spots, rather sparingly distributed at the small end, but nearly hiding the ground color at the large end. There is considerable variation in size, as well as color, among these eggs, as the following measurements show: 1.50 by 1.10; 1.39 by .98; 1.45 by .95; 1.59 by 1.08. After the eggs are laid the male evidently becomes a wiser and a sadder bird, for his merry trill is heard no longer, and, should some wandering naturalist happen along and start a sitting bird from the eggs, the chances are equal that he finds the female is not "at home," but that it is the poor male who has fallen a victim to his faithful care of the nest.

On two occasions I started these birds from their eggs, and in each instance the parent fluttered and stumbled along the ground, trying to distract my attention, and in each case examination showed it to be the male, and the two large, bare patches on the breast showed that they were accustomed to the task. Females shot at the same season showed the same marks of incubation, so it is evident that the work is shared by the two parents. The earliest nest found by me was on June 6, and the latest on July 3; in both the eggs were fresh.

The young are generally on the wing by the middle of July, or a little later, and by the first of August the birds begin to gather in flocks. A young bird in its first plumage is as follows: Centers of feathers on the crown blackish, with well-marked dingy fulvous or buffy edgings; back, scapulars, and tertials with black centers, and a mixed edging of grayish, dull, buffy yellow, shading into rusty, especially on the tertiaries; rump dark fuscous brown; sides of head and neck smoky fuscous brown; a chin-patch of white; the rest of throat pale smoky brown, shading into a buffy brown of breast, each feather having a dark center; these dark centers are much hidden by the broad, overlaying brown edgings; from the breast, extending back over the area occupied by the black breast patch of the adult, the feathers are tipped with dull, faint brownish black; rest of the under surface white; the wing-coverts are edged with pale buff. This plumage gives place very rapidly to the winter dress.

An adult bird from Greenland has the throat and breast markings very distinct; there is a predominance of the black centers of dorsal feathers, and the rusty-red edgings are narrow and much darker than ordinarily. Whether this is characteristic of the Greenland birds or not cannot be decided from the scanty material at hand. These Greenland specimens have been considered as identical with the Old World form by Mr. Ridgway. Specimens secured by me in Northeastern Siberia are the same as the Alaskan birds. There is much individual variation in these birds at all seasons.

TRINGA FERRUGINEA Brünn. Curlew Sandpiper.

At Point Barrow, on June 6, 1883, Mr. Murdoch had the good fortune to take a fine male of this species in full breeding dress. It was in company with a flock of *Tringa maculata*, and its capture is the only record we possess of its occurrence in Alaska, or, in fact, anywhere else on the western coast of America.

Genus EURYNORHYNCHUS Nilsson.

This remarkable Sandpiper has the following generic characters:

Bill expanded laterally, at the tip, into a broad, flat obcordate or rounded expanse, with a slight carination along the median line on the upper surface; bill slightly grooved, with the nostrils close to the basal end. The hind toe is minute, and there is but a very slight trace of a web between the outer and middle toes. The other toes are free.

EURYNORHYNCHUS PYGMEUS (Linn.). Spoon-bill Sandpiper.

The presence of this remarkable little Sandpiper in the list of birds of Alaska is due to the capture of a specimen at Choris Peninsula, during the summer of 1849, by the captain of the British ship Plover. This specimen was for a long time in the collection of Sir John Barrow, but when presented by him to the University Museum at Oxford it came under the notice of Mr. Harting, who records, in the Proceedings of the Zoological Society (1871, p. 110), the capture of this bird, and at the same time a Mongolian Plover, at the locality mentioned.

Choris Peninsula is a sandy spit which extends out into the head of Kotzebue Sound, and is covered with pools of water which are formed by the overflowing of the sea-waves, or the gathering of the rain, and thus forms an excellent point for birds of this character. This place would well repay further examination during the summer season, as also would the strip of low, marshy and sandy lagoons dotting the coast from Cape Prince of Wales northeast; around the Alaskan shore, toward Kotzebue Sound, as it must be a favorite resort for many waders and water-fowl. Doubtless several Siberian species occur there in addition to the two just named.

Although this is one of the rarest of the Sandpipers, it has a wide distribution over portions of Asia. Mr. Harting doubts the occurrence of this bird anywhere in Europe, and especially in France, and in a footnote to one of his articles, he quotes M. Jules Verreaux as having recently informed him that no specimens of this bird ever existed in the Paris Museum, and the specimen which had been referred to by various authors under the name of *E. griseus* is nothing else but *Tringa subarcuata* with the hind toes cut off and the bill remodeled with the aid of some warm water. Mr. Harting concludes his article upon this bird by stating that nothing is known of its nesting habits, and refers to the unexplored regions of Northeastern Asia as the place likely to afford light upon this form, as well as upon other little-known species.

Up to October, 1869, only twenty-four specimens of this bird were known, and of these twenty-three were from Southern India, the single other specimen being from Kotzebue Sound, Alaska. In India these birds frequent the muddy flats at the mouths of rivers, sand-bars, and the sea-shore, where, with the various species of *Tringa*, they always find an abundant harvest of food deposited by the receding tide.

At Plover Bay, on the Siberian shore, I first saw this bird, when on a visit there with the Corwin in 1881. The bird was standing on the border of a small, gravelly-edged pool on a spit at the entrance of the harbor. It had evidently fed to its satisfaction, and stood pensively at the water's edge when I came along. While watching it before shooting, I saw it dabble its bill in the water, and then draw it in its neck, paying no further attention to its surroundings, although I was close by. This was in the same locality where, in 1880, Dr. Bean secured a specimen in autumn plumage. During our visits to this place, on several succeeding occasions, I searched the spot carefully again and again, but not another individual of this rare bird was seen. Swinhoe reports a specimen taken at Hakodadi, Japan, showing that these birds migrate south along the eastern coast of Asia. Nordenskjöld records it at Tapkan, on the northern shore of Siberia, near Bering

Straits, where, with the first bare spot in June, it became so common that they were served twice upon the gun-room mess-table of his vessel. Nordenskjöld supposes it not to nest there; but this is evidently erroneous. He suggests that the bird may go farther north to breed, but as it is found in summer from Plover Bay to Cape Wankarem, which latter place is west of Nordenskjöld's winter-quarters, on the same coast, it would seem certain that this portion of Siberia forms the breeding ground of this strange species. Specimens were seen also by me on several occasions at this last-named place, early in August, 1881, so it is certain that the bird remains throughout the summer along this shore.

EREUNETES OCCIDENTALIS LAWT. Western Sandpiper (Esk. *Libr-i-libr-i-lá-úlk*).

As the snow disappears on the low ground about Norton Sound, from the 10th to the 15th of May each year, and the ponds, still ice-covered, are bordered by a ring of water, these gentle birds arrive on the shore of Bering Sea, in the vicinity of Saint Michaels and the Yukon mouth. The advancing season finds their numbers continually augmented until, toward the end of May, they are extremely common and are found scattered everywhere over the mossy flats and low hill-sides. Their gentle character and trusting ways render them very attractive to the frequenter of their territory at this season.

The warm days towards the end of May cause the brown slopes and flats to assume a shade of green, and among the many pretty bird-romances going on under our eyes none is more charming than the courtship of this delicate Sandpiper. They have forsaken the borders of icy pools and, in twos and threes, are found scattered over the tundra, showing a preference for small dry knolls and the drier tussock-covered parts of the country in the vicinity of damp spots and small ponds. Here the gentle birds may be seen at all times tripping daintily over the moss or in and out among the tufts of grass, conversing with each other in low, pleasant, twittering notes, and never showing any sign of the wrangling so frequent with their kind at this season. The female modestly avoids the male as he pays his homage, running back and forth before her as though anxious to exhibit his tiny form to the best advantage. At times his heart beats high with pride and he trails his wings, elevates and partly spreads his tail, and struts in front of his lady fair in all the pompous vanity of a pigmy turkey-cock; or his blood courses in a fiery stream until, filled with ecstatic joy, the sanguine lover springs from the earth, and rising upon vibrating wings, some ten or fifteen yards, he poises, hovering in the same position, sometimes nearly a minute, while he pours forth a rapid, uniform series of rather musical trills, which vary in strength as they gradually rise and fall, producing pleasant cadences. The wings of the songster meanwhile vibrate with such rapid motion that they appear to keep time with the rapidly trilling notes, which can only be likened to the running down of a small spring and may be represented by the syllables *tzr-r-r-e-e, zr-e-e-e, zr-e-e-e*, in a fine high-pitched tone, with an impetus at each "z." This part of the song ended, the bird raises its wings above its back, thus forming a V, and glides slowly to the ground, uttering at the same time, in a trill, but with a deeper and richer tone, a series of notes which may be likened to the syllables *tzur-r-r-r, tzur-r-r-r*. The word "throaty" may be applied to these latter notes as distinguished from the high-pitched key of the first part of the song. Beside the trilling song, which may be characterized in some respects as a finer and weaker copy of the song of *Tringa americana*, the Semipalmated Sandpiper has a variety of low, happy, twittering vocalizations, used when feeding with its companions or addressing the female. Very soon after the real duties of the season begin the joyous songster forgets his lay and betakes himself to the more matter-of-fact duties which are his as the father of a family. By the first of June, and earlier in some seasons, they have eggs, and in one instance young were found the 7th of June. Their nests are usually upon the drier parts of the tundra, generally on a mossy hummock or slight swell. A sheltering bunch of dwarf willow or a few grass stems in a tuft form a favorite cover. The male keeps near by and rises now and then to utter his song in an exulting tone, but as the honeymoon wanes he loses much of his musical character. The females vary much in their actions when disturbed from the nest. In some cases they fly off a few yards and proceed to feed with perfect indifference; others flutter about under the intruder's feet, with head down and trailing wings, falling every few feet and beating the wings upon the ground, apparently just ready to expire.

At the Yukon mouth, on June 3, a female was driven from her eggs and flew a few feet away, where she stood crouching, with her wings hanging quivering nervelessly by her sides, uttering, meanwhile, as she watched me, a low, plaintive, long-drawn cheeping note which was so expressive of maternal grief and pain that I had not the heart to touch her treasures, but left the tender mother in possession of her undisturbed home. This is one of the few instances I have met where the notes of the parent bird have assumed such human expressiveness when their nest has been approached that any but a heart lacking all feeling must have been affected. The most striking instance besides the one just detailed was the sorrow shown by a male Snow-bunting for his mate which I shot on Saint Lawrence Island.

The eggs of this Sandpiper are sometimes placed on a thin layer of dead grass stems, or willow leaves, loosely arranged, but very commonly the mat of dry willow leaves or grass afforded by the spot chosen serves as the nest without special arrangement. On June 9, 1879, in company with two natives, I landed on the coast of Norton Sound near the Yukon mouth, and built a large camp-fire of the abundant drift-wood strewn about. Just as the fire was well under way we noted the strange motions of one of these birds; she advanced within a few feet of us when some slight movement would cause her to run away for a few yards, only to retrace her steps again in a few seconds. I made the men remain quiet, and in about half a minute the anxious mother came tripping along, casting an anxious eye at us as she did so, and, to my surprise, she slipped into a tuft of grass not 10 feet away, and, covering her eggs, sat there in full view. This was so near the large fire that the heat could be felt by us when standing by the eggs. The bird ran off as we drew near, and my workman extended himself full length on the ground with outstretched hand close beside the nest. The rest of us retired, and the bird soon returned as before, and, without paying the slightest attention to the man, she actually crossed his arm and encoined herself upon the eggs and was caught by a turn of the hand. After looking at the terrified creature I released her, but she refused to trust us again, and kept 20 to 25 yards away. I scarcely need remark that her eggs were left undisturbed as a reward for her devotion. During all this time, as is usually the case, the male kept at a safe distance, and took matters much more philosophically than did his partner.

On one occasion, as I was transferring the eggs of one of these Sandpipers to my basket, the female which was close by, having been started from the nest, saw another female of her kind come tripping along through what she evidently considered her territory, for extending her head and ruffling her feathers she ran at the intruder and drove her away.

The eggs measure from 1.30 by .92 to 1.11 by .82 inches, and there is an equally great variation in the markings. The ground is ordinarily pale clay color, shading toward pale brownish clay. In many instances, usually among the larger eggs, the ground color is nearly or quite concealed by fine, light reddish brown spots or specks. The other extreme has the spots gathered mainly about the large end in large irregular spots and blotches, and the intermediate ones have the shell about half hidden by markings of chocolate and umber-brown in small spots, a little more dense at the large end. In some eggs the spots are rich chocolate and the light or slightly reddish-brown cast in the markings even of the darkest colored eggs usually serves to readily separate these eggs from any others with which I am familiar.

Early in July the young are on the wing and begin to gather in flocks toward the first of August. The last of these birds are seen on the coast of Norton Sound and the Yukon mouth the first of October.

Although it is not recorded from the Seal and Aleutian Islands, I have seen the bird at Saint Lawrence Island, south of Bering Straits, and at several points along the northeastern coast of Siberia, and it frequents the Arctic coasts of Alaska in addition to being found throughout the interior along streams where suitable flats occur. Murdoch notes it as a fall visitor at Point Barrow. It has been found in abundance on the southeast coast of the Territory, where it occurs during the migrations.

The young in the first plumage present the following characters: Feathers of crown dark brown, edged with dull fulvous; feathers of back with dark centers edged with a mixture of white or grayish and dull rusty and fulvous red. Wing-coverts dull ashy brown edged with dull buff.

Rump dark ashy brown, darkest on the upper tail-coverts. Sides of head, neck, and a broad pectoral band dull smoky gray, the same smoky shade extending over the sides and abdomen as a pale wash.

A downy young taken near Saint Michaels in June has the middle of crown and of dorsum velvety blackish surrounded by the dark buff of the rest of upper surface. A few scattered spots of blackish are seen elsewhere on the back, but are very limited. Many of the long hair-like feathers on the back are tipped with light yellowish white. Chin, throat, breast, and abdomen dull white, washed with buff on the breast.

CALIDRIS ARENARIA (Linn.). Sanderling.

The only record of this widely spread species from Alaska is that of Mr. Dall, who informs us that it is "very common at Nulato and on the Yukon to the sea." At Nulato he noted its arrival from May 10 to 15, and it passed south late in fall. He saw them at the edge of the ice on the river in October apparently quite at home.

It has been taken repeatedly in spring and fall on the coasts of Japan and China, and is a rare migrant on the Commander Islands. Several specimens are in the National Museum collection obtained at Sitka during the migrations, but during the entire time spent by me in the north I did not see a single individual, although I looked for them each spring and fall.

During Parry's first expedition the Sanderlings were found nesting on the north Georgian Islands, and it undoubtedly breeds along the barren Arctic shore of the North Alaskan coast east of Point Barrow, but not in any numbers to the south of this point, as my observations during the summer of 1881 show. It is found wintering in low latitudes on both coasts of the Pacific, but is rather rare on the shores of India.

LIMOSA LAPPONICA BAUERI (Narm.). Pacific Godwit (Esk. *Tu-gû-tû-gû-ûk*).

This bird was added to our faunal list by the naturalists of the Telegraph Expedition. Dall found it plentiful about the Yukon mouth, and informs us that it lays "two light olivaceous spotted eggs in a rounded depression in a sedge tussock, lined with dry grass." The same author found a single specimen on an islet in Akoutan Pass near Unalaska, June 2, 1872, and again the 9th of June at Unalaska, where he states that it breeds. West of this place in the Aleutian chain it was not observed by him. Murdoch found it to be an occasional summer visitor at Point Barrow. It occurs on the Commander Islands during the migrations.

Although this is a well known species of Eastern Asia, breeding as far north as 75° and wintering in Southeastern Asia, Australia, and Polynesia, our knowledge of it as an American bird is very limited, the summary of Mr. Dall's work just given, and Elliott's statement that it passes north in a straggling manner over the Seal Islands early in May, returning south in flocks of a dozen to fifty toward the end of August, comprising it all.

This is one of the species figured in Dall and Banuister's paper in the Chicago Academy Transactions, and is described by Professor Baird under the name of *Limosa uropygialis* Gould, in the same paper. On May 26, 1877, while I was at Unalaska, a native brought in a half dozen of these birds, and on June 3 I obtained three others from the sandy beach of a small inner bay. They were very unsuspecting and easily killed. Although these birds appeared to be migrating, yet the following years I found them arriving at Saint Michaels in flocks of from twenty-five to two hundred from the 13th to 20th of May. These flocks were shy and kept in continual motion, wheeling and circling in rapid flight over the low land, now alighting for a moment then skimming away again in a close body.

Their movements and habits at this season are similar to those of other Godwits. By the last of May the flocks are broken up, and the birds are distributed in small parties over their breeding ground. Their courtship begins by the 18th or 20th of May, and is carried on in such a loud-voiced manner that every creature in the neighborhood knows all about it. The males continually utter a loud ringing *kû-wééé, kû-wééé, kû-wééé*, which is repeated with great emphasis upon the last syllable, and the note may be heard for several hundred yards.

They frequent open grassy parts of the country and are quick to protest against an invasion of their territory. As a person approaches, one after the other of the birds arises and comes circling about, uttering a loud *ká-wéé* with such energy as to make the ears fairly ring. If their nests are near, or they have young, they come closer and closer, some of the boldest swooping close by one's head and redoubling the din. This same note is heard upon all sides while the birds conduct their courtships, and it serves also to express their anger and alarm. At the mating season the males have a rolling whistle also like that of the ordinary field plover, but shorter. When the birds fly at this time they hold the wings decurved and stiffened and make a few rapid strokes, then glide for a short distance. On the ground it walks gracefully, its head well raised, and frequently pauses to raise its wings high over the back and then deliberately folds them. They may be decoyed when flying in flocks if their whistling note be imitated. If wounded and taken in hand they utter a loud harsh scream.

These Godwits are among the first of the waders to leave Alaska in fall. The young are flying by the middle of July and before the end of August not one of these birds, young or old, is to be found. In the breeding season all the birds of the neighborhood will unite to escort a dog through their territory with the most resounding cries.

There is a wide range of individual variation among many species of waders, and this is nowhere better exemplified than in the present species, as will be shown in the following notes and descriptions: A male in perfect breeding plumage obtained at Unalaska June 3, 1877, has the crown striated by broad sooty black shaft-lines and dull yellowish edgings of each feather; the entire back of neck dull buffy or yellowish brown, marked longitudinally by fine blackish shaft-lines which become very much broader near the back and on the dorsal area; including the scapulars and most of tertials the feathers are dark blackish brown, each bordered by a varying amount of dull gray, brown or buffy, in the form of irregular marginal spots and uneven borders. Feathers on upper rump pale ashy brown, faintly white-edged, changing on the upper-tail coverts, which contain irregular central areas of white inclosed in brown and these finally become, like the tail, ashy brown, shaded with buff and barred with several irregular and frequently imperfect bars of white or pale buffy white. The tail markings consist of six distinct bars of light. Entire under surface rich buffy red, broken only by a few irregular dark bars on feathers of the sides and under tail-coverts. Secondaries and wing-coverts light ashy brown edged with grayish white. Upper surface of primaries dark blackish brown; under surface of same pale ashy, the inner webs becoming whitish, broken by irregular clouding and maculations. In old male birds the feathers on the breast are irregularly marked by fine black shaft-lines.

The female in perfect breeding dress is like the male, except that the buff of the lower surface averages paler and is always mixed with white, giving an immature appearance. This character is frequently present in the male as well, but in full-plumaged males it is absent; I have yet to see a female with the buff unbroken.

Two females taken at Saint Michaels on June 16 are in winter plumage without a trace of the usual summer coloration, and in several other spring females parts of the winter dress remain.

Both sexes begin to assume the fall dress in July, but they leave for the south before it approaches completion.

A young female taken August 25 at Saint Michaels presents the following characters: Crown striated with dull black shaft-lines and dull ashy-brown edgings. Back of neck marked in the same pattern, with the dark centers very pale and rendered obscure by the broad ashy-brown borders. Entire dorsum, scapulars, tertials, and wing-coverts with dark brownish centers, approaching black, except on the wing-coverts. Each feather is edged with pale grayish or dull fawn brown, this edging encroaching on the dark centers of the tertials and some of the adjoining feathers in a serrated pattern. Elsewhere the edgings are uniform. Secondaries and secondary-coverts ashy, the latter edged with pale fulvous, the former with white. Primaries as in adult. Breast and neck dark smoky fawn color, very light on the chin and sides of the head, the latter slightly maculated. Entire abdomen and sides light reddish fawn color. Rump and tail as in adult. Length of wing, 8; tail, 3; tarsus, 2.6; culmen, 2.31 inches.

In winter plumage the crown, back of neck, dorsal region, with scapulars and wing-coverts, are marked by narrow dark-brown central shaft-lines which shade rapidly into the adjoining grayish brown, followed by the gray of the border. There is no trace of the irregular serrated pattern of edging seen in the ordinary breeding bird of either sex. The rump and tail are much as in breeding birds, but, like the wings, are lighter colored in winter. The throat and neck below are dull grayish or brownish ashy; the breast and abdomen are white, faintly marked on the sides by a few obscure bars. Young birds are shaded below with pale fawn-color in winter. The set of measurements appended give the range in dimensions exhibited by Alaskan specimens of this bird:

Date.	Locality.	Sex.	Wing.	Tail.	Tarsus.	Culmen
June 3	Unalaska Island.	♂	8.52	3.10	2.20	3.20
June 3	do	♂	8.64	3.45	2.20	3.28
July 11	Saint Michaels.	♂	8.75	2.95	2.21	3.40
June 16	do	♂	8.60	3.20	2.56	3.25
July 11	do	♂	9.00	3.35	2.20	3.33
July 11	do	♂	9.45	3.50	2.20	4.46
May 16	do	♂	9.00	3.15	2.29	3.70
May 16	do	♂	9.40	3.40	2.29	4.40
June 16	do	♂	9.20	3.20	2.42	4.42
June 16	do	♀	8.85	3.15	2.28	3.63

From these measurements of specimens taken at random from my collection it will be seen that the females average larger than the males in every way, but especially in length of bill.

LIMOSA HÆMASTICA (Linn). Hudsonian Godwit.

A single specimen, a female in a stage midway between the summer and winter plumage, taken at Nulato in June, is in my collection, and Dall obtained two specimens from the Yukon mouth in spring. The above comprise all the records of this bird in the vicinity of Bering Sea. At Fort Yukon it occurs more commonly as a migrant, but thus far it is not known to breed within the Territory, although it undoubtedly does. A single specimen is recorded by Hartlaub as seen at Chilcat.

This bird has a remarkably wide range, extending from the Arctic regions on the north, through the entire length of two continents, to the Falkland Islands and Straits of Magellan. In Birds of the Northwest, we learn that a set of its eggs is in the National Museum collection; they are four in number, and were found by Macfarlane, June 9, on the Anderson River. They measure 2.15 to 2.20 in length and 1.40 in breadth. "The ground is a very heavily shaded olive-drab, much darker (almost as in a Loon's or Jaeger's egg) in two of the specimens than in the other. In these darker specimens the markings are almost lost in the general heavy color, merely appearing a little darker; they are chiefly evident at the greater end. In the other the markings, of the same general character, are, however, much more conspicuous, owing to the lighter ground."

It has been taken, on May 4, at Kenai, and a young bird, in its first plumage, is in the National Museum collection from that locality. The young in first plumage is very different from the adult. The feathers on the crown have dark-brown centers with narrow, pale, ashy-white borders. The back of neck is a rather sooty-brown with fulvous and dull ashy edgings. On the back the bases of feathers are dull ashy, with a subterminal border of blackish bordered at tip, or outer edge of the feathers, by dull buffy or fulvous. Rump dark ashy. Upper tail-coverts white. Tail as in adult, except duller and with the markings less defined. The under coverts are white with an ashy-brown wash, but no sign of barring. Sides of head pale fulvous, mottled with dull ashy. A band of dull fulvous ashy extends across the breast, and the rest of the under surface is dull fulvous.

TOTANUS MELANOLEUCUS (Gmel.). Greater Yellow-legs.

Bischoff secured several specimens of this bird at Sitka, and these are the only ones known to have been taken within the limits of Alaska. It must nest wherever found in the Territory, and is very likely to occur upon the headwaters of the Yukon and its tributaries. Well identified eggs of this bird still remain a great desideratum, although a set has recently been obtained by the National Museum from one of its correspondents.

TOTANUS FLAVIPES (Gmel.). Yellow-legs.

During the explorations of the Western Union Telegraph Expedition specimens of the small Yellow-legs were taken at Sitka and Kadiak Island, on the southeastern shore of the Territory, and at Fort Yukon Mr. Lockhart secured its eggs. Hartlaub records it in small flocks on Chilcat River. Dall found it at Nulato and the Yukon mouth, and the middle of August, 1878, I shot a bird of the year, at Saint Michaels, as it was feeding on the border of a brackish pool. The natives were familiar with the bird, but told me it occurred only rarely.

In the Upper Yukon region, however, it is more or less common, and among the skins brought me by the fur traders is a female, taken on May 3, at Fort Reliance, and another secured on the 7th of the same month. On the Lower Yukon it is not common, and is very rare along the shore of Bering Sea.

Spring birds from the Upper Yukon have many black feathers with irregular whitish borders scattered over the back, mixed with the ordinary winter dress. The young bird from Saint Michaels has the same pattern of coloration as the adult, but the colors are dull. There is no record of this species from the Asiatic shore nor from the Arctic coast of Alaska.

TOTANUS SOLITARIUS (Wils.). Solitary Sandpiper.

A few skins of this Tattler were brought me from Anvik and Nulato, both on the Lower Yukon. At the latter place Dall records it as a scarce species, arriving about May 5. There is no instance known of its occurrence in Southeastern Alaska, but its capture on the Lower Yukon involves its presence along the upper part of the same stream. Notwithstanding the general distribution of this bird, and its occurrence during the breeding season through the Northern States, its eggs still remain among the special prizes to be drawn by some fortunate collector.

In the Bulletin of the Nuttall Ornithological Club, October, 1878, Dr. Brewer describes the first and only known set of its eggs which bear the marks of authenticity. As a commentary upon the character of the eggs which have been produced so frequently as those of the bird in question, I quote the doctor's remark, that "during the last year eggs were sent to me for verification from five different parties, and all were deemed not worthy of credence." The doctor learned of the capture of a bird from the nest near Castleton, Vt., and secured the loan of both parent and egg, and I quote the gist of his remarks below:

The bird and egg were taken about the middle of May, 1878, on the ground, in a pasture bordering a swamp. The bird fluttered from her nest when approached and ran a short distance, then stood still until shot by the finder, Mr. J. Richardson. The single egg was placed in a small depression in the ground, without any attempt at a nest. The egg had the appearance as if prematurely taken from the parent, and was smaller than the doctor anticipated, measuring only 1.37 by .95, whereas the egg of the European *Totanus ochropus*, a closely-allied bird, corresponding in size and shape, measures 1.50 by 1.10. The ground color is light drab, similar to that of the egg of *Egialitis melodus*. Over this are scattered small rounded markings of brown, some of these quite dark and nowhere confluent, and never large enough to be called blotches. At the larger end there are a few purplish or lilac shell-marks. The shape is as usual in snipe-eggs.

HETERACTITIS INCANUS (Gmel.). Wandering Tattler (Esk. *Tsle-kube-i-uk*).

Well termed the "wandering" is this plainly colored and graceful bird.

Over the entire coast of the Pacific north of the equator its presence has been noted by the various naturalists whose Bohemian tastes have made their lives somewhat akin to that of this gentle wanderer. Across the broad ocean it ranges to those bits of paradise dotting the South Seas, tripping its way daintily on the beaches of the coral-enclosed islands, their feet laved by the warm waters of the tropics, and their eyes familiar with the luxuriant face of nature in its gentlest and most lovely state. The next season may find them thousands of miles to the north, under the shadow of the stupendous cliffs and grand but desolate and repellent scenes of the Aleutian Islands. It reaches the north in May, and a specimen in the National Museum collection was taken by Dall on May 27 at Nulato, on the Yukon.

Bean took a specimen at Unalaska on October 16, and on the Near Islands Turner records it as a rare summer visitor. Stejneger thinks it breeds on the Commander Islands.

May 15, 1877, while the writer was walking along the rugged beach on Sanak, one of the eastern Aleutian Islands, one of these Tattlers was started from its feeding ground on the wave-washed rocks, where, amid the seaweed, it found an abundance of small crustaceans and mollusks. As I approached it started off, uttering a loud, clear, flute-like *tū-tū-tū-tū*. This is a common note they utter when startled, although they change it at times to a sharper sound.

The last of May, 1879, a specimen was obtained at Anvik, on the Lower Yukon, which, combined with the Nulato record, would appear to indicate that these birds may breed in the interior, as, in fact, I was told they do by the Eskimo at Saint Michaels. They usually reappear on the sea-coast about Saint Michaels the last of July or very early in August, and remain until from the 1st to 10th of September. At this season their iris is hazel and bill dark horn bluish; the feet and legs dull greenish yellow.

During their presence on the coast of Norton Sound they show a decided preference for the most rugged and rock-bound parts of the shore, rarely or never occurring elsewhere. They are unsuspecting and gentle, moving gracefully from rock to rock and running to the edge of the water searching for their food. They are usually solitary, but three or four may be started sometimes from a small islet on which is a good feeding ground. A gunshot echoing among the huge boulders and cliffs about their haunts starts up those near at hand with mellow cries of alarm, but they either fly a short distance and renew their pursuits, or alight on some jutting point or top of a rock, and stand motionless, like gracefully-poised statuettes, until perhaps the gun again wakes the echoes and breaks the spell. It is a frequent and regular summer bird on the rocky parts of the coast to the vicinity of Bering Straits, and occurs on the islands and Siberian shore of Bering Sea.

From the records obtained it must breed nearly if not quite to the Arctic Circle. Bischoff took two specimens at Sitka, and Elliott notes its presence on the Seal Islands for a short time the 1st of June, and again toward the end of July. The fall specimens secured by me are almost uniform plumbeous ashy above, the feathers faintly edged with grayish white. The chin is white, and the neck and pectoral band, including the sides of the breast, are the same color as the back, washed and maculated with grayish white. This same marking extends back along the sides. The adult spring bird has the cheeks, chin, neck, and rest of lower surface, except middle of abdomen, barred distinctly with dark ashy brown and white.

BARTRAMIA LONGICAUDA (Bechst.). Bartramian Sandpiper.

The specimens of this well known species, obtained at Fort Yukon by Mr. Lockhart, are the only known instances of its occurrence within this Territory. Richardson noted it north only to the valley of the Saskatchewan, so the Fort Yukon record adds many degrees of latitude to its known habitat, and extends its breeding range within the Arctic Circle.

In *Birds of the Northwest*, Dr. Coues writes that it is not found west of the Rocky Mountains, overlooking the British Columbian (Colville Bay) reference quoted in the synonymy at the head of his article.

TRYNGITES SUBRUFICOLLIS (Vieill.). Buff breasted Sandpiper.

The last day of May, 1880, a pair of these widely-ranging birds was found on a dry knoll a hundred yards or so from the buildings at Saint Michaels. It was on one of those rare but beautiful spring days which occur at times even in the far north. The snow was gone, except a few drifts flecking the distant hill-sides with white, and the open tundra stretched on in dun-brown shades, upon which the sun poured down his life-giving rays, already turning to green the borders of pools and damp spots. About the dwellings house-flies left their shelter and buzzed about or clung drowsily to the warm logs. A few drowning humble-bees and wasps flew clumsily from place to place, and the air was filled with the happy chuckling notes of the barn-swallows rejoicing in the welcome sunlight.

A strong quivering motion of the atmosphere blurred and rendered unrecognizable distant objects on land, as well as on the still ice-bound sea, now a sheet of dazzling white, reflecting the sun's rays from myriads of constantly altering facets. From the distant hill-side came the long-drawn plaintive whistle of the Curlews, and nearer at hand the sweet musical cry of the Golden Plover. Circling over the ice-locked bay were Glaucous and Kittiwake Gulls, adding their hoarse cries to the strange sounds of the distant chorus of wild fowl flocking about the borders of ponds and lakes on the not distant flats. The house became unendurable, and, gun in hand, I had scarcely left the building behind when a pair of Buff-breasted Sandpipers, the first I had seen in this vicinity, were before me, feeding busily on a large dry knoll. After watching their graceful motions for some time, I shot one and the other flew off out of sight, but an hour later it returned and was secured, and on examination it proved to be the female.

It is an abundant summer resident at Point Barrow, where they arrive the 1st of June and leave early in August. Mr. Murdoch found them nesting there on the drier parts of the tundra, where they lay four eggs in a little moss-lined depression on the ground. In one instance five eggs were found. During the breeding season the males have some curious habits. Murdoch frequently saw solitary birds walking about, at this season, with one wing fully extended and held high in the air. At times two birds would meet and "spar" for a few minutes and then rise together for 30 feet or so like towering birds and drift off to the leeward. Sometimes one would stretch himself up to his full height and, spreading his wings forward, puff out his throat and make a sort of clucking noise, to the apparent admiration of his companions. As a rule they were notably quiet even at the mating season.

The 30th of May, 1879, a party of three was seen by the writer on one of the islands in the Yukon delta, and Dall records two specimens from the Yukon below Nulato and one from Sitka. To the east, in Northern British America, especially in the Anderson River region, it is present and breeds in large numbers. The 1st of August, 1881, I found them rather common on the north coast of Siberia west of Koliuchin Bay, and they were evidently on their breeding ground there. The eggs are fully described in Coes's Birds of the Northwest.

From the meager opportunities I have had to observe this interesting bird, I judge it to be one of the gentlest and least suspicious of its kind, as it is one of the most elegant in form and markings.

ACTITIS MACULARIA (Linn.). Spotted Sandpiper.

A few specimens were taken at Nulato, from the 10th to the 30th of May, by Dall, but the record by the same naturalist that these Sandpipers are "not scarce at Saint Michaels in the fall," is certainly erroneous, since during four successive autumns I paid special attention to securing all the species of waders occurring there, but did not find a single example of this bird. It was taken by Bischoff at Sitka, and this ends our very insufficient knowledge of its distribution in the Territory.

NUMENIUS HUDSONICUS (Lath.). Hudsonian Curlew (Esk. *Mûg-û-nô-ôkh-tai ù-li*).

From May 18 to 25 these birds begin to make their appearance on the coast of Norton Sound, where, however, only a very few pairs remain to nest, the others passing on still farther north to the extended open country bordering the shores of the Arctic. At the Yukon delta, on May 31, 1879, a pair was found mated and evidently about to nest, from the manner in which they greeted my invasion of their haunt.

The last days of May, and sometimes the first of June, they are rather common in flocks and small parties on the dry hill-sides about Saint Michaels, but they are never abundant and are always rather shy. Their long, mellow whistle is a familiar sound at this time, and is a pleasant note amid the many harsh though joyous cries from the lusty throats of the various water-fowl.

They are soon gone, except a stray pair here and there; but early in August, as the blueberries and "erow-berries" begin to ripen, flocks of this and the following species come down, young and old, from their summer homes, and remain during most of August, until they are fat and heavy through much feeding. Early in September they are on their way still further south, and are seen



BRISTLE-THIGHED CURLEW.
Numenius labitans

no more until the following season. It migrates, to some extent, by way of Sitka, where Bischoff took a specimen. It occurs throughout the Alaskan mainland, but is unknown on the islands of Bering Sea. Dall found it common about the Yukon mouth in spring, and records its favorite attitude to be perching, with one leg drawn up, on a high stump, piece of drift-wood, or even an alder bush.

The adult spring birds have the feathers on the back with dark centers and regular and rather obscure edgings of buffy brown. Autumnal birds, especially the young, have the edgings of the dorsal-feathers broken into distinct spots of buffy, which encroach on the dark centers, and produce a much brighter and more variegated pattern than is seen on the adult. The bills of the birds of the year are also much slenderer and shorter than in the adult. Below, adult and young are much alike.

Along the Arctic coast of British America these Curlews are abundant, and in winter they extend their range far into South America.

NUMENIUS BOREALIS (Forst.). Eskimo Curlew (Esk. *Pi-pi-pi-äk*).

This is the most abundant Curlew in Northern Alaska, especially along the coasts of Bering Sea and Kotzebue Sound. It has been found by various collectors at Fort Yukon, and I received a few specimens from Nulato. Murdoch reports it an irregular summer visitant at Point Barrow, where it arrives by May 20.

On May 12, 1878, at Saint Michaels, a number were seen passing to the north, and from this date on through the month they occur, frequently in considerable numbers, in the vicinity of that place.

They are always more numerous than *hudsonicus*, and sometimes flocks of one hundred and fifty or more are seen, though generally they occur in smaller parties of twenty-five or less.

Their haunts, habits, and food are almost precisely like those of their larger relative. But very few remain to breed so far south as Saint Michaels, but by the last of May nearly all have, like *hudsonicus*, passed north to breed within the Arctic Circle. With the preceding species they return at the end of July or first of August to feed and grow fat on the blue-berries and the fruit of the heath (*Empetrum nigrum*), which begin to ripen on the hill-sides. They are less suspicious than their larger companions, and generally may be approached without difficulty.

In common with many of the snipe kind this bird appears to feel more confident under the leadership of a larger species, and a dozen or so will follow the wanderings of a single *hudsonicus* all about the country, just as small flocks of Sandpipers will frequently join their fortunes with those of a solitary bird of this species, and so it runs down the scale. This peculiarity among birds may result from an appreciation of the greater watchfulness which characterizes the species of larger size, and the safety thus secured. Both this and the preceding eat berries continually in fall and often have the entire lower surface of the body stained a purplish shade.

This bird remains later in autumn than the Hudsonian Curlew, and is sometimes found on the grass and moss-covered uplands until about the middle of September.

NUMENIUS TAHITIENSIS (Gmel.). Bristle-thighed Curlew (Esk. *Mäg-ü-nö-ök-k-tai-ä-li*).

On May 24, 1880, while I was shooting Black Brant, a pair of these birds settled near by on a rising stretch of land covered with large tussocks. They uttered a loud whistling call-note very much like that of *hudsonicus*, but something in their general appearance led me to stalk and secure one of the birds. To my gratification it was a Bristle-thighed Curlew, and I made great efforts to secure the mate, which had stopped a hundred yards or so beyond. As she raised on my approach I fired at long range and the bird fell mortally hurt on a distant hill-side, where it was lost amid a host of large tussocks.

The specimen secured was a male in fine plumage, and this is the second known instance of the bird's occurrence on our shores, the former record resting on the capture of a specimen at Kadiak Island by Bischoff, as announced by Mr. Ridgway in the American Naturalist for July,

1874, under the name of *Numenius femoralis* Peale. Nothing is known of its habits in America, but the presence of the pair at the date mentioned in the vicinity of Saint Michaels would indicate that it nests, at least occasionally, in Alaska.

Their close resemblance in size and habits to *N. hudsonicus* renders it difficult to say just how rare they are, for they might be mistaken very frequently for the ordinary species and passed by, so it behoves naturalists visiting this region in the future to keep a sharp lookout for them. It is numerous on the Puumotu group, in the South Pacific.

Dr. Streets found them very abundant on Palmyra Island, but only a few were seen on the other islands of the Fanning group, which are located in the Pacific, just north of the equator.

Although this species has been known to naturalists for a considerable number of years, yet, beyond the bare mention of its presence in a few localities, I have been unable to learn anything concerning its habits.

My specimen, a male, measures 19 inches in length by 34.5 in extent of wing, when fresh, and the basal half of the lower mandible was dark, dull flesh-color and horn-black on the rest; feet and tarsus dull livid blue; iris hazel. Its crop was full of the last year's berries of *Empetrum nigrum*, upon which it was feeding when shot. Length of wing, 10.18 inches; tarsus, 2.30; culmen, 3.67 inches.

Coloration.—The crown is dark brown, divided longitudinally through the median line by a narrow line of feathers with narrow brown shaft-lines and broad borders of pale buff; commencing at base of upper mandible, on each side, is a pale buff-shaded, white superciliary line, reaching to the nape, the feathers being finely marked with numerous small dark centers; a dark-brown loreal line reaches to front of orbit, and continues from posterior side of orbit to nape as an indistinct line; below this the feathers of the sides of the head and neck are marked each with a drab shaft-streak and bordered along the sides with pale buff; these shaft-streaks are very minute on the side close to the base of the lower mandible, and increase rapidly and uniformly in size until at the shoulder they occupy most of the feather; these markings extend around in front on the lower neck, thus inclosing a pale buffy white chin and throat-patch, from which, reaching to the upper part of the breast, the feathers are marked as on the sides of the neck; the back of the neck has the same pattern, but the centers are darker brown and their borders of a deeper buff tint than on the sides; back, scapulars, and tertial feathers each with bright very dark brown centers, bordered with varying shades of buff; in some places the buff edging is a rich, warm tint, fading in other places to a pale whitish shade; between the bases of scapulars the buff edging takes the form of an irregular but well marked border; the rest of feathers on the back have this border broken up into irregularly rounded spots, from two to four in number, along each side of the feather. The rump is of the same dark brown as the back, relieved only by the narrow dark buffy borders, which are less marked than on the back; the upper tail-coverts are dark, dull buff, marked with irregular dark bars and shaft-spots; tail dark buff with a faint brownish shade and crossed by five blackish brown bars, the inner bar poorly defined. Below, along the sides of the breast, the feathers are irregularly bordered with dark, and the rest of the lower parts, lower half of breast, abdomen, flanks, thighs, and under tail coverts are uniform light buff; under wing-coverts and axillaries richly barred and spotted with deep buff on a dark brown ground; the primaries dark brown with white shafts, and a coarse, deep, but faint serration of pale buff along inner edge of inner web; secondaries and inner primaries each with a series of dull buff spots along outer edge of webs and tipped with gray. The distribution of the color on the back gives a dark surface coarsely spotted with buff, and is one of the most characteristic features of the bird, when compared with the duller and more uniform shades of the other American species of Curlew.

CHARADRIUS SQUATAROLA (Linn.). Black-bellied Plover (Esk. *Tu-zhék*.)

This species is found at Sitka during the migrations and is rather common on the entire Yukon. It arrives at Nulato about June 1, according to Dall; but I found it rather common at the Yukon mouth on May 12, and a little later; so it occasionally, at least, reaches Nulato earlier than June

It is a very handsome bird in full spring dress, and with its mottled black and white back and glossy black under surface presents a striking appearance while standing by the border of snow-drifts or on the banks of ice-covered rivers. From Saint Michaels north it appears to occur rarely. It is found also on the Asiatic shore at Plover Bay, but it has not been recorded from any of the islands in Bering Sea, although it undoubtedly occurs upon nearly, if not all, of these at times during the migrations. At Point Barrow it is a rare visitant, according to Murdoch, and on the Commander Islands was noted only as a fall migrant. It returns to Saint Michaels the last of August in straggling parties, and stray individuals linger until the last of September, feeding along bare tide flats and the borders of brackish pools and streams, where various individuals of its kind may be found feeding in amiable companionship. The first frosts send them off to the south, though, arriving early in spring, they are often forced to endure cold storms and harsh weather. This is one of the peculiarities noted in the arrival of birds in the north during spring, that their eagerness to reach their nesting ground after they once start causes them to brave temperatures and cheerless surroundings which are much more severe and inhospitable than any which they endure in fall or while at the south.

The female in her full spring dress is distinguishable from the male by the mixture of white feathers in the black or lower surface. High plumaged males have the head nearly white. The spring dress is changed for that of fall and winter the last of July, at which time the young are on the wing and the birds begin the wandering life common to so many waders after the close of the breeding season.

As in more southern lands, it is not uncommon to see one of these birds, a giant among pigmies, leading a party of small Sandpipers, including two or three species.

Although this fine bird nests sparingly at the Yukon mouth, I did not find it in the neighborhood of Saint Michaels in the breeding season, and so had no opportunity for observing its habits at this time. Richardson states that in the British fur countries its "eggs are oil green, spotted irregularly with different shades of umber brown." The birds are said to be found in similar localities, but are much less common than the Golden Plover.

CHARADRIUS DOMINICUS Müll. American Golden Plover (Esk. *Tū-zhék*).

About the middle of May this beautiful Plover reaches the vicinity of Saint Michaels. The earliest record I have, for the Territory, is May 13, specimens in my possession having been secured at Fort Reliance on the Upper Yukon at this date. As the breeding season approaches, it is found as one of the commonest breeding waders over the grass and moss grown country extending along the shore of Bering Sea. In some cases they have deposited their eggs by the 1st of June.

It is a widely-spread species over the eastern coast of Bering Sea and the Arctic, but is not very numerous on the islands of this sea. It is an abundant summer resident at Point Barrow, according to Murdoch. They arrive the last of May and leave the last of August. Dall secured specimens, June 22, on the Shumagin Islands, and this is the only instance in which the bird has been taken on the Aleutian chain. Elliott obtained specimens of the Asiatic coast species on the Fur Seal Islands, as will be mentioned later. It arrives along the shore of Norton Sound, the last of May, in small flocks rarely exceeding thirty or forty birds. They are in full breeding dress, and are a beautiful sight as they glide about on easy wing, or feed over the marshy flats. Their soft, clear call-note gives evidence of the rich song to be heard later. They soon pair and disperse, so that within a few days after the main arrival their nests may be looked for. Their nests are generally in small depressions which may be found among the moss and dried grass of a small knoll, and at times a slight structure is made of dried grass. The grass, and, perhaps, a few dead leaves of the dwarf willow are arranged in a circular, saucer-shaped form, about 4 or 5 inches across, and contain four eggs, which have a pale yellowish ground-color with very dark, well-defined umber-brown spots scattered rather profusely over the shell, especially about the larger end. One set of eggs measures 1.98 by 1.35; 2.09 by 1.30; 2 by 1.30; 2.08 by 1.33. This set of eggs was obtained at Stuart Island in June. Three odd specimens measure respectively 1.90 by 1.25; 1.92

by 1.38, and 1.86 by 1.29. A second set, obtained in June, 1880, near Saint Michaels, measures 2 by 1.31; 2.09 by 1.30; 2.09 by 1.26, and 2.02 by 1.29. The ground-color is very uniform, the only variation being to a slight buffy shade, in some instances, and a slight increase, or decrease, in the abundance of the dark markings.

A curious fact in connection with this bird is the arrested state of plumage which occurs either in spring or fall, and is well shown by several specimens taken in the vicinity of Saint Michaels, which would indicate that it is of rather frequent occurrence. Two autumnal specimens—one obtained at Saint Michaels October 12, and the other on the Upper Yukon—show this in a striking manner. The black feathers of the lower surface, the dark feathers of the crown and back, as well as the white frontal and supraorbital band of the nuptial dress, remain mixed with about an equal amount of the ordinary fall plumage. Other specimens obtained in spring show the same mixture from the retention of the winter plumage. There is no difference in the habits of these birds, so far as I have been able to observe.

The males are conspicuous objects, as they stand like silhouettes, their black and white breasts and sides of neck presenting a sharp clear-cut outline on the brown and gray background. At intervals their clear, mellow, and melancholy note rises for a moment, and then the bird apparently sinks into a day-dream and remains motionless for some time, until he is prompted to assure his partner of his presence by another call. The male at this season has a brighter plumage than the female, and in places little frequented by man he becomes very unsuspecting; near villages, however, he is always on the lookout, and is difficult to approach even when he is found by his nest. Toward the end of May and during the first of June the males utter a clear, rich song, which is frequently heard during the twilight of the short Arctic nights.

Where I was camping, at the Yukon mouth, the last of May and first of June, 1879, these birds were scattered all about in the vicinity of the tent, and frequently, during the middle of the night, the song was heard close by, and was extremely sweet and musical. One night, in particular, I remember lying awake, listening to the usual continuous faint clicking among the disintegrating ice in the river, which seemed to make the silence still more marked; suddenly, just back of the tent, arose the clear plaintive note of the Golden Plover, which may be represented by the syllables *too-lē-e*. Soon after, in the same sweet musical tone, was uttered a marvelously harmonious succession of notes, which I wrote down at the time, listening to the song as it was repeated again and again, and ascertaining the exact number of syllables. These I find are very imperfectly represented as follows: *Tē-lē-lē, tā lē lē wēt, wēt, wēt, wēt-ū wēt, eh lē ū too lē-e*. The three last syllables are the ones most commonly uttered, serving as a call-note, but the song in full is only repeated on special occasions, as before remarked, being oftener heard during the still hours of the night than during the day, if, indeed, it can be called night when the sun disappears below the horizon for little over an hour.

The courtship of this handsome bird is carried on very quietly, and I have witnessed no demonstration of anger or quarreling among the rivals. When two are satisfactorily mated they quickly go about their nesting, after which each pair limits its range to the immediate vicinity of its treasures.

During the cruise of the *Corwin* to the north, in the summer of 1881, this Plover was observed at various points, mainly along the Kotzebue Sound coast of Alaska and upon Saint Lawrence Island, where it breeds. It also occurs on Saint Matthew's Island at this season, but is not known to breed on the Seal Islands, or south of them, except near the mainland, although it undoubtedly occurs also upon the Aleutian Islands at this season. In Dall's paper on the birds of the Territory he records its arrival on the Yukon during the latter part of May, and adds, that its eggs are generally two in number; but this latter statement must be an error, since the considerable number of nests which I have seen all had complements of four. The young are hatched and on the wing during July, and by the last of September many have already left for the south, but stray individuals are found well into October, the 12th of this month being the last date which I noted.

In the spring the male has the crown and back of a brownish black with a greenish-gray gloss; the neck and breast are a sooty black; the loreal white spot is present, the feathers of the frontal

region and middle of crown are edged more or less strongly with white, and the post-oculars, with an area extending down the neck and across the breast, are marked with white in the same manner. Bill and feet dull greenish-black. The spring female has the white markings about the head and breast much obscured, and is also distinguished by the brownish shade on the dorsal surface. The young of the year lack the white marking on the head; the throat is pale brown, and the head, neck, and breast are dull brown, becoming gradually darker posteriorly, where the color on the back is darker brown with a greenish shade as in the adult, and the feathers of the back, breast, and scapulars are edged with grayish and pale brown. I was unfortunate in not being able to secure the downy young of this species.

CHARADRIUS DOMINICUS FULVUS (Gmel.). Pacific Golden Plover (Esk. *Tū-shēk*).

The relationship of the Golden Plovers found on the islands and coast of Bering Sea is rather unsettled, owing to the presence of this bird, which reaches the coast during the summer and breeds, mingling, at this season, with the well known bird of North America. A careful comparison of a series of about forty Golden Plovers from the northwest coast of Alaska with specimens from the interior of America and the Asiatic coast does not reveal any constant difference in color-markings sufficient to invariably distinguish the birds of the different regions. There appears to be a difference in size sufficient generally to distinguish resident Asiatic birds from those of interior North America. On the Siberian coast of Bering Sea the typical Asiatic form is found common, and is of much rarer occurrence on the Alaskan coast, from the peninsula of Alaska north to Point Barrow. On this stretch of coast to the island of Saint Lawrence *dominicus* is the predominating form, but specimens are found grading in a regular series from this bird to the *fulvus* of the Asiatic region. The considerable number of specimens examined show that only the ordinary *dominicus* occurs in the interior of Alaska. The breeding range of this latter form extends thus over the entire interior of Alaska and meets that of *fulvus* along the west coast of the Territory in the vicinity of Bering Straits, with its southern limit on the Shumagin Islands and the adjoining coast of the North Pacific. *Fulvus* breeds around the northern shore of Bering Sea on both continents, and upon their Arctic coasts as well. It is a rare fall visitor to the Near Islands. It occurs on the islands of Bering Sea from the Fur Seal group north to Saint Lawrence. It also occurs on the Commander Islands during the migrations. At Wrangel Island, in the Arctic, a single Golden Plover was seen by me, which was undoubtedly this form. Elliott secured the original American specimen of this race on Saint Paul's Island of the Fur Seal group, May 2, 1873, and was informed by the natives that it was a frequent visitor, occurring there the last of April and first of May in spring, and returning in September, when it feeds upon the larvæ found upon the killing grounds of the seals, passing south toward the last of October.

No specimens of *fulvus* have been taken along the Pacific coast south of Alaska, hence it is probable that very few, if any, of this race follow this course in their southern migrations, whereas *dominicus* is known to migrate throughout the breadth of the continent. *Fulvus* breeds along the northern border of Asia, and migrates south, in winter, to the eastern countries in India, and in the southeast islands reaches New Zealand. Mr. Swinhoe describes its nest as a loose structure of dried grass and fibers lining a hollow, containing four eggs. These are greenish gray, blotched and spotted with deep blackish sepia, and have occasionally obsolete purplish gray spots. They measure about 1.50 by 1.10, thus showing a marked discrepancy in size between the eggs of this bird and *dominicus*.

The most striking distinction between the two forms of this Plover is shown by the young birds in autumn. At this season the young of *fulvus* has the entire crown and back marked with golden yellow in the shape of strong edgings to the feathers. This rich color frequently occupies half or more of the entire dorsal surface, and, joined with the yellow suffusion of the sides of head and neck, which latter extends over the breast in a fainter degree, renders the bird strikingly different from the pale, dull-colored young of the ordinary *dominicus* from the interior, and even from those found along the Bering Sea coast of Alaska. My large series from this region shows every gradation in other respects from one form to the other, but none of the interior birds ap-

proach the coast form in intensity of coloration. The series of measurements appended will show the relative proportions of these birds from different regions, and at the same time show the differences in the dimensions between *fulvus* and its American representative:

C. FULVUS FROM EXTRALIMITAL LOCALITIES.

Date.	Locality.	Sex.	Wing.	Tail.	Tarsus.	Culmen.
Winter, 1862.....	Amoy, China.....	(?)	6.42	2.60	1.79	.98
April 21, 1881.....	Shanghai, China.....	♂	6.50	2.50	1.79	1.00
Winter.....	Loo Choo I.....	Juv.	6.30	2.40	1.73	.92
Do.....	Honolulu I.....	Juv.	6.40	2.50	1.82	(1).88
Do.....	New South Wales.....	♂	6.36	2.42	1.70	.84

ALASKAN COAST SPECIMENS.

May 1.....	Seal Islands.....	(?)	6.40	2.50	1.70	
May 30, 1881.....	Saint Michaels.....	(?)	6.25	2.48	1.69	.95
September 5, 1877.....	do.....	♂ Juv.	6.55	2.40	1.69	.93
September 16, 1877.....	do.....	♂ Juv.	6.70	2.51	1.70	.92
Spring.....	Sitka.....	♂	6.90	2.65	1.70	.91
June 3.....	Saint Michaels.....	♂	6.92	2.70	1.80	.89
May 27, 1881.....	do.....	♂	7.30	2.89	1.69	.90
June 5.....	do.....	♂	7.10	2.72	1.65	.89
May 18.....	Kotlik (Yukon).....	♂	7.10	3.15	1.68	.88
May 23.....	do.....	♂	7.10	3.23	1.64	.85

C. DOMINICUS.

May 26, 1860.....	Fort Simpson, H. B. T.....	♂	7.12	2.75	1.70	.95
Spring.....	Great Slave Lake.....	♂?	7.00	2.85	1.64	.92
June.....	Barren grounds.....	♂	7.45	2.89	1.76	.90
May 13.....	Fort Reliance, Alaska.....	♂	7.30	3.08	1.80	.98
May 14.....	do.....	♂	7.25	2.72	1.65	.90
September 24.....	Carlisle, Pa.....	♂	7.15	2.65	1.70	1.60
June 6.....	Hudson's Bay.....	♂	6.80	2.63	1.69	.85
November 12.....	Fort Walla Walla.....	♂ Juv.	7.00	2.70	1.78	.89
September 27.....	Souris River.....	♂ Juv.	7.62	2.83	1.58	.81
September 8.....	Hudson's Bay.....	♂	7.15	2.70	1.70	.92

Dr. Streets, in his contribution to the natural history of the Hawaiian Islands, published in Bulletin No. 7 of the National Museum, records this bird as being very abundant on the island of Oahu, where he was informed by the inhabitants that they make their appearance about the first of September, arriving very poor and weak, having evidently been a long time without food. During the winter they become very fat, and in March and April they prepare for their departure. At this time they can be seen taking long or short flights out at sea and returning again to the island. This exercise, the doctor thinks, was undoubtedly for the purpose of strengthening themselves for the final effort, their muscles having become flabby and feeble during the inactivity of winter.

While the Corwin was midway between the Aleutian Islands and San Francisco, in October, 1881, a small party of birds, undoubtedly of this species, was seen passing high overhead, coming from the direction of the Aleutian Islands and passing directly toward the Hawaiian group. This is certainly a remarkable flight for birds of this character to undertake, and its accomplishment indicates great powers of flight, as well as great endurance.

ÆGIALITIS SEMIPALMATA Bonap. Semipalmated Plover.

According to Dall this bird is very common at Nulato and the Yukon month, but his statement of its abundance at Saint Michaels I did not verify, as I found it to be of infrequent occurrence along the Norton Sound coast. It is probably much more numerous in the interior, and I received specimens from various places on the Yukon. It was found rather common at Sitka by Bischoff. On the Asiatic coast at Plover Bay, and again on the north coast near Koliuchin Bay, I found them rather common about the sandy or gravelly borders of pools near the sea. It also occurs on the shore of Kotzebne Sound and northward. Mr. Dall states the number of eggs to be generally two. I have never had an opportunity to learn anything about their breeding habits. It appears to be most abundant along the Atlantic, where it is found in great numbers, but on the west coast its numbers are much less, especially in the north.

Young birds in their first plumage are seen the first half of July. They have a white frontal bar and the pectoral collar is brown like the crown and back. The feathers of crown and back are narrowly edged with pale buff, and a narrow collar of blackish borders the front of the brown of back, separating it from the white ring about the neck. The bill is entirely black and the feet dingy fleshy yellow.

The downy young are pretty little objects, with the crown and entire back ashy-brown, with a faint buffy shade in places, and the entire surface irregularly maculated with black. The colors of the crown and back are separated by a white collar, which joins the uniform white of the lower surface on the sides of the neck.

ÆGIALITIS MONGOLA. (Pall.) Mongolian Plover.

This handsome addition to the Plovers of North America was made by the captain of the ship Plover, during his visit to Kotzebue Sound, in the summer of 1849, when he secured two specimens upon Choris Peninsula. It is a common summer resident on the Commander Islands, where it arrives during the first half of May and leaves the last of September. Their eggs were taken there by Stejneger the first of June and the young about the middle of July. A nest found on June 4 contained three eggs. It was in a hollow between the stems of four *Angelica archangelica* and lined with dry fragments of leaves and stems of the same plant. The eggs are described by Stejneger as being larger and of a deeper ground color than eggs of *Æ. semipalmata*, and the spots average rather smaller than on eggs of the latter.

The Choris Peninsula specimens alluded to above were presented some years since to the Oxford Museum, among other birds, by Sir John Barrow, and the only published account of them which I have been able to find is that by Mr. Harting in the Proceedings of the Zoological Society of London for 1871 (p. 110). As the bird is now first recognized as a member of the American fauna, I append a description of it taken from a beautiful male recently received by the National Museum from Yokohama, Japan. This bird, an adult male (No. 8579, National Museum collection), taken April 28, 1881, is marked as follows: Crown, ashy-brown on the posterior half, and much mingled with dull buff; forehead black, the black reaching back of and bordering the orbit in front. A concealed, badly-defined line of white is found upon the edge of the black frontal band just above the lores, and extends around the frontal region as an indistinct light line, which thus divides the frontal band into an upper and lower portion. This light or white area is very indistinct, being merely a spot just over the base of the culmen, but is distinctly marked on each side in front of the orbit. Commencing at the base of the upper mandible at each side and extending back, including cheek and ear-coverts, is a broad black bar. Chin and throat clear bright white. This area covers the sides of the neck and entire base of lower mandible; entire breast occupied by a broad band of rich buff, approaching chestnut. This area extends irregularly along the sides from the flanks and, reaching over the back of the neck, forms a collar of a duller shade of the same color. In the perfect plumage this color extends up over the entire crown. Entire back and tertials, scapulars, and middle of rump pale olive-brown with a wash of grayish; feathers of the sides of the rump and upper tail-coverts bordered and edged with white; tail ashy-brown, becoming lighter towards the sides, where the outer feather is white; quills dark brown, and the shaft of the outer primary white. The rest of the primary shafts are dark brown with a median white or pale stripe. A white wing-bar is produced by the edgings of the coverts; secondaries and some of the single primaries bordered with white areas of varying extent; abdomen white, much duller than the clear bright white of the chin and throat.

Dimensions: Wing, 5.15; tail, 2; tarsus, 1.18; culmen, .60.

For peculiarities of plumage, discussion of synonymy, range, &c., of this species, the reader is referred to Mr. Harting's paper upon the little-known *Limicola*, in the Ibis for 1870.

APRHIZA VIRGATA (Gmel.) Surf-bird.

During the exploration of the Western Union Telegraph Company in Alaska, four specimens of this widely-spread bird were taken in the vicinity of Sitka by Bisehoff. North of this there is no record except that of the birds secured by myself in the vicinity of Saint Michaels. It is a

widely-spread Pacific species, occurring only as a rare summer or fall visitant on the shore of the North Pacific and Bering Sea, reaching the vicinity of Bering Straits in Norton Sound. One autumn about October 1, I saw a pair feeding upon the bare muddy flats, near Saint Michaels, but with the exception of the record of two or three other specimens obtained at various times in autumn, near the same place, I have but little to add concerning its habits or distribution. The natives, however, claim that it is found breeding on the bare mountains in the interior, some 20 or 30 miles from the coast; but they probably mistook it for some other bird. Its favorite haunts are exactly those of the Wandering Tattler, and each of my specimens was collected while this Tattler was the object of pursuit. The isolated character of the spots chosen by these birds requires a special visit to the outlying islands and capes, in order to obtain information concerning them, and this may account, in a measure, for their supposed scarcity. The present record extends its range north of 63°, and it undoubtedly reaches the immediate vicinity of Bering Straits.

A young male taken at Saint Michaels, August 19, 1879, is in an interesting state of plumage. In fall plumage the birds are very different from the spring adults, and bear a strong superficial resemblance to the corresponding stage of plumage of the Knot (*T. canutus*). The crown has the centers of the feathers uniform blackish brown, edged narrowly with grayish white, thus producing an irregular striation of grayish white and dark. Around the back of neck and entire dorsal region to rump, including the scapulars and tertials, the feathers are uniformly ashy, olive-brown, each feather narrowly edged with grayish white. Wing-coverts dark ashy, but lighter than the back, and with broader white margins of the feathers. The wings and tail as in the adult. Rump, under tail-coverts, and abdomen white. Chin white, lightly maculated with dark. The throat and sides of the head marked with dark ashy brown and white lines, the dark forming the shaft-lines. Each feather of the breast is ashy brown, crossed by two narrow white bands near the extremity, one of which tips the feather. The feathers on the sides of the abdomen are marked with scattered dark shaft-lines. When fresh, the bill is black at the tip and dingy grayish-yellow at the base. Gape yellow. Feet and legs dingy gamboge yellowish. Iris dark-hazel. Length, 9.60; spread of wings, 20; wing, 6.50; tail, 2.35; tarsus, 1.10; culmen, .80.

ARENARIA INTERPRES (Linn.). Turnstone (Esk. *Tūbe-ä-tā-tūk*).

During the summer this bird is found from the mouth of the Yukon north to Point Barrow, where it is noted by Murdoch as scarce. It probably occurs to the south of the Yukon mouth at this season, but we find no records thence. It has been noted on Saint Matthew's Island by Elliott, and during the cruise of the *Corwin*, in the summer of 1881, we found them numerous on Saint Lawrence Island, where they were breeding at the time. It also breeds on Saint Matthew's and the muddy flats of the sea-coast, from the Yukon north, wherever the surroundings are favorable. Dr. Bean took a specimen on Saint Paul Island, August 6, and a second at Plover Bay, Siberia, a little later. Although not recorded from the Aleutian Islands, yet its abundance on the Fur Seal Islands—only a comparatively short distance north of the chain mentioned—renders it very probable that the bird occurs also on the Aleutian chain during its migrations. As confirmatory of this statement, I may add that as we approached the Aleutian Islands, in the spring of 1877, several birds were seen which I identified as of this species. These were seen while we were about ten or twelve hours' steaming from the islands, and while they were on their way north.

According to Elliott, this bird does not nest upon the Seal Islands. He records their arrival there by the third week of July, and they leave for the south about the 10th of September. While 700 miles offshore, west from the Straits of Fuca, heading northwest for the Aleutian Islands, he saw other specimens of this bird.

It feeds upon the larvæ of the insects which are found upon the tens of thousands of seal carcasses strewn about the Seal Islands in fall, and they are only known here in their brilliant fall plumage. Although rather common along the entire Alaskan coast, within the limits mentioned, this bird is far less numerous than the Black-headed Turnstone, which is found within the same Alaskan range as the present species. It breeds on the same parts of the coast as the latter, and mingles with it in small flocks in autumn, when both forsake their breeding grounds and wander along the shore in stray parties, living upon the fat of the land, and preparing for their passage

south. It is found along the barren Arctic coast as far as Point Barrow, and thence east and south through the fur countries it is a common bird, extending its range north to the eightieth parallel and beyond along the coast of Greenland and the adjoining American shore. Upon the Asiatic shore these birds were observed at Plover Bay, and to the northward beyond East Cape on the Arctic coast, and several parties were seen in the vicinity of Wrangel Island, whence they came and circled about the vessel several times. Stejneger found the species scarce on the Commander Islands in the breeding season, but numerous later in the summer.

It arrives in the vicinity of Saint Michaels from the 15th to 20th or 23d of May, according to the season, and is found scattered about the newly opened ponds and mud-flats, where it remains in small numbers to breed. It is usually much noisier than the Black-headed species, and utters several loud, ringing notes when in parties passing from one feeding ground to the other, and especially when disturbed. They remain until the last of August and into September, when they gradually straggle away. They also pass to the south along the Asiatic coast in large numbers, being repeatedly recorded from various Japanese and Chinese localities by the different naturalists who have visited those countries. It is found among the islands of the Southern Pacific to New Zealand, and a male has been taken on that island in the breeding plumage on the 1st of April. Among the natives of certain islands Dr. Finsch (Ibis, 1881) found these birds kept for pets, singly or in pairs, in small cup-shaped cages by the natives, who also used them as fighting cocks, matching strange birds with each other almost exactly in the manner done elsewhere with the common game chicken. This pugnacity is a trait not usually known, and is one of which my field experience with this bird, often in the breeding season, had given me no inkling.

Two females obtained at the Yukon mouth on May 19 and 20 have a white throat-patch and a glossy black breast, the black reaching up on the sides of the neck to bill and to the eye; thence from the lores to the upper mandible inclosing the loreal white spot. From this black area a bar extends to the nape, leaving the white ear-coverts and the supraloral line which extends to the nape and thence across the frontal region. The back is irregularly marked with a mixture of black rusty or reddish brown and dull ashy yellowish brown with white edgings. The pattern of wing coloration is the ordinary one. The top of the head is streaked with black and grayish brown. The legs are dull orange-red. Iris very dark brown. The full-grown young of the year, taken at Saint Michaels the last of July, were in the following state of plumage: The white throat-patch is present as in the adult, and the dark breast and neck area of the adult are outlined in the young by irregularly-defined blackish brown feathers, edged and washed with yellowish and grayish, which extend over the entire side of the head. The lores are pale brown. Crown light-brown in front, darker posteriorly, and with light-brown edges to the feathers of the neck. Back and rump blackish brown, with a grayish olive gloss, and profusely edged with dull yellowish brown or buffy, the latter most marked on the tertials and wing-coverts. Tips of the two middle tail-feathers buff. Iris very dark brown; legs dull fleshy, with an orange shade.

A female from Saint Michaels, taken in June, is remarkably dark, having the crown and entire dorsal surface, except the white spots on the rump, covered with blackish, only marked here and there with reddish and rusty spots. Even the wing-coverts are much darker than usual, and the white markings on the head are limited and obscured in places.

ARENARIA MELANOCEPHALA (Vig.). Black Turnstone (Esk. *Tábé-à-tá-túk*).

This Turnstone is far more plentiful on the coast of Bering Sea than the preceding species, and is one of the most abundant waders from Sitka north along the mainland coast of the Territory. I found it also along the coast of the Arctic from Bering Straits to the vicinity of Point Barrow during the cruise of the Corwin, and it was also observed sparingly on Saint Lawrence Island and along the Asiatic shore on a few occasions. It breeds among the brackish pools on Saint Michaels Island, and is found scattered over the wet flats everywhere. It is one of the commonest birds of this locality, its sharp, clear note breaking the silence wherever one turns his steps among the pools and marshy places. It has a habit of circling around the intruder, during the nesting season, with a fine, clear, peeping cry like the syllables *veet, veet, too-veet*, as it moves restlessly about; now stopping a moment on a slight knoll, then running hastily along the

edge of a neighboring pool, perhaps picking up a scrap of food as it runs, and then it mounts on wing again and comes careering about, evincing the liveliest distress at the invasion of its haunts. When disturbed in the vicinity of its nest it has also a sharp *peet, weel, weel*, very similar to the well-known note of the Spotted Sandpiper. Let the hunter go where he will on the marshy ground and his ear is greeted by the same remonstrance.

They are found along the course of the Lower Yukon during the summer season and breed wherever found. When the young are able to take wing in July they leave the flats, to a great extent, and frequent the sea-coast, where they keep in small straggling parties searching for food along the tide line.

These birds arrive in the vicinity of Saint Michaels or the Yukon mouth about the middle of May; rarely before this date. In autumn they move gradually to the southward, until by the last of August they become rarer, and during the first half of September all have gone with the exception of an occasional straggler found along the sea-shore. Dall found them to arrive in the vicinity of Nulato on May 27, although it undoubtedly occurs earlier in the season than that. Among the considerable number of this species in my series I find only a single individual with a white throat patch.

HEMATOPUS BACHMANI And. Black Oyster-catcher.

This bird is found abundantly at Sitka and Kadiak, and Dall found it a summer resident on the entire Aleutian chain. It arrives in May on the western part of these islands. On one of the Shumagin group (Range Island), June 23, 1872, he found two nests. In both cases the eggs were placed directly upon the gravel on the beach; one contained two eggs, and the other one. They were all partly incubated.

Their iris is rich orange, with the edge of the eyelid scarlet. The birds were extremely wary—as also are their east-coast relatives—and kept entirely out of gunshot. Their note was a peculiar, low whistle when disturbed; they have a habit of standing on the beach, or rocks, a short distance apart, and calling to one another. Like the eastern bird, their motions are stilted and odd.

Its range is not known to extend beyond the Aleutian Islands to the north. From this point south it is found on the coast and neighboring islands to some point in the tropics, where it meets the species *ater*, found on the west coast of South America. In the *Nova Acta Acad. Petropol.* 1800 (p. 350), Sevastianoff gives a first account and comparison of this bird with the European Oyster-catcher, but does not propose a name. Specimens of this bird were obtained in Alaska by Billings's Expedition (1785 *et seq.*). Pallas records it from the Kurile Islands, where he also cites the Old World *ostralega* as being found.

DENDRAGAPUS OBSCURUS FULIGINOSUS Ridgw. Sooty Grouse.

During the explorations of the Western Union Telegraph Company, Bischoff secured seven of these birds from the vicinity of Sitka, and Hartlaub records it from Portage Bay, where its low notes are said to be heard from April 1 to July. There is no doubt but that this bird occurs considerably farther to the north and westward of Sitka along the coast region, and, perhaps, extends across to the headwaters of the Kuskokwim, where the heavily-wooded character of the country furnishes the proper ground for its presence.

DENDRAGAPUS CANADENSIS (Linn.). Canada Grouse.

This handsome Grouse is found throughout the wooded portion of Alaska extending to the shores of Bering Sea at the points where the spruce forests reach the vicinity of tide-water. It is more numerous, however, in the interior, and along the upper portion of the Yukon. It is permanently resident wherever found. Mr. Dall records it as the least common of the Grouse found in the vicinity of Nulato, where he observed it frequenting willow thickets, and feeding exclusively upon the buds of this bush. At Anvik, on the Lower Yukon, it is rather common, and inhabits the mixed forests of spruce and deciduous trees, whence it has the habit of coming out on the

gravely river bank, early in the morning, during pleasant weather in spring and summer, and falls an easy prey to the native hunters, who watch for it in these locations. It is so quiet and retiring in the woods that it is rarely seen. I also found it at the headwaters of the Innoko River in midwinter, where, however, it did not appear to be very common. It has been taken on the island of Kadiak, and its range therefore extends from the islands bordering the coast of the North Atlantic to those in the North Pacific. Specimens were brought me from the headwaters of the Yukon taken in autumn, and Richardson and others have traced it down the Mackenzie to the delta of this river, well within the Arctic Circle. It also extends its range to Southeastern Alaska, where the var. *franklini* might be supposed to usurp its place. Thus Hartlaub records it from Portage Bay and Chleat. The above author notes that specimens from these localities differ in nowise from the bird of the northeast, and hence are true *canadensis*.

My specimens also, from various points in the northern portion of the Territory, compared with the series of birds from the more southern and eastern locations on the continent, show them to be identical. In addition to the above records is one from Fort Kenai, on the southeastern mainland shore of the Territory, where Bischoff secured a specimen in May. On Peale's River, and near the delta of the Mackenzie, Richardson found these birds frequenting the marshy parts of the forest.

BONASA UMBELLUS UMBELLOIDES (Dougl.). Gray Ruffed Grouse (Esk. *Kh-ták*).

Like the Spruce Grouse, and sharing with the latter its range in Northern Alaska, this bird is found everywhere where wooded land occurs, reaching the head of Norton Sound and vicinity of Bering Straits, following the belts of timber as they approach the sea in this portion of the Territory. It is not uncommon in the vicinity of Nulato, where it frequents the deep spruce growths, and feeds exclusively upon the buds of these trees, its flesh being tainted in consequence. Dall found it nesting there in May, and a set of eggs was found in a willow stump. Like the Spruce Grouse, this bird is found wherever spruces occur, and both species range well into the Kaviak Peninsula, so that they are found within a very short distance of Bering Straits. It is about as numerous as the Spruce Grouse, giving place, however, in the southern coast of the Territory, to the closely-allied form mentioned under the next heading.

As I had no opportunity to observe this bird I have nothing to add to the record of its habits. Specimens were brought me by the fur traders from various points along the Yukon and adjoining region, so that evidently it is of common occurrence throughout that portion of the country. All the specimens of *Bonasa* north of Great Slave Lake, excepting the dark coast form found along the Pacific, are referable to the gray northern form. There is considerable individual variation in Ruffed Grouse from any particular locality, and the races grade from one to the other in an unbroken series.

BONASA UMBELLUS SABINI (Dougl.). Oregon Ruffed Grouse.

A few specimens of this bird have been taken about Sitka by Bischoff, and others have been found in British Columbia, so that there is no doubt it occurs along the northwest coast as far as the heavily wooded region in the vicinity of Kadiak and the adjoining mainland. The typical form of this bird appears to be rather strictly limited to the Pacific slope, as Mr. Heenshaw found that birds taken east of the Cascade Mountains in Oregon were referable to *sabini*, although they were not typical of the latter form, and showed an approach to the eastern race, losing that intensity of coloration which is characteristic of the northwest coast birds.

LAGOPUS LAGOPUS (Linn.). Willow Ptarmigan (Esk. *Ā-kāzh-gik*).

Throughout the northern portion of Alaska this bird is a resident in summer, frequenting the extensive open country, and being most abundant along the barren sea-coast region of Bering Sea and the Arctic. It breeds also south of the peninsula on the Shumagin Islands, whence Dr. Bean obtained a female in mid-summer plumage during his visit to those islands in the summer of 1880. Other records of *albus* in the Aleutian chain are referable to var. *nelsoni* or *athensis*, according to locality.

At Point Barrow it is noted by Murdoch as a resident but not abundant species. At this locality specimens were noted so late as July 10 with considerable white still in the plumage, so it is evident that the summer molt in part of the Territory is not a complete change in color, as is the case further south.

According to Hartlaub this bird extends its range far to the southeastern extremity of the Territory, and was found in flocks at Chiletat February 9. In May they leave the coast and go higher up into the dwarf forests among the willows and small birches. A nest of seven eggs was found on the Damaáka June 28.

In the northern portion of their range these Grouse are summer residents; but in autumn, the last of August and during September, they unite in great flocks and migrate south to the sheltered banks of the Kuskokwim and Yukon Rivers and their numerous tributaries. In early spring, as the warmth of the returning sun begins to be felt, they troop back to their breeding grounds once more. During a large portion of the year these birds form one of the most characteristic accompaniments of the scenery in the northern portion of Alaska. They change their summer dress for the white of winter in autumn before they make their migration, and after they arrive at their winter destination they keep in immense flocks about the open glades and willow-grown country along the courses of various inland streams. In traveling through these tracts in mid-winter I have sometimes come across flocks numbering several thousands. In one instance a large area, a half mile across near the Lower Kuskokwim, was literally covered with these birds, and the bushes around the borders were also covered with perching birds. They allowed us to get into their midst with our dog-sledges before they took flight; as they arose the whirring of their wings made a noise like the rumbling of thunder and seemed to make the very ground tremble. As they arose the flock spread in every direction, and for a mile or two beyond we met small scattered parties, where they had taken refuge. They move in flocks, often numbering several hundred, during their migration, when they pass to and from their summer haunts.

Among the Alaskan natives, both Eskimo and Indian, especially those in the northern two-thirds of the Territory, this bird is one of the most important sources of food supply, and through the entire winter it is snared and shot in great abundance, and many times it is the only defense they possess against the ever-recurring periods of scarcity and famine.

The Eskimo of the Kaviak Peninsula have a curious way of taking advantage of the peculiarities of this bird in their migrating season. Taking a long and medium fine-meshed fishing-net they spread it by fastening cross-pieces to it at certain distances; then taking their places just at sunset in early November or the last of October, on a low open valley or "swale," extending north and south, they stretch the net across the middle of this highway, with a man and sometimes two at each cross-piece, while the women and children conceal themselves behind the neighboring clumps of bushes. As twilight advances the net is raised and held upright. Ere long the flocks of Ptarmigan are seen approaching skimming along close to the snow-covered earth in the dim twilight, and a moment later, as the first birds come in contact with the obstacle, the men press the net down upon the snow sometimes securing fifty to sixty birds. While the men throw themselves upon the net and hold it down, the women and children rush forward and kill the birds by wringing their necks or by biting their heads. On some evenings several flocks are thus intercepted, and the party of natives return to their houses heavily laden with spoils. In winter the birds are snared in their haunts by placing fine nooses attached to low bushes close to the ground. Sometimes small brush fences are built with snares at the passage-ways purposely left open. In spring, as the snow begins to leave the mossy knolls here and there, the natives shoot a male bird and stuff it roughly with straw, and, mounting it on a small stake, place this effigy upon one of the bare knolls in a conspicuous position; then they surround it with a fine sinew net held in place by slender stakes. The hunter then conceals himself close by and imitates the challenge cry of the male. All around can be heard the loud cries of the pugnacious birds, and attracted by the decoy notes of the native some of them are almost certain to bestow their attention upon the decoy; they approach swiftly, and either fly directly at their supposed rival or alight and run at him in blind rage. In either case their jealousy is fatal, as they are at once hopelessly entangled in the net of the hunter, who disposes of them, and repeats the maneuver indefinitely, generally returning home well laden.

In winter I found this bird frequenting the shelter of the spruces at the head of Norton Bay. Under these circumstances they have almost precisely the habits of the Ruffed Grouse at this season, so it is evident that their preference varies greatly with the locality and individual birds' tastes.

Dall speaks of the curious spring migrations of this bird at Nulato, the birds leaving in immense flocks the middle of February and returning again in March of each year. This is probably due to the passage of the winter-resident birds at that place to the north, while the birds which reside during winter in the south reach Nulato on their northward migration later in the season.

During the winter season these birds extend their range south to Sitka and Kadiak, whence specimens in white plumage are in the National Museum collection. Whether these birds nest upon Kadiak Island or not is unknown. Toward the end of March, as the small bare spots commence to show on the tundra, the Eskimo say this will bring the Ptarmigan from the shelter of the interior valleys, and their observation proves true. At Saint Michaels these birds commence their love making according to the character of the season—on some years by the 1st of April their loud notes of challenge are heard; but the recurrence of cold weather usually puts a temporary stop to their proceedings. About the 5th or 15th of this month the first dark feathers commence to appear about the heads and necks of the males. During some seasons the males make scarcely any progress in changing their plumage up to the middle of May, when I have frequently seen them with only a trace of dark about the head and neck. In the spring of 1878, the first males were heard calling on the 26th of April, and on April 27, in 1879, the males were just commencing to moult, showing a few dark feathers; but these seasons were unusually late. In autumn the change frequently commences the last of September, and by the first of October it is well under way, the winter moult being completed toward the end of this month.

During an excursion taken from Saint Michaels on May 9, 1879, the males of these birds were found extremely numerous all over the country in the vicinity of that place. The soft, slushy snow covered most of the ground, leaving bare a few dark-brown and brownish-red moss-covered spots and tussocks. Here the male Ptarmigans had stationed themselves, and as we passed, frequently within 15 to 20 yards of them, they would squat and watch us. Several times I stopped and snow-balled them, and even then they would remain motionless, until a well-aimed ball would strike so close as to cover the bird with snow. Frequently they dodged the ball by running a few steps, and in one instance I fired several shots from my rifle at one bird as it crouched at some distance, but it did not start, although the balls struck each time close to it. Not a call was heard during this evening, owing probably to the gloomy sky, but the birds are ordinarily much less pugnacious at this time than in the morning. On the next day they were extremely common all along the coast from our starting-point to the mouth of the Yukon, frequenting the hillocks bordering the shore, and several times two males were seen paying court to a single female.

As we turned into the mouth of the Pastolik River, close to the mouth of the Yukon, on the evening of May 10, a female Ptarmigan was seen coming down the river pursued by a Gyrfalcon, which was following close behind, and gaining upon the terrified grouse with every wing-stroke. Suddenly the grouse saw us, and swerving around, lit upon the opposite side of the sledge, not 5 feet from us, and ran quickly around to the side where a native and myself stood. The hawk, eager in its pursuit, did not notice us, until the grouse disappeared in its sudden change of course, and the pursuer had barely time to check itself as he came swiftly on in a direct line with my head, so close, in fact, that I involuntarily dodged as the hawk suddenly extended its wings and shot up 15 or 20 yards at a direct right angle to its former course and hovered there looking down upon us in evident surprise. I hastened to remove my gun from the lashings which attached it to the sledge, but before it could be taken out the hawk had assured itself of danger, and made good its escape. The grouse took wing when the hawk disappeared, and made off in the opposite direction. The grouse, in so suddenly changing its course and placing itself under the protection of man, showed a wonderful amount of quickness and intelligence.

At the Yukon mouth, in the evening, May 24, these Ptarmigan were heard uttering their hoarse notes all about. As we were sitting by the tent, my interpreter took my rifle, and going

off a short distance, worked a lump of snow to about the size of one of these birds. Fixing a bunch of dark-brown moss on one end of the snow to represent the bird's head, he set his decoy upon a bare mossy knoll. Then retiring a short distance behind a knoll he began imitating the call of the male, until a bird came whirring along and taking up the gauntlet lit close by its sup. posed rival and fell a victim to the ruse. The note used by the native in this instance was a peculiar nasal *yak-yak-yak yak*. This was made by placing his hands over his mouth and closing the nose with thumb and finger. At this time the males were continually pursuing each other or holding possession of prominent knolls, frequently rising thence 5 to 10 yards in the air, with quick wing-strokes, and descending with stiffened wings with the tips curved downward. While ascending they uttered a series of notes which may be represented by the syllables *ká-ká-ká-ká*, which is changed as the bird descends to a hard rolling *kr-r-r-r-r*, in a very deep guttural tone, ending as the bird reaches the ground. Frequently a pair would fly at each other full tilt, and a few feathers would be knocked out, the weaker bird quickly taking flight again, while the victor rises, as just described, and utters his loud note of defiance and victory. On other occasions, when the birds are more evenly matched, they fight fiercely, until the ground is strewn with feathers. On June 1, at the month of the Yukon, in spite of a cold raw gale and rain, which sent all other birds to the sheltering thickets in the vicinity, the shrill call of the male Ptarmigan was heard on every hand. The change this morning was the more striking as, on the preceding evening, when the weather was calm and pleasant and evidently foretold a storm, all the other birds of the marshes were extremely noisy, especially the geese and gulls, which raised such a din on every hand that it was difficult to carry on conversation. In the morning not a sound was heard, excepting an occasional *luk-luk* of a goose, as it passed on its way to some feeding ground or sheltered spot in the distance, and the cries of the Ptarmigan, which seemed but little affected by the depressing character of the weather.

On May 24 almost all of these birds were paired, but some did not complete their nuptials until the first few days of June. This grouse take but a single mate in Northern Alaska, and I am informed by the natives of Unalaska that the same is the case with the Rock Grouse found on the Aleutian Islands, nor have I ever known of the Ptarmigan assembling in numbers about any special meeting place to carry on their love affairs; they scatter about, as previously mentioned, being seen singly here and there on prominent knolls over the flat country. Early in June, rarely so early as the last of May, the first eggs are laid; by June 20 and 25 the downy young are usually out, and when approached the female crouches close to the ground among her brood. When she sees it is impossible to escape notice she rolls and tumbles away as though mortally injured and thus tries to lead one from her chicks. The young at the same time try to escape by running away in different directions through the grass. At this season the female and male both moult and assume a plumage which differs considerably.

The young are fledged and on the wing at varying dates through July, and are nearly full grown by the 1st to the 10th of August. On November 25, 1877, they were numerous, in large and small flocks, along the bushy gullies and hill-slopes on the shore of Norton Sound, but were shy. In many places where they had stopped the night before, their sleeping-place was well marked. In each instance they had occupied a small clear spot in the midst of a dense thicket, and in no case had the birds approached on foot, but had flown in over the top and plumped down into the soft snow, where they had remained during the night, each bird thus making a mold of itself in the snow. In some instances there were fifteen to twenty of these molds in the snow in an area of a few feet. In leaving their stopping-place the birds arose and flew directly from their "forms," as was shown by the marks of the wings on each side as they touched the snow in rising, so there were no tell-tale tracks to or from these places; the open places were undoubtedly chosen to allow the birds an unobstructed escape in case they were surprised by prowling foxes, which hunt these thickets for food.

Occasionally Ptarmigan were seen about the houses at Saint Michaels. Upon one occasion one sat for several minutes on the roof of a warehouse gazing curiously into the yard where a number of men and dogs were passing back and forth, evidently affording a novel and interesting sight for the bird, which, however, soon took flight, as though remembering the risk he might be running in such proximity to his usual foes.

The young are hatched the last of June, or rarely the first of July, and are handsome little creatures in brown and yellow down, with a chestnut cap and black lines down the back. In a few days after birth the young begin to show traces of the first full plumage upon their breasts. The young of the year differ from the adult, as is shown by the description.

In nesting, these birds usually gather a few grasses and dry leaves, and with them loosely line a shallow depression which is situated on the side of some slight knoll or dry place on the open grass and moss-covered tundra. The eggs vary considerably in the amount of dark markings, which, in some cases, form heavy dark purplish-brown blotches, scattered over the surface and interspersed with finer blotches and spots of the same. These markings cover the light and rich yellowish-brown of the ground color. In other cases the markings are of a lighter shade, and form rather small spots scattered uniformly over the surface. In others the spots are comparatively few, but this latter style is not common. The number of eggs varies from seven to ten and twelve; one set, taken in early June, at Saint Michaels, contained ten eggs measuring respectively as follows: 1.81 by 1.23; 1.78 by 1.30; 1.80 by 1.29; 1.80 by 1.31; 1.80 by 1.30; 1.80 by 1.27; 1.78 by 1.28; 1.80 by 1.23; 1.83 by 1.32; 1.78 by 1.22. These eggs are about the average size.

A young male bird taken September 10, 1880, just as it began to assume the white winter plumage, as shown by the white area on the abdomen, has the color of the crown and back of the neck intermediate between the spring plumage of the male and female, but more closely approaching the female in possessing blackish-brown feathers barred with rich buffy-brown. The feathers of the back are long and lanceolate in place of being bluntly rounded at the ends, as in the spring birds, and their centers are blackish-brown. The whitish and buffy edgings of these feathers, with yellowish and buffy mottling and barring on their webs, are arranged so as to mark the borders of the feathers, and to give the back the appearance of being marked longitudinally in place of the transverse patterns on the shortened and blunt pointed feathers in the spring female. A careful comparison of feathers from adults and young shows that the distinction of markings and coloration is similar in the summer male and young birds, but the shortening of the feathers in the adult gives the transverse in place of the longitudinal markings seen in the young birds. The long upper tail-coverts of the young bird shows the same pattern of marking. The throat and breast have a mixture of dull chestnut, much duller than in the male adult, and the buff, combined with dark transverse markings, is much less in amount than is present in the female, the bars being very narrow. The feathers of flanks and sides are yellowish, irregularly barred and mottled with dark brown. The feathers of the entire back, sides of the neck, and breast are tipped with small white spots.

The change of summer plumage to that of winter begins on the abdomen and gradually extends over the entire body, the head changing last. This change occurs between September 10 and the last of October, the young assuming their winter garb a little in advance of the adults. In spring the change is reversed, commencing about the heads of the birds and thence passing over the rest of the body. After the head has assumed its summer plumage, the change on the rest of the body goes on very slowly, and in many instances is never perfected, the back and abdomen of the majority of summer specimens being never entirely free from white feathers. The wings remain white throughout the year. There is considerable individual variation in the plumage of adult specimens shot the same season. In summer this variation appears mainly in the barring of the feathers according as the dark centers have more or less of the buffy and gray bars.

The adult male bird shows still another plumage in mid-summer. When the pairing season is over the fleshy comb over each eye shrivels and is hidden under the feathers, and the rich brown plumage of the head and neck gives place to a dull chestnut-brownish, becoming rusty-red on throat and neck. The crown, back, and sides of neck are buffy-brown irregularly barred with blackish, changing to black or very dark brown on back. Rump and tail-coverts thickly barred or mottled, with transverse lines or spots of yellowish-brown, and most of the feathers are edged with a narrow grayish-white border. This plumage is almost intermediate between that of the spring plumage of the male and female birds, but is distinct from either, although combining certain characteristics of each. Kumlien reports that in latitude 67° north on the Davis Strait coast of America these birds begin changing their winter plumage for that of spring the middle of May,

but further north the change commences still later, and in Greenland the males are pure white in the breeding season.

This species was found sparingly about Cumberland Gulf by Kumlien, and is extremely abundant from Bering Straits across the entire northern portion of America and Greenland. The Scotch Ptarmigan, a near relative of the present bird, is known to breed by the end of March in the lowlands of Scotland, and as late as June among the highlands. In the south of Scotland the males perch on knolls during a mild morning, and, rising several feet, drop again, uttering a note which has been indicated in syllables as follows: *Eek-kek-kek-ueuk-ueuk-ueuk*. This note and habit are identical with those of the Willow Grouse, as observed in Alaska, though more frequently the note of the Alaska bird is the one previously indicated.

LAGOPUS RUPESTRIS (Gmel.). Rock Ptarmigan (Esk. *Ūng á-wik*).

This beautiful Ptarmigan is a common resident of the Alaskan mainland, from Bering Straits to the British border on the east, including the entire north and south extent of the mainland. Unlike the common White Ptarmigan, it frequents the summits of the low hills and mountains during the summer season, where it remains until the severe weather of early winter forces it down to the lower elevations and under the shelter of the bush-bordered ravines and furrows marking the slopes.

On May 10, 1881, while visiting two volcanic hills in the vicinity of Saint Michaels, I suddenly came across a pair of these handsome birds, which were still in almost perfect winter plumage, the female having but a very sparse sprinkling of clayey feathers, and the male but three or four dark feathers on the sides of the head. These birds were feeding upon the last year's berries, on the marshy knolls near the end of one of the hills. They allowed me to approach within 20 feet, and paid no attention beyond looking curiously at me as I walked slowly along. The suspicion of the male being slightly excited, he uttered a low, rolling or whirring sound, like that produced by rolling the end of the tongue. The female answered with a low, clear "*yop-yop*," with a peculiar intonation, strikingly like that of the female hen-turkey, except it was much lower. When we were about 15 feet from the birds, they stood looking at us for a moment with a pretty air of innocent curiosity, and then, without showing the slightest signs of alarm, arose and flew off to the hill-side, a hundred yards or more away. The comb over the eye of the male stood erect, and was of the same brilliant orange-red as that of the White Ptarmigan; but the outline of the upper border of this comb is cut out in the middle, so that only upon each end does it bear the filamentous prolongation seen bordering that of *L. albus*. Just as the male alighted upon the hill-side, he took a slight upward curve, and then descended to the ground on stiffened wings, very much in the manner that characterizes *albus* at this season; at the same time he uttered a loud, rather harsh and guttural series of rolling notes, very much like the peculiar rolling call-note of *Dafila acuta*.

During the entire year these birds are resident north at least to Bering Straits, as I obtained specimens from that vicinity on one of my winter expeditions. In summer it extends still beyond this, to all portions of the country crossed by mountain chains and hills. In autumn, toward the last of October and first of November, this bird unites with the common Ptarmigan in great flocks, on the northern shore of Norton Sound, and migrates thence across the sound to Stuart's Island, thence reaching the mainland. The birds are frequently seen by the natives while they are passing Egg Island, on their way to the island just mentioned. They are said to commence their flight just before dark in the evening, and at this season, as mentioned under the preceding species, many are snared at the head of Norton Bay. In April the birds return to the north, always traveling in the evening or night, as they do during their autumnal migrations.

This Ptarmigan is resident at Point Barrow according to Murdoch but is less common than *albus*. Mr. Dall mentions its presence in the Gens-du-large or Romanzoff Mountains northwest of Fort Yukon in about latitude 68° N. It is also found commonly in the vicinity of Fort Yukon. The Smithsonian Institution has received a large number of these birds from the region bordering the Arctic shores of the fur countries. On the Arctic coast of British America Mr. Rae killed some Rock Ptarmigans, August 9, which were moulting at that time. They were not shy, and

when flushed would fly near the ground until behind the first knoll or rise of the surface, then turning suddenly to one side they would crouch and remain motionless until they were approached closely.

The first American record of Ptarmigan in these islands was made under the title of *Lagopus albus* by Mr. Dall in his paper on the ornithology of this region, and has been corrected by me in the Bulletin of the Nuttall Ornithological Club for June, 1878. The male specimen secured at Unalaska, and upon which this identification and correction was based, is figured in the present report with the characteristic mountainous surroundings. All the records of *Lagopus albus* upon the Aleutian chain apply solely to this species, with the single exception, perhaps, of the easternmost island, which lies next the mainland of the Alaskan Peninsula, where the ordinary *albus* is found, according to the information given me by residents of the islands.

Concerning this bird Mr. Dall gives us the following notes in his paper before cited: It is more or less abundant throughout the chain. The eggs which he speaks of having found upon the islands of Atna and Kyska are to be referred to the new race, *athhensis*. The Ptarmigan eggs found by Dall on the Shumagin Islands, June 20, were either those of the present species or of *albus*; this latter bird is known to occur upon these islands, as is shown by the specimens secured by Dr. Bean. As mentioned in describing the habits of this species, it frequents the more elevated portions of the country, its range complementing that of *albus*. The latter keeps more strictly to the lower and more level parts of the country, and frequents the open stretches of moss and grass covered tundra in the summer, or keeps the center of deeply bordered water-courses and ravines during winter. *Rupestris* keeps to the mountain sides and summits in summer and about their bases in winter. This difference in the habits of the two birds may account for the presence of *rupestris* alone in the Aleutian chain, for the precipitous slopes and rugged cliffs, which arise from the water on every side, among this chain of islands, afford none of the low flats and bushy shelters congenial to the tastes of *albus*. With the exception of the Aleutian Islands, where *rupestris* alone occurs, this latter species is less numerous than *albus*, the ratio perhaps being one to ten, though the disproportion increases as the country becomes more mountainous, as I had occasion to observe in the vicinity of Bering Straits. In the portions of the country where flats occur, as between the Lower Yukon and the Kuskoquim, *albus* alone is found. North of British America Captain Sabine records *rupestris* as abundant in summer on Melville Island, in latitude 75° north, where it arrived May 12 in full winter dress. Some males retained this plumage unaltered until the middle of June. In winter it makes a partial migration from this region. As this bird occurs on the American side of Bering Straits it undoubtedly occurs upon the adjacent Asiatic shore and should be looked for about the mountain summits of that coast. Specimens of *lagopus* taken at the mouth of the Lena River, latitude 71° north, during April, by Seebohm, are said by Newton to be referable to *rupestris* and not to *mutus*. The male differs from the female in having the ochraceous bars narrow and interrupted by more numerous lines, thus making the plumage darker and richer. During the recent English Arctic Expedition Ptarmigan were found in latitude 83° 06' north, which were referred to this species by Captain Fielden. This was at the highest northern point of land at that time visited by man. The birds were again seen in latitude 82° in September, after which they migrated south, returning by March 11 the following spring.*

*While examining the series of Ptarmigan contained in the National Museum, during the preparation of this work, I was surprised to find a bird from Cumberland Gulf on the American shore of Davis Strait, and from the Greenland shore of the same coast, differing very decidedly from the many specimens of *rupestris* and *albus* in the collection. This led me to examine the matter more thoroughly, and I find that nearly all the older writers credit four species of Ptarmigan to America, whereas the later authors have united in ignoring one of the species and placing it as a synonym of *rupestris*. My search through the various forms has resulted in satisfactorily determining that the bird found on the coast of Greenland and the adjoining portion of the American mainland is totally distinct from the ordinary *Lagopus rupestris*. It may be well to give a slight review of the Ptarmigan mentioned by the several authors who have written upon the region in question. Hearne mentions the Rock Grouse (*rupestris*) as plentiful in the region northwest of Hudson's Bay, and this with *albus* may comprise the two forms with which he was acquainted. Parry found birds on the shores of Davis Strait which are considered to be exactly similar to the Scotch Ptarmigan, or *Tetrao lagopus* of Gmelin. In the North Georgian group, at a later date, another species was found more abundantly, to which he refers as *T. rupestris* of Gmelin. In the appendix to Parry's First and Second Voyages it is

LAGOPUS RUPESTRIS NELSONI Stej. Nelson's Ptarmigan.

In his paper on the birds of Bering Sea in The Cruise of the Corwin, Mr. Nelson gives two accounts of the Rock Ptarmigan, numbered, respectively (78) and (79), both, however, being placed under the same headings, viz, *Lagopus rupestris* (Gm.) Leach. The Rock Ptarmigan. It needs but a glance at the second account (79) to show that Mr. Nelson considered the bird here treated of to be different from the one previously mentioned (78). In fact he states that "the detailed description of this form will be given in the account of the Birds of Alaska, now in course of preparation." He had thus noted the distinguishing characters of the form which was subsequently named in his honor by Dr. Stejneger, and had intended to describe it in his report (*i. e.*, the present one), and to merely designate it by name in The Cruise of the Corwin. Why he subsequently failed to set this forth in his errata slip I am at a loss to understand. He there complicates the matter by stating that "through an error, the notes under numbers 78 and 79 were not placed under a single heading." The form was named by Dr. Stejneger in Ank, July, 1884, p. 226, and partially described. The types of the race were taken by Mr. Nelson at Unalaska, in spring, and winter specimens were taken by Dall at the same place. A fine series of this bird, collected by Mr. Townsend during the summer of 1886 at Unalaska, corresponds well with the types and confirms the validity of the race.

According to Mr. Nelson, this Ptarmigan is common on the Aleutian Islands, at least from Unalaska eastward, where it frequents the mountain tops and slopes, breeding there in June.

Subjoined is a description of the bird, prepared by Dr. Stejneger at my request.—H. W. H.:

♂ ad. (U. S. Nat. Mus., No. 73488. Type. Unalaska Island, Alaska, May 18, 1877. Coll. E. W. Nelson, No. 19.) Top of head and neck all around bright tawny brown, inclining to burnt sienna on the former, barred with black; rest of upper surface of the body deep amber-brown, each feather being very finely and densely vermiculated with blackish; lores and eye-region black, more or less interspersed with old white feathers; wings white, with a few of the coverts and the tertaries like the back, the six or seven outer primaries with the shafts dusky above; under surface from the breast backwards, including the feathering of the feet, white except a few new feathers on the flanks, which are like those of the back; most of the nasal plumes, the feathers on the forehead, those on chin, throat, and sides of face below the eyes are old white feathers, remains of the winter plumage, and a few similar ones are

stated that "there is much difference in the color" in summer specimens of *T. rupestris* and *T. lagopus*. "The upper plumage of the 'Ptarmigan' (*T. lagopus*) is cinerous, with undulating, narrow black lines and minute spots, whereas in the Rock Grouse each feather is black, and cut by transverse broad lines or bars of a reddish-yellow * * * * * with spaces of black between them broader than the bars. The feathers are tipped with a light color in the male, approaching to white in the female."

The males (*rupestris*) average 13½ and the females 12½ inches in length, and both were inferior in size to specimens of *T. lagopus*. The two agree in the character of bill and claws and the black bar over the eye.

The ground-color of the eggs of *rupestris* is "pale yellowish-brown, irregularly blotched and spotted with a darker brown." From the information procured from Sabine's contribution to the appendix of Parry's Voyage, I am convinced that his *rupestris* is identical with *reinhardtii* of Greenland and the adjoining American coasts, whereas *T. lagopus*, which he describes as having been found in the country south of Barro's Strait and east of Regent's Inlet, but as not met with in the North Georgian Islands, and which he claims is the Ptarmigan of Scotland, is our *rupestris*. The specific characters of *T. lagopus* of Gmelin mark it as referable to *rupestris*, the summer plumage of which is cinerous, with minute black lines, or spots, except on the head and neck, where it is characterized by the same author as marked with broad bands of white. The white prevails on the throat and the back, and ferruginous on the crown and hinder part of the head. The main portion of the preceding notes are from Sabine in a supplement to Parry's First Voyage, under the heading of *T. lagopus*. From the statements made here it appears that the birds from the coast northeast of Hudson's Bay are thus marked with fine undulating lines in summer and heavier-banded markings about the neck. The male of *rupestris* in summer is distinguished by the large amount of black forming the ground-color of the feathers and by the distinct barring of yellow or buff. Audubon's figure of his *Lagopus americanus* answers perfectly to specimens contained in the National Museum from Cumberland Gulf and the opposite coast of Greenland, and is undoubtedly referable to *reinhardtii*. It is quite likely the specimens recorded by authors as *rupestris* from the high northern latitudes along the Greenland coast and the adjoining mainland may also be referable to this species. While *reinhardtii* is distinguished by the heavy black barriings which divides the feathers into two or three parts and the interspaces with grayish and buffy-brown spaces, *rupestris* has its plumage covered with fine vermiculations and dottings of varying shades of brown, buffy, and black. It was my intention to make a satisfactory arrangement of the American Ptarmigan, but I find the amount of material contained in the National Museum collection insufficient, as the individual variation among these birds requires a large series of specimens from their entire range in order to give satisfactory data for generalizations.



NELSON'S PTARMIGAN.
Lagopus rupestris nelsoni.
(MALE IN SPRING.)

still left on the fore neck and the upper surface; tail black with an indistinct white edge to the tips of the feathers, and the outer rectrices white at the base for a very short distance. Wing, 200^{mm}; tail-feathers, 117^{mm}; bill from nostrils, 11^{mm}; tarsus, 32^{mm}; middle toe with claw, 35^{mm}.

First primary shorter than sixth; second longer than fifth and shorter than third and fourth, which are longest.

The adult female does not differ materially from typical *Lagopus rupestris* in corresponding plumage.

The designations of the colors in the above description refer to Mr. Ridgway's "Nomenclature of Colors."

LAGOPUS RUPESTRIS ATKIENSIS (Turner). Turner's Ptarmigan.

Among the specimens secured by Mr. L. M. Turner, during his residence in the Aleutian Islands, are two Ptarmigans, which, upon examination, prove to represent a well-marked geographical race of *rupestris*. His specimens were secured June 7 and May 29 upon Atka Island, at the extreme western end of the Aleutian chain. They are found upon this island and undoubtedly also upon those adjoining. As compared with my specimens from Unalaska the bill of this bird is considerably broader at the base, and is somewhat longer and slenderer. In addition to this, a striking difference is the very much lighter color of the western bird, which has a predominance of ashy-gray and pale yellow. The dark rusty or buffy-brown seen in the Unalaskan bird is replaced by a pale yellow on the western variety, and the general shade of color is grayish in place of brownish. The female of the Atka bird is more finely marked, as a rule, and has much less of the grayish and buffy vermiculation which is exhibited by the bird from Unalaska. It is undoubtedly to this race Mr. Dall refers in his contribution to the ornithology of the western end of the Aleutian chain, when he speaks of finding nine much-incubated eggs, on June 21, at Attu Island, and chicks which were hatched at Kyska, July 8.*

PEDICOLETES PHAENELLUS (Linn.). Sharp-tailed Grouse.

This grouse is given by Dall as a not uncommon species at Fort Yukon and for 200 miles lower down this river to the Ramparts, below which place it is not found. It may be called a bird of Eastern Alaska, being limited to that portion of the Territory bordering on the British possessions. Its nest was found by Mr. Kennicott near Fort Yukon at the foot of a clump of dwarf willows, with scattered spruces and other trees growing about. Other nests were afterwards found in similar locations. The structure resembles that of the common prairie hen. The record of this bird from Fort Yukon places its nesting range within the Arctic Circle, but how much beyond this point it occurs to the north remains to be seen when future and more extended observations are carried on in that region. Richardson found this grouse along the Mackenzie to the delta of that stream in about latitude 69°, and it may occur to that point in the adjoining portion of Alaska.

CIRCUS HUDSONIUS (Linn.). Marsh Hawk (Esk. *Nākh-tā-kā-lēk*).

These hawks are numerous throughout Northern Alaska during the migrations. It is seen frequently along the barren coast of Bering Sea, and has been recorded as rather uncommon in the interior. It is a rare summer visitor to the Near Islands. It has been taken in Northeastern Siberia, and is found on the mainland throughout Arctic North America. It breeds on the Lower Anderson and other northern rivers, and is one of the regular and common birds of prey in these regions. The Marsh Hawks arrive later and depart earlier from the coast of Northern Alaska than they do from the interior of the British fur countries. The last of May, 1879, it was common at the Yukon mouth, and on May 6 a specimen was secured by Mr. McQuesten at Fort Reliance, on the upper part of this river. In autumn, from the middle of August until the end of September, is the time of its greatest abundance, although it sometimes remains until November, according to Mr. Dall. It is also seen frequently from the middle of May until the first of June.

While I was at the Yukon mouth, on May 19, 1879, a pair of hawks was seen repeatedly crossing the river on different days at a certain point, the leader always performing, as he went, a succession of curious antics; it would turn over and over a half dozen times in succession like

* *Lagopus leucurus* has been killed in British America, at Fort Halkett, on Liard's River, in latitude 63° north, so close to the Alaskan boundary that it seems almost certain this species is to be found within the limits of Alaska.

the Tumbler Pigeon, and after descending nearly to the ground it would mount to its former height and repeat the performance, so that its progress was a perfect series of these evolutions. One of its favorite and most striking performances consisted of turning head down and by placing its wings in a peculiar position descend rapidly about 20 or 30 yards with a swift screw-like motion. The last bird always flew slowly and smoothly along as if enjoying the performance of its companion.

In markings and appearance these birds were apparently exactly alike. They were white-rumped, slaty on the back and light below, with blackish wing-tips and the under surface of the wings white. The feet were light colored. I tried again and again to secure them, but failed. It is extremely probable that they were male Marsh Hawks, since the above-mentioned characters apply to no other American hawk with which I am acquainted; the peculiar evolutions, however, I have never seen performed by this or any other hawk. A series of Alaskan specimens shows all the usual variations of plumage exhibited by this bird and agrees with specimens from various parts of North America. Although these birds nest throughout their northern range I never found them nesting in the vicinity of Saint Michaels. There is no definite record of these birds from the Aleutian Islands, although Mr. L. M. Turner describes a small flock of hawks seen by him at Unalaska, which were probably this species.

ACCIPITER VELOX (Wils.). Sharp-shinned Hawk (Esk. *Chi-kübe-i ük-shü-gük*).

Dall records a female of this species killed on the Yukon, just above Nulato, on April 29, 1877, and tells us that the natives prize it highly, using its feathers for shafting arrows or for ornamenting their dancing costume. Its value, like that of the Pigeon Hawk, was equal to one marten-skin when the Western Union Telegraph Expedition visited the country. Since then hawk-skins have less value and marten-skins are worth much more. Along the Yukon and northern portion of the Territory it is outnumbered by the Pigeon Hawk ten to one. A number of specimens were brought me from various points along the Yukon, and fragments of others were seen among the natives at various other places in the Territory. It has been taken at Sitka, and is pretty generally distributed through the wooded portion of the Territory, being very rare on the barren sea-coast, and, perhaps, never occurring on the islands of Bering Sea. On the Upper Slave River, in the Hudson's Bay country, it was found by Kennicott and Ross, nesting abundantly on the cliffs. Kennicott also found a nest at Fort Resolution, British America, which was made of spruce twigs and placed in a spruce tree. A specimen which was taken on September 7 has been brought me from Fort Reliance, and it arrives at Nulato the last of April.

ACCIPITER ATRICAPILLUS (Wils.). Goshawk (Esk. *Abr-üüg-ü-likh-tük*).

The present species of hawk is the handsomest, as well as one of the most abundant, of the birds of prey resident in Northern Alaska. It is present everywhere throughout all the wooded region, and in spring and autumn, especially during the latter season, it is a common visitor to the open country bordering the shore of Bering Sea and the Arctic coast, and is a characteristic bird in the fur countries, breeding nearly to the Arctic coast. Considerable numbers of these birds were secured in the vicinity of Saint Michaels, and many others were seen during my residence at that place. Although many of these birds remain in the north during the winter, yet I believe that a considerable number of them pass farther to the south. The presence of this bird in portions of the Northern United States during winter indicates a partial migration. The young and adults occur in about equal numbers in the vicinity of Saint Michaels, as is shown by the specimens secured, numbering six of each.

While on a winter expedition to the vicinity of Bering Straits some fragments of these birds were found in the hands of a native, and the bird was said to be common in that vicinity. Other specimens were brought from Kotzebue Sound, and Dall found them common in the vicinity of Nulato, where he secured a nest placed in a large poplar which was on a small island in the river thickly overgrown with other trees of the same character. This structure was about 30 feet from the ground, and was made of small twigs. The Goshawk preys extensively upon the Ptarmigan, which it follows during the migration and winters with them on the Lower Yukon and Kuskoquim Rivers.

The eggs of this bird are four in number, greenish-white in color, and are usually laid by the 1st of May. An egg of a set secured by Dall, on April 27, 1868, at Nulato, measures 2.28 by 1.90 inches, and is of a dead white color with a very faint greenish shade. Another egg, secured near the head of Unalakleet River, by the same naturalist, measures 2.32 by 1.80, and is of a more greenish white shade, with a few spots of bronze brown scattered irregularly over the surface.

The middle of September, 1881, while the Corwin remained in Kotzebue Sound, these birds were rather numerous about the shores, frequenting the alder-patches, and making forays among the flocks of Ptarmigan which were gathered in this vicinity at the time, preparing for their autumnal migration. In one instance a wounded Ptarmigan was seized and carried off before my eyes.

The Goshawk has a bad reputation among the natives, from its habit of stealing birds from their snares, as well as for hunting the Ptarmigan, upon which, at certain seasons, the Eskimo depend largely for a food-supply.

While at Niantlic, on the west coast of Davis Strait, September 19, Mr. Kumlien found one specimen of this bird.

ASTUR ATRICAPILLUS STRIATULUS Ridgw. Western Goshawk.

While examining the large series of Goshawks in the National Museum collection to ascertain the status of the variety *striatulus*, a new and well-defined race was found to exist upon the Pacific coast, of which a number of specimens are in the National Museum from California and Washington Territory, with the skin of a young bird from Sitka. It is characterized by the clearly-defined and dark markings of the lower surface, so dark that they stand in sharp contrast to the light ground-color. The color of the cap is much darker than in *atricapillus*, and extends down the nape to the middle of the back and covers the shoulders. The bars of the tail are also more sharply defined than in *atricapillus*. I propose naming this form in honor of my friend, Mr. H. W. Henshaw, who is so well known for his work in western ornithology.

[This Goshawk, described by Mr. Nelson in the Auk for April, 1884, p. 166, proves to be a well-marked race, for which, as shown by Mr. Ridgway in the Auk for July, 1884, p. 253, the name *striatulus* requires to be taken under the law of priority. The adult *striatulus* of Ridgway, 1874, proves, indeed, to be a special phase of plumage of *atricapillus*, as shown by Mr. Nelson; but under the name were described also several immature birds, which now turn out to belong to the race characterized by Mr. Nelson under the name *henshawi*.—H. W. H.]

The habitat of this race is the northwest coast of America from the Sierras in Middle California north through Oregon, Washington Territory, to Sitka, at least, and probably farther along that coast. The types of this race are specimens in the Smithsonian collection, No. 79798, a female adult from Cheenakan Creek, Oregon, taken on August 16 by Mr. Henshaw; No. 85625, a male adult, taken at Big Trees, California, on June 17, 1881, by Mr. Belding; No. 85624, a male adult, taken at Big Trees, California, June 19, 1881, by Mr. Belding. The measurements of these birds respectively are as follows:

	Wing.	Tail.	Tarsus.	Culmen.	Depth of bill.
79798 ♀ ad.....	13.5	11.50	2.95	1.10	.75
85625 ♀ ad.....	14.25	11.80	3.25	1.40	.75
85624 ♂ ad.....	12.75	10.15	2.90	1.18	.75

The following measurements are of two adult birds of typical *atricapillus* in the National Museum collection:

	Wing.	Tail.	Tarsus.	Culmen.	Depth of bill.
49663, Calais, Me., ad. ♀.....	14.25	11.60	2.95	1.35	.80
81214 (1559) Saint Michael, Alaska.	14.25	11.00	3.30	1.25	.80

The characters upon which this race are based are mainly the intensity of the dark markings on the abdominal surface and the extension of the dark color of the crown over a large part of the entire dorsal surface. In *striatulus* the under surface differs also in the abundance and intensity of the markings on the throat, which in the new race is as profusely marked as the breast; the ashy-brown of the markings on the breast are very dark, becoming blackish-brown, and in No. 85625 the entire under surface has a dark sooty wash. On the crown the color varies from a dark sooty to a glossy black, and this color extends over the nape to the back, covering the scapulars and extending even to the rump in some cases, but usually shading to a dark bluish-ashy on the posterior half of the back. The wings are very dark brown. The tail is also much darker than in *atricapillus*. The young birds may be distinguished by their generally darker color and the large size and intensity of the linear markings on abdomen and breast. There is a young bird from Sitka, and several from Oregon, California, and Washington Territory, all of which agree in these characters. The white postocular line in this form is more obscured by dark markings, and the whole may be summed up by saying that *striatulus* is a dark, northwest coast race of the Goshawk, characterized, like other geographical races of that region, by the great predominance of the dark markings as compared with birds of eastern and northern localities. The only bird among the large series of *atricapillus* in the National Museum collection which approaches the new race in its dark colors and intense markings is one from New Jersey, which is very dark colored. This appears to be a solitary example of individual variation, as among a series of twenty-five birds examined this proves to be the only exception.

BUTEO BOREALIS CALURUS (Cass.). Western Red-tail.

The only known instance of this bird's occurrence in the Territory is recorded (*loc. cit.*) by Dr. Bean, who secured a bird in the young plumage near Sitka, June 5, 1880.

149. BUTEO SWAINSONI Bonap. Swainson's Hawk.

During my residence in the north this bird did not fall under my notice either alive or dead. Dall obtained a skin of this bird near Nulato on May 26, 1867, and adds that it prefers the thickets and wooded places, building a large nest of sticks. It begins to lay the last of April and the young are hatched by the end of May, about the time the ice leaves the rivers. He found the bones of rabbits, squirrels, mice, and ducks, and even part of a whitefish, in the vicinity of their nests, showing that they are ready to prey upon anything that falls in their way. It is a summer visitor and occurs on the Lower Mackenzie and Anderson Rivers, whence specimens have been sent to the Smithsonian. The Alaskan specimen taken on the Yukon was in the melanistic or *insignatus* state. This appears to be a common species in the middle and southern parts of British America, but is rare farther north, where it arrives about the 1st of April or later, leaving toward the end of September. It is not known beyond the wooded country, and there is no record of its occurrence on the southeastern coast of the Territory, although it is likely to be found in that region. It is also unknown from the islands of Bering Sea and the barren coast of that sea and the Arctic.

ARCHIBUTEO LAGOPUS (Brünn.). Rough-legged Hawk (Esk. *Pi-tó-gñák*).

Several specimens from Saint Michaels and one obtained by me at Unalaska Island (the parent of the eggs secured there) are indistinguishable from European birds contained in the National Museum collection. On the northern coast of Alaska, including the shore of Bering Sea and the Arctic, and thence in the interior along the entire course of the Yukon, many specimens of the Rough-legged Hawk have been taken, but none from this region are in the melanistic phase so common among birds from the Hudson's Bay country. In fact all the specimens from Northwestern Alaska appear to be referable to the Old World form, as certainly are the examples mentioned. A specimen from Saint Michaels (No. 833) possesses a large amount of white upon the back and head, and the purity of the light edges to the feathers on the head, unshaded by yellowish-buff, gives the head the appearance at a short distance of being pure white, and this is characteristic of those birds which approach or are identical with the European form.

They have been found to be very common birds in summer throughout the northern portion of the Territory, arriving in the vicinity of Saint Michaels and the Yukon mouth from May 12 to 30, and returning south from the end of August to the middle of September. They range from Unalaska in the middle of the Aleutian chain north to the northern extreme of land along the shores of the Arctic. A breeding female was taken on the Shumagains by Dean the middle of July. Turner does not record it from the Near Islands. A single specimen taken by Stejneger on the Commander Islands is said to be typical *lagopus*.

Mr. Ridgway has already noticed the fact that not a specimen in the black phase is known from the extreme northern part of its range in British America among hundreds of skins examined, and I must bear similar witness concerning the large number of these birds seen or obtained in various portions of Northern Alaska.

At Unalaska Island, on May 21, 1887, a pair of these birds was found nesting on the face of a high cliff. About 9 p. m., one evening in the dusky twilight, as I was passing along the beach close under the cliffs, I was surprised by a long whining cry almost exactly like the mew of a young kitten. It was with some difficulty that I made out the form of a hawk perched high up in a niche on the cliff. Just as I caught sight of the bird it flew, uttering the same querulous cry, and an ineffectual shot only served to elicit another cry, as the bird disappeared around an angle of the cliff. Following the bird it was found perched in a similar niche. The bird caught sight of me as I drew near, and launched out with its usual cry only to come whirling to the base of the cliff with a broken wing. At this moment the same cry, with a slightly different intonation, reached my ear, and glancing up I saw the head of another hawk peering from the edge of a shelf close above the perch of the one I had just shot. Two shots at this head only resulted in bringing forth the usual cry, without causing the bird to take wing, and the increasing darkness forced me to secure my bird and make the best of my way back to the village. On May 24 I revisited this nest with two companions, and was lowered to the nest by a rope, and secured three eggs. The nest was on a narrow moss-covered shelf, and the body of the structure was composed of coarse stalks of weeds with a thick lining of soft grass; it was about 2 feet in diameter and had a slight depression in the middle about 10 inches across.

The eggs of this bird taken in Europe are said to vary greatly in color, shape, and size, and measure 2.44 by 1.82 to 1.95 by 1.53. Its nest is sometimes found on trees, where it is constructed by the birds themselves, and at other times they take possession of deserted Ospreys' nests. It is found breeding commonly in Lapland and all along the northern border of the Old World.

ARCHIBUTEO LAGOPUS SANCTI-JOHNIS (Gmel.). American Rough-legged Hawk (Esk. *Pi tó-ghūk*).

No examples of this bird were secured by me in Northern Alaska, nor are there any specimens in the National Museum collection from that portion of the Territory. Several specimens from Kadiak in the melanistic phase of plumage are the only ones known from Alaska. This form is found abundantly in the Hudson's Bay country, where the black phase is known to predominate. They arrive in spring on the headwaters of the Anderson and Mackenzie Rivers and in the region about Hudson's Bay, where they find breeding grounds. In autumn they form the rear guard of the migrants passing south into the Middle States where they are winter residents. In the north it nests indifferently upon trees or cliffs. During their migrations in spring and fall I have seen thousands of these birds passing through Northern Illinois, both the dark and light forms associating in their migration as they do in the breeding season.

A friend of the writer's living on a farm in Northeastern Illinois amused himself one spring by trapping various birds of prey as they passed north, using his empty corn crib as a bird-house. Into this, in rapid succession, were introduced Red-tailed, Sharp-shinned, Coopers, Broad-winged, and Rough-legged Hawks, with a single Horned Owl. As might be expected, the family was by no means a happy one, and as my friend failed to provide a sufficient supply of food, the owl made use of his fellow-prisoners, and in a very few days the owl and a black Rough-legged Hawk—the band-somest specimen I ever saw—were the only occupants of the crib. The next act in the tragedy closed with the Rough-legged Hawk perching quietly in his usual corner, while the badly used-up form of

Eubo lay among the bones of its victims. The conqueror was thereafter well treated and, fastened by one leg with a long cord, was kept in the orchard as a pet, until the intense heat in early June proved too much for him and death resulted from the effects of a sunstroke.

AQUILA CHRYSÆTOS (Linn.). Golden Eagle (Esk. *Kū-jū-tūl-ik*).

Throughout a large portion of the Territory, especially that part which is more or less heavily wooded and interspersed with mountains, the Golden Eagle is found. The Point Barrow party secured a single specimen taken by the natives east of Colville River. It extends its range west along the Aleutian chain, having been obtained on Unga Island by Dall, who mentions it as a common resident on the Aleutian chain as far west as Unalaska. Turner notes that it is a rare visitor to the Near Islands.

During my visit to the eastern portion of the Aleutian chain, in the spring of 1877, none of these birds were found, although the following species was very numerous. The skin and quills of this bird are used for ornamental purposes in the religious festivals and dances of the Eskimo, and the bird itself figures extensively in their legends. During my residence in Northern Alaska I saw only fragments of skins in the possession of the natives, none of the birds coming under my notice.

It nests rather commonly on the Lower Mackenzie and Anderson Rivers, and extends its range to the Arctic shores of the mainland, and perhaps reaches some of the adjacent islands north of British America. In spite of the courageous and even fierce character of this fine bird it sometimes descends to feed upon carrion. On one occasion a pair was disturbed by a friend of mine while they were feeding upon the remains of a hog in Northern Illinois. As my friend approached the birds arose, and swooped fiercely at him. Both birds were shot almost at the muzzle of the gun; the first fell dead almost at his feet, but this apparently served only to increase the rage of the survivor, which renewed the attack until it, too, was disabled.

HALÆETUS LEUCOCEPHALUS (Linn.). Bald Eagle (Esk. *Mū-tūgh-ō-wik*).

Bald Eagles are very abundant throughout the Aleutian chain, where they are resident. In summer they feed upon fish and the numerous wild fowl, which breed among these islands. In winter they feed upon Ptarmigan and the sea-fowl, which reside there during this season. When at the salmon run in Sauborn Harbor, Nagai, Mr. Dall saw seventeen eagles within 100 yards. During winter he found many eagles dead, but they were too fat to have starved, and he was unable to account for the mystery. When he left the islands, in October, he found the young still unable to fly, and remarks upon the great length of time they remain in the nest.

It is well known to be extremely common on the entire Aleutian chain, and thence along the south coast of Alaska throughout the Kadiak and Sitkan region. In the latter part of its range it is mainly a fish-eating bird. Throughout the northern portion of the Territory, where it is widely distributed, it is not uncommon to find a pair of eagles frequenting the cliffs in the interior, where they rear their young. Here they prey upon the young reindeer and smaller game, and the natives accuse them of even carrying away children.

The following is a good specimen of Eskimo animal myths, and records the belief that long ago the eagles were larger and fiercer than they now are. The story is current among the Eskimo along the Lower Yukon and neighboring coast: In ancient times there were eagles of tremendous size frequenting the tops of the highest mountains in the interior and preying upon whales and full-grown reindeer, and even upon men. A volcanic crater of very regular outline, situated upon the summit of a mountain near the Lower Yukon, was pointed out to me as the nest of the ancient *Mutughowik*. Around the rim of the crater are differently-colored stones, which, the natives claim, were gathered by these birds to ornament their nest. When the birds sat here, overlooking the Yukon on the one side and the sea far away to the horizon on the other, their screams could be heard for miles, and many luckless creatures were caught in their talons and carried swiftly to their eyrie, and there torn into fragments to be devoured. Year after year these birds remained, until men were afraid to go out on the broad bosom of the Yukon for fear of being caught by these evil guardians of the mountains overlooking their village. Each year the young were raised and flew away, none knew whither; so that never more than two old birds inhabited

the mountains. One spring, after the birds, as usual, had hatched their young, a famous hunter of the village went out alone to attend to his fish-nets. While he was out one of these eagles soared high over the village, and seeing the hunter's wife outside of the house, swooped with a mighty rush of wings and carried her off to feed the nestlings. Ere long the hunter returned, and with wailing cries his friends told him of his loss. For a time he was inconsolable, but at length he seized his bow and examined it carefully, then he selected a quiver of his best arrows, and heedless of remonstrance began climbing toward the nest of the eagles. When he had nearly reached his goal he heard the whistling of great wings, and crouching behind a huge bowlder, with an arrow drawn to its head, he waited. In an instant the female bird was seen descending, her terrible eyes fired with rage; but just as she was about to grasp the hunter in her talons he buried an arrow under her wing and she fell far down the mountain side, mortally hurt. He then advanced, and in a short time reached the summit of the mountain, finding the young so large that they entirely filled the enormous nest. All about were strewn fragments of men and animals, among which were seen the frames of many kyaks. With vengeful heart he shot arrow after arrow until the last of the brood lay dead. He had scarcely finished, when a wild cry was heard close by, and he saw the male bird approaching. At the same instant the bird caught sight of its slain young and of the hunter. A still louder and more terrifying cry was heard, which made the villagers below shudder for their friend. The eagle darted at its enemy. With unshaken courage the hunter met each assault with a well-directed arrow until the bird, pierced with many wounds, turned, and, upon outspread wings, slowly glided away and vanished far off to the north. Since then none of its kind has ever been seen, and men have been able to hunt without fear. The villagers afterwards visited the nest with their deliverer and found many relics of friends who had perished, and it was only a few years ago that the remains of the kyaks were still to be seen about the nest. This story is implicitly believed by the natives of the Lower Yukon and adjacent sea-coast, and the Bald Eagle is known by the name which they apply to the bird of their legend.

In British Columbia Mr. Lord found the White-headed Eagles remaining in winter and during the most intense cold several were seen by him perched close together upon a pine branch in such a benumbed state that he frequently shot one of the number without disturbing the others, and one morning he found three birds frozen stiff upon the ground where they had fallen from their perches. In the fur countries the Bald Eagle is resident as also upon the Aleutian Islands and the southeastern shore of Alaska, and in portions of Northern Alaska as well. It arrives as soon as the streams show signs of opening in spring, being one of the earliest arrivals in Northern British America, according to Richardson. At Unalaska, in the spring of 1877, I saw large numbers of them, and visited an eyrie on a cliff overhanging the sea. Although this was in May, the birds had not deposited their eggs, and I was informed by the residents that their usual time for incubating is from the middle of May until into June, which is very late in the season considering the comparatively mild climate at this place. In the north, along the portion of the country occupied by the Eskimo, the feathers and skin of this bird are prized for ornaments used in their festivals and dances.*

FALCO ISLANDUS Brünn. White Gyrfalcon.

During my residence in the north I secured only a single specimen of this bird, an Eskimo skin taken at Cape Darby on the Alaskan shore near Bering Straits. Dall saw one on the rigging

* *Haliaeetus pelagicus*, Pallas.—Kamchatka Sea Eagle. The great Kamchatka Sea Eagle of Pallas has been erroneously accredited to the Aleutian Islands proper. That this Sea Eagle should occur, as a rare straggler, on the western extreme of the Aleutian chain, would not be surprising, as it is common in Kamchatka and occasionally visits the Commander Islands situated only about 300 miles west of the extreme of the Aleutian chain; but it has never been captured within the limits of these latter islands, nor have we authentic records of its occurrence. For the purpose of identification, for the benefit of future explorers in the Bering Sea region, I will add here the most prominent characters by which the Kamchatka eagle may be distinguished from the Bald Eagle. It is larger than the Bald Eagle. The tail is rather short and wedge-shaped; the middle feathers are nearly 4 inches longer than the outer ones. All the fourteen feathers are somewhat pointed, but the central four are lanceolate. The head, tail, thighs, and a broad band from the shoulder to bend of wing are white.

of his vessel off the coast of Kamchatka and north of Bering Islands. This bird remained with them many hours and finally left for the adjoining coast. It is apparently found merely as a straggler in the northern portion of the Territory and across the entire northern part of North America. During several springs a few birds were seen passing over just as the sun began to melt the snow from the tundra and the hardiest migrant birds were returning. The loud notes of the Ptarmigan are now heard rising for the first time from the hill-sides, and doubtless serve as the signal which sends this handsome hawk back to its summer haunts. The natives told me that these White Hawks sometimes breed on the mountains of the Kaviak Peninsula; but I had no means of verifying this statement, although my solitary specimen came from there. Kunlien found it very rare on the Cumberland Gulf side of Davis Strait and much more numerous on the Greenland shore. He notes that it is apparently much slower on the wing than the common Duck Hawk, and also that it was seen pursuing the gulls until they were exhausted before the hawk could secure its prey, thus showing that their endurance exceeds their speed.

FALCO RUSTICOLUS GYRFALCO (Linn.). Gyrfalcon (Esk. *Chī-kūre-i uk juv.*; *Kā-gōk-kūk, ad.*)

Throughout all Alaska, from the Aleutian Islands north, both along the coast and through the interior, extending from Bering Straits across the northern portion of British America, the present falcon is the commonest resident bird of prey. It was observed by Murdoch at Point Barrow, though it was not common. It frequents the vicinity of cliffs and rocky points about the sea coast, or the rocky ravines of the interior, during the breeding season, and the remainder of the year, especially in fall, it is found wandering over the country everywhere that food can be obtained; it is especially numerous during the migration of the Ptarmigan along the sea coast. It is less numerous on the Aleutian and other islands in Bering Sea than elsewhere, and there is but a single record of this species from the Fur Seal Islands, where Elliott obtained a specimen on Saint Paul's in March, 1873. This is an immature bird in the streaked plumage.

The young are much more abundant throughout its range than the adults, and from six to eight of the former were secured to one of the latter. The young from Alaska form a pretty uniform series, with but a comparatively small amount of variation for this extremely polymorphic species. The specimen obtained on the Seal Islands by Elliott, is larger and paler than the average Alaskan birds, and thus approaches nearer the young of the form known as *islandicus*. The adults secured on the shores of Norton Sound vary in the amount of spotting on the abdominal surface and in the shape and size of these spots. On the back they also vary from a condition in which the entire surface is washed heavily with ashy-blue, and the light cross-barring of the feathers is nearly obsolete, to one in which the cross-bars are well marked and of dull yellowish-white. In a series of skins of this species, from various parts of its range, there is found an interminable gradation from the whitest *islandus* to the darkest *gyrfalco* and *rusticolus*. Specimens in the National Museum collection from Greenland show the widest extremes, which are bridged by connecting specimens, so that it is impossible to definitely separate them. The young retain their streaked plumage until the second fall, as is stated by Newton in the Proceedings of the Philadelphia Academy of Natural Sciences, 1871, pp. 96, 97. This author's separation of *gyrfalco* from *islandicus* on the assumption that the head is lighter than the back in one and uniform with the back in the other rests upon a purely individual character, as is shown by my Alaskan series.

In Greenland Holbøll found the young of *islandus* moulting throughout the winter; but none of my winter specimens show signs of moulting, and the young specimens in my collection taken in April and May, still in a striped condition, show no sign of change. Macfarlane found numerous nests of this bird on the Anderson River, nearly all of which were placed in trees, and the eggs were laid in May, the earliest being upon the 10th. Along the sea-coast in the vicinity of Saint Michaels it breeds rarely, choosing rocky cliffs facing the sea. Along the Lower Yukon and Kuskoquim Rivers in winter it is numerous, and finds an abundance of Ptarmigan, upon which it preys. At this season it is frequently seen perching on a stout branch of a tree overhanging the river bank, and I have seen it on several occasions allow a train of dog-sledges to pass within 40 or 50

yards, only noticing their presence by slowly turning its head. It was seen in the vicinity of Bering Straits and around the shore of Norton Sound during the cruise of the Corwin in the summer of 1881, as also upon the northeast shore of Siberia in the vicinity of East Cape and Plover Bay. Swinhoe records specimens of this bird from Peking, China, and it also occurs in the Kurile Islands. At Saint Michaels on May 1, 1881, a specimen of this bird was brought me by a native woman, who had taken it from one of her Ptarmigan snares, where it was caught just after having robbed another snare of a Ptarmigan. The iris of a specimen taken on October 6, 1880, was dark hazel, and the large scales on the upper surface of the feet and tarsus were a greenish-yellow, the rest of the feet and tarsus being livid greenish; the bill was horn blue. Another specimen, taken on October 12, had the cere, like the tarsus, livid bluish-green; the bill was dark horn color at the tip and bluish-green at the base.

FALCO PEREGRINUS ANATUM (Bonap.). Duck Hawk.

A single specimen of this widely ranging species was obtained by Mr. McQuesten on the Upper Yukon at Fort Reliance on September 16, 1878. Dall found it breeding on the Middle Yukon, nesting in dead spruces and with the young nearly ready to fly on June 1, 1867. It is found in all the wooded parts of Alaska, from Sitka north to the extreme tree-limit. All the specimens from the southeast coast of the Territory, however, are to be referred to the dark variety *pealei*. The specimens from the Yukon are identical with others taken in the United States. All writers who have studied the Duck Hawk in life agree in giving it the reputation of being a swift and courageous marauder. It sits quietly perched on some point of vantage, whence it dashes with surprising quickness upon its prey.

On Cumberland Island and the west coast of Baffin's Bay Knudsen found this bird to be a regular summer resident, which, with the Alaskan and British American records, show that it reaches the northern Arctic portions of America entirely across the continent.

Along the eastern coast of Asia the Old World form, the true *peregrinus*, is recorded by various authors, and Nordenskjöld found a pair with young on the north coast of Asia in about latitude 70°.

FALCO PEREGRINUS PEALEI Ridgw. Peale's Falcon.

Along the southeastern coast of the Territory from Kodiak to Sitka this dark handsome variety of the Duck Hawk is found, perhaps entirely replacing its more eastern and northern relative. It has not been recorded from the interior or northern portion of the Territory to the north of the Alaskan Mountains; but in Dall's paper on the birds of the Western Aleutian Islands, in the Proceedings of the Californian Academy of Sciences, he records the following:

The form of Arctic Falcon referred to under this name is, according to Professor Baird, a true Gyrfalcon as distinguished from *caudicus* and *islandicus*, and has now its first record on American Territory.

Turner found it to be not rare upon the Near Islands, and Stejneger found it common on the Commander Islands.

A male bird, the subject of the preceding note by Dall, was taken at Kyska Island, at the western end of the Aleutian chain, on June 30, 1873, where a number had their nests on the brow of a precipitous cliff at the western end of the harbor. They were seen by the same naturalist at Amchitka Island later in the season. It did not appear to be common, and was the only hawk seen west of Unalaska. A note confirming the quotation just made was published in the American Naturalist for July, 1874, but Mr. Ridgway informs me that he has since examined the specimen upon which the identification and just quoted notes were made, and finds this specimen is really a typical example of *Falco pealei*; so that the range of this bird is extended to the extreme western end of the Aleutian chain. During the last of September, 1881, as the Corwin approached the Aleutian Islands from the north, with pleasant weather and a light wind, some half dozen specimens of this Duck Hawk were seen, one after another, as they came circling about the ship, and after remaining a short time, each departed to the southwest toward the island of Unalaska, which was in sight. All came from the direction of Akoutan Island. Several of these birds came very close to the vessel, and with the naked eye appeared almost black; but by the aid of a pair of good glasses,

the details of their color patterns were easily distinguished. From this observation, and that of Mr. Dall at the westward end of the chain, it would seem that this species is not uncommon on these islands; but there is no record of its presence to the north of this point on any of the other islands of Bering Sea, nor on either coast except south along the American mainland.

FALCO COLUMBARIUS Linn. Pigeon Hawk (Esk. *Chî-Kubr-i-ûk-shû-gûk*).

The well-known, widely-spread Pigeon Hawk is one of the most numerous and familiar birds of prey throughout the wooded portion of Northern Alaska, ranging during the migrations to the barren coasts of Bering Sea and the Arctic, and perhaps even extending its range to the north-eastern shore of Siberia. The well-known *Falco aesalon* of the Old World is recorded from the east coast of Asia, in China, and adjoining parts of that continent, and its range might be expected to extend across Bering Strait; but among a considerable number of Pigeon Hawks secured from that region not one is referable to this form. Among a series of eight Alaskan birds only one is in adult plumage; two immature specimens from Norton Sound are darker than the average, and some of the other specimens approach *richardsoni* very closely in the pale cast of their coloration. A Sitkan bird secured by Bischoff approaches variety *suckleyi* very closely in its dark plumage, and it is almost certain that the dark northwestern coast race occurs in this part of the Territory. The nesting range of the common Pigeon Hawk is confined to the wooded portions of the Territory.

The natives prize the feathers of this bird as an ornament and frequently as a fetich, on account of its boldness and powers of flight. It also figures frequently in the totemic system of the Western Eskimo.

At Fort Reliance, on the Upper Yukon, Mr. McQuesten secured a specimen of this bird on April 22, 1878, and Mr. Dall records it as a permanent resident at Nulato; but this, I am inclined to think, is somewhat doubtful, from statements made me by the fur traders and natives. In the interior of the Territory the Indians value the quills and tail-feathers of these birds for shafting their arrows. According to the naturalist just quoted it occupies the same nest for many successive seasons. The nest is made of sticks and straw in the top of a high tree. In one instance Dall saw one of these birds kill a Ptarmigan. The great size of this grouse as compared with the diminutive size of the hawk shows the prowess of the latter. Typical examples of this race have been taken at Kadiak Island, and I secured a skin on Sledge Island in Bering Straits. On October 6, 1878, I saw one of these birds dart down and strike its talons into the back of a Burgomaster Gull (*Larus glaucus*) as the latter was flying over the sea; after holding on for a moment—the gull continuing its flight unimpeded—the falcon let go, and rising almost directly up for 30 or 40 yards made off. In the summer after the young are on the wing these birds are not uncommon along the coast near Saint Michaels. Like the other hawks at this season they appear to wander extensively.

FALCO SPARVERIUS Linn. American Sparrow Hawk.

Mr. Dall records a specimen of this bird from Unalaska in the fall of 1871. Since then it has not been found by the several collectors in Alaska until noted by Dr. Aurel Krause, as numerous on Chilcat River, near the end of August. It is probably a very rare visitor to the more northern sections of Alaska. Perhaps its occurrence at Unalaska is to be regarded as accidental, and it is confined almost exclusively to the southern portions of the Territory.

PANDION HALIAËTUS CAROLINENSIS (Gmel.). American Osprey (Esk. *Ā kûm-kû-thla gû-yû-lî*).

This bird is found nesting on Vancouver Island and in British America, and it has been taken at various points coastwise to the north. Bischoff secured its eggs at Sitka, and it is found rarely along the shore of Norton Sound, and sparingly along the clear streams of the interior, extending its breeding range within the Arctic Circle. On the Yukon, as elsewhere in their extended habitat, they make a conspicuously large nest and return to it year after year. They

are of very uncommon occurrence along the shore of Bering Sea, on Norton Sound, but they are far more numerous on the southeastern coast of the Territory. Although in the interior this bird extends its range within the Arctic Circle it is not found on the Alaskan shore of the Arctic Ocean. At the Ynkou mouth, in May, 1879, a pair of these birds was seen hovering over the open places in the ice which still covered the stream. In British America Richardson notices the strange fellowship these birds keep, nesting close to the home of the Bald Eagle, and apparently living upon the best of terms with this robber.

The Fish Hawk has been recorded also from the eastern shore of Asia, including East China, Japan, Formosa, and other points to the south and north. These Eastern Asiatic birds are said to differ from those taken in Europe, and the northwest coast bird from America may be found to vary from its eastern representative. It is a point worthy of attention from any naturalist who may have the opportunity to secure birds from the northwest coast, and to compare them with the eastern bird.

ASIO ACCIPITRINUS (Pall.). Short-eared Owl (Esk. *Ming-kō-chē-wāk*).

My first acquaintance with this bird in Alaska was made on May 21, 1877, while stopping at Unalaska. Here, one evening, just as the long twilight was drawing to a close, and I was making my way back to the village from a hunting excursion, my attention was drawn to two birds which appeared to be pursuing each other in sport over the adjacent hill-sides. As I approached they ceased their erratic flight, alighted and watched my movements. A few moments later one of them gave a rather loud cry, which sounded like the syllables *hoo-hoo-hoo-hoo*, uttered rapidly in a higher key than the note of the Horned Owl and in a much less sonorous tone. These birds were very shy, and it was impossible to get within gunshot. Later, in the vicinity of Saint Michaels, it was found to be a regular and common migrant and rather common summer resident, and skins were brought me by the fur traders from various points on the Yukon; the Eskimo brought skins also from Selawik Lake, near Kotzebue Sound, the summer of 1880. According to Turner, it is an uncommon resident of the Near Islands; it is also found on the Commander group.

On the Aleutian chain, where it is frequently found, Mr. Dall reports it as nesting in burrows on the hill-sides, and tells us that these burrows are usually about 2 feet deep and lined with grass and feathers, and that the birds have a habit of sitting by their entrances during the day. While the same naturalist was descending the Yukon, one of these birds followed his boat for a considerable time until the superstition of the natives became excited and they killed it. He informs us that the Indians consider its liver as a love-philter if given by a woman, but a deadly poison if given by a man, and the charm is broken if discovered before being eaten. The Short-eared Owl is the commonest bird of prey found on the shore of Norton Sound in summer, and is sometimes very numerous. It is never very shy there, and has a great amount of curiosity.

On one occasion I was lying prone in a bunch of grass while shooting geese and saw one of these birds approach. I remained perfectly quiet and it alighted close beside me and began to gaze about, keeping up a continual blinking with its large round eyes, in the most comical way, moving its eyelids with a peculiar quick motion as though they were worked by springs. At the same time it kept turning its head watchfully from side to side. I made a slight noise, which caused the bird to arise and hover directly over my face so close that the fanning of its wings was felt. It hovered there nearly a minute trying to understand the strange object below until I broke the spell by a shout and threw up my arms, upon which the owl dashed off in wild irregular flight as if its wits were completely scattered. To account for the stupidity of this owl, and for its peculiarly-shaped head, the natives have a legend that the *mán-kō-chē-wāk* was a little girl living on the Lower Yukon with her parents; but from some cause she was turned into a bird with a very long bill, very much like a crow's, and as she started up in a wild confused way to get out of her village after the change, she flew plump into the side of a house, compressing her bill into a very short one, and flattening her face; and so it has remained to this day, as any one may see by examining the bird.

Throughout the northern part of its range this is a migratory species, arriving the last of May at Saint Michaels, on Norton Sound, and in the surrounding region, where it remains until the last of September or first of October. In Northern Illinois they come late in the fall, frequently in considerable numbers, and remain on the prairies and marshes all through the winter. At this season they remain concealed in the bunches of dry grass and reeds until about 2 p. m., when they rise and quarter the ground the rest of the afternoon in search of mice. They are very heedless and may be easily approached, and, at times, may be called close to one by imitating the squeaking of a mouse. They sometimes alight and watch a person's movements, at the same time going through a curious bowing motion, swinging the head about, much like the odd bowing of the Burrowing Owl when it is approached. When disturbed and pursued the Short eared Owl frequently utters a hollow, sonorous, rolling whistle. I have heard the same note in the fall at Saint Michaels when the birds come about the dwellings as they are preparing to migrate. At this time they are frequently found about the houses in the evening, frequently dashing rapidly back and forth by one's face as if in sport.

Kumlien reports finding these birds breeding on Penny Peninsula in latitude 72° North, and the natives informed him that they nested under ledges. It is rare on the Greenland coast.

ULULA CINEREA (Gmel.). Great Gray Owl (Esk. *Mū-gā āi-pai-ūkh*).

Throughout all the wooded parts of Alaska from Sitka north to the northern tree-limit, and from the vicinity of Bering Straits east throughout the Territory, and extending over all of the fur countries, this fine owl is a common and well known resident. Unfortunately, owing to my limited acquaintance with the interior—having made but a few winter expeditions in this direction—the present bird became known to me only through specimens brought in by the fur traders and natives; and, as a consequence, I can add nothing to our knowledge of its habits. It was found to be remarkably stupid by Mr. Dall, who informs us that on the Yukon it can be caught by the hand in the daytime. He found it feeding mainly on small birds, and took thirteen *Egiothi* crania from one of them. He tells us also that it is eaten by the old men and women, but the natives have a superstition that if young persons eat it they will become old very soon and die. Owing to its heavy flight and awkward motions the Indians in the vicinity of Nulato call this bird *Nāhl-tohl*, the "heavy walker."

This is a common bird throughout most of the north, but is not familiarly known to the coast people, owing to its predilection for the more heavily-wooded portions of the country. It occurs as a very rare straggler even on the open sea-coast of Bering Sea and the Arctic, but the bird is totally unknown on the islands of Bering Sea. Along all the heavily-wooded southeastern coast of the Territory, including the Sitkan region, and thence south to Washington Territory, it is a common resident species.

ULULA CINEREA LAPONICA (Retz.). Lapp Owl (Esk. *Mū-gā pāi-ūkh*).

The introduction of this bird as a member of the North American fauna rests upon a single specimen taken at the Yukon delta, on April 15, 1876, and sent to the U. S. National Museum by Mr. Turner. The original record of this capture is published in the Bulletin of the Nuttall Ornithological Club for January, 1878, p. 37. The range of this bird in America is probably limited to that portion of the Bering Sea coast and shore of the Arctic in Alaska adjacent to the Siberian shore, where the bird may occur as an occasional visitant. Its habits are undoubtedly closely related to those of its American representative.

In Lapland this owl has been found nesting on the stumps of trees and on the Scotch fir. It is said to lay four eggs, and ranges throughout Northern Europe and Siberia. The difference between it and its American representative consists of the much lighter colors and fainter markings of the Old World bird.

NYCTALA TENGMALMI RICHARDSONI (Bonap.). Richardson's Owl (Esk. *Tūk-ūché-ling-ūkh*).

This handsome little bird is common throughout the northern part of Alaska wherever trees or large bushes occur to afford it shelter. At Nulato Dall frequently heard it crying in the even-

ing almost like a human being. Owing to poor eyesight it is frequently caught alive in the hand by the natives, and the Eskimo call it, in consequence, the "blind one"—*Tuk-uhé-tug-ûk*. They sometimes capture the bird and tie a small piece of dried fish between its shoulders, and let it go again, so that it will bring them a successful hunt, perhaps with the idea that this will render the game as blind to the approach of the hunter as is the owl. I found Eskimo children keeping these owls as pets on the Lower Yukon, feeding them with dried and fresh fish. The birds were very tame, and looked complacently about when taken in the hand, evidently perfectly reconciled to their fate. In one instance, while at the Yukon mouth, I heard them uttering a peculiar grating cry on a cloudy morning the middle of May. A fur trader from Kotlik brought me a set of four fresh eggs of this bird, taken from a nest in a bush near the Yukon mouth, the 1st of June. These eggs were white and round as are most owls' eggs. The man who brought them unfortunately neglected to bring the nest, but told me that it was a rather small structure of twigs and grass. It was probably a deserted nest of the common Rusty Black Bird or of the Gray-cheeked Thrush, both of which nest commonly in that vicinity. The eggs were found in the midst of a dense thicket.

Dall and others tell us that this bird generally nests in a hole in a tree, but the lack of trees at the Yukon mouth and the presence of bushy thickets may lead this bird to even build a nest for itself, and the fur trader insisted that the eggs above mentioned were in a nest of the bird's own construction. The only authenticated eggs known to Dr. Brewer were a set from Fort Simpson, taken on May 4, 1861, one of which measured 1.28 by 1.06. Of the set secured by myself I have been able to find only three of the eggs since my return. These measure, respectively, 1.54 by 1.24; 1.50 by 1.24, and 1.50 by 1.27. A careful examination of my extensive series of these birds, from various parts of the Territory, shows but little individual variation; the intensity and amount of markings on the lower surface, especially on the feathers of the tarsus, is the main point. In some instances the markings on the latter are almost entirely obsolete, while again they are very distinct. Northern birds appear to be of a slightly lighter shade of brown, and grayer than birds from Eastern North America; otherwise there appears to be no appreciable geographical difference.

The difference between the Old World form and the present bird rests entirely upon the light colors of birds from Europe and Siberia, as compared with the dark tints of the American birds.

MEGASCOPS ASIO KENNICOTTII (Elliott). Kennicott's Screech Owl.

The type specimen of this species was a young bird in the tawny brown phase taken at Sitka during the explorations of the Western Union Telegraph Expedition, and described by D. S. Elliott in the Proceedings of the Philadelphia Academy of Natural Sciences for 1869, p. 69. Up to a comparatively recent date our knowledge of its habitat and history was limited. We have, however, within the last few years learned that it extends down the northwest coast from Sitka to Oregon, and then east to Idaho, and Mr. Brewster, in a paper describing the smaller variety of this bird (*bendirei*) as hereafter mentioned, shows that *kennicottii* intergrades with *bendirei* where their habitats overlap.

The habits of both birds remain as yet almost unknown, but the eggs of *bendirei* have been described recently from notes published in the Bulletin of the Nuttall Ornithological Club for July, 1881, giving an account of two sets taken by Capt. Charles Bendire at Fort Walla-Walla, Wash., on the 7th and 11th of April of that year. The first set contained four eggs and was taken on April 7. This was in a hole in a cottonwood tree about 25 feet above the ground, the eggs resting upon decayed wood and a few dead leaves. The eggs measured, respectively, 1.47 by 1.28; 1.43 by 1.29; 1.45 by 1.30, and 1.46 by 1.30. The second nest, taken on April 11, contained five eggs, which measured, respectively, 1.53 by 1.31; 1.50 by 1.27; 1.47 by 1.32; 1.50 by 1.32, and 1.49 by 1.30. This nest also was in a hollow cottonwood tree, and about 40 feet above the ground. The eggs rested upon rubbish in the bottom of the cavity, there being neither feathers nor leaves as a lining. The parents in both instances remained in the holes while the eggs were being removed.

Mr. Brewster has recently made a careful examination of a large series of these owls in connection with the other North American races of *Scops*, and gives the following diagnosis of *kennicottii*, which we quote from the Bulletin of the Nuttall Ornithological Club for January, 1882:

Description.—"Wings, 6.40 to 7.60; Dichromatic, assuming either a gray or a tawny-brown condition. Gray phase similar to that of *asio*, but with the plumage beneath thickly barred and streaked along the median line. Brown phase characterized by a general dusky-number or tawny-ochraceous coloring unlike that of any other North American form."

In a footnote Mr. Brewster states that the small quadrate spots on the primaries and the indistinct tail-bands, formerly held as diagnostic, are variable, and have no varietal significance.

BUBO VIRGINIANUS SUBARCTICUS (Hoy). Western Horned Owl (Esk. *Mū gā-pā-āk*).

Throughout the entire wooded part of Northern Alaska the present bird is found, extending its range in autumn to the open treeless shore along Bering Sea and portions of the Arctic coast. In several instances at Saint Michaels I found them perched on our wood pile in the evening, late in autumn, and saw others, now and then, using for a lookout the upright stacks of drift-wood we had placed above high-tide mark for winter use. When traveling at night along the Yukon in midwinter I have frequently heard the hollow notes of these owls echoing from the black recesses of the spruce forests which wall in the river down to within a hundred miles or so of its mouth. This sound, with the sharp bark of a fox, or the much rarer cry of a hare as it is caught by a lynx, or, rarer still, the long drawn howl of a wolf, are the only noises that greet the ear of the weary traveler. We may add, however, the monotonous squeaking of the sledges over the snow and the grinding sound of the snow-shoes, forming a continuous undertone. At last motion becomes mechanical, and with dim, half-closed eyes we keep our course, while everything visible in the immediate vicinity appears to assume fantastic shapes; the broad white surface of the river appears to rise like a wall before us, and the two black spruce-grown banks form arms that stretch out on either hand and beckon to us with a wavering motion. As the darkness becomes more and more intense a deep silence falls upon the scene, and in a waking trance our minds wander back to distant firesides where gather those we love; familiar faces take form, and the companionship of friends thousands of miles away is ours until, breaking in upon the reverie, comes the loud *hoo-hoo-hó-oo* of this self-appointed guardian of these wilds. With a start we again become conscious of our surroundings. The river stretches out interminably, and the banks appear to draw back as we advance. Ere long, however, a distant howl is heard; the dogs prick up their ears and start off at a trot, and in the midst of a confused howling and shouting we make our grand entrance into a town composed, perhaps, of two or three underground huts filled with people and dogs.

It is upon occasions like this that the traveler is likely to make the acquaintance of these owls. When the winter draws on and during the famine period just before the spring opens it is common for them to get a foot into a fox-trap while they are foraging for food. Again, in early June, as the fur traders come down the Yukon with their furs, they not infrequently bring the half-grown young of these birds as pets, and by such means a number of the young reached me at various times.

Near Fort Yukon Kennicott found them breeding on April 10, and describes the nest as a very large structure made of dry spruce branches placed in a spruce tree standing amid a dense growth of other trees of its kind. This date, however, is probably somewhat earlier than usual, as would appear from the size of the young which I have seen brought to the sea-coast by the fur traders, which were not half grown by the middle of June. Strangely enough this form extends not only through Northern Alaska but through the northwestern portion of British America, and thence down along the Rocky Mountains and along the Sierras to California, where specimens occur which are identical with those farther north.

I have a bird in my collection secured in Northern Illinois which is exactly like some Alaskan examples and it is found over all the intervening country in winter. The Great White-horned Owl (*arcticus*) of the Hudson's Bay region and thence north is a race which is apparently very similar

to the present bird, but with the white predominating so as to nearly obliterate the darker color. The habitat of this form, however, appears to be very much more limited than that of *subarcticus*, and is confined to northeastern extremes of continental North America.

BUBO VIRGINIANUS SATURATUS Ridgw. Dusky Horned Owl.

The present species is an extremely dark-colored form of the Horned Owl, found along the damp, heavily-wooded south coast of the Territory, and extending its range thence south to Washington Territory, and perhaps farther.

The Horned Owl is split into the following geographical races:

Virginianus.—Atlantic States.

Saturatus.—Labrador, Hudson's Bay, and North Pacific coast.

Arcticus.—Extreme north of the continent, in the interior.

Subarcticus.—Rocky Mountains and Alaskan region, crossing into Southern California, and extending thence east to Wisconsin and Illinois.

NYCTEA NYCTEA (Linn.). Snowy Owl (Esk. *Ung-päk*).

From the Sitkau region north to the furthest point of the Territory the present bird keeps mainly to the more barren portions of the coast and interior, and always is found less numerous where trees are abundant. It occurs also upon the islands of Bering Sea, and more sparingly upon the Aleutian chain, where it is rare. It is resident at Point Barrow and also on the Near Islands. On Bering Island it has become abundant since the introduction of mice. On June 12, 1877, we were on a vessel about 75 miles east of the Fur Seal Islands, when one of these birds came on board and remained most of the night in the rigging, but left early in the morning.

The Eskimo are well acquainted with these birds and with their habits, and one man told me he had seen these owls catch the large Arctic hare by planting one foot in the hare's back and stretching the other foot back and dragging its claws on the snow and ground; at the same time the bird used its wings to hold back, by reversed strokes, until the hare soon became exhausted, when it was easily killed.

On the Lower Mackenzie, Richardson relates that one of the Hudson's Bay Company's Factors, Mr. McPherson, saw one of these owls fly over a cliff and carry off a full fledged Duck Hawk in its claws. It crossed the river to the further bank, where it lit on the shore to devour its prey. The parent hawk followed, uttering loud screams, and, darting down with great rapidity, killed the owl with a single stroke, but whether with wing or claw could not be determined. After this summary act of vengeance the falcon returned to its nest.

This owl also preys upon ducks, as Stejneger saw it pursue sea ducks on the reefs of Bering Island.

North of Hudson Straits Kunlién found Snowy Owls rather scarce during the winter, and saw them hunting during the day, but notes their excessive shyness. This shyness appears to be characteristic of the bird throughout its northern range, and even upon the lonely and almost unknown Wrangel Island, where, upon our landing, one of these birds was seen, it arose and hastily left for the interior, although we were about 200 yards from it when it first caught sight of us. It has been reported as a resident of the Aleutian Islands, where Dall saw a dead bird and fragments of skins of others at Unalaska. It is more common in the northern part of the Territory, where its distribution, however, is irregular, it being abundant at one season and almost totally unknown the next. I was informed by Captain Smith—a well known whaling captain of that region—that he had seen as many as fifty of these birds perched in view at one time along the abrupt coast-line of the Arctic, in the vicinity of Cape Lisburne, and yet they were so shy that it was impossible to secure a single bird. It breeds upon the ground, as far south as the mouth of the Kuskoquim, especially during the years when lemmings are abundant, when this owl also becomes proportionately numerous. The natives told me of seasons, separated by long intervals, when the lemmings have occurred in the greatest abundance, and the White Owl accompanied them in such numbers that they were seen dotting the country here and there as they perched upon the scattered knolls. During such seasons the owls nest on the hill-sides, laying, according to the natives,

from five to ten eggs, in a grassy depression in a sheltered spot on the hill-side. The last time when they were so abundant about a dozen pairs were found nesting upon an isolated hill near the coast, just east of Saint Michaels, as I was informed by several different persons.

On one occasion, while traveling south of the Yukon in December, I secured a beautiful specimen of this bird, which was nearly immaculate milky white, with a rich and extremely beautiful shade of clear lemon-yellow suffusing the entire bird, exactly as the rosy blush clothes the entire plumage of some gulls in spring. The bird was kept until the next morning; an examination then showed that beautiful tinge had vanished and the feathers had become dead white, with barely a trace of the coloring seen the previous evening. The birds showing the largest amount of white are usually males.

The highest latitudes reached by Arctic explorers have not exceeded the bounds of this hardy bird, which is represented by a similar or identical form around the northern shores of the Old World. In the History of North American Birds the American bird is separated from the European by the greater amount of white possessed by the latter. It is rather common to find pure white specimens of this bird from the northern part of America marked by a very few scattered spots upon the back. A specimen sent to the National Museum from Sitka, taken during the winter of 1881-82, has a larger amount of black markings than any bird I have seen. It may indicate a local dark-colored form in that region.

The Snowy Owl is said to nest in Lapland, after a great lemming season, and in Northern Norway as well. When it nests there it always chooses a hill-top or hill-side. The eggs, which are from six to eight or more in number, measure from 2.05 by 1.02 to 2.25 by 1.77, and are of a roundish oval form; the color is white, and the shell has a fine texture. Like numerous other birds this owl figures largely in the mythologic tales of the Northwestern Eskimo, one of which in particular is an interesting account of the way in which man learned the use of various implements by the experience of a metamorphosed owl. It does not appear to have been a very common bird near the winter quarters of the Vega, although every explorer has found it wherever he has penetrated the Arctic.

Wrangel accuses these birds of being carrion-eaters in Northern Siberia. During the Nares Arctic Expedition these birds were found nesting on Grinnell Land, in latitude $82^{\circ} 33'$ north, on June 24, when a nest with seven eggs was found. The eggs were placed in a mere hollow scooped out in the earth on the top of a rise in the center of a valley. They were found nesting in abundance by the same party in latitude 81° .

SURNIA ULULA (Linn.). Hawk Owl.

The presence of this bird in this report rests upon the capture of a single specimen near Saint Michaels in October, 1876, by Mr. L. M. Turner, and recorded in the Bulletin of the Nuttall Ornithological Club for January, 1878. Its great rarity at this point, as well as throughout the interior of the Territory, is attested by its absence in the large series of Hawk Owls secured by myself and Mr. Turner while in the north. It is a rather abundant species around the Arctic region of the Old World, and is numerous in Lapland, where it is noted for its indifference to the presence of man. It nests in hollow trees, and the male fiercely defends the eggs. They have been known to even wound a person climbing the tree, thus showing a spirit as bold as the American birds. One of the latter made an onslaught upon Mr. Dall when investigating a nest.

The present form may be distinguished at once from the American bird by the predominance of white barring on the lower surface and the large amount of white upon the neck, with a general paleness and increased amount of white upon the back. The brown bars of the lower surface are narrow and pale, and the white bars broader than in *caparoch*. The feet and legs are dull white with a fine, pale and very indistinct brown mottling. The top of the head appears white with dark markings, whereas in the American bird the crown appears dark-brown with white marks. The white marks on the upper back, scapulars, and rump are larger and more prominent than the dark markings. The brown of the entire bird is pale and has a bleached appearance. The pattern of coloration is the same in the two forms, but the European bird will be recognized at once

by the characters given. From the material I have been able to examine these two owls appear to form very good races. The only record of the presence of the American form in the Old World appears to be that of its capture in England.

SURNIA ULULA CAPAROCH (Müll.). American Hawk Owl.

This is perhaps the most abundant resident bird of prey throughout the entire wooded part of Northern Alaska. It is rather closely limited to the region of spruce and pine forests of the interior, and occurs along the open coasts of the Arctic and Bering Sea merely as a straggler, and it is unknown from the various islands of Bering Sea. It is found also along the southeast coast in the Sitka region. On May 5, 1868, Mr. Dall secured six eggs of this bird from the top of an old birch stub about 15 feet high in the vicinity of Nulato, on the Lower Yukon. The eggs were laid directly upon the wood and the male was sitting. When he climbed to the nest the sitting bird dashed at him and knocked off his cap, thus showing their fierce and bold character, which is shared by their Old World representative. The eggs were smooth and clear white.

Their food consists mainly of mice, and the bird itself forms food for the old Indians of the Yukon. Although it is very rare on the sea-coast, yet stray individuals make their appearance now and then. According to the evidence of various authors these birds nest from April until June.

There is considerable variation in the amount of white marking, and one Saint Michaels skin secured by me is about midway between the two recognized forms.

CERYLE ALCYON (Linn.). Belted Kingfisher.

Several specimens of this bird were brought me from the Lower Yukon, where it is a regular summer visitant. It is found along the entire course of this river, reaching the shores of Bering Sea from the Yukon mouth north to the head of Norton Bay. It has been taken at Sitka and frequents all the clear streams of the interior, nesting, as it does elsewhere, in a deep burrow in a bank. Towards the end of June Mr. Dall saw a male bird digging short tunnels into a bank near its nest. These tunnels were not deep and apparently were made as a pastime by the bird, which was seen to use them only upon one occasion when he entered one to devour a fish which he had just caught. The Eskimo brought me Kingfishers from several places on the shore of Norton Sound, and the Eskimo of the north coast brought specimens of the Kingfisher to MacFarlane from the shore of the Arctic, between the Mackenzie and Anderson Rivers. From its mode of life, however, it is forced to retreat before the fast-closing streams of the far north as winter advances, yet the Kingfisher can brave a very low temperature provided its food supply is not shut off. I have seen these birds along Western rivers among the Rocky Mountains in January, when a deep layer of snow covered the ground and weighted down the bushes overhanging the streams. Even on the Saskatchewan it holds its own until into October, but is forced south when winter sets in. It does not appear to be a bird much addicted to wandering beyond its usual range, which is pretty wide, as it extends to the shores of Hudson's Bay and thence across to the vicinity of Bering Straits, and from the coast of the Arctic Ocean south to the tropics in winter. The Californian and west coast birds are said to be larger than those found in the interior and Eastern United States. It is probably this form which extends its range to Sitka during the summer and perhaps even winters along the sea, which there is never frozen.

DRYOBATES VILLOSUS (Linn.). Hairy Woodpecker.

Strangely enough, although the distribution of the present bird is eastern, and although in Northern Alaska and the interior of British America it is replaced by a large northern form, yet the typical *villosus* also occurs in British Columbia and thence north along the southeastern coast of Alaska; how abundantly it is found there is not known. It is probably this form which is recorded by Hartlaub under the name *Picus villosus harrisii* Aud., as seen in great numbers around Portage Bay the last of August.

DRYOBATES VILLOSUS LEUCOMELAS (Bodd.). Northern Hairy Woodpecker.

This large form of the Hairy Woodpecker nests along the northern tier of States, particularly those bordering the Saint Lawrence, and thence north through the interior of the fur countries, reaching rarely, if at all, the coast of Bering Sea and the adjacent Arctic shores. It is distinguished from *villosus* by its greater size and the larger amount of white. It was found by Richardson in the Hudson's Bay country to the sixty-third parallel, but was reported to be rare north of the fifty-sixth degree. The specimen in my collection was taken by Mr. McQuesten at Fort Reliance, on the Upper Yukon, about latitude 66°, and undoubtedly the bird straggles still farther north. It has not been taken on the Lower Yukon, but at Sitka and south in British Columbia is found the common *villosus*, replacing the *harrisi* of Washington Territory, Oregon, and thence south. The range of the two latter forms, from Southeastern Alaska to Washington Territory on the northwest coast, appears to be intermixed, and just what relationship the two forms bear one to the other in this portion of their habitat is, at present, unknown.

The following set of measurements show the difference between the small-sized Hairy Woodpeckers from the Southern Atlantic States and those from the headwaters of the Yukon, the specimen measured from the north being the one in my collection taken at Fort Reliance. The second set is from a specimen in the National Museum collection from Georgia:

No. 1155.

	Wing.	Tail.	Tarsus.	Culmen.	Depth of bill at base.
Northern Alaska ...	5.10	3.58	.73	1.25	.34
Georgia	4.40	3.20	.....	.95	.29

DRYOBATES PUBESCENS (Linn.). Downy Woodpecker (Esk. *Pū-gūkkī-tū-yū-lik*).

Throughout the Territory where woodland or a growth of bushes and small trees occurs the present bird is certain to be found, and is a resident winter and summer. It has been taken along the entire course of the Yukon as well as at various points on the coast of Bering Sea, and thence south at Kadiak and Sitka. In autumn it is a rather common visitant to the coast of Norton Sound in spite of the lack of timber, and it was not uncommon to see it clinging to the sides of the houses, or to the flagstaff, and other similar supports; after resting awhile, and, perhaps, tapping a few times on the unproductive logs, they would leave for a more promising field. They were seen at times passing from one alder patch to another, on the lill sides, and they follow the spruces and other trees to the shore of the sea.

While I was camping in spring, at the Yukon mouth, these birds were rather common in the dense bushes along this stream and its tributaries. Their holes were frequently found in the decaying stubs, although I did not find a nest containing eggs. This species appears to frequent deciduous thickets and trees by preference, as, in addition to the various times which I saw it in the interior in winter, while at the Yukon mouth, I always found it about locations where only deciduous trees and bushes were found, and its holes were always made in cottonwood or birch-stubs.

In the History of North American Birds, Mr. Ridgway notes the restriction of the black bar on the tails of specimens from the Yukon. After a careful examination of a large series of Alaskan specimens before me, I find that they are generally indistinguishable from birds taken in the United States, though they average, perhaps, a little larger than most of southern specimens. Nor are these proportions constant, as appears to be the case with the northern form of *villosus*. Northern birds are usually less soiled below than specimens from southern localities, and the absence or restriction of the black bars on the under tail-feathers in Yukon and other northern specimens appears to be chiefly due to individual variation; but, at the same time, among the northern series there appears to be a general inclination toward a less amount of black barring on the tail. All of the white markings appear to be somewhat clearer in northern specimens, and also to be slightly increased in amount, thus approximating the characters of *leucomelas*, though to a very slight extent.

I give below measurements of two series, one of northern birds taken in the vicinity of Saint Michaels and along the course of the Yukon, and the other from specimens taken at various points in the United States, by a comparison of which may be seen the amount and character of the variation exhibited by birds from the two regions:

PICTUS PUBESCENS.

United States specimens.	Wing.	Tail.	Tarsus.	Bill.	Depth of bill.
Fort Leavenworth, Kans., ♀.....	3.80	2.70	.66	.56	.21
Sherborn, Mass., ♀.....	3.80	2.75	.65	.53	.20
Whitfield, Ga., ♀.....	3.60	2.50	.64	.50	.21
Carlisle, Pa., ♀.....	3.65	2.35	.64	.55	.21
District of Columbia, ♂.....	2.75	2.32	.65	.60	.22
Massachusetts, ♂.....	3.70	2.42	.65	.58	.22
Illinois, ♂.....	3.65	2.55	.65	.57	.21

Northern Alaska.	Wing.	Tail.	Tarsus.	Bill.	Depth of bill.
No. 580.....	3.75	2.85	.66	.61	.22
No. 631.....	3.88	2.79	.67	.63	.23
No. 736.....	3.85	2.90	.65	.63	.23
No. 1154.....	3.82	3.00	.65	.62	.23
No. 370.....	3.85	3.00	.66	.63	.22
No. 356.....	3.70	2.78	.65	.62	.22
No. 1407.....	4.10	3.20	.66	.61	.22

PICOIDES ARCTICUS (Swains.). Arctic Three-toed Woodpecker.

Very little appears to be known concerning the movements and habitat of this bird, especially in the north. I secured but a single specimen, which was brought me by Mr. McQueen from Fort Reliance, on the Upper Yukon, and its rarity as compared with the other Three-toed Woodpecker appears from the fact that dozens of the latter were brought me each winter. No one among the various naturalists who have visited this region before has secured it, and *arcticus* is totally unknown west of the point where my specimen was found. The wooded and mountainous southern portion of the Territory is a still unknown region, and it is likely that the bird will be found to be more or less common there. The next record appears to be the one given by Mr. Lord, who secured one on the summit of the Cascade Mountains in British Columbia, and upon this rests the only other northwestern record of this bird. It penetrates the United States at various places, and is not very uncommon in Northern New England and New York, as well as near the northern border at various other suitable places, reaching the Rocky Mountains and the Cascade Range of the Sierras, and it extends farthest to the south on the eastern and western extremes of its range.

The National Museum possesses specimens from the vicinity of Great Slave Lake, beyond which there appears to be no record. My bird, which was secured on the 17th of October, 1878, does not differ from others of the same species taken at various localities in the Eastern United States.

PICOIDES AMERICANUS ALASCENSIS (Nels.). Alaskan Three-toed Woodpecker.*

A careful comparison of the large series of *Picooides* contained in the National Museum from the Rocky Mountains and a series of nearly a dozen fine specimens from Northern New York, kindly loaned me by Drs. C. H. Merriam and A. K. Fisher, with a large number of British American and Alaskan skins, shows conclusively that three well-marked geographical races of this bird exist in North America. From the Lake Superior region eastward, and along the Atlantic coast north, embracing the region about Hudson's Bay and joining the habitat of the other forms about Fort Simpson, on the headwaters of the Mackenzie River, is the range of typical *americanus*, which intergrades with the other races along the junction of their habitats. Along the Rocky Mountains from Fort Simpson, on the headwaters of the Mackenzie, and westward to the Sitkan and Kadiak regions of Southeastern Alaska as its northern border and thence along the Rocky

* Described in the Auk, April, 1884, pp. 165, 166.

and other mountains of the west to the south is found the form known as *dorsalis*, which, as will be seen in the appended description, is a well-marked race. From Fort Simpson and Fort Liard, on the headwaters of the Mackenzie River north, including also the Anderson and Lower Mackenzie Rivers, and to the west, covering the entire northern portion of Alaska, on the south-eastern shore of the Territory, its range merges into that of *dorsalis*, as mentioned previously. The differences existing between *americanus* and *alascensis* will be seen by the following parallel tables, in which the northern form is compared directly with specimens from the Adirondacks:

AMERICANUS.

Crown the same in both forms. The nuchal collar frequently indistinct, and never forming a heavily-marked band. The upper half of the dorsum is frequently black, almost unspotted, and is never heavily or thickly barred or marked with white; the lower half of dorsum is frequently rather profusely barred with white, but rarely equaling even those Alaskan specimens with the lightest markings. The rump is sometimes black, but usually has more or less white markings in the shape of spots and small bars; the white wing-barring and spotting along the edges of the vanes of the primaries, secondaries, and tertiaries are about equal in number in the two races, but the individual marks are much smaller, as a rule, in *americanus*. The pattern of the white markings about the head is the same in both forms, but in the present bird these markings are very much less decided than in the northern race. The upper tail-coverts are either unmarked or the markings are very narrow. The barring and streaks on the sides of the breast and flanks are always black and distinct.

ALASCENSIS.

White nuchal collar generally very broad and well defined. The upper half of dorsum is almost invariably thickly and heavily barred with white, which often occupies two-thirds of this area. This is one of the main and most striking differences between the two forms. The lower half of dorsum, although less abundantly marked than the upper half, usually has about one-half its surface covered by transverse or longitudinal white markings; in some instances these markings cover nearly the whole back, so that the bird appears to be almost uniformly white on the entire dorsal surface with a faint wavy barring of darker showing indistinctly through the white. The rump is always profusely marked with white bars and streaks, which extend over the upper tail-coverts, which latter are generally broadly barred and marked with white. The white markings on the wing-feathers have the same distribution as in *americanus*, but they occupy nearly twice the area occupied by those in *americanus*, and in many cases the primaries and secondaries are broadly tipped with white in the northern birds. The streaks and barring on the sides and flanks are much lighter than in *americanus*, and frequently are pale fulvous brown in very narrow bars with broad interspaces of white.

The following notes form a summary of the characters distinguishing the three American forms of this bird; a series of measurements is appended:

Americanus.—A series of eleven birds from Northern New York have the white markings of the back in the form of transverse bars, which are frequently restricted to the central portions of the feathers, and in several instances the upper half of the dorsum is very much less marked than the lower portion. The oval or quadrate spots and bars along the webs of the wing-feathers are small. The white line extending from the eye to the nape is very narrow and frequently scarcely discernible. In short, the birds of Eastern North America are darker colored, with the white markings less inclined to spread and become united into broad areas, than is the case in the following forms.

Dorsalis.—The National Museum series of Three-toed Woodpeckers from the Rocky Mountains, ten in number, ranging from Fort Kenai and the Southeastern Alaskan coast, and Fort Simpson, on the headwaters of the Mackenzie River, south to Colorado and Arizona, agrees in having a well-marked nuchal collar, which is joined by a white stripe from the eye. In all well plumaged summer birds a longitudinal white band begins with the nuchal collar and extends down the back to the rump, with no trace, or at most a very slight one, of transverse barring. This white dorsal band has the same appearance and outline as the white band on the back of the Hairy Woodpecker, except that on *dorsalis* this white area extends much higher on the nape than it does in *Picus villosus*. The feathers of the rump are usually white tipped. The white quadrate spots and bars on the wing-feathers are smaller than in the birds found farther north, but agree in averaging a little larger than in the birds from Eastern North America.

Alascensis.—In the country from Fort Simpson north and west, including the Lower Mackenzie and Anderson Rivers, and all of Northern Alaska, occurs this well-marked race of the Three-toed Woodpecker, which is characterized by the extent and amount of the white markings upon the dorsal surface, mainly in the form of barring. The well-marked white postocular stripe reaches the back and joins the nuchal collar, as in the other two races, but, as is the case with all the white head-markings in this form, they are broader and more distinct than in the southern races. Commencing at the nuchal collar and covering the dorsum extends a series of transverse white bars, two or three on each feather, one of which forms the tip. These bars are generally so broad and distinct that they occupy over one-half the surface of the back. In many examples the white encroaches on the black until the latter appears only as spots along the border of the web of each feather, and the back is covered by a much larger white area than in typical *dorsalis*. In Alaskan birds this white area is generally mottled with darker, whereas in *dorsalis* the white area is usually unbroken. In some cases the rump and tail-coverts are tipped with white, as in *dorsalis*, and again they are heavily barred with white, the difference being shown most strikingly by the heavy barring of the upper tail-coverts, which, in the southern forms, are usually much darker and with far less white barring than in the northern. In some instances the white on the dorsum of the northern form extends to the rump, and, occupying nearly all of the dorsal surface, forms an area very similar to that present in *dorsalis*, but the two may be distinguished at a glance by the hoariness and much greater amount of white exhibited by the northern bird. In many instances the barring of the sides of breast, body, and flanks (which are usually very similar in the three races), is encroached upon by the light colors in the northern bird until the under surface, as well as the back, becomes extremely light. This race appears to reach its greatest divergence from the others on the Middle and Lower Yukon.

From the series of *americanus* before me, taken in Northern New York, and including both summer and winter specimens, there appears to be very little seasonal difference of plumage except, owing to the greater amount of wearing incident to the summer season, birds taken at this time have the white tips and borders of the feathers considerably lessened by abrasion, thus appearing a little darker than winter specimens. The females and young birds possess no yellow on the crown.

From Fort Liard and Fort Simpson, on the headwaters of the Mackenzie River, extending thence north along the course of this stream and the Anderson River, and westward, covering all the wooded portions of Northern Alaska to the northern tree-limit, occurs *alascensis*, outnumbering by far the combined numbers of all the other woodpeckers of that region. It also extends its range south across the Alaskan Mountains, encroaching upon the range of *dorsalis* in the Sitkan region, and upon the island of Kadiak, whence the National Museum possesses typical specimens of this northern form.

Richardson records this bird as very abundant between Great Slave Lake and the Arctic coast. On the Yukon these birds are said to prefer the groves of poplar and willow to the spruces. During my visits to the interior I saw it alive only in a few instances, and learned nothing of its habits. From the number of skins brought me by the fur traders, taken at various points along the course of the Yukon, from near the mouth of that stream to the vicinity of Fort Reliance, its great abundance is attested. We learn from Dall that the Yukon Indians dislike this bird and call it *Tikektalat*, in common with the Kingfisher and the other woodpeckers.

The natives are said to have a legend of this bird, a male of which—according to the story—during a time of famine devoured its mate. Just as he was swallowing the last morsel the other birds came trooping through the forest, and as they approached him he hastily wiped his claws on the back of his head to conceal the deed. The new-comers inquired concerning the whereabouts of his wife; his unsatisfactory replies caused them to institute a search, and they quickly detected the marks of fat upon the back of his head; and ever since that day the males of this woodpecker have borne the mark as a memento of the crime.

PICOIDES AMERICANUS.

Number.	Locality.	Date.	Sex.	Wing from carpal joint.	Tail to basal end of feathers.	Tarsal joint.	Bill above.	Depth at base.	Breadth at base.
*1313	Herkimer County, New York	Nov. 5	Ad. ♂	4.40	3.10	.81	.96	.56	.36
*1318	do	Nov. 8	Ad. ♂	4.40	3.10	.82	.96	.58	.38
*1311	do	Nov. 2	Ad. ♂	4.50	3.00	.83	.92	.56	.37
†2033	do	Nov. 6	Ad. ♂	4.43	3.15	.82	.93	.55	.37
11891	Moose River, New York	June 4	Ad. ♂	4.69	3.18	.83	.99	.53	.39
12881	Moose Lake, New York	July 24	Ad. ♂	4.50	3.15	.82	1.00	.57	.40
†2145	do	Dec. 29	♀	4.43	3.04	.83	1	.54	.35
11892	Moose River, New York	June 4	♂	4.53	3.02	.81	.92	.57	.34
15982	Moose Lake, New York	Aug. 16	♀	4.39	2.95	.85	.90	.55	.35
3016	do	Oct. 9	♀	4.40	3.05	.83	.90	.55	.32
*1312	do	Nov. 5	♀	4.40	3.00	.81	.89	.56	.38
N. Mus. No.	Var. <i>dorsalis</i> .								
22631	Bitter Root Mountains	Sept. 7	♂	4.70	3.00	.85	1.00	.59	.40
72925	Colorado	Oct. 7	♂	4.95	3.00	.87	1.04	.56	.39
72610	Arizona	July 12	♂	4.72	2.97	.86	1.09	.57	.41
67146	Colorado	June 25	♂	4.89	3.18	.85	.98	.58	.39
18460	New Mexico	Apr. 4	♀	4.82	2.707	.86	.98	.57	.38
79771	Colorado	June 3	♀	4.72	3.057	.85	1.00	.58	.38
Collector's No.	Var. <i>alascensis</i> .								
638	Fort Yukon, Alaska	Mar. —	♂	4.45	2.98	.84	.95	.56	.39
1162	Fort Reliance, Alaska	Dec. —	♂	4.50	3.05	.84	.95	.57	.39
1169	do	Nov. —	♂	4.60	3.10	.83	1.05	.58	.38
659	Fort Yukon, Alaska	Sept. —	♀	4.55	3.10	.81	.89	.57	.37
1167	Fort Reliance, Alaska	Oct. —	♂	4.35	3.00	.81	.92	.56	.39
1158	do	Oct. —	♀	4.45	3.00	.80	.90	.57	.36

* From collection of Dr. A. K. Fisher.

† From collection of Dr. C. H. Merriam.

PICOIDES AMERICANUS DORSALIS Baird. Alpine Three-toed Woodpecker.

In examining the series of *Picoides* in the National Museum collection from Southeastern Alaska, I find examples from Fort Kenai which must be referred to this form and others from Kadiak Island which approach it closely. As *dorsalis* of the Rocky Mountains extends its range north to Fort Simpson, on the headwaters of the Mackenzie River, it is probable that the birds occurring on the southeastern coast of Alaska, in the Kadiak and Sitkan region, intergrade between typical *dorsalis* and the new northern race described above. Specimens of typical *dorsalis* are present from the extreme headwaters of the Yukon River, but no examples referable to this form are among the series of woodpeckers taken at Fort Reliance and thence down the course of that stream to Bering Sea. We possess no information of the habits of this race, and very little upon its distribution in Southern Alaska, and, in fact, no definite knowledge is possessed regarding the extension and limits of its northern range.

SPIHYRATICUS RUBER (Gmel.). Red breasted Sapsucker.

Known as an Alaskan bird only from the record of Hartlaub of two males taken at Chileat River April 12. (Journ. Orn., July, 1883. 275.)

179. COLAPTES AURATUS (Linn.). Flicker.

This handsome woodpecker breeds from one side of the Territory to the other wherever wooded country occurs. In the winter of 1880 I secured a skin from a native on the shore of Bering Straits, and was told by an Eskimo there that in summer it occurred not uncommonly among the spruces a few miles in the interior. From this vicinity it is found to the eastward in all suitable places, and has even been recorded from Greenland. It has been sent to the National Museum from the Lower Anderson River, and is well known to breed along the entire course of the Yukon, reaching to the mouth of the latter, whence I received several skins. It is a regular summer resident at the head of Norton Bay, and reaches the Arctic on the shore of Kotzebue Sound, where the natives told me the bird was not rare during the summer.

The National Museum collection possesses typical specimens of this bird collected at Sitka and Chilkat, on the southeastern coast of the Territory, thus showing that it ranges across the Alaskan Mountains to the shore of the Pacific in Southeastern Alaska. How common and widely spread it is in this region is unknown at the present writing.

COLAPTES CAFER SATURATIO Ridgw. North Western Flicker.

During Bischoff's visit to Sitka, at the time of the Russian-American Telegraph Expedition, numbers of these beautiful birds were taken there, and the specimens are now in the collection of the National Museum. Since then, however, the bird has not been secured from that region. Both forms undoubtedly breed in that section, their habitat overlapping, but no intermediate examples have been secured thus far. There is no Alaskan record of this Flicker except in the limited territory named, although it is to be expected to range across the Alaskan Mountains even to the headwaters of the Kuskoquim River.

TROCHILUS RUFUS (Gmel.). Rufous Humming-bird.

This is one of the smallest North American humming-birds, and is also the most northerly in its distribution. It is a summer resident at Sitka and beyond, thus occurring far along the coast of the North Pacific. Nearly every voyager to these regions has noted with surprise the occurrence of this small and delicate bird so far beyond the usual range of its kind. From specimens secured on the northwest coast it was named *sitkensis* by Rhatke. In spite of its small size, however, it is a hardy bird, and occurs in great abundance in Oregon, Washington Territory, and Vancouver Island, arriving in latitude 47° on this coast as early as April 10, and in latitude 49° early in May, returning to the south again in September. It apparently does not winter in California, where it is partly replaced by a resident form described some time since by Mr. Henshaw as *S. alleni*, a form which was long considered identical with the bird found throughout the Rocky Mountain region and along the northwest coast.

The life history of this interesting visitant to the shores of the northwest is yet to be studied. It moves on through California just as the spring opens, reaching Vancouver Island from the last of March to May, and, passing up the intricate heavily-wooded channels among the many islands of the northwest coast, it reaches the vicinity of Sitka, where Dr. Bean took a nest and eggs June 9. Farther to the north they nest under the shadow of the snow-capped peak of Saint Elias and on the shores of the deep-cut fiords, bordered with glaciers, which fill the air with their thunder, and are brooded over by damp fogs and rain-laden winds—surroundings seemingly not at all in keeping with these tiny visitants.

SAYORNIS SAYA (Bonap.). Say's Phoebe.

Several specimens of this bird were brought me from Fort Reliance by Mr. McQuesten, one a male taken on May 12, and a young of the year taken on September 12. The history of this bird has been pretty well worked out by the ornithologists connected with the various expeditions in the Rocky Mountain region, where it is one of the commonest summer residents. To the north it reaches the valley of the Saskatchewan, where it was recorded by Richardson, who supposed that it extended its range to about the sixtieth parallel. It gives me pleasure to record the capture of two specimens on the Upper Yukon in about latitude 66°, and one of these is a young bird of the year, taken in September. The fur traders told me that the bird breeds thus far north, and perhaps even beyond, within the Arctic Circle, which crosses the Yukon a short distance from the locality whence came my specimens. I have nothing to add regarding its habits in the Territory, and can only quote from Richardson that it arrives on the Saskatchewan early in May, and that it is a late fall migrant. It has a habit of nesting about buildings in the west very much like the common Phoebe of the east. At Fort Simpson, in British America, it has its young about July 1.

CONTOPUS BOREALIS (Swains.). Olive-sided Flycatcher.

The single specimen of this bird, brought me from the Lower Yukon in latitude 63°, is the only instance known of its capture in Alaska, although on the eastern side of the continent it has

strayed even to Greenland, where, at Nenortalik, it was obtained August 29, 1840. It is very common in Washington Territory, and the types of the species were obtained from the Saskatchewan in latitude 54°, north of which, until the present, there appears to be no record but that from Greenland. The natives informed me that it is not uncommon in the vicinity of Anvik, where my specimens were secured, and they described its usual habit of perching on the top of tall trees, whence it makes forays for insects, so there is little chance that they were mistaken. It probably reaches as far north in the Rocky Mountain region as the preceding species, and along the coast north of Washington Territory probably to the Sitkan region. Like a number of other birds its northern range will be considerably extended when a careful summer survey has been made through the wooded portions of Northern Alaska, the annual life of which, at present, is but little known.

EMPIDONAX DIFFICILIS Baird. Baird's Flycatcher.

A single specimen taken by Dr. Bean on June 5, 1880, at Sitka, is the only record of its capture in Alaska, but as others were seen at the same place it is probably a regular summer resident in that district.

185. EMPIDONAX PUSILLUS (Swains.). Little Flycatcher.

A single male of this widely-spread little bird was brought me from Nulato in the spring of 1878, and a second specimen was secured at Saint Michaels the same season. The natives knew the bird and told me it was not common. Hartlaub records a single specimen seen in Lower Dejih Valley May 24. The above specimens comprise all the known Alaskan examples. It may be considered as an irregular, though probably not abundant, summer resident. Kennicott and others found it nesting in alder-bushes near Fort Resolution in latitude 62° north, in the Hudson's Bay country, and it probably extends its range far beyond this on the Yukon and Mackenzie Rivers.

OTOCORIS ALPESTRIS LEUCOLEMA (Coues). Pallid Horned Lark.

Throughout Alaska this species appears to be very rare. Two specimens were taken in the vicinity of Saint Michaels during my residence there, and three were secured on the Upper Yukon by Mr. McQuesten on April 3 and 30, 1879. All of these birds are spring males and typical of this variety. It is much more common on the headwaters of the Yukon during spring and summer than along the shores of Bering Sea, where it can only be counted a very rare straggler. It has not been recorded from any of the Bering Sea islands nor from the adjoining Asiatic coast. Not a single individual was seen by us during the summer of 1881 anywhere along the Alaskan coast north to Point Barrow. In addition to the specimens obtained by me is a single bird secured on the Yukon by Dall. All of these birds are very pale, but are far less bleached than the peculiar variety in the National Museum collection from Astrakhan, which is labeled "variety *bei*." This bird has almost uniformly faded to a pale grayish ash above and white below, and probably represents a well-marked local race. The typical *alpestris* apparently does not occur in Alaska, and the specimens taken at Portage Bay and at Dejih Pass, in the southeastern part of the Territory, and recorded by Hartlaub, are doubtless referable here. In Oregon and Washington Territory, and perhaps throughout British Columbia, is found a small, very brightly-colored form, with the rufous of the back and the yellow, which in some specimens extends over the throat and entire under parts, very intense. Whether this form extends its range to the southern border of the Territory cannot be ascertained until that region has been visited and more thoroughly examined than it has at present. Richardson found the Shore Lark on the coast of the Arctic at the mouth of the Mackenzie River, and a single wandering specimen has been taken in Greenland.*

* *Auda arvensis*, quoted in the History of North American Birds [vol. II, p. 136], as occurring on the Aleutian Islands, apparently rests its claim upon the fact of Steller having found an allied species on the Kurile and Commander Islands, near the Kamchatkan coast, which, of course, does not warrant its being included here.

PICA PICA HUDSONICA (Sab.). American Magpie.

This handsome bird is limited in its distribution to a comparatively small portion of the Territory, occurring as a resident and abundant species along that portion of the coast-line extending from the Shumagin Islands east and south. It is abundant on Kadiak Island and in the vicinity of Sitka. Mr. Turner tells me that, during his visit to Kadiak Island, he saw a considerable number of the nests of this bird built in trees close about the village at that place. North of the Alaskan Mountains it is comparatively rare, although in the interior, about the head of Bristol Bay, it is not very rare, and even reaches, in some instances, as far as the Lower Yukon, a single specimen having been taken in midwinter in 1880, at Mission, on the lower course of this stream. Two specimens were brought me from the upper portion of the Yukon by Mr. McQuesten, who obtained them at Fort Reliance. These include all of the Alaskan records of this bird. The two specimens from Fort Reliance place its range close to the Arctic Circle. These birds extend their range west on the Shumagin Islands and on the peninsula of Alaska to Isanotsky Pass, where the alder-bushes and the mainland of Alaska find their western limit together. The alders are used by the magpies to support their nests, and the lack of such support further west is probably the chief reason for the birds' absence beyond. Their northern limit on the Upper Yukon is near the Arctic Circle at Fort Yukon, but on the Lower Yukon and its tributaries it is in about latitude 63° or 64°.

The two specimens taken at Fort Reliance, on the Upper Yukon, measure as follows:

Original numbers.	Sex.	Date.	Wing.	Tail.	Tarsus.	Culmen.	Depth of bill.
1137	♀	Nov. 15	8	11.5	1.82	1.23	.55
1136	♀	May 16	7.5	10	1.76	1.20	.53

A comparison of birds from Europe and this continent shows that they intergrade and that there are no constant differences of coloration. The pattern of wing-coloration is subject to great individual variation, but none of the American examples seen show such a large amount of white as do some specimens from continental Europe.

The shape of the spurions primary varies greatly among individuals.

PICA HUDSONICA.

National Museum Catalogue number.	Locality.	Date.	Sex.	Wing from carpal joint.	Tail to basal end of feathers.	Tarsal joint.	Bill above.	Depth of bill at base.
65119	Colorado	June	♂	8.20	11.5	1.90	1.20	.60
53829	Nevada .....	.....	♂	7.80	11.2	1.89	1.20	.52
52482	Kadiak Island, Alaska .....	.....	♂	8.00	10.4	1.90	1.42	.60
.....	Carson, Nev. ....	.....	ad.	7.80	11.6	1.78	1.23	.51
.....	Washington Territory .....	.....	ad.	7.00	10.2	1.78	1.18	.50
.....	Nevada	Nov.	♂	8.10	11.35	1.83	1.40	.56
.....	do	Dec.	♂	8.25	11.8	1.87	1.32	.58
<i>European specimens.</i>								
.....	Europe (rustica) .....	.....	ad.	7	8.50	1.88	1.20	.51
.....	Hungary (rustica) .....	.....	♂	6.90	8.60	1.80	1.19	.45
.....	Bergen, Norway (rustica) .....	.....	♂	7.40	10.20	1.85	1.21	.55
.....	Saxony (rustica) .....	.....	♂	7.00	8.65	1.78	1.10	.50
.....	Hungary (rustica) .....	.....	♂	7.40	8.50	1.87	1.20	.50
.....	Europe (caudata) .....	.....	♂	7.42	9.00	1.90	1.20	.53
.....	Saxony (caudata) .....	.....	♂	7.35	8.00	1.86	1.23	.50
.....	France (rustica) .....	.....	ad.	7.68	10.35	1.88	1.32	.55

CYANOCITTA STELLERI (Gmel.). Steller's Jay.

At Sitka this is an abundant bird, and undoubtedly it occurs still farther to the north, possibly even across the Alaskan Mountains. From accounts derived from the natives I believe that this jay may reach even the Upper Kuskokwim River. They informed me of a bird found on the

wooded mountains to the south of that river, which has a large crest on its head; but the rest of the description was so vague that it was hard to determine to just what bird it referred. The heavy snowfall and severe winters, in the region named, would seem to negative the possibility of the bird's occurrence, though it may be a migrant there. Specimens are in the National Museum collection from Sitka taken in October and January, thus proving it to be a winter resident north at least to this point. Sitkan examples of this jay are typical of the variety. Dr. Beau found this jay at George's Island in June.

PERISOREUS CANADENSIS (Linn.). Canada Jay.

From the headwaters of the Yukon to the mouth of the Tanana River occur birds which are almost typical representatives of the jay found in British America, and thence down to Canada. A large majority of them approximate, or are typical of, Mr. Ridgway's variety *fumifrons*.

PERISOREUS CANADENSIS FUMIFRONS Ridgw. Alaskan Jay (Esk. *Kū-pā-nū-ūkk-pūk*).

As noted under the preceding species, many specimens from the Upper Yukon are nearly typical *canadensis*, but the present form gradually replaces it lower down this stream until, near Nulato to the coast, birds approaching the *canadensis* style are almost unknown. The present form is the only *Perisoreus* found throughout the Sitkan and Kadiak region, and thence north along the region bordering the Bering Sea coast and up the wooded interior.

On June 9, 1880, I saw a single specimen at Cape Romanzoff, just north of the Yukon mouth, on the coast of Bering Sea, and in the winter of 1878 I saw this jay on the Lower Kuskoquim, and specimens were brought me which were taken at the head of Norton Bay, so that it appears to range to the coast of Bering Sea wherever alder-bushes occur to afford it shelter. It has been taken also at Kenai by Bischoff. Dall took a nest with four half-grown young on April 20, at Nulato; it is evident, therefore, that the bird must nest during the latter part of March, and frequently while the temperature ranges well down toward the freezing point of mercury.

Dall's statement that this bird is not found south of the Yukon is erroneous, since it occurs throughout the Territory wherever timber is found. A young bird of the year, taken the last of July, at Fort Kenai, is just beginning to assume the adult plumage. The range of this form includes all of Alaska, probably down to the coast of British Columbia, meeting there the ground of *obscurus*. Typical examples of *fumifrons* are in the National Museum from Fort Kenai, Fort Yukon, Fort Reliance, Nulato, and Saint Michaels; this must also be the form found in the Lower Mackenzie Valley and, perhaps, through a large portion of Northern British America. Throughout its range occur specimens which closely approach *canadensis*. Comparing the large series of specimens from Eastern and North-western America I find the following characters to distinguish *canadensis* from the present variety:

CANADENSIS, from Nova Scotia.

Back dull smoky-brown with an ashy shade; crown dark sooty-brown, sharply defined by the white of the frontal, cheek, and nape area. The nuchal collar of white, separating the dark area of the crown from back, well marked. Sides of head and neck, as well as throat and most of breast, silvery white. The white on upper breast shades thence into light smoky-brownish, which usually occupies the sides and flanks. The two forms run closely together, in this particular, in a number of cases.

FUMIFRONS, from Alaska.

Back ashy-brown. Crown dark blackish-brown with an ashy wash, the dark area encroaching upon frontal space until the latter may be almost absent or it may be present nearly as in *canadensis*, but this rarely. Nuchal color of white usually obsolescent. Sides of head, neck and throat dull white in most cases, much shaded with ashy-brown. The white is limited to the throat and is replaced on the breast by color of abdomen, which shades into the light on upper breast. The color of abdomen is a smoky brownish-gray, with a dark ashy shade predominating on sides and flanks.

The Alaskan birds are a little larger than specimens of typical *canadensis* from Eastern North America.



ALASKAN JAY.
Perisoreus canadensis fumifrons.

Two nests were brought me from the mouth of the Tanana River by Mr. François Mercier, who obtained them the 1st of April, 1880, after considerable persuasion and an offer of a large reward in flour to the natives during a time of scarcity. By these means he succeeded in getting a native to go out and search for the nests of this bird. The young fellow returned in a few hours with two nests, each containing half-grown young. Walking into the house he told the trader to take the nests and birds at once, for he was sure some evil would result from his act, and taking his flour he hurried away before the birds and nests were examined. All the old croues and men of the vicinity prophesied that the weather would turn cold, and that a very late spring would ensue as a result of this robbery. As chance would have it the prophesies of the old soothsayers came true in a remarkable degree, and the spring was the coldest and most backward by nearly a month of any year since the Americans have had possession of the country. On the following spring (of 1881) I asked the same trader to try and get me eggs of this bird by sending out natives earlier in the season. He complied and offered still greater rewards than on the first occasion, but the natives could not be bribed to risk the visitation of the birds' anger, and the old people positively forbade any of the younger ones to have anything to do with the matter; therefore the attempt was abandoned. One point was gained, however, and that was the information how the natives found the nests so readily. They told the trader that these nests could always be easily found by examining the snow at the base of each bushy-topped spruce, and whenever a number of small dry twigs were found lying near together upon the snow under a tree there was a great probability of a jay's nest being snugly encoined in the thick branches overhead.

These two nests, now before me, are built of a matted mass of a cotton-like down of some plant; about the upper edge and in the cavity are pieces of rabbit-fur, a few Horned Owl feathers, and fine strips of bark. The entire nest rests upon a horizontal branch nearly 2 inches in diameter, and a scanty number of small dead spruce twigs, 6 to 8 inches long, loosely woven into the structure, give it consistency and prevent it from being easily damaged. This nest is $1\frac{1}{2}$ inches high by 6 broad, with a cavity $2\frac{1}{2}$ inches deep by $3\frac{3}{4}$ inches across the top. The other nest was placed in the fork of a small branch less than half an inch in diameter, and rests on a rough platform of slender spruce twigs. The main part of the nest is made of the same cottony substance as is the first, and is also interwoven with twigs. Above this is a layer of fine fibrous black moss such as occurs on spruce trees. The inside of the cavity is slightly lined with fine grass. This nest measures 4 inches high by 6 inches broad, and the cavity 2 inches deep by $2\frac{3}{4}$ inches across the top.

Hearne says that it is well known that the Whisky Jack lays up great stores of berries for a winter supply, and speaks of its power of mimicry.

CORVUS CORAX SINUATUS (Wagl.). American Raven (Esk. *Tū-lā-kū-ghūk*).

Everywhere throughout the entire Territory of Alaska, including the shores of the Arctic Ocean and Bering Sea, and the various Islands of the latter, this bird is a well-known resident. Here, as in some more civilized regions, it bears a rather unenviable character, and many and strange are the shapes it assumes in the folk-lore of the natives of these far off shores.

On Akoutan, one of the Aleutian Islands, May 13, 1877, I found a pair of these birds nesting on a shelf about 50 feet above the beach, and, as usual, their home was inaccessible. Bean found it an abundant resident on the Near Islands. On Saint Matthew's Island Elliott found several, and on Saint Lawrence Island they were seen by Elliott and myself. Strangely enough, however, the bird is unknown upon the Fur Seal Islands, although these are only a little over 150 miles to the northward of the Aleutian chain. An attempt has even been made to populate the Seal Islands by capturing ravens on the neighboring Aleutian Islands and taking them across by vessel, but the unwilling emigrants refused to colonize their new abode and took the first opportunity to make their way back to their former home. This is especially remarkable, since the annual slaughter of fur seals on these islands strews the land on every side with innumerable carcasses, which one might suppose would render the islands peculiarly attractive to these cunning birds.

Throughout the Territory the Raven is a rather common but scattered species, becoming abundant only along the southeast coast and the entire length of the Aleutian chain, where is found its center of abundance. North of the Aleutian chain, wherever a jutting ragged cape or bold cliff faces the sea and defies the grinding ice and surging waves, one or more pairs of these birds may be found to have taken up their residence, safely out of reach of predatory raids from above or below. In passing these cliffs, during stormy winter days, when the wind whistles around the arches and jagged points of the rocks, I have frequently heard the strange notes of the ravens, and caught glimpses of their dark forms as they showed themselves for an instant through a rift in the storm, gliding back and forth, uttering their wild cries, and apparently enjoying the fierce gales and in full accord with the wild surroundings. A particular instance is especially impressed upon my mind. It was during a journey in midwinter when we arrived at a rocky promontory just as a terrible gale of wind and snow set in. Our road for several miles lay around the base of a series of cliffs. On the left arose sheer black walls of rock around whose angles and spurs the wind swirled and beat the sharp fragments of snow in blinding masses. Along the path which we were forced to travel, lay a shelving mass of fallen rock, a few yards wide, and covered with ice formed by the spray dashed up from the sea, which surged, inky-black, against the foot of the cliff some 10 feet below. We crept around the narrow shelf, every muscle strained to keep the sledges from being dashed over the edge of the rock into the sea; suddenly, directly overhead, came with startling distinctness the hoarse cry of a raven. A hasty glance upward showed one of these birds floating directly over us upon motionless wings, and until we were safe on the farther side of the cape this bird kept above us, uttering repeatedly its harsh notes, which superstitious fancy might easily, under the circumstances, have construed as of evil omen. It is to such scenes as these, doubtless, with the occasional accidents attending them, that is due the occult standing enjoyed by this bird among the ignorant and superstitious.

At Unalaska, one of the eastern Aleutian Islands, the raven is extremely numerous and familiar. It keeps about the village and is scarcely more shy than the domestic fowls. On wild, stormy days it appears to delight in soaring high overhead in large numbers. During the time when fierce gales are rushing over the mountain-tops and down the gorges into the confined valleys, thirty or forty of these birds may be seen at a time circling overhead on outspread wings, in involved circles, uttering a medley of odd "cork-drawing" and other strange notes. The birds appear to be animated by a frolicsome disposition, and pursue one another playfully as if exulting in the fierce dashes of sea and rain that are driven before the wind. At other times they feed along the shore and make the roof of the Russian church, in the center of the village, a general meeting place to rest and doze. They have a common habit of rising high overhead with a sea-urchin (*Echinus*) in their beaks, and after reaching an elevation of several hundred feet of allowing the shell-fish to fall. As a consequence, it is common to find the shells of these radiates scattered all over the hill-sides in the vicinity of the sea; apparently the ravens do not do this with the intention of gaining readier access to the contents of the shell, and I do not recall a single instance where a raven followed the shell to the ground, although on several instances I have seen the birds dive hastily after the falling shell and capture it in their beaks before it reached the ground, apparently in sport.

In spite of their familiarity at Unalaska they are wise enough to place their nests on almost inaccessible cliffs some distance from the village and beyond the reach of mischievous boys. At Nulato, on the Lower Yukon, they lay their eggs about April 20, and there, as elsewhere, the birds exhibit much anxiety if their nests are approached.

Litke tells us that—

The ravens are the police of Sitka. No poultry can be raised, since the ravens devour the fledglings as fast as they appear, making only one mouthful of them. The porkers are too large to be overcome in the same manner, and the ravens are obliged to satisfy their greediness by keeping the pigs' tails close cropped. This is the reason why Sitka pigs have no tails.

In spite of this ancient persecution, we are assured by Mr. Dall that the pigs of the present day have caudal appendages of the usual length.

Both the Eskimo and Indians unite in accusing this bird of pecking out the eyes of newborn reindeer and afterwards killing them, and they are notoriously mischievous in robbing traps of bait, as is well known throughout the fur countries, though the thief frequently pays the penalty by getting a foot in the trap.

Although the common crow (*C. americanus*) has not been taken within the limits of the Territory, yet its known occurrence as far north as the Lower Anderson River, within the Arctic Circle, would appear to render it highly probable that they will be found on the Upper Yukon when more careful explorations have been made. While wintering at Cumberland Gulf, on the west coast of Davis Strait, Kumlien found the ravens resident, and notes the fact that the Greenland birds are much smaller than those from the mainland. He credits the raven with plucking out the eyes of the reindeer and killing it, and also of capturing young seals. In this latter operation great intelligence is shown. As an instance he observed that one bird dropped directly into the seal's hole through the ice, thus barring its only means of escape; then the second bird attacked the helpless victim and brained it on the spot. Another pair he observed giving chase and capturing the northern hare after a long pursuit. They were in the habit of keeping about the camps and were seen even after dark and on moonlight nights when food was scarce. The last English Arctic expedition found ravens north to latitude 81° 44', which Captain Feilden thinks is their northern limit.

The eggs obtained in Alaska are light green, with a variable amount of dark brown spotting. These spots are usually scattered uniformly over the shell, but they vary greatly in size from small rounded points to large irregular blotches. Six of these eggs from the Lower Yukon measured as follows: 2 by 1.41; 1.98 by 1.42; 2 by 1.43; 1.92 by 1.43; 1.92 by 1.38; and 1.90 by 1.38.

CORVUS CORAX SINUATUS.

National Museum Catalogue number.	Locality.	Sex.	Wing from carpal joint.	Tail to base of feathers.	Tarsal joint.	Bill above.	Depth of bill at angle.	Depth of bill at base.
88443	Greenland .....	.....	16.70	10.10	2.40	2.90	.98	1.15
18813	.....do .....	.....	16.90	9.90	2.50	2.95	.99	1.64
18870	Labrador .....	.....	16.85	9.30	2.55	2.89	.99	1.11
29452	New Brunswick .....	.....	16.60	9.30	2.61	2.90	1.04	1.17
18831	Lower Canada .....	.....	17.05	10.35	2.66	2.90	.99	1.17
	An example from the Arakancheichi Islands in Bering Sea on the east coast of Siberia is dull-colored like European specimens .....	.....	16.84	10.50	2.52	2.90	1.01	1.11
45031	California	♂, ad.	16.10	9.45	2.57	2.28	.82	.99
	Upper Yukon, Alaska .....	.....	17.50	10.29	2.65	2.75	1.00	1.03
	.....do .....	.....	16.54	9.55	2.70	2.70	.97	1.06
	.....do .....	.....	17.65	10.50	2.57	2.85	.97	1.10
	Saint Michaels, Alaska .....	.....	17.25	10.38	2.55	2.95	1.00	1.10
41136	Vancouver Island .....	.....	17.50	10.93	2.85	3.00	1.00	1.15
6857	Utah .....	.....	16.75	9.60	2.50	2.51	.81	.99
83910	Nevada .....	.....	16.23	10.05	2.89	2.78	.98	1.01
51846	Missouri River .....	.....	17.60	11.60	2.60	2.70	.90	1.00
83911	Nevada .....	.....	16.50	9.60	2.58	2.69	.86	.98
58662	Tchuantepco .....	.....	17.40	10.50	2.99	2.88	1.00	1.06
54163	.....do .....	.....	17.09	9.70	2.82	2.80	.98	1.04
30886	Vera Cruz .....	.....	16.40	10.60	2.63	2.66	.89	1.04
33623	Guatamala .....	.....	16.60	9.95	2.94	2.80	.90	1.10
29456	.....do .....	.....	17.00	10.15	2.78	2.66	.90	1.00
	Germany .....	.....	17.65	10.22	2.75	2.84	1.04	1.12
	Europe .....	.....	16.90	9.90	2.63	2.60	1.00	1.17
	.....do .....	.....	15.50	9.00	2.67	2.80	1.04	1.17
	Syria .....	.....	16.50	9.75	2.82	3.00	1.03	1.12
	Jerusalem .....	.....	17.36	10.60	2.78	2.61	1.00	1.19

* This specimen is like the European birds in color and proportions, with even a heavier bill than that of the Syrian specimen.

† An adult bird, but with a remarkably small bill and very slender feet and legs.

The foregoing measurements of the ravens in the National Museum collection were made under the impression that sufficient variation could be found to separate the Old and New World birds into well-marked races.

As the measurements show, however, specimens from various widely-separated North American localities have as large an amount of variation as can be found between American and Old World

birds, and in both cases many examples are found uniting the various extremes. The recognition of the American and European birds as races would involve the separation of the American bird into three races.

The Old World birds usually have heavier bills than the American. The bill is deeper at the base, whence the culmen has a full, well-marked curve to the tip of the bill. There is less of the purple gloss on the feathers, but one specimen shows this gloss as in American birds, and among the latter may be found the heavy bills and dull plumage apparently most common among European birds.

CORVUS CAURINUS Baird. Northwest Crow.

Bischoff obtained numerous specimens of this little known bird at Sitka. Dr. Bean found it abundant at Sitka in June and saw others at George Island. From Sitka down the coast to Washington Territory it is very abundant. An egg of this bird from Sitka has the ground color light sea-green, with markings and blotches of olive-brown, varying in size and of different shades.

Scarcely anything is known of the habits of this fish-crow, and of the meager account which we possess I quote the most important. According to Mr. J. K. Lord it abandons the sea-coast of British Columbia early in May, and builds its nest on trees or bushes on the borders of small prairies in the interior. Their nests are precisely like those of the magpie, arched over with sticks. The bird enters by a hole on one side and leaves by an exit on the opposite. The inside is plastered with mud and a few grass stalks strewn loosely on the bottom keep the eggs from rolling. He examined great numbers of nests on this prairie and on the Columbia, but invariably found the same habit of doming prevailing. While the birds remain inland their food consists of small reptiles, insects, mollusks, and it even captures butterflies on the wing. Both male and female defend the nest fiercely from all intrusion of bird or mammal. They lay from five to seven eggs, which are smaller and lighter colored than those of the common crow. The breeding season over, they return to the sea-coast, the immediate vicinity of which they frequent with the common crow, feeding along the shore at low tide. Mr. Lord's opinion of the specific identity of this bird is upheld by later investigations, particularly those of Mr. Henshaw, though until further work is done, and a larger series of birds at hand, the subject of the crows of the northwest coast cannot be satisfactorily concluded. In the interior of North America Richardson found the *Corvus americanus* extending to latitude 61° north, near the Great Slave Lake, and it is to be looked for in the Upper Yukon region and thereabout.

At Puget Sound Mr. Henshaw found these birds abundant and saw them frequenting the exposed reefs, where they gathered shell-fish during low tide, and carried them high over the rocks to drop and break the shell, thus rendering the contents more accessible. This was repeated again and again and appeared to be their ordinary manner of feeding.

PTICORVUS COLUMBIANUS (Wils.). Clarke's Nutteraker.

Since the capture of a single Sitkan specimen taken in August by Bischoff, no Alaskan record of this bird has been made. It is likely to be found all along the heavily-wooded coast region from British Columbia, where we learn it is an abundant species, north to the beginning of the peninsula of Alaska, since this entire stretch of coast region has approximately the same characteristics.

The first account of the nesting of this species was given by Mr. Lord, who found a nest at Fort Colville, Wash. The eggs of this nest, however, were destroyed by felling the tree, so the description of the eggs and a satisfactory account of the nest still remained to be made, and it was only a comparatively short time since that Captain Bendire was able to throw further light upon this interesting subject. In the vicinity of Camp Harney, Oregon, on April 22, and again on the 27th of this month, in 1876, nests of this jay were found by him. The first nest he obtained upon the extremity of a pine branch about 25 feet from the ground, and well protected from view by the longer branches projecting both above and below the nest. It was bulky, like all the others he found. The nest proper rested upon a platform of small sticks of white sage placed upon pine branches, and is composed of dry grass, vegetable fibers, and the fine inner bark of the western

juniper. The latter mass is well woven and makes a warm, comfortable structure. The outer diameter of the nest is 8½ inches; the inner diameter 4½ inches; the inside depth 3¾ inches, and the outside depth 5 inches.

The two eggs measure, respectively, 1.22 by .95 and 1.20 by .90. The ground-color is light grayish-green, speckled and blotched with grayish, principally about the larger end. On the smaller egg the spots are finer and more evenly distributed, half of them being rather of a lavender color than gray. These eggs resemble in shape those of Maximilian's Jay, two of whose eggs I have from Mr. Aiken out of a nest found by him in Colorado.

All the nests found by Captain Bendire were placed in pines, well out on the branches, and generally 20 or 40 feet from the ground. The edges of forests are preferred and trees well supplied with branches. The female sits closely, and seems devoted to her eggs and young. When the first nest was visited the bird refused to leave until some of her tail-feathers were pulled out in removing her, and she returned to her nest before the man had left it. On the second visit, in order to see how much disturbance these birds would bear when on the nest, he fired a shot into the limb on which the nest was placed. He threw sticks at the nest, striking the base once or twice; still no bird appeared; but when he sent a man to examine it, and the latter approached within a foot or so, the bird left.

Mr. Lord tells us that a few of these birds winter in British Columbia, the majority leaving for the south in September. On their arrival in May and early June they assemble in immense flocks, and keep up a nearly constant discord, screaming and chattering, and raising such a din that one is deafened by it. During about a week of this reassemblage all their wooing is done, and the best birds carry off the fairest partners. The single nest he found was in a pine tree about 200 feet above the ground. It was large, built of fir twigs and bits of bark, with pine-needles, root fibers, some moss and gray lichen mixed carelessly in it. The eggs were destroyed when the tree fell and the nest was much damaged.

STURNELLA MAGNA NEGLECTA (Aud.). Western Meadow Lark.

In J. K. Lord's entertaining Naturalist in British Columbia, we learn that these birds are generally distributed throughout British Columbia, extending north to Sitka and even farther for aught I know." The preceding is the only record of this species from Alaska, and as later collections from Sitka do not contain this bird it can scarcely be common there. Mr. Lord continues in his pleasant style concerning these birds in British Columbia (Vol. II, 146):

After being shut up, and closely imprisoned by the bitter cold and deep snows of a North-Western winter, one hails with delight the first heralds, announcing the prospect of speedy relief—sunshine and summer. The Meadow Larks (or starlings, more correctly) are amongst the earliest arrivals, making their appearance in the interior of British Columbia before the snow has begun to thaw even from the roofs of the log huts. Their custom, on first arriving, is to sit on the extreme tops of the sprays that project above the snow. The brilliant golden yellow, decking their breasts, and the rich browns on the back and wings, are in such vivid contrast with the intense white on every side, that one is almost tempted to imagine that some magi's hand had conjured gorgeous blossoms on the leafless sticks; until the mellow plaintive songs, pealing over the wintry waste, tells you that life is there, with hope and confidence in coming events. Leaves, flowers, grass, insects, all are missing, still the birds know they are sure to come; their instincts are true, and so they patiently await the change from bleak winter to genial spring, as joyous as if they had not quitted the sunny south.

SCOLECOPHAGUS CAROLINUS (Müll.). Rusty Blackbird.

Dall noted the arrival of this widely-ranging bird at Nulato on May 20, where it was abundant and tame, and he saw one nest commenced about the end of the month. The eggs have been taken at Fort Yukon, while skins are in the National Museum collection from Sitka and Fort Kenai. It arrives in the British fur country at Great Bear Lake, latitude 65° north, by the 31 of May, and breeds throughout the northern extreme of the continental land, reaching the farthest limit of the wooded region on the Lower Anderson and Mackenzie Rivers. In Northern Alaska it reaches latitude 70°. On the Bering Sea and Arctic coast of this Territory from the mouth of the Kuskokwim River the bird is a regular but not numerous summer resident wherever trees and bushes are found reaching the vicinity of the sea-coast.

During the migrations it is a rather common visitant to this coast; but I found it abundant only at the Yukon mouth, where the widely-extended areas of bush-grown country offered it suitable shelter, and where it consequently nested in considerable numbers; thence being found along this river throughout its entire length. Wherever the bushes on the streams flowing into Bering Sea or the Arctic Ocean afford shelter, it delights to make its summer home, and the males may be seen on all sides mounted upon projecting branches uttering their cheerful but not musical notes, or busily searching for food around the shallow pools and along the muddy banks of streams, and they even become so familiar as to join with the snowbirds and fox colored sparrows in searching about the fur-traders' doorsteps for food. In autumn they remain until well into September, and are still more frequently found in the vicinity of the houses at this season than in spring-time.

In May, 1879, while I was living for a time with a fur trader at the mouth of the Yukon, these blackbirds were very common in the vicinity, frequenting the dense growth of willows and alders which stood a few yards from the log huts. They were very indifferent to the presence of the natives and others, who were continually passing about, and here they annually came to carry on their love affairs and rear their young, as I was assured by the residents. I did not remain there long enough to investigate their housekeeping, so I can only quote what Dr. Brewer tells us concerning some eggs sent to the National Museum from Fort Yukon. These eggs measured 1.03 by .75 of an inch, and were scarcely distinguishable from the eggs of Brewer's Blackbird. He also informs us that all the Fort Yukon eggs of this bird he had seen had a ground color of very light green, very thickly covered with blotches and finer dottings of a mixture of ferruginous and purplish brown. There appears to be very little individual variation in these birds, as was shown by an examination of a considerable series of skins from the north.

PINICOLA ENUCLEATOR (Linn.). Pine Grosbeak (Esk. *Ni-kübé-u-gñähk-takh-täk*).

Along the entire west and northwest coast of America, from Vancouver Island north to within the Arctic Circle, this bird occurs in greater or less abundance. The only breaks in this range are the treeless areas which occur along the coast of Bering Sea. Throughout the interior of the above region it is an abundant species. On the Kaviak Peninsula, in the vicinity of Bering Straits, it is found among the stunted spruces to longitude 165° west, thence through the entire Territory of Alaska to the British boundary line it is abundant; at Sitka and Kadiak it was found numerous by Bischoff, during the Western Union Telegraph Expedition, and specimens were brought me from points along nearly the entire course of the Yukon. It is limited by the range of spruce, pine, and cotton-wood forests. Dall found the crops of these Grosbeaks filled with cotton-wood buds at Nulato, on the Yukon. During winter, while traveling along the frozen surfaces of the water-courses of the interior, it is common to note a party of these birds busy among the cotton-wood tops uttering their cheerful lisping notes as they move from tree to tree. I have frequently passed a pleasant half hour on the wintry banks of the Yukon while making a mid-day halt, and waiting for the natives to melt the snow for our tea, listening to the chirping and fluttering of these birds as they came trooping along the edges of the snow-laden woods in small parties. They rarely paid any attention to us, but kept on their way, and were, ere long, lost to sight in the midst of the bending tree-tops, and silence again pervaded the dim vistas of the low woods. These birds withstand the severest cold in these forests, even within the Arctic Circle, and appear to be about equally distributed throughout the wooded region. Unfortunately my opportunities for observing them were confined entirely to the short glimpses obtained in the manner cited, and I can add nothing to their history during the summer and breeding season. Beyond the faint, soft call-note uttered as the birds trooped along through the forests, I never heard them make any other sound. The American authors appear to have overlooked, or not noted, the song of this species, which is said to be—especially in the European bird—very pleasant and musical.

In their Monographie des Loxiens, Bonaparte and Schlegel say they can only find that the American birds differ from the European by having "*les teintes tant soit peu plus vives que ceux d'Europe.*" They also inform us that the song of the European bird is exceedingly "agreeable,

varied, melodious, sonorous—sometimes strong, sometimes soft. It imitates the voices of other birds, and its song recalls sometimes that of the Thrush (*Turdus musicus*), sometimes that of *Chrysomitris spinus*, and that of the Willow Warbler.* From the close relationship of the two we would infer that our bird has equal powers of song.

The young of this species, in the first dress, has the usual soft, loose plumage common to young birds, and the entire under surface is covered with a smoky brownish shade, palest on the abdomen; on the back the smoky shade is present, but washed over with dull yellowish, which is strongest on the crown and rump. The tail and wings are the same as in the adult, but are a little more dingy and duller colored. A careful comparison of the large series of Pine Grosbeaks in the National Museum collection, in conjunction with my own specimens, results in the determination of three appreciable geographical races, of which two (*enucleator* and *canadensis*) have been recently united in Mr. Ridgway's Catalogue of the Birds of North America. The third is a new race, found only along the south coast of Alaska, extending south, perhaps, to Washington Territory. There are specimens of it in the National Museum collection from Sitka and Kadiak.

I find that the European and American forms may be separated by certain appreciable and pretty constant characters, mainly differences of proportion. Specimens from Alaska—north of the Alaskan Mountains, and from Bering Straits east to the Mackenzie River, and thence south through the Rocky Mountains—agree in the different shape of the bill and in the clearer ashiness of the plumage as compared with specimens from the Eastern United States and especially from Southeastern Alaska, and as compared with Scandinavian specimens of the European form. The northwest coast birds and those from Europe agree in having a wash of dark olive in marked contrast to the clear and almost uniform ashiness in many of the Rocky Mountain and North Alaskan birds. The color of the adult males of the Northern Alaskan bird is like those from the Eastern United States and Europe. The Kadiak birds and thence south to Oregon have a rich shade of red in summer. A male from Sitka has the head, breast, and rump bright scarlet. The scarlet of a male from Kadiak—shot during the winter—is pale like some specimens from Europe and America in winter, so it is probable that in the matter of coloration alone there are no distinctive racial characters. We find, however, that differences of proportion are apparently sufficiently constant for the discrimination of the several forms. The beak of the Kadiak bird is longer and slenderer and less full, or swollen, on the sides than the birds from Northern Alaska, and the under mandible is disproportionately heavy as compared with the other forms. The birds from Northern Alaska, the Rocky Mountains, and the Mackenzie River region have the bill much inflated, and the tip of the upper mandible is not strongly decurved and lengthened as in Kadiak specimens. There are two young birds in the first plumage, from Kadiak, which have a much larger bill than a young bird in the same stage of plumage killed in Utah during the month of September. The former also have more of a greenish-yellow shade on the head and rump. The birds of the Eastern United States are recognizable as a rule from Rocky Mountain or Alaskan specimens by their smaller and much less inflated beaks. Oregon specimens are very much like those from Kadiak and Sitka in proportions and general appearance, but are larger, thus approaching the Rocky Mountain form, which would indicate that it is along this portion of their range that the two races intergrade.*

* Two races of the North American bird are recognized by Mr. Ridgway, in his Manual of North American Birds, as *P. enucleator canadensis* and *P. enucleator kodiaka*, the latter being the race which Mr. Nelson suggested, but did not name.—H. W. H.

The series of measurements will show the differences in proportion upon which the races might be based:

PITICOLA ENUCLEATOR.

Locality.	Number of specimens averaged.	Sex.	Wing from carpal joint.	Tail to base of feathers.	Tarsus.	Bill above.	Width of bill at base.	
Yukon and Mackenzie Rivers	17	♂♂	4.66	4.21	.91	.52	.395	
Do	16	♂♂	4.57	4.14	.91	.52	.39	
Largest male			4.75	4.15	.94	.51	.40	
Largest female			4.66	4.52	.87	.56	.40	
As the largest dimensions of the pairs occur in different birds, I aggregate these in the following list taken from the males.								
Smallest dimensions of the males are			4.75	4.53	.94	.58	.42	
Largest dimensions of the females			4.60	4.10	.87	.50	.36	
Smallest dimensions of the females			4.70	4.53	.94	.55	.41	
The largest specimen in the Smithsonian collection is from Montana, and measures			4.40	4.00	.87	.50	.37	
A series from the Eastern States average	10	♂	5.00	4.40	.93	.55	.42	
A series from Alaska average	33	♂ and ♀	4.40	3.94	.90	.55	.37	
The largest aggregate measurements from the Eastern States			4.61	4.18	.91	.52	.39	
The smallest aggregate measurements from the Eastern States			4.60	4.60	.92	.59	.40	
The average of the ten examples from the Eastern States given above included an example from Racine, Wis., and another from the Red River of the North.			4.15	3.70	.88	.52	.34	
These two examples measure respectively			4.95	4.15	.90	.58	.38	
And are intermediate between the east coast birds and those from the Rocky Mountain region. Eliminating these two specimens from the Eastern States series, the average from that region is as follows			4.75	4.15	.91	.56	.40	
Specimens from Kodiak Island and Siska, Alaska, are identical, and average as follows	8	♂ and ♀	4.36	3.89	.90	.54	.37	
Maximum dimensions			6	4.40	3.74	.89	.60	.39
Minimum dimensions			4.30	3.80	.91	.62	.40	
A male and female from Camp Harney, Oregon, are very much like Kodiak birds in general appearance, and also in size as shown by the following measurements			4.90	3.65	.88	.59	.38	
The Oregon birds differ from the Kodiak form in their larger size, this agreeing with the form found both north and south in the Rocky Mountains.			4.58	4.00	.90	.60	.38	
The dimensions of a small series of European birds is shown below, all of which are from Sweden.			4.50	4.00	.90	.57	.39	
Largest measurements	5	♂ and ♀	4.23	3.71	.89	.61	.37	
Smallest measurements			4.25	3.73	.91	.62	.39	
The largest bird in this series is a female.			4.10	3.69	.88	.60	.36	

PYRKHULA CASSINI (Baird). Cassin's Bullfinch.

The presence of this bird, as a member of the North American fauna, rests solely upon the capture of a specimen at Nulato, on the Middle Yukon, June 10, 1867, by Mr. W. H. Dall. In the Transactions of the Chicago Academy of Sciences, wherein are recorded the results of the ornithological work done during this expedition, Professor Baird describes this bird as a new species. For some years thereafter nothing more was learned of it, but after a time there came a record from the interior of Siberia, in the vicinity of Lake Baikal, where we now know the bird is a rather common resident, and a considerable number of specimens have been obtained from there. As no additional specimens have been secured in Alaska, notwithstanding the labors of several naturalists, we are forced to conclude that, strangely enough, the type-specimen of this species was an accidental straggler, hundreds, if not thousands, of miles from its home. A record has been cited in several instances of this bird's occurrence in Belgium, but I am informed by Dr. Stejneger that this record was based upon a female specimen of the ordinary *coccinea*; hence the range of this handsome species is confined, so far as known, to Eastern Siberia, the occurrence of the single specimen noted above in northern Alaska being, apparently, quite accidental.

During my residence in Alaska I frequently described the bird to natives from Nulato, and showed them a cut of it, and they declared, in repeated instances, that they knew the bird and had found it nesting to the north of Nulato during the spring time. This statement, however, is very untrustworthy, as the natives very likely mistook it for the Pine Grosbeak or some other bird. As still further indicating its scarcity in the Yukon region, I may mention that the bird was carefully described to various fur traders and natives, and a large reward offered for its

capture, but not a single individual was secured or reported as having been seen during my four years' residence in the Territory. It is to be hoped that more careful work in the interior may result in finding it a regular inhabitant of the Territory, for its elegant coloration and the well-known beautiful notes of all the birds of this genus render it a valuable and interesting member of the bird-life of any region.

LOXIA CURVIROSTRA MINOR (Brehm). American Crossbill.

Along the southeastern coast of the Territory, in the vicinity of Sitka and the adjoining regions, this is a rather common bird. North of the Alaskan Mountains, however, it has been obtained only in a single instance; this was a male, taken by L. M. Turner in the vicinity of Saint Michaels during the winter. It is an immature bird, with a mixed red and yellow plumage, and, like all the specimens I have examined from Sitka and Kadiak, as well as Shoalwater Bay, Washington Territory, is very small as compared with birds from the Eastern United States and the Rocky Mountains. Although a large number of the white-winged species were brought me from various points on the Yukon, and others were obtained by myself in the interior, not a single Red Cross-bill was seen, nor was it found by the Western Union Telegraph explorers; so its rarity in the northern portion of the Territory is established. In the National Museum collection is a specimen from Fort Rae which is differently colored from any other example in the entire series. It is of a dark maroon color with a clear ashy suffusion on the back. There are two distinct dusky stripes on the cheek, one on the upper edge of the ear-coverts, the other along the lower edge. The lining of the wing is without the red tint, which appears in all the other specimens of true *americana* and *mexicana*. The wings and tail are a pure sepia-brown, quite different from the others, and the feathers show no red margins. The lower mandible is very much curved. This specimen is noted in the History of North American Birds, and is certainly in very curious plumage. It would not be surprising to find that it is a stray representative of the Northeastern Siberia race, although it is possible that it is merely a remarkable individual variation of the ordinary bird.

This species, like several other hardy birds, attends to its nesting and the rearing of its young during the most inhospitable part of the year. Commencing early in March, they continue the duties of incubation through the frequently intense cold of their northern home with the same success as the Whisky Jack and one or two other species. They are strange, wandering birds, abundant in a locality at one season and disappearing again may be for years, to turn up again as unexpectedly as they left. In the Old World it is represented by a closely-related form, which in Asia extends as far south as the limits of the Palaearctic region.

Middendorf observed it along the Yenesei above latitude 62° N., and flocks were seen at Ivikulik early in October. It is recorded as tolerably common in Japan, also in Northern China, where it is kept by the people as a cage-bird.

In describing the nesting habits of this bird in the north of Scotland, Mr. J. A. Harvie-Brown writes that the female is always on the nest while incubating, and is fed constantly by the male, and that the young birds are found sometimes as early as March 10. The size of the beak varies, and the birds from Scotland are said to show a range reaching from variety *americana* to variety *pityopsittacus*, or the heavy-beaked European form, answering closely to our *mexicana*. A young female from Sweden is of a little lighter color than the American bird of the same plumage and sex. The average length of sixteen European eggs is seven-eighths by five-eighths of an inch.

The half dozen Alaskan and northwest coast specimens of this Crossbill are very different in size from the ordinary bird of the remainder of North America, and agree so uniformly among themselves that it would appear as though here was another northwest coast race. The small number of specimens, however, render it hazardous to venture a definite conclusion. Among the large series of specimens in the National Museum collection from various parts of North America the only specimens of the diminutive size of those from the northwest coast are two taken in New York State. Should the diminutive size of the birds from the northwest coast prove to be uniform it may be necessary to recognize them as a distinct race.*

*The Alaskan specimens here alluded to by Mr. Nelson agree with the small eastern examples to which Mr. Ridgway would restrict (Proc. Biol. Soc. Wash., II, 105, 1884) the name *L. americana*.—H. W. H.

The subjoined set of measurements will show the characters of these birds as exhibited in series from various portions of their North American range:

LOXIA MINOR.

National Museum Catalogue number.	Locality.	Date.	Sex.	Wing from carpal joint.	Tail to basal end of feathers.	Tarsal joint.	Bill above.	Depth of bill at base.
6440	Washington Territory	Mar.	♂	2.42	2.23	.70	.61	.35
18943	Fort Crook, California	Mar.	♂	2.40	2.30	.67	.67	.38
76293	Saint Michaels, Alaska	Mar.	♂	2.25	2.00	.63	.57	.33
83369	New York	Mar.	♂	2.40	2.25	.61	.52	.32
83863	Massachusetts	Mar.	♂	2.50	2.31	.70	.70	.42
85531	Maryland	Mar.	♂	2.54	2.24	.69	.70	.40
.....	Fort Rae, British America	Mar.	♂	2.55	2.29	.64	.62	.38
.....	Sitka, Alaska	Oct.	♂	2.25	2.45	.63	.53	.33
.....	Kadiak, Alaska	Oct.	♂	2.20	2.00	.62	.50	.34
	Average			2.38	2.22	.65	.60	.36

ALASKAN EXAMPLES OF AMERICANA.

.....	Kadiak, Alaska	Oct.	♂	2.25	2.00	.60	.53	.35
.....	do	Oct.	♂	2.28	2.05	.60	.50	.33
.....	Sitka, Alaska	Oct.	♂	2.30	2.15	.61	.53	.32
.....	Saint Michaels, Alaska	Oct.	♂	2.20	2.00	.62	.55	.31
.....	Shoalwater Bay, Washington Territory	Oct.	♂	2.20	2.00	.60	.56	.31
	Average			2.25	2.05	.61	.53	.32

LOXIA STRICKLANDI.

68441	Arizona	Oct.	♂	4.00	2.55	.73	.77	.46
73974	do	Oct.	♂	4.00	2.50	.72	.79	.48
69462	do	Oct.	♂	4.22	2.61	.70	.76	.46
69465	do	Oct.	♂	4.65	2.60	.71	.78	.45
83570	Colorado	Oct.	♂	3.70	2.39	.70	.75	.42
	Average			3.93	2.51	.71	.77	.45

LOXIA CURVIROSTRA.

17016	Europe	Oct.	♂	2.89	2.49	.68	.75	.41
17011	do	Oct.	♂	2.82	2.15	.70	.71	.44

LOXIA BIFASCIATA.

34129	Stockholm	Oct.	♂	3.70	2.55	.60	.70	.43
34132	do	Oct.	♂	2.60	2.52	.62	.69	.41

LOXIA LEUCOPTERA.

.....	New Jersey	Oct.	♂	2.50	2.60	.63	.61	.32
.....	Philadelphia	Oct.	♂	2.54	2.52	.62	.63	.36
.....	Alaska (Arvik River)	Oct.	♂	2.55	2.51	.62	.64	.35
.....	Maine	Oct.	♂	2.60	2.69	.64	.59	.38
.....	Great Slave Lake, British America	Oct.	♂	2.35	2.61	.63	.....	.36
	Average			2.51	2.57	.63	.62	.35

LOXIA LEUCOPTERA Gmel. White-winged Crossbill.

Although the preceding species is thus far known only as an excessively rare visitant in the northern portion of the Territory, the present bird is found in the greatest abundance wherever trees occur to afford it shelter. It is in even greater numbers than the Pine Grosbeak, and shares with the latter its range. It is more familiar than the Grosbeak, frequently coming low down among the smaller growth, and it is a common sight to see parties of them swinging about in every conceivable

ble position from the twigs on the tops of the cotton-woods or birch trees, where the birds are busily engaged in feeding upon the buds. They pay no heed to a passing party of sleds except, perhaps, that an individual will fly down to some convenient bush, whence he curiously examines the strange procession, and, his curiosity satisfied or confidence restored, back he goes to his companions and continues his feeding. When fired at they utter chirps of alarm and call to each other with a long, sweet note, something similar to that of the ordinary Goldfinch (*Spinus tristis*). They keep up a constant *cheeping* repetition of this note when feeding in parties, and if one of their number is shot the others approach closer and closer to the hunter, and gaze with mingled curiosity and sympathy upon their fluttering companion.

It winters through its range within the tree-limit and was found in the Hudson's Bay country up to the twenty-eighth parallel of north latitude by Richardson, and there are several records of its occurrence in South Greenland. Dall states that they are not found about Nulato during the summer; but, from their retiring habits during this season, they were undoubtedly overlooked, since they surely breed throughout the timbered portions of the northern part of Alaska. On the coast of Bering Sea and Kotzebue Sound it is found merely as a very rare straggler, mainly during the autumn and spring, at which times occasional wandering parties or solitary birds occur.

Reinhardt records five Greenland examples of this bird, and one of its peculiarities is its apparent fondness for ranging to the eastward over the Atlantic.

Kumlien took a young bird on board the Florence, August 15, 1877, in the bay of Newfoundland. In the List of Occurrence of North American Birds in Europe,* Dalgleish gives seven instances, which he appears to consider authentic, of this bird's occurrence in Great Britain, all between 1838 and 1870. He quotes Gray as authority for the statement that the late Dr. Dewin, of Glasgow, when crossing the Atlantic some years ago, saw a flock of these birds 600 miles off Newfoundland, flying east before a westerly wind, and ten or twelve of the birds were captured. He adds, however, that the numerous Swedish records of nearly a dozen instances are not authenticated. It appears to be limited mainly to the eastern portion of North America, reaching the west coast in Alaska north of the Alaskan Mountains, but in the Western United States it very rarely reaches the Rocky Mountains.

In its variations of plumage there are a number of interesting special phases found in the collection. In finely-plumaged birds an irregular black band across the back unites the scapulars, and the red bars range from dingy to a clear bright rose-color, approaching earmine in some specimens. One bird from Fort Yukon, February 16, 1876, has a rich blending of saffron yellow and rose-tipped feathers over the entire body, the colors becoming especially rich upon the throat, breast, and rump, the yellow of these parts becoming a rich lemon. An adult, taken May 13, 1876, has the edges of the feathers worn so that the greenish-yellow shade is partly obsolete, and the dark shaft-markings of the feathers are thus brought out and rendered prominent. One adult, a male specimen from the Northwestern United States, is dull scarlet, with a slight metallic luster in certain lights. A full grown young male from Fort Yukon, April 29, 1877, has the feathers above and below with broad, dark, longitudinal shaft-streaks of blackish-brown. On the crown and middle of the back the dark shaft-streaks are heavier than on the rest of the body. The feathers on the crown, neck, and throat are edged with grayish-white. Those of the back, rump, and upper tail-coverts are edged with a dingy fulvous; breast, abdomen, and under tail-coverts with a pale yellowish gray edging. The white markings of wings are shaded with yellowish. Wing and tail feathers edged with grayish white. Bill and feet pale. Another young bird, taken by Kumlien on the Florence, as before mentioned, is older than the one just described, and shows the effect of wearing. It is very dark and almost black above, being almost uniform blackish brown on the neck, crown, and back, with ashy-gray edgings. Rump lighter, owing to the broader yellowish-white edging to feathers. Below, the feathers are marked uniformly with sharp narrow shaft-markings, with ashy-gray edgings. The bill is larger and longer than in the young Alaskan specimen. The wing-bars are pure white and there is no trace of yellowish shading except on the rump. In Bonaparte and Schlegel's *Mon des Laxiens* is recorded and figured a specimen from the Himalayas said to belong to this species, but it shows certain differences which would indicate, in addition to the extreme extralimital range, that this bird should be referred rather to some Himalayan species.

*Bull. N. O. C.

The *Loxia bifasciata* of Europe and Siberia is very much like *leucoptera*, but differs in having a larger and more robust form throughout. The red of the male is dull scarlet, in contrast to the rose-red and purplish-red of *leucoptera*. In its stout proportions it resembles *curvirostra*, while in some of the color-markings, especially in the female, it resembles *leucoptera*, so that it appears to unite several of the characteristic marks of the two species and to merit an intermediate position between the plain and the banded winged species.

LEUCOSTICTE GRISEONUCHA (Brandt). Aleutian Leucosticte.

On the Aleutian Islands from one extreme to the other is found this large and beautiful finch, extending its habitat thence north to include the Seal Island group and the small island of Saint Matthews, still further to the north. East of the Aleutian chain it reaches Kadiak Island. Upon all these islands, with the exception of Saint Matthews and the Fur Seal group, it is a permanent resident.

For a knowledge of its habits we are indebted mainly to the observations of Messrs. Dall and Elliott. The latter saw a few on the island of Saint Matthews August 9, 1874, and this forms our only record from that point. On the Seal Island group the same observer found it abundant, and tells us nearly all we have concerning its breeding habits. We learn that on these strange islets the "*Paktoshkie*," as it is termed by the creole inhabitants of the island—

Nests in a chink or crevice of the cliffs, building a warm, snug home for its little ones, of dried grasses and moss, very neatly put together, and then lined with a few superfluous feathers. The eggs vary in number from three to six; there generally is four. They are pure white with a delicate rosy blush, when fresh, and measure 0.97 by 0.67 of an inch. The young break the shell at the expiration of twenty or twenty-two days' incubation, the labor of which is not shared by the male; he, however, brings food to his mate, singing as most birds do of his kind, highly elated by the prospects of paternity. The chicks, at first, are sparsely covered with a sprinkling of dark-gray down, and in two or three weeks gain their feathers, fitting them for flight, though they do not acquire the ash and black of the head, while the chocolate-brown on the back is rich, and the rosy tints of their feather-tips turn to crimson. These bright hues of adolescence do not appear until they are one year old; between the old birds, however, there is no outward dissimilarity in size and coloration, the male and female being exactly alike. They feed upon various seeds and insects, as well as the larvae which swarm on the killing-grounds. They are fearless and confiding, fluttering in the most familiar manner around the village huts. In the summer of 1873 a pair built their nests and reared a brood under the eaves of the old Greek church, that tottered on its rotten foundations, at St. George.

This bird has no song, but utters a low, mellow chirp. It seems to pair permanently, and never assembles in flocks. Dall adds that it has no song at any season, but a clear chirp-like *veet-a-veet-a-veet-veet*. He reports it as on the wing a great part of the time, avoiding the ground, but darting rapidly in a series of ascending and descending curves, now springing on the broad top of some unbelliferous plant, now alighting on the ledge of a perpendicular bluff, jumping from point to point, seemingly delighted at its own agility. The nest which he found on the Aleutian Islands was in a small hollow on one of the ledges, provided with a few straws and bits of moss. The eggs are deposited in May, and in August the young are fully-fledged. He considers the birds as almost wholly granivorous, but found several beetles in the crop of one. At Unalaska he found it especially numerous, and on May 24 took its nest from a crevice in a rocky bank on the shore of Captain's Harbor. The structure was of grass, very neatly woven together, and lined with fine grass and a few feathers. It contained five eggs, newly laid, and was about 12 feet above the beach. The birds were found singly or in pairs frequenting the grassy banks and rocky bluffs near the shore. It was not found at elevated points on the mountains.

During my residence at Unalaska, in May and June, 1877, I saw but a single individual of this species, the last of May, as it was fluttering from point to point along the face of a high cliff, at such a distance that it escaped my shot and disappeared over the brow of the precipice. I spent considerable time searching for them in every suitable location, from my arrival up to the date of leaving—the 1st of June—but none were to be found; yet only a few seasons before they had been found numerous by Mr. Dall, over exactly the same ground—an additional illustration of the familiar fact that a bird may be numerous at a place in one season and the next find that locality without a single example. On my return to the Aleutian Islands, the last of September, 1881, up to our leaving, on October 4, of the same season, I again made search for this finch, but with the same lack of success which attended my previous efforts.

A single specimen of this bird is recorded from Fort Rupert, Vancouver Island, June 1, 1862, but this reference undoubtedly belongs to *littoralis*. Mr. Ridgway is inclined to consider this bird a well-defined species, and to separate it from the form to which it has been referred, claiming that the two do not intergrade, as has been supposed. This supposition may be true, but it is difficult to definitely settle the matter until more is known of the geographical range of the two. *L. arctoa* has been ascribed to the Aleutian Islands, but apparently upon insufficient evidence, although Bonaparte and Schlegel, in their work (*loc. cit.*), state that they have seen specimens of this bird which were killed upon the islands. It was recorded by Steller as one of the birds he found upon Bering Island, and it is well known from the Kurile Islands and the coast of Kamchatka.

On the Commander Islands Stejneger found *griseonucha* resident, and most numerous on Copper Island, where they frequented the rugged coast-line. This observer notes them as a shore-loving species during the breeding season, but when the young are able to follow the parents lead them inland along the streams in search of insects. He shot full-fledged young on July 7, and adds that many pairs raise two broods in a season.

It winters in Southeastern Siberia, frequenting the vicinity of villages, and becomes very familiar, approaching the houses for its food. A young *griseonucha*, about two-thirds grown, obtained on Saint George Island, on July 12, by Elliott, has the entire body fuscous-brown orumber-brown. A dingy rusty wash on back and breast. The head may be called a dark nuber with a grayish wash. The outer edges of secondaries and wing-coverts pale rose. Tertials edged with rusty. Wing and tail feathers dark brown-edged with a narrow pale border. The basal half of feathers on body dull, pale plumbeous, which shows through on the abdomen, and less distinctly on other parts of the body, giving a peculiar shade to the general tint. A full-grown bird of this species, in this plumage, is figured with an adult in Bonaparte and Schlegel. (*Loc. cit.*)

Toward the close of the last century, Sauer, a member of Billings's Expedition, writes that the Unalaskan Aleuts prized this bird for its feathers, which they used for ornamental purposes on their clothing.

LEUCOSTICTE TEPHROCOTIS LITTORALIS (Baird). Игбурн's Leucosticte.

The types of this form came from Sitka, where they were obtained during the explorations of the Russian-American Telegraph Expedition, and the original description is contained in a communication by Professor Baird in the Transactions of the Chicago Academy of Sciences, p. 318. Since then specimens have been obtained from Sitka, Kadiak, British Columbia, Wyoming, and various portions of the central Rocky Mountain region, as far south as Colorado. We learn from Mr. Ridgway, in his monograph of this genus,* that *littoralis* occurs in winter with *tephrocotis* throughout the latter's southward range, the abundance of the former increasing to the westward. "We have seen it in the winter plumage from Kadiak and Sitka of the Alaskan coast, from Fort Simpson, British Columbia, Idaho, Wyoming, and Colorado, while it is known to extend in very severe winters as far southward as the parallel of 39° in the Sierra Nevada and contiguous ranges to the eastward. On the Cascade Mountains J. K. Lord found them in October."

In summer plumage this race has been obtained only in Colorado, where Mr. Aiken shot it from flocks of *tephrocotis* as they were passing to the northward in the spring. From the fact that it has been found during winter in the northwest, from the island of Kadiak southward, it is exceedingly probable that the breeding ground of this race is the coast system of mountain ranges of Southeastern Alaska and British Columbia, possibly extending southward to the alpine summits of the Cascades of Washington Territory and Oregon. Mr. Ridgway further states that a series of eleven winter specimens in the National Museum collection, representing the "*campestris*" style, forms a connection between *littoralis* and *tephrocotis*. On Kadiak Island *littoralis* and *griseonucha* occur in company, and it is possible that further study, in this and the adjoining region, may show that the two forms intergrade. For a most complete and satisfactory treatment of this genus those interested are referred to Mr. Ridgway's monograph, previously cited. The Kadiak specimens, obtained in February, are indistinguishable in general coloration from the

* Bull. U. S. Geol. and Geog. Surv., I. No. 2, second series, 1875, p. 62.

specimens of *griseonucha* obtained at the same time, except that they are smaller size and have lighter chocolate tints. A typical specimen of this form is in the National Museum collection from Gilmer, Wyo., sent in with a number of *tephrocotis*. The breeding habitat and distinctive habits of this species, if it possess any, are as yet totally unknown.

ACANTHIS HORNEMANNI EXILIPES (Coues). Hoary Redpoll (Esk. *O-krikk-tá-ghik*).

This is the prevailing species of the genus throughout Northern Alaska, where it occurs in great numbers. Its habits and range are shared by the common Redpoll, and the two are almost indistinguishable, excepting for the differences in coloration. Their notes, nesting-sites, nest, and eggs are indistinguishable. Both forms are summer and winter residents, making a partial migration into the interior during the severe weather of winter. The series obtained by me contains both forms from various points along the Yukon from the sea to the British boundary line. They are usually found in parties of varying size comprising both forms, although, owing to the greater abundance of *exilipes*, parties composed wholly of it are found at times. It is found on the Commander Islands in limited numbers during the winter.

Young *exilipes*, taken at Saint Michaels in July, have the bill dark horn-color; feet pale in young specimens, but in full-fledged birds the feet and tarsus are dark horn-color. The feathers on the top of head, back, and rump, sides of neck, breast, and body each with a shaft-streak of dull blackish-brown, and feathers of crown and rump edged with more or less ashy or grayish, and in some cases the gray extends down the middle of the back. Ear-coverts, edges of dorsal, and scapular-feathers buff, or dull fulvous-brownish. The two wing-bars and tertiaries are edged with a lighter shade of buff; edges of primaries and rectrices grayish, washed more or less heavily with a fulvous shade; the abdomen ashy-white; chin occupied by a concealed patch of sooty-brown feathers with a dull white wash; there are black shaft-streaks on the throat and sides of neck, the feathers edged with dull grayish-white washed with more or less of the fulvous shade. Very young birds are darker than those full-fledged, and show much less grayish-white on the crown and rump.

The nests vary from 1½ inches in height by 3 inches broad to 2½ inches high by 5 inches broad. The central cavity is sometimes shallow and sometimes deep, and is usually more or less warmly lined with ptarmigan-feathers and the cottony down from willows and other plants. The eggs vary from three to five in number, and are light-blue in color, with an occasional shade of green. They are variously marked, some being thickly covered with fine pale reddish-brown or rusty-brown specks, much more numerous about the large end. Others are sparsely dotted here and there with fine brownish spots or purplish-ashy markings, which become more numerous about the large end in the form of a ring of straggling irregular dark markings, much smaller and less decided than the irregular markings of an oriole's egg, though resembling the latter. In one instance, however, these dark-brown marks are very distinct and are very much like the eggs mentioned.

Dr. Brewer characterizes the eggs of this bird as pale bluish-white. Those I have seen, however, are decidedly blue or bluish-green, which color is found in all American specimens, except, perhaps, such as are much faded by exposure to light after being blown.

A large series of eggs, consisting of thirty-four specimens from Saint Michaels, measure as follows:

ACANTHIS EXILIPES.

.70 by .52	.70 by .51	.71 by .52	.67 by .54	.70 by .50
.70 by .51	.69 by .51	.70 by .52	.69 by .52	.71 by .50
.64 by .50	.67 by .52	.70 by .51	.70 by .51	.65 by .50
.67 by .52	.69 by .50	.70 by .50	.72 by .51	.....
.69 by .53	.67 by .50	.72 by .52	.68 by .49	.....
.68 by .51	.67 by .50	.68 by .52	.69 by .51	.....
.70 by .53	.69 by .50	.73 by .52	.69 by .50	.....
.71 by .51	.....	.70 by .51	.70 by .50	.....

Largest, .73 by .52. Smallest, .61 by .50. Average, .69 by .51.

Dr. Brewer gives the measurements of an egg from Greenland referable to *hornemanni* as .75 by .60 of an inch.

The habits of this species are included in the description of the following bird, as they are indistinguishable. Be it remembered, however, that *exilipes* is the prevailing form at Saint Michaels, and the observations refer mainly to it.

ACANTHIS LINARIA (Linn.). Redpoll (Esk. *O-kwiik-h-tá-ghük.*)

This species is found in Alaska in smaller numbers than the preceding. On the southeastern coast of the Territory, including the Kodiak and Sitkan region, the present bird is found to the exclusion of the other, as also to the south along the coast to Washington Territory and British Columbia, where Mr. Lord found it resident. Taken at Cook's Inlet on July 1, on August 31 at Chamisso Island, Kotzebue Sound, by Bean. In Kamchatka it is the common breeding form, and on the Commander Islands it is the most common form in winter. It is not considered by Stejneger to be a summer resident there.

This and the closely-allied species commence to nest in the vicinity of Saint Michaels, even as early as May 22, and in 1878, before the ground was free from snow, and while the sea and small streams were still covered with ice, we found a nest of this bird cunningly placed in a cavity in a stout branch projecting from a log of drift-wood, which a high tide, many years before, had stranded on the bare tundra several miles from the sea. In the bottom of the shallow cavity, to which the bird gained access by a small knot-hole, was placed a compact structure of fine straw and grass, lined with ptarmigan-feathers and containing three eggs. The log was from 20 to 25 feet in length, and while a native sat at the farther end the female entered the nest, the male keeping close by and continually uttering his cheerful notes, as if to assure his partner of his presence.

A pair of these birds built their nest early the same season within the shelter afforded by my inverted kyak, as it lay upon the staging close by the house, and nests were found all about in bushes, or tufts of grass, indifferently, according to the locality. The material used by them is as varied as the sites chosen, and appears to consist of such material as comes first to hand. One, for instance, is composed entirely of an irregular mass of fine dry twigs with a very few ptarmigan-feathers for lining; another, is a fine, compact, cup-shaped structure of dry, coarse grass, warmly lined with a finer material of the same, united with feathers and the cotton obtained from willows and other plants.

It has been recorded from the Aleutian Islands, at Unalaska in Ellis's voyage, and this is the only record from those islands. To the north I found it and *exilipes* on both shores of Bering Sea to the Arctic. On the Alaskan coast the two were common about Kotzebue Sound, *exilipes*, however, being the predominating species. In the vicinity of East Cape and adjoining portions of the Siberian coast the two forms occur, *exilipes* being in the majority there, as it is on our shore.

The first nests are built early in spring, as noted, and from the middle of May until the last of June and first of July they are seen but rarely in the vicinity of the houses. After about the 1st of July, however, they come trooping about, young and old, in large parties, with great confidence and a peculiar pertness, taking possession of the premises and using the roofs and fences for convenient perches, making excursions thence to whatever point appears likely to yield food, or chasing each other playfully about. In spring they are beautiful objects, with their bright rosy hues and fluffy plumage. On warm sunshiny days during April they come familiarly up to the very windows and doors, and peer about with an odd mixture of confidence and curiosity, examining everything, and scarcely deigning to move aside as the people pass back and forth. By the 8th of June their young are frequently hatched, and by the 1st of July are fully fledged. All through July and August they are extremely abundant, but in September the number commences to diminish, until toward the end of September the majority are gone, and but comparatively few are seen in the vicinity of the coast until spring approaches. Flocks of considerable size, however, unite at this season and remain about the country, frequenting the bushy tracts on the hill-sides until into November, when all but a few of the hardiest leave. The migrants mainly flock to the interior, where they brave the severest weather. The last of March and early in April they reappear on the sea-coast and make their first visits to the houses. Their movements at this season are rather erratic. They sometimes appear in considerable numbers and remain permanently, and again remain for a few days or hours, and then disappear for several weeks.

PLECTROPHENAX NIVALIS (Linn.). The Snowflake (Esk. *Am-á-gó-lti-gúk*).

The Snowflake is a well-known summer bird in all the circumpolar regions, and none of the various Arctic expeditions have extended their explorations beyond the points where this handsome species is found. It chooses indifferently the bleak shores of the Arctic islands encircled by an icy sea, or the warmer shores to the south as far as the Aleutian Islands, and nearly as far on the opposite Siberian shore of Bering Sea. Although it rears its young far from the usual haunts of man, it passes to the south and is one of the most familiar and well-known birds through the Northern States. But few remain during this season in Alaska, and these mainly on the Aleutian chain and the southeast shore of the Territory, where the climate is comparatively mild. To the north of this the intense cold and violent storms permit the presence of only a small number of the most hardy. Before the winter is fairly broken—by the 6th of April—they commence to return to the north, and are found on this date at Fort Reliance, on the Upper Yukon, and thence they advance slowly with the returning sun until during this month they have regained nearly all their summer haunts within the Territory. Along the north coast of Asia, Nordenskjöld mentions finding it at nearly every stopping-place of the Vega during his famous voyage, and notes its arrival at Tapkan, on the Siberian Arctic shore, northwest of Bering Straits, on April 23. During the summer of 1881, while with the Corwin, I found it common on the Arctic coast of Alaska to Point Barrow, along the entire northeast Siberian coast, and again on Herald and Wrangel Islands.

Elliott found it resident on the Seal Islands in Bering Sea, and informs us that—

This bird builds an elegant and elaborate nest of soft, dry moss and grass, and lines it warmly again with a thick bed of feathers. It is placed on the ground beneath some heavy lava shelf or at the foot of an enormous boulder. Five eggs are usually laid, about the 1st of June. They are an inch long by two-thirds broad, of a grayish or greenish white, spotted sometimes all over, sometimes at or around the larger end only, with various shades of rich dark brown, purple-brown, and paler neutral tints. Sometimes the whole surface is quite closely clouded with diffuse reddish-brown markings. Upon the female the entire labor of the three weeks' incubation required for the hatching of her brood devolves. During this period the male is assiduous in bringing food; and at frequent intervals sings his simple but sweet song, rising, as he begins it, high up in the air, as the skylark does, and at the end of the strain drops suddenly to the ground again. * * * The food of this species consists of the various seeds and insects peculiar to the rough, higher ground it frequents, being especially fond of the small coleopterous beetles found on the island. * * * It cannot be called at any season of the year gregarious, like its immediate relative, the Lapland longspur, with which it is associated on these sea-girt islands.

Dall found it resident throughout the Aleutian Islands, and on June 20 and 23, 1873, he found two nests, one with five fresh eggs and the other with four, much incubated. These nests were built on low grassy banks on Attu Island, one of the extreme westernmost of the Aleutian chain. At Unalaska, in the eastern section of these islands, he found it frequenting the mountains in summer, and only approaching the shore when the heavy snows rendered the heights uninhabitable. The Snow Bunting is also found breeding on all the other islands of Bering Sea and in mountainous localities along the entire shore-line to that portion of the Arctic coast north of Kotzebue Sound; here it frequents the low, flat, pebbly shores and breeds close to the sea-level. In proportion to the distance south of the Arctic regions it is found, it resorts to higher and higher altitudes in summer.

At Point Barrow Mr. Murdoch found the Snow Bunting to be a common summer resident, arriving from the 9th to the 16th of April; breeding in early June and moving south again the last of September. Upon the Commander Islands, according to Stejneger, it is resident, and in winter frequents the shore at low tide, and feeds in company with Cones's Sandpiper. The first broods are hatched on these islands about the 1st of June, and a second brood is under way in July. On the Shumagins Bean found young just able to fly on the 16th of July, and Turner reports them as common residents on the Near Islands. Sauer notes their arrival at Unalaska about the end of September.

About Plover Bay, on the high mountains rising abruptly from the water, I found it common and breeding the last of June, 1881, and on June 24, the same season, it was also found in fine breeding plumage at the southwest cape of Saint Lawrence Island, where we landed from the Corwin. At the base of this bluff were the ruined huts of the famine-stricken Eskimo, and

the steep hill-side was studded with the glistening skulls of the victims. Every large depression held a heavy snow-bank, and the tops of the hills were gray with masses of lichen-covered rocks or a stunted vegetation. On the summit overlooking this desolate scene were two walrus-hide huts, sheltering a few survivors of a village which contained nearly two hundred inhabitants a little over a year before. As we made our way up to these huts we were greeted by the hard rattling *chir-r-r* of several Snow Buntings as they flew from place to place before us. Their note was different from any that I have ever heard them utter during their winter visit to the south, and was one of protest or alarm, as shown by the uneasiness of the birds as they flitted overhead. We suspected they were nesting from their movements, and asked three or four native children, who ran to meet us, if they knew where the birds had their eggs. In an instant a broad smile illuminated each grimy countenance, and away they scampered, each eager to be the first to reach the spot and gain the prize. Just back of the huts, about 100 yards distant on the hill-side, and sheltered by a slight tussock, was placed a warm closely-made structure of fine grass stems interwoven throughout with feathers and the cottony seed-tops of plants. The central depression was built uniformly like the rest of the nest, and the entire structure measured $2\frac{1}{2}$ inches high by $4\frac{1}{2}$ inches across the top, and $2\frac{1}{2}$ inches across the central depression, which latter was $1\frac{1}{4}$ inches deep, and contained one fresh egg. Its ground color is dull grayish-white with a tint of bluish; over this is spread an abundance of reddish-brown markings, in the form of dots and irregular spots, which are larger and form a ring around the large end of the egg. The nest was taken, and the female was shot, while she hovered restlessly about, uttering her sharp chirring note. As we returned slowly toward the shore, the male flew about us continually, uttering a loud plaintive call-note like the syllables "*p-chir*," prolonged at the end, the entire time of our stay in the neighborhood. It exhibited the greatest distress, and appeared to be perfectly aware of our having the female in our possession, for the vicinity of its rifled nest was deserted, and it followed us over 100 yards, circling about and keeping close by, perfectly regardless of any danger to itself.

Later in the season, during the latter half of July and first of August, the young Snow Buntings were found fully-fledged and accompanying the parents wherever we landed on the shore of the Arctic either on the American or Asiatic coasts. It was also seen on Wrangel and Herald Islands, and on the former, two pair of adults with their young broods greeted us as we set foot upon that previously unknown shore. When these Buntings prepare for their northward flight in spring in Northern Illinois they gather in flocks, and I once heard a flock utter a sweet warbling song in a low musical chorus as they were perched in the tree-tops on a street in the city of Chicago. In the far north, however, I have never heard this, and can only recall the rolling call-note previously mentioned, and the rich clear and rather hard song which is uttered by the male during the mating season and for a short time afterwards.

Hearne tells us that the Snowflake may be kept alive for a long time in a cage, and if placed near a canary learns the song of the latter and sings both winter and summer, thus showing that the bird possesses considerable musical ability as well as power of mimicry.

At Plover Bay, East Siberia, I heard it uttering a loud clear whistling song from the jutting points of the rocks on the hill-side. The song consisted of a few short notes, which were repeated at intervals of a few minutes in a clear wild tone, striking the ear harmoniously amid the surrounding wilderness of bare, rocky, mountain slopes.

Along the Alaskan shore of Bering Sea it is not an abundant breeding species, but a pair or two may be found at almost any point where the coast is rugged and high land is found in the vicinity. It arrives there during the last half of April and lingers until winter sets in.

At Cumberland Gulf, on the west coast of Davis's Strait, its arrival is recorded by Kumlieu as occurring on the 1st of May, and the first eggs were obtained there by him June 20. It nests there in the fissures in the rocks and among the Eskimo graves and cairns, and one nest of this bird has been found constructed in the cavity of an Eskimo skull. All accounts agree in stating that it is a bulky structure of grass, lined with feathers, and containing from four to six eggs.

During the Nares Expedition Captain Feilden found a Snow Bunting's nest June 24, in latitude 82° north. The nest contained four eggs and was within 20 feet of a Snowy Owl's nest. It was made of grass and lined with the owl's feathers. Another nest was lined with the fine wool of the Mask Ox.

There is a very decided amount of individual variation among the specimens of this bird in my collection, which is composed mainly of winter birds. This variation appears to be, however, as stated, purely individual, since a comparison between birds of this species from various localities on the two continents shows no geographical difference. The range of individual variation appears much greater than is shown among the allied species, and I append notes of some of the most remarkable states of plumage. Its fondness for wandering from place to place is exhibited in the north, as well as south, and in summer, except during the breeding season, it is found scattered everywhere throughout its northern range. The parents and young wander restlessly wherever their inclination leads, until, at the approach of winter, they band together in parties of various sizes and betake themselves to the south.

One specimen, a female, obtained at Saint Michaels, April, 1879, is pure white over the entire body, with the exception only of the tips of the primaries for an inch from their ends. This part of the primaries is jet black, mainly on the inner web, with a narrow edge of white at the tip, but the shaft and most of the outer web are white. The tail is pure white without a trace of black. The bases of the feathers are not black, as is usually the case with this bird, but are dark sooty-plumbeous. Feet black, bill pale. This bird is not an albino, as is shown by the black wing tips, which have much the same color arrangement as is exhibited in the gulls. Another specimen somewhat similar has the tips of the two middle tail-feathers black and black-shaft lines on the tips of the other tail-feathers. It has also black wing-tips and black tips to the tertials with the bases of these feathers white. The crown and back are washed with rusty. This bird was taken at Uvalaska Island in January.* The third curious plumage shown in a bird taken at Saint Michaels in February, 1879, has the four outer tail-feathers white, with the other half of the shaft black. The central tail-feathers are very dark brown, edged with white, with the basal parts of webs, excepting the two middle feathers, white. The wings are dark brown and colored much as usual, but the dark bases of the feathers on the back terminate in long narrow pointed shaft-lines edged with dull, yellowish white, which gives the back a striated appearance of brownish lines and yellowish-white interspaces.

A female taken at Saint Michaels August 24, 1879, is in full winter dress, and a fine series from Fort Reliance, on the Upper Yukon, taken early in April, shows conclusively that this bird does not pass through a spring moult, but that the rusty edges or tips of feathers wear away and leave exposed the beautifully contrasted black and white characteristic of the breeding birds.

The female—parent of the egg described from Saint Lawrence Island—though much worn, has the feathers still edged with dingy yellowish on the head and grayish-white on the back, and thus appears much duller than the summer male. The rapid wearing away of the feathers in spring is similar to the process undergone by the fur-bearing mammals at that season—the rays of the sun, with the fierce reflection from the snow, bleaches the dark color of the winter fur to a much lighter shade, and renders the ends of the hair so brittle and harsh that by the last of March and first of April the skins of the foxes and other fur-bearing animals are worthless. Animals killed at this season show that the hair becomes shorter and shorter, by abrasion, as the season advances. Compared with the fine, glossy fur of winter, the difference is very striking, and would seem to show that shedding had taken place were we not aware of the actual cause.

It is to be supposed that the feathers of birds, when the breeding season approaches, receive additional coloring matter which vivify the tints of the plumage, as is best exemplified in the gulls, which are rose-tinted in spring.

PLECTROPHENAX HYPERBOREUS Ridgw. McKay's Snowflake.

This species was described in Proceedings U. S. National Museum, vii, June 11, 1884, p. 68, from specimens taken by Mr. Nelson at Saint Michaels, and by Mr. McKay at Nushagak, Bristol Bay. At both localities the bird appears to be a migrant only. Recently Mr. Townsend has found the bird breeding in abundance on Hall Island, Bering Sea, and the species is likely to prove an insular form, with its breeding-ground restricted to this and perhaps the neighboring islands of Saint

* The specimens here alluded to by Mr. Nelson, with others taken by McKay at Nushagak, were subsequently described by Mr. Ridgway as the *P. hyperboreus*.

Matthews and Pinnacle. It being an insular form its summer habitat might be supposed to include Saint Lawrence Island, to the north of Saint Matthews. Such, however, is not the case. The *Plectrophenax* of this island is known to be true *nitalis*. The form resident on the Prybilov Islands, to the south, is distinct from either of the above, and has recently been described by Mr. Ridgway as a race of *hyperboreus* (*P. hyperboreus toicensis*). H. W. H.

CALCARIUS LAPPONICUS (Linn.). Lapland Longspur. (Esk. *Tik-i-chi-luig-uk*.)

Like the preceding species, the Lapland Longspur is a widely-spread circumpolar bird, whose presence is recorded from nearly every point visited by explorers along the shores of the Arctic coast. It is found breeding in Iceland, Greenland, and on nearly all those islands lying in the icy sea just to the north of the continental mainlands. In the territory covered by the present paper it is an extremely abundant and familiar bird, found, perhaps, more numerously upon the mainland, but also known from the various islands of Bering Sea. It was found by Dall as a summer resident on the western portion of the Aleutian chain; it was also found resident on the Seal Islands by Elliott, and on Saint Lawrence Island was found by myself during the summer of 1881. It is a summer resident on the Near Islands and abundant about Point Barrow, where it arrives about May 20 and lays the first eggs the beginning of June. It returns south from that point the last of August and first of September. On the Commander Islands it is one of the commonest land birds, arriving about the 21st of April and leaving the end of October. On the north coast of Siberia it was found with its young during the same season, but was not seen on either Wrangel or Herald Islands during our visit. Regarding its presence on the Seal Islands Elliott tells us that "this bird is the vocalist *par excellence* of the Prybilov group, singing all through the month of June in the most exquisite manner, rising high in the air and hovering on fluttering wings over its sitting mate. The song is so sweet that it is always too short." * * *

According to Dall it arrives at Nulato, on the Middle Yukon, about May 12, but this must be exceptionally late, since it frequently arrives at Saint Michaels on the sea-coast the last days of April or 1st of May, and they are known to arrive in the south of Greenland by the 1st of May. The naturalist just quoted found it an abundant summer resident on the Western Aleutians, and obtained a nest with four eggs much incubated the 18th of June. He also tells us that they leave these islands in autumn, and I doubt if any winter in the Territory, with the possible exception of the Kadiak and Sitkan region.

During my residence at Saint Michaels over thirty nests were obtained, and the number might readily have been doubled. Their nests were so abundant everywhere on the grassy flats that one could scarcely walk over the tundra for half an hour during the proper season without finding from one to a half dozen of them. By the middle of May the males are numerous and in full song along the coast of Norton Sound, having arrived about this time or a little earlier in flocks, and spread rapidly over their breeding ground. Its range during the nesting season is from Fort Kenai and Kadiak, on the southeast coast of Alaska, north through the entire Territory to the Arctic coast. In July and August Kumlien found the eggs and young of this bird on Disco Island, Greenland, and notes that they keep back from the coast, having a greater preference for the interior than the Snow Bunting. I have noted this peculiarity wherever I have had an opportunity of observing their habits along the shores of Bering Sea and the adjoining Arctic coasts. When they arrive early in May the ground is still largely covered with snow with the exception of grassy spots along southern exposures and the more favorably situated portions of the tundra, and here may be found these birds in all the beauty of their elegant summer dress. The males, as if conscious of their handsome plumage, choose the tops of the only breaks in the monotonous level, which are small rounded knolls and tussocks. The male utters its song as it flies upward from one of these knolls and when it reaches the height of 10 or 15 yards it extends the points of its wings upwards, forming a large V-shaped figure, and floats gently to the ground, uttering, as it slowly sinks, its liquid tones, which fall in tinkling succession upon the ear, and are perhaps the sweetest notes that one hears during the entire spring-time in these regions. It is an exquisite jingling melody, having much less power than that of the Bobolink, but with the same general character, and, though shorter, it has even more melody than the song of that well known bird. There is such joyous exultation in the song that the songster assumes a new place in one's regard.

By the last of May or the first of June the birds are mated, and each pair has its snug nest carefully placed in the midst of a sheltering tussock, or on a dry knoll, where are deposited from four to seven eggs, which is a quota. The young are out on the wing sometimes as early as the 1st of July, but more generally by the 10th of this month, from which time they unite in small bands, frequenting the vicinity of the trading posts and native villages, where they remain in great abundance until the last of August or first of September, when they commence their straggling departure for the south. While in the neighborhood of houses they are extremely heedless of the presence of people, and are nearly as familiar as are the English sparrows in our cities. By the last of September or the first of October the last one has passed away towards the south, and none are seen until returning spring brings them north again. Some doubtless remain to winter along the southeast coast of the Territory, but none are found in the north, nor do they occur at this season on the islands of Bering Sea.

The nest is generally placed on the drier portions of the flats; a hummock or tuft of grass is chosen, or perhaps a projecting bunch of dwarf willow stems, and as one comes directly upon it, the female usually flutters off under one's feet; the male keeps in the immediate vicinity, and joins with his mate in a *cheeping* protest at the intrusion. If the eggs are nearly ready to hatch the females show the greatest solicitude, as they do also in case the nest contains young. In one instance a parent was driven from her eggs just as they were about to hatch, and she ran along the ground for a few yards, uttering a plaintive note, like *chéè chéè chéè*, in a fine, vibrating, metallic tone, at the same time dragging her outspread wings and tail upon the ground, and fluttering as though in mortal agony. Ordinarily they hover about or fly restlessly from tuft to tuft, uttering a chirp of alarm and protest, until the intruder has left the vicinity. The males remain in song but a comparatively short period, for by the middle of June scarcely a note is heard. The adults change their summer to winter plumage toward the end of July.

In a series of twenty-six nests, obtained in the vicinity of Saint Michaels during the first half of June, is to be found so great a variation that it may be safely said no two are alike. The nests vary in size from $2\frac{3}{4}$ inches in depth by 5 inches across the top, and in size of central cavity from 2 inches deep by 3 inches across the top. The walls are thick and strong, composed of an abundance of material, or they may be a mere cup shaped shell, barely sufficient to hold the eggs. The majority of nests are composed of rather coarse grass, sometimes with moss interwoven, forming a thick layer, which was frequently as thoroughly water-soaked as a wet sponge when the nest was collected. The amount of material used depends greatly upon the locality; in damp places a much greater amount is made use of, while in dry places the nests are much lighter. Though the outer part of the nest was frequently formed of old and often grimy or partly decayed vegetable matter, the interior was invariably composed of fine, soft, dry, yellow blades of last year's grasses. These in many instances are unmixed with other material, and in others are combined with feathers of the Ptarmigan or other wild fowl. In a few cases the lining of the nest is a warm cup of feathers resting upon fine grass, and one has a thick lining of feathers and dogs' hair. Some nests are so small that they may be inclosed in the hand, while others can scarcely be inclosed by both, and the smallest nest collected may be inserted entire into the cavity of the largest one. The largest nest contained also the largest eggs, and probably belonged to an unusually large bird.

The ground-color of the eggs (when it can be seen) throughout the entire series is a light clay with a pale greenish tinge. The eggs of one set (No. 386), numbering four, obtained at Saint Michaels, on June 5, 1881, measure respectively .90 by .65, .98 by .64, .95 by .65, and .92 by .68. These eggs have a pale greenish clay-colored ground, and are covered irregularly with a coarse blotching of reddish brown most plentiful at the large end. The markings occupy over half the surface. Another set (No. 219), obtained also at Saint Michaels, in June, is marked somewhat in the same manner, and the eggs measure respectively .80 by .57, .83 by .61, .79 by .59, .80 by .60, and .81 by .61. In this set there are dark zigzag markings on every egg in addition to the other marks or spots. The third set (No. 114), obtained on June 5, 1880, at the same locality, has the ground-color concealed by the close light-brown markings which are so light that the ground-color shows through and produces a decided olive-brown over the entire egg. They measure respectively .81 by .61, .82 by .59, and .81 by .60. This set of eggs resembles in coloration the ordinary style of

the eggs of *Budytes flavus leucostratus* so closely that had they not been identified by means of the parent it would have been impossible to distinguish them, and in the preliminary separation of eggs which I made prior to looking up the numbers in my note-book I included them in the series of Yellow Wagtail's eggs. Set No. 80 has the same appearance. The smallest eggs are set No. 345, from the same locality. These have the ground-color almost concealed by the fine reddish-brown speckling, and measure respectively .75 by .57, .75 by .58, .76 by .57, .77 by .56, and .76 by .55. From the sets marked by spots, or by spots and irregular blotches sparsely enough distributed to allow the ground-color to be distinctly seen, there is a regular gradation, the markings becoming heavier, darker colored, and more abundant, until the ground-color may be entirely concealed under the rich, warm chocolate-brown, which reveals only a very faint mottling of olive-brownish where the ground-color is less thickly overlaid. Many of the sets are more or less plentifully marked with irregular zigzag markings of dark umber-brown, very much as in the eggs of the Orioles, but less decided than in the latter. The pattern and style of coloration vary greatly, but are pretty well defined by the variations described in the preceding notes. It may be remarked that eggs of the same set rarely show very much individual variation.

Notes on plumage.—Partly-fledged birds taken the last of June or first of July have the feathers of the crown, back, rump, breast, and throat with black or very dark-brown shaft-lines, which, upon the breast and throat, are narrowed to about one third the width of the feather. On the crown and back the black central markings occupy over half this width. The feathers of the crown are edged with a dingy yellowish-buff; those on the nape with grayish or dull ashy, and on the back and rump with a dingy yellowish-gray or buffy. There are two indistinct white wing-bars. The throat is dingy ashy. The edges of breast-feathers are soiled yellowish, which washes the feathers of the entire under-surface. Tertiaries, secondaries, and greater coverts broadly edged with a dull shade of chestnut. Primaries lightly edged with a paler shade of the same. Quill and tail feathers dark-brown, the latter edged with reddish-brown. A little later the bird attains its growth, and by abrasion the feathers soon lose a great part of their fluffy immature appearance. The dingy yellowish of the abdomen changes to soiled whitish; the throat also becomes lighter and the yellowish borders of the feathers on neck and breast wear so that the dark shaft-markings appear less diffused, and are more sharply defined. The crown is occupied by a well-defined area of feathers with black centers and rusty reddish edges. A dingy white area begins on the lores at base of bill on each side, and passes back, encircling the eye to the nape. This area is dotted with fine, dark shaft-lines. Ear-coverts dull rusty reddish. Back, shoulders, and rump feathers with heavy dark centers, edged with grayish or yellowish gray and dull buff. The pattern of tail-feathers is the same as in adult. Wing and tail feathers brown, the latter darkest. Wing-coverts tipped with white, forming indistinct wing bars. Tertiaries, secondaries, and primaries with dull ashy-white tips.

This state of plumage is scarcely attained before it begins to give place to the fall and winter dress with which we are familiar when the birds come trooping down from the north at the commencement of winter. Beginning on the lower part of the breast the feathers are gradually moulted and replaced, the change extending slowly toward the bill. I am inclined to think that the moult commences about the tail and rump, and slowly extends forward. It begins the last of July and first of August, at which time the old birds are already far advanced in their autumnal change. In my collection are adult males with nearly complete winter dress taken July 22, and probably some make the change even earlier than this. They begin to move south before they have fully moulted, so that only the comparatively few individuals which have completed the moult in September are found in perfect winter dress on their northern breeding grounds.

The males reach the Upper Yukon on their return in spring by the 5th to the 18th of April in nearly perfect breeding dress, and from the examination of specimens obtained there by Mr. McQuesten, as also of others taken in full breeding plumage, I am led to believe that, like the Suow Bunting, this bird does not undergo a spring moult, but attains its breeding plumage merely by the wearing away of the light edges to the feathers; at the same time the feathers are imbued with a richer shade and a greater amount of coloring matter. There is considerable individual variation in these birds, which, however, consists mainly of a variable intensity of coloration rather than a change of pattern. In the males the postocular stripe varies from a pure white to a richer

buffy-yellow. The chestnut cervical collar varies from dark to light, and the general color of the back in some birds is very dark, while in others it is much lighter, though this depends to a great extent on the amount of wearing the feathers have undergone. Birds from Labrador and Greenland appear to be uniformly darker than the majority of Alaskan examples, but the small series in the National Museum collection from the first named regions does not suffice for a satisfactory comparison. It would be interesting to compare a large series of this bird from various parts of its extended habitat and ascertain the amount of geographical variation.

The Lapland Longspur winters in various parts of Central Europe, through Asia to China and Japan, and in the United States, where its distribution at this season is well known.

CALCARIUS PICTUS (Swains.). Smith's Longspur.

This species has been taken at Fort Yukon by Strachan Jones, but there is no other record of its occurrence in the Territory, though its abundance in the adjoining Mackenzie River district renders it extremely probable that it occurs more or less regularly in the neighboring portions of Alaska. Next to the two preceding species the present bird is the most northerly in its distribution of the species in this group; it differs, however, from the Snow Bunting and Longspur in its narrowly-restricted range.

It breeds on the northern shores and through the northern central districts of British America, and penetrates during winter into the Mississippi Valley and interior plains of the United States, turning towards its northern haunts at the first approach of spring. In Northern Illinois it passes to the north by the last of March or first of April, just as it is commencing to assume spring livery. That the species passes through a spring moult is certain, since a number of specimens, secured by me, were in the first stages of this moult.

The biography of this species is, as yet, almost entirely unknown; we possess a few facts of its distribution, and some skins of the birds in breeding plumage, with their eggs, have reached the National Museum from the Lower Anderson River, close to the Arctic shore.

According to Dr. Cones, it arrives in Northern Dakota the last of September, and associates with *Calcarius ornatus*. I have found it passing north through Northern Illinois the last of March and first of April. There is about the same range of variation in the markings and intensity of color among these birds as occurs in the Lapland Longspur. The autumnal plumage of the young is well described by Dr. Cones in *Birds of the Northwest*, p. 121.

AMMODRAMUS SANDWICHENSIS (Gmel.). Sandwich Sparrow.

This species occurs during summer along the entire Alentian chain and the island of Kadiak, in addition to the southeastern shore of the Territory. Dall cites it from Unalaska, where he found it numerous, as he did also thence to the eastward; but he did not find it to the west of that island. On the Shumagins this Sparrow was found to be rather common. At Unalaska, the 10th of May, 1877, I found it common. It had just arrived from the south, and on the 15th of the same month it was seen at Sanak Island, over 100 miles to the eastward.

It was ascertained to prefer the rocky beaches, where, like *Melospiza cinerea*, it was certain to be found at all times, but it frequently occurred on grassy flats. Its song was a short, weak succession of notes, somewhat similar to those of *alaudinus*, which latter bird I did not see at this point. According to Bean, it was common at Belkovsky, on Alaska Peninsula, the last of July, 1880, and a spring and summer resident on the Near Islands.

Nothing is known of its breeding habits, and its wintering ground is but slightly known.

It has been recorded from California in winter. Mr. Heuslaew secured several specimens in Middle Oregon, and other naturalists have found them elsewhere along the coast of Oregon and Washington Territory. In the *History of North American Birds*, I, p. 539, Baird, Brewer, and Ridgway say:

Specimens of this race from Sitka are absolutely undistinguishable from eastern *savanna*, except in size, the colors and proportions of bill being the same. A young bird from Kadiak differs from that of *savanna* in larger size, and bright reddish-fulvous tinge to upper parts, and deep yellowish-fulvous tinge on jugulum and along the sides. This variety is the northwest coast form of the common Savanna Sparrow, and is found during the summer from Oregon to Alaska.

To extend the range of the Savanna Sparrow proper "northwest to Alaska," as is done in the History of North American Birds, is a mistake, and Mr. Ridgway assures me he has never seen a specimen of typical *savanna* from that region. All the numerous skins in the National Museum collection from the Anderson and Mackenzie Rivers, as well as from Alaska, belong to *alaudinus*, excepting those of the larger race, *sandwichensis*, which is peculiar to the Aleutian Islands, and thence south along the coast. The Savanna Sparrow proper probably does not breed in the interior of the continent north of Hudson's Bay, and the chain of lakes extending northwest from Winnipeg may form its western and northwestern boundary. Specimens from Sitka, and the northwest coast, are referable either to *sandwichensis* or *alaudinus*, the former being the resident form in summer in Southeast Alaska, and the latter occurring as a migrant there and a summer resident throughout the rest of the Territory.

AMMODRAMUS SANDWICHENSIS ALAUDINUS (Bonap.). Western Savanna Sparrow
(Esk. *Mi-jü-kük*).

Next to the Lapland Longspur, the Western Savanna Sparrow is the most abundant of the sparrow tribe throughout the Bering Sea coast region of Alaska, and it extends thence north to the Arctic shores of the Territory. In order to ascertain positively whether more than a single form of this bird occurred in the vicinity of Saint Michaels, I made a practice during my stay of shooting every Savanna Sparrow which appeared at a hasty glance to differ from the ordinary form, *alaudinus*. As a result, I secured about fifty skins, every one of which is referable to the present bird; and if it is taken into consideration that, in addition to the skins saved, at least a hundred specimens were examined, but not preserved, it will be apparent that no other form is likely to have been overlooked.

This form was found to be common at Cook's Inlet and Kadiak Bay by Bean in July, 1880.

In the paper of Messrs Dall and Bannister (*loc. cit.*) the statement of the occurrence of *P. anthinus* at Saint Michaels is erroneous. The specimens upon which this identification was based are at present in the National Museum collection, and are typical examples of *alaudinus*. Elliott does not mention a single *Passerculus* from the Seal Islands, though one or both forms undoubtedly occur there, as *sandwichensis* is common at Unalaska, only a comparatively short distance to the south. In the notes of Messrs. Dall and Bannister, before mentioned, all accounts of the occurrence of *P. savanna*, *P. anthinus*, and *P. alaudinus* are to be referred, without exception, to the latter form.

The *P. savanna*, cited as common on the Yukon, yet rare at Saint Michaels and Unalaklik, and as being found at Sitka by Bisehoff, must be referred to *alaudinus*, as is shown by an examination of the specimens upon which these records were made. Bonaparte places the habitat of *P. anthinus* in Russian America and that of *alaudinus* in California, in his original description, and, as is stated in a foot-note in the History of North American Birds, from the fact that this form, *anthinus*, is not found in any part of Alaska, nor, indeed, north of California, it is probable that the localities of the two forms were transposed in Bonaparte's original description. *Anthinus* appears to be a narrowly-limited Californian coast race, almost wholly confined to the salt marshes and vicinity of the sea-shore. On the other hand, we have in *alaudinus* a widely-extended interior race, which reaches the shores of the Arctic Ocean on the Anderson and Mackenzie Rivers, and along the coast of Alaska, while it passes the summer at various points to the south, along the interior Rocky Mountain country to Utah, and across to the Pacific side of the Sierra Nevadas, where it has been found breeding even to Santa Barbara, Cal., where a recently-fledged young has been taken.

At Saint Michaels, on Norton Sound, these birds arrive in early seasons by May 10, but usually about the 15th of this month, and become more and more abundant until about the 1st of June, when all are back in their summer haunts and have already paired. In a short time they have chosen their nesting-sites and constructed the light structure which is to contain their eggs. Towards the last of June the young are out, and are fully fledged early in July, after which, with the adults, they come in abundance about wet places in the vicinity of houses. Most of them leave early in September, and they are rarely seen after the middle of this month. The site where the nest is placed varies considerably with the locality. I have discovered nests on open, grassy

flats or on mossy knolls, where they were concealed by an overhanging bunch of moss and a few scattered grass blades, or a steep side of a bank is chosen, where the overhanging tussocks afford a niche in which the nest is placed. If the nest is among the grass, and the female is not taken too quickly by surprise, she glides off and runs away, mouse-like, through the grass-stems, and when at a safe distance, comes into view and exhibits great anxiety for her home, hovering about, and flitting restlessly from point to point, or hopping along the ground, and uttering a sharp *tsip, tsip, tsip.* The male sings his short, monotonous ditty for hours at a time, from some prominent point, choosing a small tuft of grass, a tall weed or stump.

The song is a low, weak, and rather harsh series of notes, which are difficult to characterize. The song is not—like that of the Longspurs—confined to the breeding season, but may be heard during the entire time of the bird's residence in the north. They are never shy, and are usually heedless of one's presence.

Among the various nests of this bird before me (all secured in the vicinity of Saint Michaels) there is considerable variation in size, but very little in material. They vary from 3 to 5 inches in diameter and from 1 to 2½ inches in height. The central cavity is from 2 to 2½ inches in diameter, and 1 to 1½ inches deep. Five of the eight nests have a thick layer of moss forming the outer part of the wall. Inside of this is a layer of coarse grass; the egg-cavity in each is neatly lined with very fine dry grass, prettily arranged in a circular layer. The nests are compactly built and are very pretty specimens of bird-architecture. Those lacking the outer layer of moss differ in no other manner from the others. It appears a little odd that no feathers should be used in the nests of this species, yet in the only nest where any of this material has been used a bunch of down has been combined with the moss in the outer wall, apparently by chance.

The eggs vary from five to six in number. Their ground-color is a greenish clayey-white, more or less thickly covered with reddish-brown, varying to chocolate-brown, spots. These markings vary in form from fine spots, which may cover the shell so thickly as to almost conceal the ground-color, to a coarse, irregular blotching and spotting scattered over the shell, but most marked at the larger end. In some cases shell-markings of pale lavender or purple may be seen. The eggs vary in size as follows: .67 by .55, .67 by .58, .68 by .57, .66 by .58, .69 by .57. In set No. 314, taken June 19, 1880, at Saint Michaels, and set No. 322, taken June 24, 1880, at the same locality, the eggs measure respectively .80 by .60, .80 by .60, .79 by .60, .78 by .58, and .79 by .60. The average, however, is nearer to the last set of measurements than to the first, as appears in the average of twenty-four eggs, which equals .75 by .58 inch.

A fully-fledged bird which I took at Saint Michaels, on July 12, has the crown feathers with dark-brown shaft-streaks and dark rusty-brown edgings. In some specimens, however, these edgings are much darker than in the adult. The dark area along the shafts of the feathers on the shoulder and back is large, oval or rounded at the end, and bordered with grayish or grayish buff. These dark-brown or black shaft-spots are larger than in the adults. The outer edging of scapulars and secondaries is warm chestnut-brown. Wing and tail feathers dark brown, the latter edged with dull grayish. Breast and sides are marked, as in adult, with dark shaft-lines, but in this young specimen, the shaft lines are sooty black and are edged with dingy yellowish. Rump with dark shaft-streaks edged with yellowish-brown. The usual fluffy appearance of the feathers of young birds of this age is present, with a dingy yellowish suffusion on the breast and sides. The yellowish or dingy buff of the back constitutes the most striking difference between the young and old birds. This plumage is barely attained when it is replaced by the autumnal feathering. In this latter dress the adults can almost always be distinguished from the young by the lighter and grayer color and by the smaller amount of warm buffy tint about the head and breast. The spring adults are readily told from the fall birds by the large clear edging of the feathers on the back and head, and by the lack of buffy shade about the head and breast, the markings and pattern of coloration thus showing in sharper contrast. The adults perform their fall moult in July and the 1st of August, by which latter time the young are in nearly perfect fall dress.

The following measurements are of five spring adults taken at Saint Michaels in June and show the normal amount of variation:

Sex.	Length of wing.	Tail.	Tarsus.	Length of culmen.	Depth of bill.
♂	2.70	2.00	.79	.40	.21
♂	2.67	2.00	.78	.39	.20
♂	2.80	2.17	.79	.39	.19
♂	2.72	2.10	.78	.40	.20
♂	2.73	2.11	.78	.40	.20

The females are in worn plumage.

ZONOTRICHIA INTERMEDIA Ridgw. Intermediate Sparrow.

Everywhere in Alaska the presence of bushes and timber is an almost certain indication of this bird's presence in summer. It is the only White-crowned Sparrow reaching these high latitudes, and it ranges to the shores of the Arctic Ocean and Bering Sea. In the northern half of British America, extending entirely across that country along the Arctic shore and thence west throughout Alaska, it is a very abundant and familiar bird. It arrives on the Upper Yukon at the Arctic Circle by the 15th or 20th of May and begins nesting about the 20th of this month. It has been taken on the south coast of the Territory at Fort Kenai and is given by Dall as common at Nulato and very common at Fort Yukon. It is said to arrive at Nulato about the 20th of May, and Dall secured a nest and set of eggs from an Indian at Nowikakat, some distance farther up the Yukon. A single specimen taken at Point Barrow by Murdoch in September extends its range to this point, but only as a straggler.

In Dall and Bannister's paper on the birds of Alaska (*loc. cit.*) the notes under the heading of *Z. gambeli* are referable to this form. To this bird also must be referred all the Arctic and Alaskan references to "*gambeli*" given in the History of North American Birds. It is the most abundant sparrow on the Mackenzie River, and it was found breeding in great numbers on the Upper Yukon and thence east to the Anderson River, where MacFarlane, Lockhart, and Ross found it breeding. The nests found were mostly placed upon the ground or in low bushes and were lined with deer-hair and feathers. A nest in my collection, obtained at Nulato June 1, 1880, is composed of fine dry grass with a slight lining of club-moss in the bottom of the cavity. The eggs are four in number, measuring respectively .90 by .63, .84 by .64, .89 by .63, .87 by .64. They have a clayey-white ground-color, thickly covered with small reddish spots, which are only a trifle more numerous at the larger end.

This sparrow reaches the coast of Bering Sea, in the vicinity of Saint Michaels, by May 10 in early seasons and in others not before the 19th or 25th of this month. Its arrival is accompanied by the short but pleasant songs uttered from the top of a wood-pile, or any vantage-point of similar character about the houses. After lingering for a few days in the vicinity of the dwellings it seeks its breeding ground among the alder-patches along the neighboring hill-sides. Its eggs are laid during the first of June, and the young are fully fledged early in July. By the 25th of July they come about the houses in considerable numbers, joining with the various other sparrows and small birds. As the cold storms of August commence they gradually pass to the south until, as this month draws to a close, they have all disappeared.

A young bird of the year, in its first plumage, taken at Saint Michaels July 28, 1877, has the crown almost uniform blackish-brown, with a few brownish-yellow edgings along the median line. Lores dingy yellowish-gray. Postocular stripe dingy-gray, each feather with a narrow dark shaft-line. Ear-coverts buffy-brown. Back very much darker than in the adult, as dark as the back of adult *Z. coronata*. The feathers of nape, back, and rump with dark blackish-brown shaft-lines, bordered with dark fulvous brown. The wings and tail are dark brown, darker than in adult *coronata*. Throat, sides of neck, and breast have the feathers each with a dark shaft-line and a dingy grayish border. Feathers of sides are very similar and the abdomen is dingy whitish. Bill and feet pale. Bend of wing white. Tertiaries edged with dull bay, and two indistinct white wing-bars are formed by light tips of the coverts. This plumage is replaced almost as

soon as gained by the ordinary autumnal dress, which is well known in its southern range. In spring adults the intensity of coloration on the back differs considerably, being much darker in some than in others. At what point in the north *leucophrys* is replaced by *intermedia* cannot be told at present, since the comparatively recent separation of *intermedia* from the eastern bird has complicated the matter, rendering it uncertain to which form each author has referred. That *leucophrys* occupies the northeastern part of British America and thence into Greenland is probable, but apparently it does not occur to the north and west of Great Slave Lake. It is a strange fact that *Z. albicollis* is not known from the Upper Yukon region, Richardson having found them in the breeding season north to the sixty-sixth degree along the Mackenzie. In the vicinity of Great Slave Lake this bird and *intermedia* are found together, but the latter is the most numerous and soon wholly replaces *albicollis* to the north of this point.

ZONOTRICHIA CORONATA (Pall.). Golden-crowned Sparrow.

During the Russian-American Telegraph Expedition our knowledge of the northern range of this bird was considerably extended. Numerous examples were secured at various places in British Columbia, Sitka, Kodiak, and at Kenai, where it breeds; thence north to the Lower Yukon and Norton Sound it is a frequent summer resident, penetrating even beyond to the Arctic Circle, in the Kotzebue Sound region, where, however, it is much less common. It was taken on Kodiak Island and on the Shumagins in July by Bean. The last of May, from the 25th to 30th, it arrives in the vicinity of Saint Michaels, and breeds sparingly all along the Bering Sea coast of the Territory, and more rarely on the shores of Kotzebue Sound. From the peninsula of Alaska south to Puget Sound it is a common summer resident. I obtained partly-fledged young of the year at Saint Michaels, and numbers of specimens were brought me from still farther north about the head of Norton Bay; like *Hesperoichla nevada*, it extends its range across to Kotzebue Sound, within the Arctic Circle. It is found at Saint Michaels usually from May 25 to the 15th of August, about which latter time it passes south with the young, which now are assuming their autumn plumage. While moving south it comes fearlessly about the houses for food, with troops of other sparrows, and is not so shy as in the spring. Its breeding ground is in the alder-patches along the hill-sides, where the various bush-loving species make their homes in the matted thickets, well protected from birds of prey and most other foes by an almost impenetrable wall of gnarled and twisted branches. On the Shumagin Islands, just south of the Alaskan Peninsula, it is common and breeds; but west of this, on the Aleutian chain—as upon the various other islands in Bering Sea—it is unknown, its absence being easily accounted for by the bare and unattractive character of these islands.

SPIZELLA MONTICOLA OCHRACEA Brewst. Western Tree-sparrow.

Of the various species of sparrows which frequent the bushes in the north, especially along the coast of Bering Sea, the present bird is the most numerous. It arrives at Saint Michaels early in May and remains until the 15th of September, sometimes even later.

Upon its first arrival it comes about the trading posts and native villages, frequenting the weed-patches. After a short visit here, and when the snow has melted from portions of their bushy retreats, they leave the vicinity of man and betake themselves to the hill-sides, where they assume the duties of the season. In the course of time the nests are made; the young are hatched and become fully fledged early in July. Toward the last of this month—sometimes by the middle—the young and old come trooping back to the vicinity of the houses again ready to feast with numbers of their fellows in a motley crowd among the weed patches and in the garden plot. They are extremely heedless and familiar at this season, like the various other species with which they associate. During the last half of July and the entire month of August, with various others of their kind, they may be found flitting about the buildings, or even coming within the yard and up to the very doorsteps, their bright black eyes carefully searching every inch of ground for morsels of food.

In spring these birds attain their breeding plumage by the wearing away of the grayish tips of the ordinary winter dress, thus exposing the deeper and more decided tint below. The crown

becomes a decided clear light rufous, with a line of the same extending back from the eye and a patch of the same on the body at the bend of wing. The rufous edge of the scapulars becomes distinct, as do the dark brown centers of the dorsal feathers. The back and sides of neck are clear ashy, and the rump ashy-brown, with a faint olive shade. The under surface differs from the back; there are clearer and better defined areas of ashy on the throat and breast and a dingy yellowish-white on abdomen. This plumage is exchanged for the winter dress the last of July and first of August. The colors become clearer toward the end of May than they are when the bird first arrives. The fully-fledged young of the year, taken the middle of July, or earlier, are marked on the crown and back with shaft-streaks of dark brown, each feather being edged with dark ashy-brown or buffy-brown. The throat, breast, and sides of head, neck, and most of abdomen, have on each feather a central tip of dark smoky-brown, larger and more diffused on throat and breast. Each feather is edged with soiled ashy-brown. On the fore part of abdomen these dark tips are much smaller and the feathers are dingy-white or buffy-whitish. This plumage is barely assumed when it is moulted, commencing posteriorly, and is replaced by the ordinary autumnal dress, which can scarcely be distinguished from that of the adult, except, perhaps, by the greater amount of ashy edgings to the feathers of the crown and back. By the first of August the fall plumage has been assumed by nearly all, old and young, but they linger about a month or more longer.

The nesting commences the last of May or the first of June. A nest (No. 321), containing four fresh eggs, obtained in an alder-thicket near Saint Michaels on June 20, was placed upon the ground, and well concealed by the overhanging bushes and the dead leaves and grass of the previous year. It measures $2\frac{1}{2}$ inches in height by $4\frac{1}{2}$ broad, with a central cavity $1\frac{3}{4}$ inches deep, by $2\frac{1}{4}$ inches across. It is composed of rather fine dry grass and a few fragments of moss scattered through the circumference. The lining of the cavity is fine dry grass and a few dog-hairs. This lining is cross-woven in place of the usual circular arrangement. The nest is a light and rather loosely-built structure, but is nearly as bulky as the nest of the Lapland Longspur. The eggs measure respectively .83 by .65, .85 by .65, .85 by .64, and .82 by .65. Their ground-color is dull greenish with an irregular mottling or dotting of reddish-brown, purplish, and chocolate color. These markings are gathered about the large end, almost concealing the ground-color in three specimens, and in the fourth they are only a trifle more numerous there than on other parts of the egg.

In the National Museum collection there is a specimen from Sitka, and the bird has been found breeding abundantly all along the Yukon. The *S. monticola* proper occurs at various places in the Northern United States during the winter. The present form has also been taken at the mouth of the Columbia River in September, as also at The Dalles of that river. It is one of the most common birds along the western shore of Alaska from the mouth of the Yukon north, wherever groups of stunted willows and alders occur. On entering almost any northern thicket the protesting *tsip* of this gentle little bird may be heard greeting the intruder upon all sides; if one sits in the midst of their covert and keeps quiet he soon becomes the center of an inquiring party, the members of which flit about in the bushes, their bright black eyes peering about from the leafy covert all around until they finally decide that the interloper is kindly disposed or harmless, and then back they go, one by one, to their former occupations.

The flocks are broken when they reach the far north in spring and the birds are mated soon after. In the north, before taking leave for their winter home, they gather in flocks on the bushy borders of the woods, and their low, sweet chorus is heard rising and falling as they tune their gentle pipes for the songs they are to utter later in the season. Its power of song, however, is not great, and its music is, perhaps, most pleasing when thus heard in chorus. It is unknown from the Aleutian and other islands in Bering Sea, though it undoubtedly occurs on Kadiak, and it may winter on the adjoining parts of the southeast shore.

JUNCO HYEMALIS (Linn.). Slate-colored Junco.

This is one of the rarest sparrows visiting the coast of Bering Sea. It is, however, much more numerous in the interior, and is found more or less common along the entire course of the Yukon, at the mouth of which it breeds. It reaches Fort Reliance, on the Upper Yukon, by April

30, and I have found it at the Yukon mouth by the 11th of May, although the earliest record at Saint Michaels is the 19th of this month. At Nulato it was found common by Dall, who records its arrival on the 1st of June. In the Hudson Bay Territory Kennicott found it breeding abundantly to latitude 65° north, and it is known to arrive on the Mackenzie River by the 20th of April. While I was camping at the Yukon mouth, the last of May, 1879, it was a common bird, and at Kotlik it was found numerous about the trading post, searching the ground close to the doorstep for food. Its occurrence at Saint Michaels is merely accidental during the migration, a few solitary individuals being seen at considerable intervals. I did not find it there during the fall. A specimen taken May 24, by Murdoch, extends its range to Point Barrow.

One of my collectors brought me a nest from Nulato, obtained the 1st of June, 1880, which was built on the ground and contained five eggs. The nest is made of fine dry grass-stems, and measures 2 inches deep by 3 across the top. The cavity is 2 inches across the top and $1\frac{1}{4}$ inches deep, and is lined with reindeer hair.

The eggs measure respectively .75 by .58, .75 by .57, .75 by .59, .76 by .59, and .75 by .57. They have a pale clayey-white ground dotted over with a varying amount of fine rusty or reddish brown, which forms a close well-marked ring about the large end in sharp contrast with the sparsely-marked larger ends.

This bird extends its summer range along the Norton Sound shore of Bering Sea and the coast of the Arctic about Kotzebue Sound, yet there is no record of its having been taken on the coast of Southeastern Alaska, nor does it occur on any of the islands in Bering Sea.

JUNCO HYEMALIS OREGONUS (TOWNS). Oregon Junco.

The occurrence of this bird in Alaska was first made known by the capture of eight specimens at Sitka by Bischoff. It was again found at Sitka by Bean. It has not been taken elsewhere in the Territory, to my knowledge, though it is very likely to be found along the timbered coast of the southeast part of the Territory reaching Kadiak Island and the adjoining mainland. Like many species of southern or middle latitude its northern distribution has not been definitely settled. The fact that in Southeastern Alaska southern birds occupy only a narrow strip of territory, 20 to 30 miles in width, along the coast, and on the other side are replaced by a Canadian and subarctic avifauna, is not well known even now, except to those who have made a special study of the Alaskan region. The various larger Sitkan and Oregon forms extend their range and are resident along this portion of Alaska, which is to be classed with that rainy northwest coast country which produces such a marked and characteristic influence on its animal life. The skin of a *Junco* brought me from Anvik in spring had a well-marked dull-rusty area on the back, as also a shade of rusty on the flanks, suggestive of *oregonus*, but the specimen was so badly damaged that it could not be ascertained just what its relations were.

MELOSPIZA FASCIATA RUFINA (Bonap.). Sooty Song-sparrow.

In the wooded coast region of Southeastern Alaska, including Sitka, and thence northwest to Lituya Bay and Kadiak, this bird is abundant; but beyond this limited region it is unknown at present. The few specimens in the National Museum collection from the points named are typical of this race. In the History of North American Birds (vol. 2, p. 29), *Melospiza guttata* is cited as an abundant species at Sitka. This is evidently a slip of the pen, and refers to the present species, *rufina*, since *guttata* has never been found anywhere in this or the adjacent region. Nothing is known of the habits of the Rufous Song-sparrow in its northern range, nor have we any knowledge of its relationship to its gigantic relative, *cinerea*, to the westward.

On June 19, 1880, at George Island, on the southeastern coast of the Territory, Dr. T. H. Bean secured the only nest known of this bird. Unfortunately the eggs were hatched. It is a large, extremely loose structure, made externally of coarse grasses and stems of other plants mixed with broad strips of bark armed with thorns, and probably taken from the *Panax horridum*; this forms the bulk of the nest. The interior is prettily lined with fine, soft, light-yellow grass. The nest was built in a large plant 2 feet above the ground and was hidden by the surrounding grasses.

MELOSPIZA CINEREA (Gmel.). Aleutian Song-sparrow.

Among the several insular forms occurring in the Aleutian Islands and rarely extending their range to the adjacent mainland of Southeastern Alaska, this large, hardy bird, a veritable giant among its congeners, is the most peculiar. The well known Song-sparrow of the wayside hedges and fences in Eastern North America, as is well known to the naturalist, is represented by several geographical races between its eastern limit and the northwest coast of the continent, where it culminates in the present bird of the western Alaskan islands. The connecting chain, however, which unites this bird with its relatives of the east has been found to be but partly complete.

At Unalaska, on May 10, 1887, upon my first arrival in the Aleutian Islands, I found this bird common and in full song, although the surroundings were desolate and forbidding in the extreme. Long banks of snow lay in ragged outline on the sheltered sides of the mountains and capped their summits. Day by day cold rain with fierce gales or squalls of snow beat through the valleys and the inner harbors. With characteristic changeability, the weather at times cleared for a few hours, and, taking advantage of the temporary sunshine, this hardy songster gave utterance to its pleasant notes from the tops of jutting rocks or even the roofs of the houses in the village. On the 15th of this month, at Sanak Island, about 100 miles east of Unalaska, it was also found abundant, and its song was heard repeatedly in rather loud, clear tones, having a certain wild melody harmonizing well with the rude surroundings. The song may be imperfectly represented by the syllables *zwee-e-tu-tu-tu-chi-e-e-e*; the first syllables clear and the last three or four slightly hard. It was mating at this season, and invariably found in pairs, generally searching along its favorite haunts at the water's edge on the rocky and most rugged portions of the beach. It is a resident throughout the Aleutian Islands, and is limited to the rocky shores and low flats with bordering beaches, never going far inland, nor does it reach any considerable altitude. Strangely enough it does not pass to the northward, even so far as the Seal Islands, where the much smaller Alaskan Winter Wren has gained a foothold. To the eastward, however, it is abundant on the Shumagin Islands and Kadiak, but whether it reaches the peninsula of Alaska or not is still unknown.

Its eggs are thus far unknown, but the nearly full grown young were found in July, at Kyska Island, near the western end of the Aleutian chain, by Mr. Dall.

On the 23d of September, 1881, when the Corwin arrived at Unalaska, and from then on until we left early in October, these sparrows were in full song whenever the weather was propitious. The songster which came most under our attention, from its nearness to the vessel, would remain sometimes for an hour or more on its perch, repeating its song at short intervals. The notes were somewhat louder than those of its eastern relative, but bore a considerable likeness to them, and since my return to Washington, during April of the present year (1882), I heard the common Song-sparrow in the Smithsonian grounds uttering a series of notes which reminded me strikingly of the familiar song of the Aleutian Sparrow heard the previous autumn. This song uttered by the common Song-sparrow was not its usual spring note, but one of the shorter and slightly harsher modifications of its ordinary ditty.

During our stay at Unalaska in the fall, these sparrows were common everywhere along the shore, especially favoring the jutting faces of rocky bluffs and the rugged points descending abruptly to the water, where they flit from rock to rock, and scramble in and out of the clefts and jutting points like the Rock-wren (*Salpinctes*); or they search the stones at the water's edge for food cast up by the breaking wavelets, running out and in close to the edge of the rising and falling water.

In a paper on the different forms of *M. melodia* (Bull. Nutt. Orn. Club, p. 159, July, 1879) Mr. Henshaw, after examining a large amount of material contained in the National Museum collection, remarks:

This gigantic sparrow is distinguished, in addition to its great size, by a much paler, grayer phase of color than its nearest geographical neighbor, *rufina*. The streaks, instead of being nearly or quite obsolete as in that form, are well defined and of an amber-brown.

Continuing, Mr. Henshaw quotes Baird and Ridgway on *insignis* as follows:

Between *M. melodia* of the Atlantic States and *M. insignis* of Kodiak the difference seems wide, but the connecting links in the inter-regions bridge this over so completely that, with a series of hundreds of specimens before us, we abandon the attempt at specific separation.

Mr. Henshaw adds:

It needs but a glance to determine that the var. *rufina* is nearer *insignis* by many degrees than the *melodia* of the east, and, as has been indicated, nothing is wanting in the chain of evidence to establish the connection between *rufina* and *melodia*. But while admitting a possibility, perhaps even probability, that the relations between *insignis* and *rufina* may be as close as that of races, we feel justified in asserting that the intergradation necessary to establish this cannot be shown from the material accumulated up to the present time. Measurements appended below demonstrate that between the largest specimens of *rufina* in the collection and the smallest *insignis* there is a by no means inconsiderable gap. Nor does there appear to be any known law of geographical variation by which this discrepancy of size can be accounted for.

The law of increase of size with increased latitude, while applying to the preceding members of this group, fails of application in the case of *insignis*; since Sitka, the metropolis of *rufina*, is in the same latitude with Kodiak, that of *insignis*; while one specimen of *rufina*, and that by no means the largest, is present from Lituya Bay, which is slightly farther north than Kodiak.

And he might have added that Sitka is farther north than a large portion of the Aleutian Island chain, a great portion of the habitat of *insignis* thus being south of the center of abundance of *rufina*. Our author adds:

Possibly its insular habitat may be deemed sufficient to account for the marked peculiarities of this giant among sparrows. So far, in fact, as color is concerned, although in this respect *insignis* is well marked, the step from *rufina* appears an inconsiderable one as compared with that of size. But, as has been stated, no intermediate specimens are at hand to prove such a close relationship.

The author concludes that *cinerea* should be allowed to retain its former position as a distinct species pending the collection of further evidence. The true relationship of this form requires for its satisfactory determination a considerable amount of material from the region where it meets *rufina*. *M. cinerea* is an abundant resident of the Near Islands, and birds from there, according to Dr. Bean, have considerably smaller bills than those from the eastern part of its range.

In the National Museum collection are various interesting stages of plumage, upon the most interesting of which I subjoin remarks, prefacing the notes by stating that there are three well marked plumages exhibited—the spring and fall adults and the young of the year in fall.

The adult plumage of fall birds from Unalaska differs from the spring plumage in having a greater amount of rufous on the crown, back, edges of the wing-feathers, and on the tail. In the spring bird these parts are dull ashy-gray, nearly uniform, excepting where the slightly darker-brown centers of the feathers on the back break the uniformity. The rump in spring is ashy-brown and is olive or fulvous-brown in fall. The rusty-brown of the spots on the breast in spring birds, and the ashy on the sides, the large amount of white or ashy-white of throat, breast, and abdomen, all give place in fall to the greatly enlarged reddish centers of the neck and breast feathers, and the large fulvous-brown areas on the sides, which latter color extends as a wash over most of the abdomen, so that the birds of the two seasons appear quite different when laid side by side. The young birds of the first autumn are to be known by their uniformly dark coloration and the obsolete character of the markings on the back. In some specimens the dark centers are almost entirely absent, as are the chestnut crown markings, which are usually dark brown in the young. Kodiak birds average slightly darker than those from Unalaska and the Aleutian chain.

A young male, two-thirds grown, taken July 15, 1872, on Kyska Island, by Mr. Dall, has the crown and nape plumbeous ashy, with a dingy fulvous-brown wash, which is much darker along each side of the crown, outlining the indistinct chestnut stripes of the adult. Feathers of back each with a dark blackish-brown shaft marking on terminal half of the feather, and bordered with dull fulvous-brown, which occupies the rump and outer tail-coverts except for the narrow, dark tip seen on some of the rump feathers. Wings and tail dark brown, considerably darker than in the adult. The tertials are edged exteriorly with dark rufous, which also borders the other wing-feathers with a duller shade of the same, and extends even to the coverts. The rufous of the coverts, however, is shaded with a light brownish buff, which forms an indistinct tip to coverts and tertials. The tail-feathers are edged with dark rusty-red, shaded with brown. The feathers of the rump in one specimen have fine blackish shaft-lines. The superciliary line is dull ashy, each feather with a reddish-brown shaft-line. The auricular patch dull reddish-brown, mot-

bled by the gray shaft-lines of the feathers. A light line extends back from the sides of the mandible and is shaded and mottled with brown. The chin is ashy or grayish white. The throat, breast, and abdomen a dingy shade of ashy-white. The feathers of throat and breast each with an indistinctly marked central shaft-tip of smoky fulvous-brown, which gives the breast of the bird at this stage an indistinct smoky or mottled appearance; on the sides there is a uniform shade of dingy fulvous-brown, which may be uniform or, as in some specimens, the feathers have faint dark shaft-lines.

MELOSPIZA LINCOLNI (Aud.). Lincoln's Sparrow.

At Nulato this bird is rare, but thence it becomes more and more numerous towards the east, and at Fort Ynkon it is considerably more abundant; its eggs have been sent to the National Museum from that place. It has been found breeding throughout the northern portions of British America to the Arctic Ocean, and in Northern Alaska extending down the Yukon to Nulato, and perhaps even still farther, to the shores of Bering Sea. It occurs commonly along the coast of California as a winter resident and migrant in spring, which is an argument for its presence along the southern shore of Alaska, but we have no record of it from that part of the Territory.

During the middle of April, 1877, I found it numerous in the vicinity of San Francisco, as it was passing north with numerous other species. Like various other birds, however, which extend their northern breeding range far within Arctic lands, this sparrow is found rearing its young also under sunnier skies, and has been taken during the nesting season in Oregon, California, at the southern end of Lake Michigan, and at various other points in middle latitudes.

PASSERELLA ILIACA (Merr.). Fox Sparrow.

Along the coast of Norton Sound this bird is an abundant summer resident, sharing with the Tree-sparrows the busily shelter of the alder thickets on the hill-sides and sheltered ravines. Wherever, along the northern coast, a fair-sized alder patch occurs, this hardy species may confidently be looked for. Its presence is first noted at Saint Michaels from the 10th to the 15th of May each spring, frequently when the ground is still largely covered with snow. The alder thickets, which are to give them shelter later, are now half buried beneath the wintry snow banks, and, their chosen haunts being thus closed to them, the birds keep about the houses or native villages, where the snow disappears quickest, and the small patches of bare ground afford them spots where they may obtain their food. The small garden patch at Saint Michaels, which bordered the south side of the kitchen, was a favorite gathering place for these birds; sometimes two or three might be seen at once in the small plot, scratching away with vigorous claws, sending the dirt right and left, pausing every few moments and looking about for any insect or seeds they might have turned up. Their mode of procedure is odd in these cases. In place of scratching first with one foot and then with the other, as gallinaceous birds do, they worked with both feet at once, so that they appeared to be continually hopping, and the pieces of dirt or small fragments of chips flew right and left in a perfect shower, some of them being thrown to a distance of 2 to 3 feet or more by the vigorous strokes of the bird's claws.

On pleasant frosty mornings at this season the males take their stand upon the roof of the highest building, or the cross upon the Greek church—just back of the dwellings—whence they pour forth their clear, thrush-like whistle. The song is clear and melodious, but far too short. The notes may be indicated by the syllables *pev-oe-düdy-péa*, these notes being uttered in a clear, musical whistle, with a rising accent to the middle and then falling rapidly, with considerable inflection at the end. The effect is very pleasing, and on clear, frosty mornings toward the end of May, a concert raised by four or five of these birds perched upon the tallest bushes rising over an alder thicket, is very fine, and affords, perhaps, the sweetest and most melodious series of bird-notes with which we are favored in that region. If the songster is approached, he ceases his song, and, after watching the motions of the intruder for a few moments, dives precipitately into the shelter of the thicket, only to reappear, however, at a considerable distance further on, where he suddenly perches upon a projecting bush and recommences his song, as if undisturbed. This maneuver he will repeat again and again until thoroughly frightened; but by remaining quiet one may be sure he

will repeat the song after a very short silence. At this time it is almost impossible to get within gunshot of them, but while they are about the houses they are tame and unsuspecting, and will allow one to approach very close without taking alarm.

At the mouth of the Yukon, the last of May and the first few days of June, 1859, they were extremely common, and every pleasant day the bush-covered banks of the numerous channels cutting the delta of this stream re-echoed with the beautiful notes of these birds; by the 7th of June, however, they were mated and had their nests; after this their notes ceased suddenly and were not heard again.

On June 5, 1880, a pair was shot in a thicket near Saint Michaels and the nest secured. The nest obtained is a very strong, compact structure, $4\frac{1}{2}$ inches across by $2\frac{3}{4}$ inches high, having a central cavity $1\frac{3}{4}$ inches deep by $2\frac{3}{4}$ across. The outer part of the nest is made of a thin, compact layer of green moss with a few dead leaves. Inside is a thin layer of dry grass running circularly up the inside of the nest; this again is lined with a handsomely cross-woven layer of wiry black moss fibers and chestnut club-moss stems, the whole being a very well made and handsome structure, in which were three eggs with a clayey greenish ground-color; two of them are thickly and uniformly dotted with dull reddish-brown; between the dots the ground-color shows plainly in many places. The third egg is so densely dotted with reddish-brown and chocolate that the ground color can barely be traced in a few places. This egg measures .90 by .70; the other two .89 by .68, and .90 by .68.

Towards the end of July and first of August the males renew their songs and are less shy than in the spring, but by the end of July the young are on the wing, and, with their parents, come about the houses. They have now much the same skulking ways as the cat-bird in southern latitudes. They come boldly about, but skurry away into the midst of the weed-patches and other convenient shelter at the first alarm, only to come back again the moment danger has passed, flitting their tails, apparently as bold and as defiant as ever. It leaves the coast of Bering Sea by the last of August. At Fort Simpson, British America, they arrive the middle of May and leave the middle of September, and it is an abundant species along the entire northern extreme of British America. MacFarlane and Kennicott found it nesting either on trees, sometimes 8 feet from the ground, or upon the ground. Its known range is apparently limited only by the limit of the bushes. There is a considerable variation among the North Alaskan series in the exact size and shape of the bill, as well as in the exact shade of color; but this is merely individual, and Alaska specimens show no apparent intergradation with their southern relative.

Owing to its predilection for bushy places, this fine sparrow is unknown from any of the Bering Sea Islands, but it occurs on the southeastern coast in the Sitkan region, and may be classed as a summer resident on all the Alaskan mainland, reaching Bering Straits on the west and the bush limit on the north in about latitude 69°.

PASSERELLA ILIACA UNALASCHENSIS (Gmel.). Townsend's Sparrow.

But very little is known of this bird's habits, and nothing of its nesting.

There are four specimens in the National Museum collection from Sitka and several from Kadiak, and the species undoubtedly occurs along the coast to the north of Kadiak, where the surroundings and climate are similar, and thence along the mainland coast to Sitka. It was found at Cook's Inlet and Kadiak by Bean and also on the Shumagin, where it was associated with Titlarks and Snow Buntings. It appears to have its breeding range north of Washington Territory, and passes south to Central California during the winter season.

A young male taken at Kadiak, April 26, 1868, has the crown and back, to the rump, dingy rusty brown. The tail-coverts are a lighter rusty. Wing-coverts a dusky shade of rusty brown to the tail. The wings dark brown, edged with a dark reddish-brown shade. The tail is almost exactly as in the adult. The wings have more rusty reddish. Sides of head dark brownish, mottled lightly with whitish. Throat and breast grayish-white, with feathers tipped and edged with brown, and a reddish shade on the breast. Abdomen fulvous white. The sides of the body heavily washed with a dingy fulvous brown; the central shaft-streaks of pale dingy reddish brown.

The under parts have a diffused smoky appearance, owing to the wash of fulvons brown. There is considerable variation between adults of the same locality, but the National Museum series does not appear to indicate any geographical differences.

PETROCHELIDON LUNIFRONS (Say). Cliff-swallow.

The lack of proper surroundings on the coast of Alaska and the Arctic Ocean appears to limit the range of this bird to the interior, and although I kept a continual lookout for it during my residence in the north I did not see a single individual. At Nulato Dall records its arrival from May 10 to 16, and from these dates up to the 24th. At the same place he found it nesting commonly about the trading stations, and was told by the natives that it nested on the faces of the sandstone cliffs along the Yukon before the advent of the white man placed at its disposal the convenient shelter of the trading posts. The birds were quick to take advantage of the hospitality offered them, and to change from their primitive nesting-sites to civilized domiciles.

It is also found breeding at Fort Yukon. Mr. Dall records the presence of this bird at Saint Michaels, but not one was seen during the four years passed by me at that place, and the evidence seems to point to a mistaken identification whereby the common Barn Swallow (which is very common there) was mistaken for the present bird. These swallows are recorded from Point Lake, in latitude 65°, in British North America, and in Alaska they are known to extend north of the Arctic Circle. Its extension north to the Arctic Ocean is doubtful—at least in our Territory—owing to the low and unsuitable nature of the country, in addition to the harsh and repelling climate. There is a single specimen in the National Museum collection obtained by Kennicott at Fort Resolution June 23, and this and the points previously given constitute the northernmost limits of its known range. There is no evidence of its presence in the southeastern part of the Territory.

CHELIDON ERYTHROGASTER (Bodd.). Barn Swallow (Esk. *Tū lū:lūgh ū-nā guk.*)

This bird is the most common and widely distributed of the swallows throughout the north. In Alaska it is found along the southeastern coast, extending thence over nearly the entire Aleutian chain, and north along the coast of the mainland to Kotzebue Sound, and thence east throughout the Territory wherever suitable situations occur. It arrives at Saint Michaels from May 17 to 26, and leaves toward the end of August. At Port Clarence, in Bering Straits, Dr. Adams found them breeding in the summer of 1851. At Unalaska, June 2 and 3, 1877, I saw a number of these swallows skimming about and over the village. Dall found them at various points on the Aleutian Islands, and they nest at Unalaska. The latter reports seeing a swallow at Atka Island, at the extreme western part of the chain, which was undoubtedly this species. About the middle of May they arrive at Nulato, where they breed, as they do also at Fort Yukon and the other fur-trading stations along the Yukon.

Gmelin's *Hirundo aonutashkensis* is undoubtedly referable to the common Barn Swallow, from the fact that among the various naturalists who have visited these islands—since Gmelin's bird was obtained—no one has recorded any but the ordinary Barn Swallow, and this has been found by nearly every one visiting this portion of the Territory during summer.

Before the advent of the fur traders these birds nested in the deserted huts of the natives, as, in fact, they do in many instances, at present, and sometimes they even share with their owners the summer-houses on the Lower Yukon. On the north coast of Kotzebue Sound, in the autumn of 1881, I found two nests of these birds in a large cleft of the rocks, into which the waves beat. Their nests were seen in deserted huts on the same shore.

This swallow arrives as soon as mild spring weather sets in, generally from the 18th to the 23d of May. The sea is still covered with an unbroken surface of ice as far as the eye can reach, and winter appears to be hardly gone when the first arrivals reach Saint Michaels and come fluttering about their former nesting sites. Those whose nests were in the old out-houses, the windows of which are left open in summer, but are now closed, try vainly to enter, and flutter just before the glass, until exhausted and driven to perch on the roofs of the buildings, or upon an

adjoining fence. Within a few days they are seen glancing all about the place or gliding in wide circles over the brown tundra, which at this time is still marked here and there by heavy snow-drifts. Their arrival may be followed by frosty nights, and even snow-squalls are by no means rare, while raw, misty rains are common. Still the birds appear to endure the unpleasant weather without harm, and shelter themselves in old nests or other places until the sun shines once more. These old nesting sites are re-occupied after being repaired, and all manner of sheltering nooks are chosen as building sites for the new-comers. Usually a number of pairs raise two broods in a season, if autumn does not come too early. When August arrives young and old are seen sunning themselves in noisy parties upon the low roofs of the log houses, which form a favorite chattering-place. Day by day passes in teaching the young the use of their uncertain wings, and sad work some of them make of it at first, affording amusement to the dwellers of the houses. Before long, however, they fly as well as the old ones, and some fine morning we wake to find a blank in place of the vivacious throng, that, like many another source of pleasure, is not fully appreciated until lost. The sky seems to assume a sadder and more dreary aspect, the brown earth looks duller, and the presence of a gloomy autumn is made more apparent by the cheerless silence. Many days shall not pass before the snow-capped hill-tops, like the tents of outposts along the coast, announce the rapid approach of a long, wearisome winter. Occasionally a pair have their unfledged young still in the nest, or just commencing to take flight, at the time the other birds leave for the south, and I have known a pair of two to remain a week or so behind the main migration in order to prepare their young for the journey before them. But this is uncommon, the nesting being usually ended and all the young on the wing at about the same time. Their first eggs are laid on the last days of May or first of June. In the British fur countries Richardson found these birds nesting to latitude $69^{\circ} 30'$ north, and Heppburn traced them on the west coast of America, from British Columbia north to Sitka. Richardson notes their arrival at Fort Chippewayan about May 15, and they were also common at Fort Good Hope in latitude $69^{\circ} 30'$, the most northerly post of the Hudson Bay Fur Company. After rearing a single brood he tells us they leave these high latitudes early in August. A comparison of specimens of this bird from various Alaskan localities with others from Eastern North America does not show the slightest appreciable difference.

TACHYCINETA BICOLOR (Vieill.). Tree Swallow (Esk. *Kau-tiigh i-yá-ghák*).

Although having even a wider northern range than the Barn Swallow this bird does not accept the shelter afforded by man, but retains its ancient habit of occupying holes in banks or trees, and, as a consequence, its distribution along the Arctic coast and shores of Bering Sea is limited to those portions where the proper positions for its nesting sites are afforded. At the Yukon delta, the 1st of June, 1879, and at Saint Michaels, the 24th and 25th of May, 1880, they were common, and although they nest at the former place, where the river banks and dead tree-trunks afford them proper sites, yet in the latter place they are unknown, except as visitants in fall or during the spring migration, when, as on the dates mentioned, they were found quartering over a series of small lakes and grassy flats, hunting insects and enjoying the genial sunshine, which lasts for a short time at this season. It is also found as a straggler, generally the young birds of the year, for a few days during the middle of August, when it departs, thus leaving for the south or its interior haunts considerably earlier than the Barn Swallow. Richardson found them nesting in hollow trees on the Mackenzie River, in latitude 65° north, and during Parry's first voyage a species of swallow was seen in about latitude 73° north, which was probably this bird. In the spring, during their short visits to Saint Michaels, they occur at the same season as the Black Brant; and while lying prone on my back upon a grassy knoll, on the open tundra, watching for geese, I have frequently amused myself by observing the silent flitting to and fro of these pretty creatures as they skim the surfaces of lakelets and bogs, gliding here and there as if floating on the faint puffs of air which appeared to hold them poised, and then to waft them about in graceful curves.

The icy sea and partly snow-covered country appear to offer a very inhospitable welcome in spring, yet this bird and the Barn Swallow do not seem to suffer the least inconvenience from these untoward surroundings.

This species is unknown on the islands of Bering Sea.

CLIVICOLA RIPARIA (Linn.). Bank Swallow.

Along the Arctic sea-coast, as well as the shores of Bering Sea, this is an extremely rare visitant, occurring merely as a straggler during its migration. On the river courses of the interior, however, it is one of the most abundant, if not the most abundant, species of swallow. Dall found it nesting in great numbers on the Yukon, and counted over seven hundred swallows in a sand-bluff near Nuklukbayet; he found from two to six eggs in the nests which he examined. These eggs were laid upon scanty beds of fine twigs without straw or other lining. Richardson found colonies numbering thousands of these birds about the mouth of the Mackenzie River in latitude 69°, and it is common all along the rivers of Arctic America. A single bird taken by the Point Barrow party, and a few others seen there the last of July and first of August, show that this species extends its range to the extreme northern point of the mainland. In Northern Asia also it is a very common species along the river courses, nesting to latitude 69° north, and passing south to the shores of the Indian Ocean during the winter. It arrives at the Yukon mouth from the 20th to the 25th of May, and leaves that region the last of August.

There is no record of the Bank Swallow's presence on the southeast coast of the Territory, though it is to be expected there owing to its wide distribution. It is unknown on the islands of Bering Sea.

AMPELIS GARRULUS Linn. Bohemian Waxwing.

There is no record of this bird's occurrence anywhere along the shores of Bering Sea or the Arctic. In the interior, however, it is rather common, and specimens were brought me which were obtained in May at Nulato, and at Fort Reliance from October 2 to 16 and on May 9. Dall states that it arrives at Nulato about June 10, when it becomes common, and undoubtedly breeds in the vicinity. That it arrives earlier in the season is shown by the specimens brought me from that locality. By Mr. Dall's observations it appears that the bird is migratory in that section of the Territory.

The only American examples of the Waxwing's nest and egg were taken by Kennicott at Fort Yukon July 4, 1861. The nest was placed on the side of a branch of a small spruce which was growing on the edge of a clump on low ground. The nest was at an elevation of about 18 feet. It was large, the base being made of dry spruce twigs, and the nest itself constructed of fine grass and moose-hair, lined internally with large feathers. The female was shot as she left the nest. The single egg obtained measures .90 by .65 of an inch, and has a grayish-slaty or stone-colored ground. The spots are dark brown with a deep violet shade. This nest and egg remain unique among American collections, notwithstanding the presence of the bird in considerable numbers in various parts of Arctic America.

The nest described above is considerably smaller than the European nests of the Waxwing. The eggs of the European bird are also much larger, being an inch long and from .70 to .69 of an inch in breadth. Hundreds of these birds' eggs were obtained in Lapland by Wolley and others.

Through the labors of this last-named naturalist and of various other ornithologists, it has been ascertained that these birds breed in the northern part of the Old World from the last of May to the end of June, but most of them have their complement of eggs by the second week of June. Their breeding range varies so much in different years that a locality where many of its eggs are found in one season may not yield a single set the next. There is no record of the Waxwing's presence on the southeastern coast of the Territory, although undoubtedly it is found there.

LANIUS BOREALIS Vieill. Northern Shrike (Esk. *Ti-ki-chiä-ueük*).

The only specimen of this bird from Southeastern Alaska in the National Museum collection is a full-plumaged male, which was obtained at Fort Kenai, Cook's Inlet, May 19, 1869, and it has not been taken on any of the islands in Bering Sea. Hartlaub records a specimen seen January 4 at the mouth of Chilcat River and a second on Lynn Canal. Over the entire northern portion of the Territory from Bering Sea east to the British boundary, and north of the Alaskan Mountains, it is a resident, rather common in some places but nowhere abundant. It is found as a rare visitor

along the open coast of Bering Sea and the adjoining portion of the Arctic; but it is far more numerous inland, and apparently is most abundant high up the Yukon, as the greater number of the specimens brought me by the fur traders were from Fort Reliance, on the Upper Yukon, near the British boundary line.

Nuttall tells us that in some parts of New England this Shrike is called the "Mocking-bird," on account of its imitation of the notes of smaller birds, though its more usual notes resemble the discordant creaking of a sign-board hinge. On November 10 he heard one uttering a low, soft warble resembling that of the Song-sparrow, changing the note immediately afterward to that of the Cat-bird.

While at the Yukon month the last of May, 1879, I had the good fortune to observe this bird several times, and also to hear its song. On May, 1879, while the ground was still largely covered with snow, I was passing through a thicket where the winter's drifts still lay deep enough to half bury the bushes, when suddenly a low, soft, musical whistle, consisting of a half dozen liquid trills, ending in two or three strange grating notes, fell upon my ear. After a slight pause this was repeated, and with some difficulty, a moment later, I made out the indistinct form of a bird close to the ground in a dense bush, about 20 yards in advance, where it had evidently concealed itself on my approach. I hastily fired into the bush to secure, as I supposed, some rarity, and, hurrying forward to gain the prize, was more surprised than pleased to find nothing but the ordinary Shrike. On another occasion I was led a long chase through a piece of tangled wood, bordering one of the Yukon channels in the delta, by some strange and musical notes unlike anything I had ever heard before, which appeared to be uttered close at hand, and a moment later to be far away. After a considerable time, as the wood became more open, the author of these notes was found skulking from tree to tree, in advance, and a long shot brought down another Shrike.

In his list of the birds of the Territory, Mr. Dall records but a single specimen of this bird, which was brought him at Nulato by a native in winter and he considered it uncommon.

A considerable number of specimens brought me by the fur traders from the various parts of the Territory show, however, that it is a rather common, if not an abundant, species in the interior, although on the sea-coast it is to be classed as uncommon or rare. Specimens were brought me by Eskimo from the head of Kotzebue Sound and Norton Bay.

Kennicott noticed this species at Fort Simpson in September, and again in October, and heard them uttering a low, irregular, and varied but musical song. It breeds far to the north, as is shown by a female bird in the National Museum collection, taken the 11th of June, 1863, in the Anderson River region, latitude 69°, with six eggs. This specimen is in immature plumage, and is probably a bird of the preceding year. The summer and winter plumages of the perfectly adult birds can be distinguished, as is stated in the History of North American Birds, by the lores, which are jet black in summer and gray in winter; the clear ashy-gray of the back and crown is a little less clear in winter, the white beneath less pure. The young require from two to three years to attain the perfect state, as is shown in a large series before me. A female shot at the Yukon mouth, May 13, which was mating, has the entire lores grayish white and the frontal patch of the same. The back, wings, and under surface cannot be told from the ordinary winter birds. Other summer specimens show the same characters grading into the perfect plumage by several stages. Among about a dozen specimens from Alaska only three are adults. The undulating vermiculated bars which cover the entire lower surface of the young of the year are gradually restricted until, in the adult, they occupy the breast and a portion of the sides, leaving the throat and abdomen immaculate. The feather markings producing this vermiculation are less obvious in the adult bird.

I do not think that the Shrikes nest along the open sea-coast except where, as at the Yukon mouth and the head of Norton Bay, dense bushes and trees abound.

HELMINTHOPHAGA CELATA (Say). Orange-crowned Warbler (Esk. same as Kennicott's Warbler).

Throughout the wooded region of Northern Alaska, from the British boundary line west to the shores of Bering Sea, and from the Alaskan range of mountains north within the Arctic Circle

as far as the tree-limit, this species is a rather common summer resident. It is known along the shores of Bering Sea and Kotzebue Sound mainly as an autumn migrant, as it straggles to the southward at the end of the breeding season. Wherever bushes occur along the northern coast of the Territory it is found at this season, and at Saint Michaels it was a common bird each summer from the last of July up to about the middle of August, after which it became rare and soon disappeared. I have never noted it on the sea-coast during the spring migration. The latest date which I have recorded is August 24. The birds seen at this time were mainly young of the year, as was shown by the numerous examples obtained.

As remarked in describing the habits of Kennicott's Warbler, in fall this species frequents the vicinity of dwellings and native villages, where it searches the crevices of the fences and log houses for insects. It breeds throughout the interior, and Kennicott secured a set of its eggs at Fort Yukon on the 10th of June, and another on the 15th of the same month. A young bird of the year, in its first plumage, obtained at Saint Michaels August 3, 1878, presents the following characters:

Feathers of crown ashy at base, tipped with smoky-brown; a brownish, dull olive-green shade on the back; rump and upper tail-feathers fulvous-olive; wings and tail brown, edged with olive-green; two dull fulvous wing-bars formed by the tips of coverts; throat and abdomen dingy with an ashy whitish wash; sides of neck, breast, and body smoky fulvous-brown; axillaries, bend of wing, and under tail-coverts with a sulphur-yellow wash; bill and feet dull brownish horn color.

From the state of plumage just described, in which there is very little greenish-yellow wash, there are all steps to the adult plumage of autumn.

The young of *lutescens* is readily distinguishable in this stage by the decided greenish-yellow shade which pervades the entire bird, especially on the lower surface; whereas, *celata*, in the same stage, is characterized by ashy shades, especially the entire head and lower surface.

HELMINTHOPHAGA CELATA LUTESCENS (Ridgw.). Lutescent Warbler.

Extending up the Pacific coast this bird is found as a common summer resident of the wooded southeastern shore of the Territory, where it replaces *celata*. Bischoff secured a specimen from Fort Kenai, and it occurs also at Kadiak and Sitka. Nothing is known of its breeding habits in Alaska, nor is it known to pass north of the Alaskan Mountains and thus intrude on the territory of its relative.

A young bird of this form, obtained at Chilkat Depot, Washington Territory, July 7, 1879, by Dr. Kennerly, now in the National Museum collection, is dull, smoky, yellowish-olive brown on the crown, neck, and back. A buffy shade from the rump to shoulders. On the back of the neck and crown a yellowish-olive cast is more apparent. Lores yellow like chin; wing and tail brown; feathers edged with clear greenish-yellow very similar to the color of the adult, but a trifle more brownish. Two faint wing bars formed by the dusky-buff tips of wing-coverts. Entire under surface greenish-yellow, which approaches a clear yellow on the under tail-coverts and axillaries, and with a dull smoky shade on throat, breast, and abdomen. The bill and feet are pale.

The dates of arrival and departure of this form are unknown, as is, to a great extent, its biography.

DENDROICA LÆSTIVA (Gmel.). Yellow Warbler (Esk. *Chung-ük chü-üg-ü-näk*).

This is, perhaps, the most abundant warbler throughout Alaska. It is found everywhere in the wooded interior, on the bushy borders of the water-courses, or frequenting the scattered clumps of stunted alders on the shores of Bering Sea, and the coast of the Arctic about Kotzebue Sound, or on the southeast coast of the Territory. Its arrival has been recorded in the northwest in British Columbia, by May 1, and by the 10th of May it reaches the Lower Yukon. In the northern part of British America Richardson noted its arrival at Fort Franklin, in latitude 66°, on May 13; and on May 25, 1879, while I was camping on the bush-grown islands in the Yukon delta, its song was heard on every hand for some days before the birds scattered, apparently making the river their highway, whence they reached the adjoining region. It has been taken on Kadiak

Island the 1st of July, and skins were brought me from various points along the course of the Yukon from where this river crosses the British boundary line to its mouth. It breeds to the shores of the Arctic Ocean wherever it can find a willow or alder patch wherein to place its nest and shelter its young. Its well-known breeding range thence south, reaching far within the temperate zone, and from one side of the continent to the other, gives it the most extensive breeding habitat of any American Warbler. Its lively presence, even among the pleasant surroundings of the south, lends animation to the scene, and even more impressive is its presence under the dismal skies and in the damp, depressing climate of the north, where such visitants are only too rare. Its bright form, full of sprightly gaiety, is seen flitting about the dark-green alder-patches, and its lisping song greets the ear like a memory of the past. But a change in the weather drives it to shelter within the low but densely clustering masses of foliage. In spite of the untoward surroundings in its far northern home, the little fellow takes matters as they come, and makes himself merry while opportunity is afforded. In fall, from the last of July to towards the last of August, they come about the houses and native villages to feast on the fare they find provided abundantly in those localities, until, a little later in the season, a few chilling storms send them trooping away with others of their kind to far distant winter quarters.

This species, as also several others, arrives at or near the Arctic Circle, along the Lower Mackenzie, and the whole course of the Yukon, at almost the same date that it reaches the Middle States. The autumn migration occurs from the 1st to the 20th of August, mainly about the middle of this month, after which the bird is very rare.

It is the only warbler, with the exception of the Black-capped Flycatcher, which nests in the alder-thickets in the vicinity of Saint Michaels.

DENDROICA CORONATA (Linn.). Myrtle Warbler.

This species is the hardiest of the American warblers. Even during its winter visit to the south it frequently passes this entire season in parts of the country where there is abundant snow and severe cold. In spring, by May 5, it reaches Fort Reliance, on the Upper Yukon, and by the 15th of May it is recorded at Nulato and reaches Saint Michaels from the 18th to 20th of this month in ordinary seasons. For comparison with the dates of its arrival in the north, I may add here that this warbler is recorded as reaching Northern Vermont on the 1st of May, and on the 15th of this month, Eastern Maine. It occurs along the open coast of Bering Sea merely as a straggler or passing migrant, and after being observed for a day or two about the houses in the spring it is not seen again until it returns towards the south during the first half of August. By the 3d of June it lays its eggs on the shores of Great Slave Lake, in the interior of British America, and it has been recorded as breeding also along the Anderson River. Kumljen obtained a single specimen July 31, at Godhavn, Greenland, and in Alaska it breeds to the northern tree-limit, considerably inside the Arctic Circle. I have no record of its occurrence on the southeastern coast of the Territory, although it is undoubtedly a visitant to that portion. A strange point in the history of this bird is the fact that it has been found breeding on the island of Jamaica, thus connecting the tropics with the extreme Arctic in its breeding range, although it is unknown during the summer in most of the intermediate region. Its nests in the north are placed on low spruces or even on the ground, according to MacFarlane, who found nests thus placed on the Anderson River. During its visit to the sea-coast, like various other species of warblers, the Myrtle Warbler makes its headquarters in the vicinity of the trading posts or the native villages, where it apparently finds an abundant supply of its favorite food. The garden plot and fences at Saint Michaels afford this and several other kinds of warblers favorite gathering places, where they feed in passing to and fro in their migrations.

DENDROICA STRIATA (Forst.). Black-poll Warbler.

Although this species has its breeding ground in the wooded interior, it occurs along the sea-coast of Norton Sound during the spring migration. I have noted it as early as May 27 at the Yukon mouth, where it breeds, and from this date on to the 5th or 6th of June it continues to

arrive in this region. A specimen in the National Museum collection was obtained at Fort Kenai, June 8, and they probably breed as far south as this point along the coast, if not still farther. On June 4 specimens were obtained at Saint Michaels, and on the 8th and 10th of June its eggs have been taken at Fort Yukon. Mr. Dall notes its arrival at Nulato about May 15. Its early arrival here is very remarkable, since Mr. Allen has never noted it in Western Massachusetts earlier than May 20, whereas the bird arrives in the far north, near the Arctic Circle, five days earlier than it is known to arrive in Western Massachusetts. It is also recorded as the last of the migrants in Central Vermont, where it is seen only for a few days in early June. In the autumn it starts on its return to the south about the 1st of August, the last being seen about the 20th of this month. On the shores of Norton Sound in fall, as in spring, it frequents the vicinity of the dwellings, and searches industriously over old board fences and log houses for insects. It is stated that it usually builds its nest in bushes, a few feet from the ground; but some Arctic nests are placed directly upon the ground. This latter variation in habit probably accords with the locality, since it nests in bushes when the latter are to be found.

A young male commencing to lose its first plumage, taken on the 1st of August, 1879, at Saint Michaels, presents the following characteristics:

Feathers of the back gray with a central shaft-line of black, edged along the tip with dark, giving an irregular faintly-barred appearance. The crown is dull olive-green, this color having evidently replaced a shade similar to that on the rump, but darker. The first plumage remains, however, as an obsolescent superciliary line, which is dark grayish, mottled and bordered with dusky. Sides of the head the same as the superciliary stripe. An olive-green wash extends from the feathers of back to the sides of head and neck, and includes the edges of the wing-feathers, where it is brightest on edges of primaries. Wings dark ashy-brown; tertiaries edged with white, washed with olive green. Coverts broadly tipped with white, forming two very distinct wing-bars. Secondaries and inner primaries slightly tipped with white. Tail-coverts and outer edges of tail-feathers ashy; the former lightest. Tail brown, with a white spot close to the tip of the two tail-feathers; in size and pattern exactly like the adult. On the third tail-feather on inner web near the tip is a small white spot, which, though small, is distinct. Abdomen and under tail-coverts dingy white, faintly streaked along the shaft and tipped with dark. Throat, breast, and sides dingy grayish-white, finely tipped on the edges with black, and faintly washed with dusky greenish-yellow. The breast and sides are strongly marked with a distinct greenish yellow area, owing to the presence of feathers belonging to the second plumage. From what is left of the first plumage it is evident that, in this stage, the bird is dingy gray with dark edging and shaft-streaks washed with a faint yellowish, producing an indistinct dingy yellow.

DENDROICA TOWNSENDI (Nutt.). Townsend's Warbler.

Hartlaub (*Jour. Orn. Dent. Cent.*, July, 1883, p. 267) states that this species was seen once by Dr. Krause, on May 27, in conifers of Upper Dejah Valley, Alaska, which is probably the most northern point from which it has yet been recorded. He also adds that there is a single specimen of this species from Sitka in the Bremen and Stockholm collection.

SEIURUS AUROCAPILLUS (Linn.). Oven-bird.

From Fort Yukon some distance down the river this bird is known to breed. Dall tells us that it is not common in that region, and on May 30 he secured a single specimen above Nulato; he adds that the natives called it the grandfather of the Ruby-crowned Kinglet. At Mission, on the Lower Yukon, a single dried skin was seen in an Eskimo hut, in the winter, which is the only addition I can make to the history of the bird within the limits of the Territory. It is thus far unknown from the coast and islands of Bering Sea, as well as the coast region of Southeastern Alaska, apparently penetrating the Territory by the way of the Upper Yukon, from its range through the British fur countries to the east.

Its nesting range extends within the Arctic Circle on the Upper Yukon and Lower Mackenzie Rivers.

SEIURUS NOVEBORACENSIS (Gmel.). Water Thrush (Esk. *Chif-cki-wó-gúk*).

From about May 25 to June 1 these Water Thrushes reach the mouth of the Yukon, and at this time their clear, sweet songs may be heard from along the bush-grown banks of the river and its numerous tributaries. The barren coast of Bering Sea north and south from this point affords it but little shelter at this season, hence its extreme rarity there in spring. It occurs in spring where the dense growth of bushes about Kotzebue Sound affords it available breeding places. In the wooded interior, as at the Yukon mouth, it is abundant, and, in fact, is one of the most common bush-frequenting birds throughout the entire far countries, extending north even beyond the tree limit. In the autumn migration it is found scattered about the country more generally than in spring, visiting even such points on the sea-coast as Saint Michaels, where, entirely outside of its usual range, it is found in friendly companionship with the Titlarks and Yellow Wag-tails, frequenting the borders of damp spots and muddy paths close to the buildings, where its only shelter is afforded by the overhanging grasses. Its presence, however, at this place is to be looked for only from about the 25th of July to the 15th of August, after which time it passes south. I have found no record of its occurrence on the southeast coast of the Territory. At Fort Yukon Dall found a nest containing two eggs, in a bushy spruce, on the 1st of June; but he saw none of the birds at Nulato, and considered it uncommon. My own experience at the Yukon mouth proves the bird to be one of the commonest species breeding at that place. Its favorite haunts, in the midst of dense thickets, shelter it from the observation of one not accustomed to its song, which, however, is one of the most striking that reaches the ear of the traveler in that region; but the songster, perched on some low branch, is quick to take alarm, and skulks away beyond the sight of one penetrating its haunts.

At Fort Yukon Lockhart shot a bird from its nest on June 21. This nest was concealed under a small pile of *drift* close to the river bank, under a large willow tree. Another nest near by was similarly placed and made of moss lined with very fine grass. In the National Museum collection is a nest containing five eggs, from Peale's River, which is composed of moss and grass and lined with mouse and rabbit fur. There are also other eggs in the same collection, which were obtained from Fort Yukon during the middle of June.

SYLVANIA PUSILLA (Wils.). Wilson's Warbler.

The movements of this handsome little species agree closely with those of the Yellow Warbler, as does its distribution, at least, so far as is shown by my experience in the north. On the Upper Yukon its nest and eggs have been taken by May 20, and by the middle of this month, or soon after, its presence is noted on the coast of Bering Sea, where it is a summer resident, occupying the same alder-thickets as the Yellow Warbler. It first makes its appearance, like the latter, about the houses in spring, but soon strays away to its summer haunts on the hill sides, where it is confined until the nesting season has passed and, about the end of July and 1st of August, it returns with its young to pay a last visit to the solitary group of houses on the open sea-shore at Saint Michaels before it passes to the south. It is one of the commonest of the bush-frequenting species in the north and extends its breeding range to the shores of the Arctic Ocean, where it is found breeding about Kotzebue Sound as well as along the entire coast of Norton Sound wherever shelter is afforded. Like most others of the wood-frequenting species, this bird is not known on the barren rocky islands of Bering Sea, but on the mainland it forms a striking and pleasant addition to the fauna so strangely attracted to these apparently forbidding regions during the short and unpleasant Arctic summer. Its range in the Territory is confined, like that of *H. celata*, to the region north of the Alaskan Mountains, and like the latter it is represented to the south of these mountains by a closely-allied geographical race.

SYLVANIA PUSILLA PILEOLATA (Pall.). Pileolated Warbler.

Early in May these birds have been found in Oregon, and by the 12th of this month some were feeding their young there. From this region it extends north and occupies the entire Pacific shore of the Alaskan mainland. It is common according to Bean at Yakutat Bay and Kadiak in

June and July, but it is not found on any of the Aleutian chain nor on the mainland north of the Alaskan Mountains. From these mountains southward it is abundant, however, and its nest and eggs have been obtained at Sitka. Its times of arrival and departure are unknown, and its biography in this part of its range yet remains to be written.

A comparison of specimens of this and of the other form from Northern Alaska and Eastern North America shows that the race *pileolata* is based upon a general and constant intensity of coloration.

MOTACILLA OCULARIS Swinh. Swinhoe's Wagtail.

Although this bird has been taken repeatedly at Plover Bay, Siberia, and thence throughout a large portion of Northeastern Asia, including China and Formosa, to the Lake Baikal region, it appears to be almost unknown in Alaska. In fact its claim as a bird of the Territory rests upon the capture of a single specimen, a young bird in summer plumage, by Captain Kellett and Lieutenant Wood in "Northwest America," as recorded in the Brit. Mus. Cat. Birds, X, 473.

The Wagtail seen by Mr. Turner on Attu Island, on the western extreme of the Aleutian chain, may possibly have been of this species, but it is far more probable that it was the *M. lugens* which Dr. Stejneger found common upon the Commander Islands.

A single specimen of *ocularis* was taken by Mr. Belding at La Paz, Lower California, during the winter of 1881-82. It is scarcely necessary to add that its occurrence at this point, so far from its home, is entirely accidental.

The western limit of this bird in Siberia is given by Seebohm as the water-shed between the Yenesei and the Lena Rivers; thence east it has been taken in many portions of the continent, including Mongolia, Chukchi land, and the localities previously mentioned.

A fine adult male secured by me June 26, 1881, at Plover Bay, Siberia, presents the following characters: The back is nearly uniform ashy, changing on the upper tail-coverts to blackish, edged with dark-ashy. All but the two outer feathers black. The two outer feathers are white with their bases black and a narrowing longitudinal band of the same along the edge of the inner web of each, vanishing towards the end of the feather. A black line extends along and near the shaft on the outer web of the next to outer tail-feather, becoming broken and disappearing toward the end of the feather. The wings are light-brown, but the tertiaries are much darker and edged with white. The latter color so broadly edges the greater and lesser wing-coverts as to overlap and conceal the dark-brown centers, and forms a large uniform patch on the upper surface of the wing. A broad frontal patch of white extends from the bill back on the middle of crown to a line connecting the posterior edge of orbits; this white is continued back nearly to the occiput as a superciliary stripe. A narrow black line extends from the gape through the eye, uniting on the back of the neck with a nearly square black patch, which occupies the occipital and nuchal area, and extends partly down the sides of the neck. From the base of lower mandible on either side a widening band of white extends back under the eye, on the cheeks, and down the sides of the neck, separating the black crown patch from the large black area, which extends from base of under mandible over the throat and breast. The rest of the under surface is dingy white with a wash of ashy on the sides and flanks. Bill and feet black, iris dark hazel. Fall specimens exhibit a somewhat similar pattern, with the black and white areas on the head and neck much broken up and intermixed.

BUDYTES FLAVUS LEUCOSTRIATUS (Horn). Siberian Yellow Wagtail (Esk. *Psû-gûk*).

On the west coast of Europe, and extending across the entire northern portion of the Old World, is found a series of closely-allied Wagtails, of which the form under consideration represents the easternmost. The literature bearing upon these birds is in a state of considerable confusion, owing to the variability and close inter-relationship between the several varieties. The Yellow Wagtail of Eastern Siberia, extending across Bering Sea into that portion of Alaska in the region of Bering Strait, is one of the handsomest among its several related forms; and of the several additions made to the North American fauna by the explorers of the Western Union Telegraph Expedition, this was one of the most interesting. The first specimens were obtained

from the vicinity of Saint Michaels, where it was found abundant during the summer of 1866-67. It was previously observed by Dr. Adams, of the English navy, during the summer of 1851; but this observation was not made public until recently. The original specimen from Alaska was forwarded to Mr. Tristram, who stated that "the specimen with a white supercilial stripe was identical with forms in breeding plumage from the Atlas, Palestine, and Lapland."

In Alaska I found this bird along the coast as far south as the Yukon mouth, where it arrived May 28, 1879, but was extremely rare. Specimens have been taken since by Mr. McKay as far south as the head of Bristol Bay, and it was noted as a late summer visitor on the Near Islands by Turner. Saint Michaels, on Norton Sound, appears to be the center of its abundance on our coast, and thence north it becomes rarer, until at Kotzebue Sound it is, as at the Yukon mouth, very rare. I saw but two or three specimens at different points on the shore of Kotzebue Sound during our visits there in the summer of 1881, the farthest northern record being just on the Arctic Circle. In Eastern Siberia it is an abundant species and is found along the entire Bering Sea coast, wherever suitable localities are found, extending its range to Saint Matthews and Saint Lawrence Islands; East Cape, Plover Bay, and various other localities on the Siberian coast are well-known points of occurrence.

In the vicinity of Saint Michaels it is one of the most familiar and common land birds, and as one walks over the open tundra its familiar clinking, metallic note strikes pleasantly on the ear. It usually has a preference for the boggy, moss-grown portions of the country, and upon its first arrival appears rather shy. Even during the breeding season they are ever on the alert, and the approach of a stranger to their haunts is sure to bring several of them from bush or flat to protest against the right of way. They may be distinguished, while yet far away, by their long, easy, swinging flight, undulating in their course like *Spinus tristis*, or a Woodpecker; drawing near; they circle slowly overhead, constantly uttering the sharp *plé-plé-plé*, or alighting for a moment upon a small bush or hummock, flitting their tails and moving restlessly about, apparently consumed with nervous impatience, and scarcely have they touched the ground ere they are again on the wing. A gunshot or two, however, is enough to send them to a safe distance, even though their nest be near by, although occasionally they show great recklessness and are as heedless of danger as most other breeding birds.

Their nests are usually placed under the edge of a tussock or slightly overhanging bank, bunch of grass, or in fact of any similar shelter, under which they can partially or wholly conceal the nest. Their preference, however, is for grassy borders of a rather steeply sloping bank, along the brow of which they place their nests. As one walks over the grass-covered places frequented by these birds, during the breeding season, he is likely to see a female flutter off her eggs at his feet, and, flying away a few yards, alight and glide away, mouse-like, among the grass with such rapidity that, unless closely watched, she quickly disappears. In some cases she will lie thus concealed for some time, and at other times she joins the male at once and circles about overhead. When the male pays his addresses to the female in spring a peculiar performance takes place, somewhat like that of the Yellow Chat. The male starts up from a bank or clump of bushes, and, rising for 20 or 30 yards at a sharp angle, suddenly stiffens and decurves his wings, at the same time slowly spreading and elevating his tail nearly perpendicularly to his body, and in this curious position he floats slowly down until within a foot or two of the ground, uttering a low, clear and rapid medley of jingling notes which can only be compared to the sound made by lightly rattling together the links of a small steel chain. This performance is very commonly executed over a large snow-bank, as if the bird appreciated the contrast afforded by such a background. As he approaches the ground in his descent he suddenly glides away to a neighboring bush or knoll, whence he repeats the maneuver.

They arrive in the vicinity of Saint Michaels from the 27th of May to the 3d of June. Usually present in full numbers by the 5th of this latter month, and quickly pairing, they seek out their nesting ground. In a very short time they have their complement of eggs. By the middle of July the young are fledged, and soon small parties come about the houses and frequent the rocky sea-shore, where they find food in abundance. Many of the adults at this season gather about patches of bushes and dry hill-sides.

Early in August the old birds commence to gradually disappear, and by the middle of the month are seen only occasionally, although on the 18th of August they have been noted on Saint Lawrence Island. The young remain longer and are found in scattered parties all about the settlements and native houses in the same localities favored by the common Water Wagtail, which occurs sparingly along the coast at this season. The Yellow Wagtail trips daintily along the grassy margins of the muddy spots, its vibrating tail and slender form distinguishing it among the motley crowd of Savanna Sparrows, Lapland Longspurs, and common Wagtails which keep it company. The complement of eggs ranges from four to seven, and much variation exists in the marking of the considerable series in my collection. No two of the seven nests are alike; nor are the sets of eggs similar, although there is a general likeness running through the series. The nests measure externally about $3\frac{1}{2}$ by 4 inches across by $1\frac{1}{2}$ to 2 inches deep, with the central depression $\frac{1}{2}$ to $1\frac{1}{2}$ inches deep, and from 2 to $2\frac{1}{2}$ inches in diameter. The outer portion is usually composed of bits of grass and moss, pretty compactly arranged, with the central cavity well lined with some warm material, such as the hair of dogs and men, or Ptarmigan feathers, or a combination of the three. One nest is built mainly of fine grass lined with a closely-felted layer of dogs' hair. The second nest has a thin layer of moss and grass followed by one of feathers, and the six eggs it contains rest upon a layer of silky-brown club-mosses. The third is composed of a felted layer of dogs' hair on the bottom, followed above by a thin layer of feathers; this is succeeded by a still thinner layer of club-moss, and the eggs rest upon a felted layer of dogs' hair. The fourth nest is composed of a uniform loosely-joined structure of feathers and pieces of grass all mingled into a heterogeneous mass. The ground color of the eggs varies from a pale-greenish clay to a clayey white, over which extends a profuse confluent mottling, varying from slaty to reddish brown, which, in some cases, almost hides the ground color; in others the spots are large and less numerous, and do not cover the shells so completely. The eggs of the same set usually are of a similar shade and marking, and in but one set can the slightest traces of zigzag markings be found about the larger ends. A series of thirty-two eggs ranges within the following limits: Extreme length, .79; extreme breadth, .60; average length of entire series, .748; average breadth of the entire series, .562; least length, .70; least breadth, .54.

The following characteristics are taken from a series of twenty-six adult birds and eleven young of the year, all obtained from the region about Saint Michaels:

The sexes are very similar. In freshly-killed specimens the males are frequently brighter colored than the females, but richly-plumaged females are much more brightly colored than the duller males at the same season.

Adult male and female in Spring.—On the crown and nape, extending down the sides of the neck the color is clear ashy, becoming shaded more or less with brown in poor or worn plumage. The back rich olive-green, especially upon the rump and upper tail-feathers, and extending to just back of the ashy crown-patch. The intermediate region between the shoulders and on the scapulars is shaded more or less strongly with brown, becoming ashy-brown or of a darker shade than the crown in some specimens. The wings are brown. The tertiaries and coverts edged with pale-yellowish white, the tips of the coverts forming two dull wing-bars. This light edging of coverts varies in amount, and in worn specimens is sometimes nearly obliterated. The middle tail-feathers are dark-brown, becoming nearly black in some specimens. Two outer tail-feathers have their basal quarter brown, with a narrowing band of the same extending from the dark base along the inner half of inner web, reaching nearly to the tip of feather. A narrow line of brown close to the shaft on the outer web to the next to the outer feather. The remainder of these feathers are white, including the entire tip of each and their shafts. The narrow white superciliary stripe usually commences at the nostril and reaches to the nape; but in some specimens it is obsolete in front of the eye, and is frequently barely discernible. A dark-brownish ashy line includes the lores, eye, and ear-coverts. Chin white, shading into rich greenish-yellow, which occupies the entire under parts, including the under tail coverts. The precise chain of the white area as well as the intensity of the yellow varies greatly with individuals. The olive-green of back extends on the sides of the neck and breast, forming a more or less obsolete and slightly clouded band across the breast, the basal half of each feather being olive-green with a yellowish tip; sometimes the yellowish tip is obsolete, rendering the green more apparent. In some specimens sev-

eral pure olive-green feathers are scattered here and there among the yellow feathers of this part. A strong wash of olive-green extends along the sides and flanks. The under wing-coverts are yellowish-white. The iris is dark hazel. The bill and feet black.

In fall adults are nearly uniform olive-brown above, with a grayish shade on the crown and grayish on the rump. The tail and wing feathers are of a softer shade than in the spring, and tinted with a mixture of olive. The superciliary line white, sometimes yellow shaded. The white chin-patch extends to the breast and the yellow or fulvous of breast surrounds it posteriorly; this fulvous-brown shade extends across the breast. Abdomen dingy yellowish; sides and flanks dingy olive. Bill and feet dark horn color.

Young of the year.—The top of the head and back is nearly uniform fulvous brown, varying to olive-brown. Wings and tail almost precisely as in the adult. The younger specimens have more of a light fulvous brownish shade throughout, which becomes darker and more ashy in older birds. The light superciliary line is fine and less marked than in the adults and oftener obsolescent anterior to the orbit. The white chin-patch is much extended, frequently reaching far down on the throat, where it is more or less washed with pale fulvous. In very young specimens a band of feathers tipped with black or very dark sooty-brown, with light-colored bases, extends from each side of the lower mandible down the sides of the neck and continues across the breast, thus inclosing the throat-patch. The dark area does not form a continuous surface, but has a broken and mottled appearance. It is in striking contrast with the inclosed whitish space. The abdomen and under tail-coverts are a very pale dingy-yellowish, with a fulvous wash in some cases. The sides are washed with dingy olive-brown. Bill and legs pale fleshy horn-color.

A young bird from Saint Michaels is in the following rather strange plumage: A faintly outlined blackish-brown cap mixed with dull olive-brown. The black is most marked as a supra-orbital line. There is a postocular yellowish-white stripe. Nape, back, and rump dull grayish olive-brown. Wings and tail as in the ordinary young bird. An oval area of dingy whitish occupies the chin and throat nearly to the breast. This area is outlined and limited by an irregular sooty-black border, which takes its origin on each side of the head at the base of the lower mandible, and extends down the sides of the neck forming a breast-band, patterned very much as the black border of throat-patch in *Sturnella magna*. The abdomen is yellowish, breast and sides a dull olive-brown.

ANTHUS PENNSYLVANICUS (Lath.). American Pipit (Esk. *Chi-ching-ik*).

On the 8th of May, 1877, during a storm of snow and sleet, the first Pipit was seen at Unalaska, on the Aleutian Islands. The following days they appeared to be still more numerous, and on the 19th of the month the Aleuts told me that these birds already had eggs on the hillsides. On the Upper Yukon, at Fort Reliance, they arrive as early as May 1, leaving about the 5th of October or later. Hartlaub records the species at Portage Bay by April 28, and numerous by May 11. They do not remain here in summer. August 15 they have been taken on Saint George Island of the Fur Seal group, and numerous specimens have been obtained from Sitka, Kodiak, and thence north along the coast to the peninsula of Alaska and through Bering Strait to the shores of the Arctic. It was noted in July on the Shumagin, and at Cape Lisburne in August. On the Near Islands it is an occasional summer resident. At Nulato, on the Yukon, it arrives May 10, and its arrival has been recorded on the Lower Mackenzie River as late as May 21. It appears at times on the shore of Bering Sea in the vicinity of Saint Michaels, and, like various other species, is rare, except during the early autumnal migrations, when it is present for a short time about the middle of August.

Kumlien records its arrival at Cumberland Gulf on May 30, while the ground was still covered with snow, and it was forced to obtain food by wading about and hunting in the edge of the water, feeding on small crustacea and mollusca. The 1st of June he thinks many perished during a severe snow-storm, during which many took shelter about his quarters and were so overcome by exhaustion that they allowed themselves to be taken by hand. Near his winter quarters they nested in crevices among the rocks; but in Greenland he found them nesting in tussocks of grass like sparrows. He also tells us that the Eskimo regard this bird as an enemy, and accuse

it of telling the reindeer when a man is in pursuit; and it is also said to tell the deer whether or not a man is a good shot. Kunlien adds that he has seen an Eskimo waste his last charge in vainly trying to kill one of these birds, although a herd of deer was near by.

In examining a large series of these birds, contained in the National Museum collection, great variation is observed between specimens from the same locality, and it is difficult to distinguish any difference which may be ascribed to geographical influence. Spring specimens from the Upper Yukon have a decided ashy shade on the crown, nape, and back, though toward the rump and upper tail-coverts there is a more brownish shade. The dark centers of the feathers over this region, the wings, and the tail are brown-edged, especially on the back, with a lighter shade. The dark ashy of the nape extends forward on the ear-coverts, and the rest of the cheek, superciliary stripe, and the entire under surface are of a nearly uniform buff or a yellowish-brown of varying intensity. The chin and tail-coverts are a little paler. A series of small, poorly-marked black and brown spots extends down the sides of throat from the bill and reaches across the breast, thence continuing towards the sides. A young bird obtained at Saint Michaels, July 29, 1877, has the crown and sides of the head brown, and the nape has an ashy wash of buff; the superciliary stripe is faintly outlined. Back brown, with dark central areas to feathers, as in adult. The wings dark brown edged with fulvous-brown. Tail similar to adult. A well-marked series of dark spots and shaft-streaks extends down the sides of the neck to bill and forms a heavily-marked area across the breast, and a less strongly-marked series extends along the sides and flanks. In the youngest specimens the buffy shade is less marked than in those which have attained their second plumage or are in the process of moulting. Bill, feet, and legs are pale in young birds. The spring birds from the northwest appear grayer and more ashy above than specimens from the Eastern United States at the same season.

ANTHUS CERVINUS (Pallas). Red-throated Pipit.

This species was accredited to the Aleutian Islands in Zander, Cab., Jour. für Orn., Extraheft 1, 14, 1853.

A specimen was recorded by Mr. Dall, at Saint Michaels, during the Russian Telegraph Expedition. This specimen has been alluded to by myself, Ridgway, and others, erroneously, as *A. pratensis*, which latter species is not known from Alaska.

CINCLUS MEXICANUS Swains. American Dipper (Esk. *Kūthl-ká-gá-yūk*).

Throughout the Territory, wherever clear, swift-running streams afford suitable locations, this bird is found. It has been obtained at Sitka and on the island of Unalaska, in the middle of the Aleutian chain, and by Turner in the Near Islands, in August, and I have specimens from Fort Reliance, at the headwaters of the Yukon, as well as from various points along the lower course of this stream, and along the shores of Norton and Kotzebue Sounds, where the small streams flow into the sea. Some natives from the interior, near the northeastern part of Kotzebue Sound, in about latitude 69° N., described to me a little black bird that remains all winter about open spots in the ice on the swift-running streams, and swims and dives in the water like a duck; this is undoubtedly the Ouzel, and I received specimens from several localities in that region. Several were obtained and brought me in mid-winter from the head of Norton Sound, during a cold period when the thermometer registered as low as -50° at Saint Michaels, and they must frequently endure a temperature of -60°, or even lower, since in the interior the cold is almost invariably much more severe than along the coast. On the Upper Yukon it is also a resident, whence the fur traders brought me wintering specimens. In this region also the cold is intense, as shown by the fact that in one instance a bottle of mercury suspended on the south side of a house remained frozen for six weeks, during which time there were no means of ascertaining how low the temperature descended below the -42° necessary to produce this result. Throughout this period these hardy little birds were busily seeking their food as usual about the open places in the ice marking the rapids in the smaller streams, the icy waters and the frigid temperature of the air not appearing to affect them in the least except, perhaps, to make them a trifle less active than usual. It seems

scarcely credible that a bird of this group can successfully brave such extreme cold, yet the fact is supported by ample proof. It is, perhaps, the only bird of its kind which winters within the Arctic Circle.

Although this Ouzel is found throughout North America from far within the tropics north to within the frigid zone, yet a comparison of my series of eight specimens obtained in Alaska with specimens from Southern United States and Guatemala shows nothing but a trifling individual variation. As usual, the fall and winter specimens have light-colored bills, and the secondaries and the feathers of the lower surface are slightly edged with grayish. Although this bird is found on the Aleutian Islands, it is not known to occur on the bleak, rocky islands elsewhere in Bering Sea. It is resident wherever found in Alaska, although, strangely enough, it is partly migratory in some portions of its range in middle latitudes. An allied species occurs in Eastern Asia.

TROGLODYTES HIEMALIS PACIFICUS Baird. Western Winter Wren.

From Sitka, Bischoff sent in four specimens during his collecting there, which are mentioned in Dall's paper as *Troglodytes hiemalis*, and others have been secured from Kadiak. Since then nothing new concerning its northern distribution and habits in the Territory has been ascertained. South of Sitka it is known to nest in abundance according to Cooper and Suckley. Specimens from Sitka and Kadiak are identical with others from Chiloweyuck, Washington Territory, and other localities to the south along the coast. Northern specimens appear to be alike, being somewhat more intensely colored, but the small series does not allow any definite statement in this regard. The geographical race *pacificus* is very distinct from the eastern *hiemalis*. The dark tint, which is so marked in birds from the northwest coast extending down to the middle Californian coast region, is apparently constant. Its breeding range appears to include the entire extent of its habitat in this region, and the National Museum has recently received its eggs from the Coast Range in the vicinity of Santa Cruz, Cal.; the parent of these eggs cannot be distinguished from specimens obtained at more northern localities.

TROGLODYTES ALASCENSIS Baird. Alaskan Wren.

The type specimen of this Wren was obtained by Mr. Dall at Saint George Island, Alaska, during the explorations of the Western Union Telegraph Expedition, and is a young bird of the year in its first plumage, and much darker than the adult, of which there is a considerable series in the National Museum collection. It is an abundant resident on the Near Islands.

On the Commander Islands Stejneger found the Alaskan Wren replaced by an allied species, which Mr. Ridgway has named *T. pallescens*. At present, although there are many skins in the collection from various localities throughout the known range of the bird, nothing definite is yet known of its nests and eggs, except a statement made by the Aleuts, and recorded by Dall, that it breeds in May, building a nest of moss in the crevices of rocks, where it lays six eggs, and a similar record by Elliott, that it breeds in the holes and crevices of cliffs, where it lays from eight to ten eggs in a nest which is made of dried grass and feathers roofed over, with an entrance to the nest-chamber at the side. This last statement is from the natives of Saint George Island.

It is found throughout the Aleutian Islands and upon the island of Saint George, of the Seal Island group. Throughout this somewhat limited territory it is a common resident. One of the most peculiar facts in its history is its abundance on the island of Saint George, which is about 180 miles north of the Aleutian Islands, whereas, on Saint Paul Island, only 27 miles distant from Saint George, and apparently suitable in every way for its presence, there is not a single record of its occurrence; and Elliott states that he searched carefully for it during his residence at that place. He also tells me that, during exceptionally severe winters on the island of Saint George, large numbers of these birds die of exposure, so that only the hardiest among them survive. But the rapidity with which they multiply brings their numbers up to the former standard in a very few seasons.

On May 13, 1877, I landed, during a heavy gale, on the island of Akoutan, just east of Unalaska, and was making my way cautiously along the rock-strewn beach, half expecting a fall

of fragments from the beetling cliffs above to join the rocky mass which had already fallen. While occupied in searching cautiously for a firm footing, a faint, wily note struck my ear and brought me to a sudden standstill. All about lay huge blocks of riven lava, from which arose the overhanging crags; a little back a more sloping bluff presented its face, the inequalities of which were dotted by scattered grass and other vegetation, now dead and yellow, or in spots were flecked with patches of snow. As my eye scanned this abrupt slope, the author of the notes was seen clinging to a dwarf willow bush at the very brow of the bluff, over which the wind came with great force, beating the bush back and forth as if it would uproot it. I put in a shell with No. 6 shot, and fired. To my joy I saw a small brown body drop down the face of the bluff and lodge in a bunch of grass. With eager haste I reached the spot, raised the little songster, and made my first acquaintance with this hardy Wren. Glowing with pleasure, I sat for some time examining my prize, and then continued my way, filled with that peculiar exhilaration enjoyed by the field naturalist when he finds a coveted prize.

The last of September and first of October, 1881, while the Corwin lay at Unalaska, I had still further opportunities for studying this little-known species in its home. They were very common everywhere on the lower portions of the island, wherever the rank grass and other plants, combined with the stunted bushes, offered a fitting shelter. Here the birds were seen repeatedly, swinging on the projecting sprays or flitting busily from point to point, and showing a peculiar sprightliness and activity common to it and its kind. Specimens have been taken along the entire Aleutian chain, but it is unknown on the coast to the eastward of these islands.

The original description of the species gives the character of the young in the first plumage sufficiently well. They may be distinguished from the adult by a smoky brown shade on the sides of the head, chin, and throat, and a brighter rusty-red on the back, especially on the rump. In the adults the bill is longer and proportionally slenderer, and the faint, light superciliary line is better marked. The crown is dull brown, shading into a dingy rufous brown on the rump and tail. Below, the adults are indistinguishable in coloration from rufous specimens of the common Winter Wren obtained in Virginia and Illinois. Young specimens of *alascensis* approach nearer *hiemalis* in the amount of rufous on the back and in the size of the bill. Another character is the lack of maculations on the back and rump of *alascensis*. The latter then may be characterized as grayer, larger, and longer-billed than the common *hiemalis* and its variety *pacificus*, and is, perhaps, less differentiated from *hiemalis* than *Melospiza insignis* is from the eastern *M. melodia*. Thus far, however, comparison of the Winter Wrens from the adjoining coast of Alaska with those of the Aleutian Islands shows a greater amount of difference than exists between the Aleutian Wren and its eastern congener. This argues in favor of the specific distinctness of *alascensis*.

CERTHIA FAMILIARIS AMERICANA (Bonap.). Brown Creeper.

In the National Museum collection is a single specimen of this bird obtained at Fort Kenai May 6, 1869, by Biscoff. According to Hartlaub it was seen at Sitka by Kittlitz. These are the only records of its occurrence in the Territory, although from its presence at the localities named it is to be inferred that it occurs in the intermediate country, thence to Washington Territory, where the bird is known to be abundant.

PARUS ATRICAPILLUS SEPTENTRIONALIS (Harris). Long-tailed Chickadee
(Esk. *Chī kū pi pi-á-ik*).

Throughout the wooded region of Alaska, from the moist, heavily-wooded coast in the Sitka and Kadiak region north throughout the entire Yukon and adjoining country, this bird is a common resident. Specimens were secured both at Cook's Inlet and Kadiak by Dr. Bean. I secured specimens from various places throughout the northern portion of the Territory, at times even along the barren sea-coast, where it only found shelter in the stunted alder or weed patches. Its visits to the coast, however, were mainly in roving parties during spring or fall. A few days of mild weather, at this season, are almost sure to bring some of these familiar birds about the coast settlements, and its familiar *dec-dee-dee* is a welcome sound on the clear frosty mornings which usher in the stinging blasts of winter, or announce the approach of spring. One meets it again while

traveling through the silent snow-clad forests of the Yukon, as he tramps wearisomely on, until the mind is unconsciously affected by the lack of animation. At such times, as we move mechanically forward, the shrill, strident note of the Chickadee, as the bird eyes us from its swinging perch on a bush close at hand, breaks the silence and diverts the mind. Frequently the chorus of their Lilliputian cries arise from the bushes all about as the jolly company of barlequins swing and balance their tiny bodies and pass on as though too busily intent upon affairs of importance to stop. After their passage the forest resumes its cheerless silence once more, and the heavy breathing of the icy wind through the tree-tops or the sharp report of the contracting ice in the river are the only accompaniments of the toilsome march.

Their habits and appearance are like those of the well-known Black Cap in southern localities, from which it is to be distinguished merely by its larger size and the greater amount of white bordering the wings and tail, in addition to the general lighter color of the back. These distinctions are likely to vary considerably in individual specimens; and, in fact, it is frequently difficult to distinguish the two forms either by color or size differences. The western and northern varieties are usually distinguishable at a glance by the much grayer back and lighter flanks of *septentrionalis*. Among many specimens of the latter from Saint Michaels and the Lower Yukon, the wash of brown on the sides is almost totally lacking, and in two specimens no differences of shade can be found in the flanks or abdomen. In the south the differences in shade between these two parts become more and more striking. Although the northern birds are usually larger, there are exceptions to the rule. Neither in midsummer nor in midwinter does this bird reach the coast of Bering Sea, and its breeding range is co-extensive with the wooded country of the interior and the timbered coast in the southeast part of the Territory.

PARUS ATRICAPILLUS OCCIDENTALIS (Baird). Oregon Chickadee.

Hartlaub records two specimens of this Chickadee taken at Chileat; he adds also "on February 17 seen on low bushes and deciduous trees near shore. Summer and winter always in low thickets near coast."

PARUS CINCTUS OBTECTUS (Cab.). Siberian Chickadee.

The first record of this species from America was published in the Bulletin of the Nuttall Ornithological Club, January, 1878, in which mention is made of several specimens, obtained by Mr. L. M. Turner from Saint Michaels. The first American specimen of this bird, however, is a female, which was sent to the Smithsonian Institution with seven eggs, from the Lower Anderson River, June 1, 1864, by MacFarlane, to whom credit is thus due for obtaining it first on this continent.

The habitat of this bird includes, so far as known, the spruce forests in Northeastern Siberia, extending across a very similar region in the northern half of Alaska, and reaching the Anderson River on the east. Its range does not appear to extend to the south along the Upper Yukon, as a considerable series of Titmice, brought me from that region by the fur traders, does not contain a single example. From the vicinity of Nulato, thence down the Yukon, and to the north and northeast, this form appears to be as abundant as the Hudsonian Titmouse, whose range it shares in this region. From about Lake Baikal, in Eastern Siberia, west through Northern Siberia and Northern Europe, extends the range of a close relative of the present form, known as *Parus cinctus*, with which this bird has been confused until very recently. The original American reference was given as *P. cinctus*, but a careful comparison of the large series of Alaskan birds in my collection with specimens of *cinctus* from Northern Europe shows a well-marked geographical difference, which will be referred to below.

Like most others of its kind, the Siberian Titmouse nests in hollows of trees, and has been known to eject the rightful owner of a cavity and seize upon the site for its own nest. Its eggs are usually placed upon a mass of hairs of the lemming and hare, combined with fine moss or vegetable down. It lays from seven to nine eggs, which are grayish-white, with reddish-violet and reddish-brown spots often collected at the larger end. The eggs are broad in proportion to their length. The North European bird is resident and comes about the houses in winter, where it searches for food among the refuse heaps, and becomes extremely familiar. In Lapland this bird uses natural cavities in trees, or such as are excavated by woodpeckers. Its cry is expressed

by the syllables "*pistéc-téé*," uttered in a hissing tone. From this it receives its Finnish name, and the superstitious among the Finns regard it as a bird of bad omen, and predict a bootless errand for the bear or squirrel hunter who chances to meet one of these busy little *pistéc tainen*, as he starts for the forest. The Alaskan and East Siberian form is closely related to *P. hudsonicus*, but the following characters will serve to distinguish the two:

P. HUDSONICUS.

Crown dark smoky brown.
 Back brownish, much lighter than crown, and of a more fulvous tint.
 Lores and cheek-patch white.
 Sides of neck ashy-gray, and an indistinct shade of the same across the nuchal region separating the crown from the back.
 Wings and tail brown, edged with a pale ashy-gray.
 Cheeks and throat-patch smoky-black.
 Breast and abdomen dingy-white, and a large flank-patch of dull vinaceous-brown.
 The average dimensions of a series of these birds, numbering fourteen are: length of wing 2.57; tail, 2.73; tarsus, .65; culmen, .36.

P. CINCTUS.

Crown ashy-brown, rather dark.
 Back a lighter shade of the same, washed with very pale fulvous.
 Lores, cheeks, and side of neck white, the white sometimes forming a very slight nuchal collar.
 Wings and tail brownish-gray, edged with pale silvery gray or white.
 Cheek and throat black.
 Breast and abdomen white, washed with a slight shade of pale brown, which covers the flanks.
 The feet and claws of this bird appear to average stouter and heavier than in *hudsonicus*, although there is a considerable amount of individual variation in this respect in both species.
 A series of nine specimens average: length of wing, 2.65; tail, 2.81; tarsus, .62; culmen, .30.

The East Siberian form is distinguished from its European and West Siberian relative mainly by its longer tail and wings and shorter tarsus. In the Ibis for 1879, Seebohm states that his Lake Baikal specimens show less rusty-brown on the flanks than do the European birds, and ought to be referred to the variety *griseescens* of Sharp and Dresser. By a direct comparison of my Alaskan series with two specimens from Lapland, in the National Museum collection, I find that the smoky-brown of the crown, in the latter specimens, is very similar in shade to the crown of *P. hudsonicus* of Alaska; but the contrast between the crown and back is considerably more marked in *cinctus* than in *hudsonicus*, and much more marked in *cinctus* than in *obtectus*. The whole back and rump of *cinctus* are rusty or reddish-brown, and a little paler than the rusty-brown of the flanks, which latter color is a little paler than the brown on the flanks of *hudsonicus*. In *obtectus* the flank-wash is frequently no heavier than in examples of *P. septentrionalis*, and in the darkest specimens is but little darker than in *cinctus* proper, while the flanks are invariably strikingly paler. The color of this flank-wash is faintly traceable on the back and rump of some Alaskan specimens, and absent in others, but an almost uniform tint of crown and back is generally characteristic of *obtectus*. The throat-patch is dark smoky-brown, with a wash of reddish-brown in *cinctus*, and smoky-black with a brownish wash in *obtectus*. The latter is also distinguishable by the clear silver ashy-gray of the wing and tail feathers with the whitish edging of the former, whereas the wings and tail of *cinctus* are of a dull ashy-gray with a smoky shade of brownish. The comparative measurements of two Lapland and two Alaskan birds are as follows:

Name.	Locality.	Sex.	National Museum No.	Wing.	Tail.	Tarsus.	Culmen.	Depth of bill at base.
<i>Parus cinctus</i>	Lapland	♂	34136	2.66	2.76	.69	.44	.17
			34137	2.65	2.74	.67	.44	.16
<i>P. cinctus obtectus</i> ...	Nulato, Alaska..	♂	(1)	2.52	2.88	.60	.41	.29
			(1)	2.60	2.80	.61	.43	.19

Outside of certain differences in proportions, as shown in the measurements given, *obtectus* may be said to differ from typical *cinctus* very much as *septentrionalis* varies from typical *atricapillus*.

PARUS HUDSONICUS FORST. Hudsonian Chickadee.

This bird has been found throughout the wooded portion of Alaska, from its southern coastline at Fort Kenai, north through the Kuskokwim and Yukon River regions to the northern treeline, well within the Arctic Circle. In the southern portion of its range its habitat overlaps that

of *rufescens*, while to the north it is found mingling with the Long-tailed and the Siberian Gray Titmouse. From the wooded interior in the north it occasionally wanders to the open sea-coast along the shore of Bering Sea and Kotzebue Sound, where a few bushy ravines and hill-sides afford it temporary shelter. These visits are usually made during the fall and spring, as is the case with other Titmice, and at such times it frequently comes about the houses and is as familiar as the other Titmice. It mainly keeps within the range of the white spruce of the north and the pine forests of the southeastern coast, and is of very unusual occurrence outside of these limits. Within its proper territory it is a very common bird, and from its Alaskan range near Bering Straits, east throughout the fur countries, and occasionally reaching as far south as the United States, it is one of the most abundant of its kind. Owing to its being confined to the interior, I had no opportunity of learning anything of interest concerning its habits, a few examples seen now and then, while passing through the forests on the Yukon in winter, being the extent of my experience with the bird in life, although large numbers of their skins were brought me by the fur traders and natives from various portions of the interior, including the entire course of the Yukon to the British boundary.

PARUS RUFESCENS TOWN. Chestnut-backed Chickadee.

From about 60° north latitude on the southeastern coast of Alaska, south into California, this Titmouse is abundant and breeds throughout the greater part of its range. On May 16, 1874, Dall obtained a specimen at Lituya Bay, and Bischoff secured numerous skins at Sitka. Hartlaub records specimens from Portage Bay in December, January, and February. As the ornithology of this portion of Alaska is almost unknown, the distribution of this bird will probably be found to extend a considerable distance farther along the wooded coast and the interior. It may be remarked, also, that the field in this portion of Alaska is one of the richest open to American naturalists, especially in the northern portion of the continent. I have nothing new to add regarding the habits of this interesting species, and it remains only to call attention to the description of the nests and eggs of this bird which is found in the appendix to volume iii of the History of North American Birds.

PHYLLOPSEUSTES BOREALIS (Blas.). Kennicott's Willow Warbler (Esk. *Chūng-ūkk-tāi-ūk*).

The original record of this warbler in America was based upon the capture of a single specimen at Saint Michaels, on August 16, 1866, by the naturalist of the Western Union Telegraph Expedition. A second specimen—an alcoholic bird in the National Museum collection, without a label—is in the same plumage, and is to be doubtfully referred to the same locality. Since the original capture, up to the summer of 1877, no additional examples were secured by the various naturalists who have visited the Territory. During this summer, on July 26 and 31, I obtained two specimens, one on each of the days mentioned, as they were searching the old board fences surrounding the houses at Saint Michaels. Later in the season, at the end of August, another example was taken, and the succeeding summer others were seen, but very sparingly, and none were obtained. At the time of the capture of the specimens noted they were in company with numerous young Orange-crowned Warblers, which were feeding about the crevices of the fences and log-houses, finding an abundance of spiders and other small insects in the lurking-places there afforded. The Kennicott's Warblers were so similar to the Orange-crowned Warblers in motions and appearance that it was almost, if not quite, impossible to distinguish them until shot and examined in hand. One of the birds obtained was a young one in rather immature plumage, and the others were adults. The season of their occurrence and other circumstances lead me to think that it breeds in small numbers along the northwest coast of Alaska in the vicinity of Bering Straits, perhaps reaching Kotzebue Sound, and certainly extending as far to the south as the mouth of the Yukon. Owing to the little known character of the avian fauna along the northwest coast of Alaska, it is not known whether this bird migrates from Northern Alaska to the south along the American coast or returns across Bering Straits to seek a winter resort with its relatives in Southeastern Asia and adjoining islands.

The bird is well known to be a great wanderer, resorting in winter to the southern portion of Asia, migrating through Japan, China, and Formosa, and reaching the Malayan Peninsula and Archipelago; while in summer it seeks the high latitudes of Asia, extending to Northern Russia and thence east even to Alaska, as recorded. At Tapkau, northwest of Bering Straits, on the Siberian shore, Nordenskjöld tells us that considerable flocks of these birds visited the vessel during June, before the ground was free from snow. They appeared much exhausted and remained about the vessel for some days. The abundance of this bird here at this season would indicate its presence in considerable numbers throughout the Chukchi Peninsula during summer. During my visits to this shore in the summer of 1881 it was not found, as might have been anticipated from the lack of bushes and suitable locations along the immediate coast where we landed.

Its habits while in America are almost unknown, hence we must draw upon the records furnished us by European naturalists, who have visited its haunts in Northern Europe and Asia. Seebohm found it on the Lower Yenesei, where it arrived a fortnight later than *P. trochilus*, *P. tristis*, and *P. superciliosus*. His account (*Ibis*, 111, 9, 1879) is as follows:

I had given up *P. borealis* in despair, when suddenly it arrived in great numbers, and became the commonest of the four species. The song is almost exactly like the trill of the Red-pole, but not quite so rapid, and a little more melodious. Its call-note is generally a single monotonous "dzit," but sometimes made into a double note by dwelling on the first part, "d-z, zit." It is less restless than the other Willow-Warblers, by no means shy, and is easy to shoot. When I left the Arctic Circle it had probably not commenced to breed; but on the 6th of July I had the good fortune to shoot a bird from its nest at Egaska, in latitude 67°. The eggs are larger than those of our Willow Warbler, pure white, and profusely spotted all over with very small and very pale pink spots. They were five in number. The nest was built on the ground in a wood thinly scattered with trees, and was placed in a recess on the side of a tussock or little mound of grass and other plants. It was semidomed, the outside being composed of moss, and the inside of fine dry grass. There was neither feather nor hair used in the construction. I did not see this bird farther north than lat. 69°.

From the same author we learn that this species breeds in the north of Asia, at or near the limit of forest growth and in a similar climate to the subalpine districts of Southern Siberia. It passes through China on its migrations, and winters in the East Indian Islands and the islands surrounding the Burmah Peninsula. It unites an extreme southeastern winter range with a wider northern range than any other species of the genus. Collett has recently obtained it in Finmark, and it is not uncommon at Archangel. It has been shot on the Mesen and on the Petchoya. It occurs as far east as the Ochotsk, and breeds in Southeastern Mongolia. It has been taken in Japan and west to Heligoland, and passes in great numbers through Amoy in spring and autumn.

The following description is taken from specimens obtained by me at Saint Michaels: Entire dorsal surface, including broad edging of wing and tail feather, nearly uniform olive-green, brightening on the wings to a shade very similar to that on the back of the Golden-crowned Warbler. The under surface white, washed with a pale yellow like that of *Vireo philadelphicus*. Across the breast and along the flanks is a wash of a dull olive-brown, heavier on the flanks, and with a well marked superciliary stripe of greenish-yellow extending from beak over the lores to the nape. Extending from bill through the lores and including the eye, ending coincident with the superciliary stripe, is a dusky-greenish band; thence down the cheeks extends a dusky greenish yellow shade, which changes to a yellowish-white on the neck and throat. The bend of wings and edges of axillaries are clear yellow and the lower edge of tips of secondary coverts are pale yellowish-white, forming a distinct wing-bar. The abdomen is grayish-white, with a faint yellowish shade, and the upper surface is dull olive-green. The upper mandible, and sometimes the tip of lower mandible, dusky-horn color. Lower mandible pale-brown and legs olive-brown.

Measurements.

TYPE OF KENNICOTT.

Date.	Locality.	Sex.	Total length.	Spread of wings.	Length of wing.	Tail.	Tarsus.	Culmen.
Aug. 16, 1866	Saint Michaels	(?)	4.75	6.00	2.40	1.86	.73	.37
Aug. 21, 1877	do	♂	.....	.....	2.50	2.05	.76	.25
Aug. 24, 1877	do	(?)	.....	.....	2.40	1.93	.72	.34
Aug. 24, 1877	do	(?)	.....	.....	2.35	1.88	.67	.24

Stejneger notes them as among the commonest summer birds in the birch and alder groves about Petropavlski, Kamchatka. He also found them on Bering Island, and on comparing his specimens with those from Alaska finds that the Alaskan specimens are smaller than the Chinese and Kamchatkan birds. The difference, he thinks, may prove constant enough to warrant sub-specific rank for the Alaskan bird, in which case it becomes *P. borealis kennicotti* (Bd.).

REGULUS SATRAPA OLIVACEUS Baird. Western Golden-crowned Kinglet.

The Alaskan records of this species are limited to the southeastern coast, where it has been obtained at Sitka and Kadiak. Although this is a common bird at Sitka and Kadiak it is thus far unknown to the north of the Alaskan mountains. The occurrence of *satrapa* is to be expected on the headwaters of the Yukon and adjacent parts of the wooded interior.

REGULUS CALENDULA (Linn.). Ruby-crowned Kinglet.

This handsome species has been secured from various portions of the Territory. The various Alaskan records include Fort Yukon, Nulato, and Anvik, in the north, with Sitka and Fort Kenai on the southeastern coast. Its range is restricted to the wooded portion of the Territory, and it has not been recorded from any part of the open sea-coast in the north. Various specimens show a wide range of variation, which is merely individual, although the extended distribution of the bird through North America might lead one to expect geographical variation. This supposition, however, is not sustained by an examination of a large series in the National Museum collection, although the peculiar form from the Guadalupe Islands is an exception. In the spring of 1868 Dall found it abundant at Nulato, where it preferred the alder-thickets away from the river. It was very courageous, and a pair which appeared about to commence a nest in a small clump of bushes tore to pieces a half-finished nest of the Rusty-headed Blackbird, and upon the return of the female Blackbird the pair of pigmies attacked and drove her away. This was repeated several times, and when Mr. Dall left Nulato on June 2 the quarrel was still unsettled. The Indian name of this bird is said to be *T'lik*. They say he is a little chief, and that the Golden-crowned Thrush is his grandfather. The Ruby Crown is to be found to the tree-limit within the Arctic Circle, but rarely approaches the damp, cold sea-shores of this region.

TURDUS ALICLE Baird. Gray-checked Thrush (Esk. *Kū yi-ū-chūik*).

This species is common throughout all the northern portion of Alaska wherever willow and alder thickets afford it shelter. Its western range extends to Bering Straits and beyond, and it has been recorded from Kamchatka, and probably occurs on the Chukchi Peninsula. Along the entire Yukon, and other streams bordered by trees or bushes in this region, it is present in great abundance during the breeding season. On the 1st of June, 1879, as I came down the Yukon by boat, large numbers of their old nests were seen in the leafless bushes along the river-banks. A number of these nests were close to the ground—within 2 or 3 feet—while others were from 8 to 12 feet high at the division of two stout branches where the compact structure of fine grass and leaves was placed. The species reaches the mouth of the Yukon and adjacent coast in large numbers the last of May or first of June. The earliest arrival which I have recorded is on May 24. They are soon found in every thicket, whence their low sweet song is frequently heard; but they are very shy, and, at the first alarm, dive into the dense bushes for shelter. As soon as the breeding season is over they become less retiring and frequent the vicinity of villages and more open spots, where many are killed by the native boys, armed with their bows and arrows. Their skins are removed and hung in rows or bunches to dry in the smoky huts and are preserved as trophies of the young hunters' prowess. In the winter festivals, when the older hunters bring out the trophies of their skill, the boys proudly display the skins of these thrushes and hang them alongside.

On the sea-coast every alder-patch has a pair or more of these birds, and its presence at Sitka and Kadiak is attested by numerous specimens in the National Museum collection. Dall records a nest obtained from an elevation of about 6 feet in a small alder. This nest was made of hair, lined

with scraps of deer-hair, feathers, and a little moss. A nest obtained by me near Saint Michaels on the 1st of June is an extremely small, loose structure, formed by lining a small depression at the base of a shrub in the midst of an alder-thicket with fine soft grass leaves. The material of the nest is uniform throughout, and in this particular partly bears out Dr. Brewer's statement in the History of North American Birds, which is: "The nests [of *alicia*] are also quite different in their appearance and style of structure. The *Hypnum* mosses, so marked a feature in the nests of *T. scainsoni*, as also in those of *T. ustulatus*, are wholly wanting in those of *T. alicia*." This statement is not confirmed, however, by the examination of other nests. A second example, obtained at Saint Michaels on June 20, was composed mainly of these mosses mixed with a small amount of coarse grass. This nest was placed upon the branching base of a small alder only a few inches from the ground. The nest first mentioned measured $3\frac{1}{2}$ inches across the top by 2 inches deep, and the eggs which it contained measure respectively .93 by .62, .90 by .64, and .93 by .63. These eggs are blue, with a varying amount of reddish-brown specking, which is most abundant at the larger end. In two specimens of this set the spots are thinly scattered over the shell, while in the other two it is so distributed that over half the surface is concealed by it. Of the specimens in the National Museum collection some are scarcely marked at all, while in others the ground-color is nearly hidden. The single egg found in the second nest measures .92 by .69. This nest measures 3 inches in depth by 4 inches in width, the central cavity being 2 inches deep.

It may be remarked here that the nest just described is typical of the structure made by *scainsoni*, according to Dr. Brewer, but, as every field-ornithologist is aware, any attempt to make an exact science of zoology and of the study of the nests of birds must fail. Observation shows that in building their nests birds are necessarily influenced by the surroundings and by the nature of the material near their nesting-sites. The so-called instinct which has been supposed to lead birds of one species to almost invariably select a certain kind of material and a certain position for their nests has little foundation in fact. The nesting-range of the Gray-cheeked Thrush extends throughout Alaska, as specimens have been obtained in all parts of the Territory, during the breeding season, except, however, the islands of Bering Sea and the Aleutian chain.

Fall specimens possess much more of the warm, buffy tint on the breast than spring birds, although many of the latter have more or less, and in some specimens obtained by me from the Yukon the buff is nearly as intense and widely spread as upon typical examples of *scainsoni*. The full-grown young of this species, obtained on the Lower Yukon, in August, 1877, has the dorsal surface of a dull brownish-olive, nearly uniform, but with a lighter shade and a decided brownish wash on the outer edges of the wing-feathers and on the tail, especially near the tip. The feathers on the side of the head, embracing the eyes and extending back to the nape, including the scapulars and intermediate feathers of the back, are each marked with a well-defined oval, lanceolate, or saggitate central area, of a dingy whitish shade, which in some places becomes pale buffy-yellowish. The feathers on the throat, neck, and breast are pale buffy-white, with black tips. These tips are larger and more intense on the breast. They are centrally located and somewhat oval or arrow-shaped on the throat, but on the breast they become a square-cut black edging to the feathers, which limit the white by a nearly straight line. These tips pass to faint edgings of black on the white of the middle of abdomen, and shade gradually into a brownish-olive on sides and flanks. The feathers on the sides and rump are dingy yellowish-brown indistinctly barred with blackish. The middle of the crown and rump are immaculate. The second specimen, obtained at Saint Michaels, August 25, is in a little more advanced stage than the one just described, and has the pale buff shade across the breast and sides of the neck of the second plumage. The lores are grayish-white, and the spots on the breast are nearly as in the adult. The bill is dull horn-color, lighter at the base of the lower mandible. Both of the specimens just described are merging into the second or adult plumage, but the first is but very little changed, and has lost only the spots on the crown and rump and the white tips on the wing-coverts. The second specimen, though a little older, still retains the faint wing-bars formed by the light tips to the coverts.

TURDUS USTULATUS (Nutt.). Russet-backed Thrush.

At present this bird is known only from the coast of the southeastern portion of the Territory, where Bischoff obtained several specimens, in the vicinity of Sitka. These specimens are the most
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rufous of any in the National Museum collection, excepting those from Shoalwater Bay, Washington Territory, and the palest skins are those from California and the neighboring region, although Mr. Ridgway informs me that specimens as dark as those from the northwest coast are taken in Central America; so that the above difference may be merely individual; the series from Alaska is too small to settle the matter. Nothing is known of the habits of this thrush, and very little of its distribution in the Territory, though it probably occurs throughout the heavily-wooded coast region from its well known habitat in Washington Territory north to the vicinity of Cook's Inlet, and perhaps to the limit of the wooded coast west of this locality.

TURDUS USTULATUS SWAINSONII (Cab.). Olive-backed Thrush.

On the coast of Bering Sea, where the Gray-cheeked Thrush is abundant, this species is very rare or does not occur at all. In the interior, however, it appears to increase in numbers as the distance from the sea-coast increases. Among a considerable series of thrushes secured there are but two specimens of this bird, one of which is from Nulato and the other from Anvik, both on the Yukon, several hundred miles from its mouth. Dall speaks of this as a common bird, breeding all along the Yukon to the sea-coast, but he evidently referred to the Gray-cheeked Thrush, which is abundant along the Lower Yukon; whereas *swainsoni* is comparatively rare, as shown by its rarity in the collections brought me by the fur traders and natives from various parts of the Territory, and from the fact that I did not find it at the mouth of the Yukon during the spring of 1879. Among my series of *alicia* are a number having a distinct buff shade on the breast and upon the sides of the neck, thus resembling *swainsoni*; and it would not be surprising to find occasional cases of crossing, since the two occupy the same territory in many places.

The subject of this article has been found to be a common breeding species on the Upper Yukon, whence eggs have been sent the Smithsonian from several points, including Fort Yukon. I have seen a specimen from Anvik, which is my lowest record on the Yukon. A set of eggs was brought me in June, 1878, from Nulato, and they measure respectively .89 by .65 and .94 by .67 inches. The ground-color is blue, exactly like the eggs of *alicia*, with scattered purplish shell-markings and fine specks of reddish-brown, which latter are much more numerous at the larger end. The nest is composed of dried grass-stems with a few fragments of moss, which is scattered through the structure as if by accident. The eggs of this species and of *alicia* are absolutely indistinguishable, both in size and shape, as are also the nests, according to the observations I have been able to make. Both species breed together throughout, perhaps, the entire course of the Yukon; but on the lower portion of the river *alicia* is far more numerous. There is no record of this species from the coast region of Southeastern Alaska, nor from the islands of Bering Sea; nor is it likely to occur in the latter portion of the Territory, owing to its preference for a wooded region.

From the observations and collections made on the Upper Yukon, the Olive-backed Thrush appears to be a common summer resident there, and thus extends its breeding range within the Arctic Circle. It appears to be influenced to a great extent in its range by the presence or absence of woods, and its northern limit may be marked as coinciding with the tree-limit. *Alicia*, on the contrary, extends beyond this, wherever a bunch of dwarf willows will give it shelter, to the very shores of the Arctic and Bering Seas.

TURDUS AONALASCHKE Gmel. Dwarf Hermit Thrush.

Specimens of this bird are in the National Museum collection, from various points along the timbered coast of Southeastern Alaska, including Cook's Inlet, Sitka, Kadiak, and Chugatchik Bay. It breeds in this part of the Territory, but appears to be limited to the mild climate and wooded shores of this region, as there are no records of its occurrence beyond to the north and west.

Mr. Ridgway has referred the *Turdus aonalaschensis* of Gmelin to this bird, the type of which came from Unalaska Island, according to the author of the name.

Since the Unalaska Thrush was described not a single specimen of any species of *Hyllocichla* has been found on this island by the various naturalists who have visited its shores—a fact of itself calculated to raise suspicion as to the correctness of the identification of Gmelin's name.

Altogether the reference of Gmelin's name of *T. aoonalascensis* to the above species appears to me of doubtful propriety. Latham's original description, upon which Gmelin's name was based, is as follows :

"*Aoonalashka Thrush*.—Size of the lark; crown and back brown, marked with obscure dusky spots; breast yellow, spotted with black; wing-coverts, prime quills, and tail dusky, edged with testaceous. Inhabits Aoonalashka."

The description is evidently of a bird in its first plumage, and while perhaps more applicable to the young of the Dwarf Thrush than to that of the Gray-cheeked form, these being the only two thrushes inhabiting this part of Alaska, it is too vague and unsatisfactory to be received as properly diagnostic of a species. Only by the process of exclusion can it be made to apply to the present species, and even then its pertinency is by no means assured. The *guttata* of Pallas was clearly based upon the present bird and the exchange of Gmelin's name, the pertinence of which must ever remain doubtful, for the *guttata* of Pallas, accompanied, as the latter is, by a carefully drawn description, appears to me extremely desirable.

MERULA MIGRATORIA (Linn.). American Robin.

Throughout the entire wooded portion of the Territory this bird is found more or less numerous during summer, and along the treeless coast of Bering Sea and Kotzebue Sound it appears merely as a straggler in the migrations. Along the Yukon and other rivers of the Territory it is numerous as low down their course as the spruce forests extend, and thence, toward the mouths, becomes more and more uncommon. A single specimen was found, storm-bound, on the Seal Islands by Elliott, and the natives informed him that it usually occurred annually in this manner. It reaches the Yukon, in the vicinity of the Arctic Circle, about May 15, and nests as far north as the tree-limit extends, in about 69° north. It arrives at Fort Reliance, on the Upper Yukon, May 5, and my earliest record at Saint Michaels is the 18th of the same month. Hartlaub records it at Portage Bay April 30, and again in large flocks the end of August. During the first half of September it commences its southern migration, but is found close under the Arctic Circle as late as the 1st of November. No appropriate localities for nesting-sites are afforded on the Bering Sea coast north of Bristol Bay, hence the robins are limited to the interior at this season. There is one exception, however, on the north coast of Norton Sound, where the spruce forest approaches the sea, and here they are found in summer. Such stragglers as are found in the vicinity of Saint Michaels, numbering several every summer, usually approach the houses for food in early spring and remain but a few hours. They are rather suspicious and easily alarmed, and all I saw were invariably silent, apparently depressed by the forbidding surroundings, and inclined to hasten back to the more hospitable region in the interior. Their nests and nesting habits are precisely the same in the north as they are in its southern locations, except that in the north they are limited more strictly to the wild woods. All of the considerable series brought home by me are typical of the eastern form, and not one is referable to the western *propinquus*. They are unknown on the Aleutian and other islands in Bering Sea, except occasionally on the Seal Islands, as mentioned.

HESPEROCICHLA NÆVIA (Gmel.). Varied Thrush.

Until within a comparatively recent time this bird was supposed to be confined to the milder region on the northwest coast. That this idea was erroneous was shown when Dall reported the bird as found on the Yukon, in the vicinity of Nulato, and Richardson noted its arrival on the Mackenzie in spring, soon after the robin and summer yellow-bird. According to my own observations this is a regular and not rare summer resident in all congenial portions of Northern Alaska, even within the Arctic Circle, and undoubtedly it extends its range as far to the north as the common robin. I have received specimens from the interior north of Kotzebue Sound, as also from the coast-line of that sound, and of Bering Sea about the shore of Norton Sound. It arrives from the middle to the 25th of May, passing, like the robin, directly to its breeding ground, and returns to the south the last of August and during September.

Dall secured a nest and two eggs of this bird near Nulato, May 22, 1867, and states that the birds arrive there about May 15, and frequent the vicinity of the smaller streams. He found its nests along the Yukon to Fort Yukon and near Nulato.

According to this observer, the Varied Thrush was not very common at Nulato, nor, according to the information I have been able to secure, is it numerous anywhere in the northern portion of the Territory, though generally distributed and of regular occurrence. A few pairs breed every summer in the alder and willow thickets about the shores of Norton Sound, and a single specimen was brought me from latitude 68°, north of Kotzebue Sound. I had no opportunity of observing the little known habits of this interesting species, but learned that it generally arrives before the ground is free from snow, during the middle and last of May, and leaves before the cold storms of autumn commence. The nest found by Dall was built in the midst of a large heap of rubbish in a group of willows, about 2 feet above the ground, and close to the river bank. The eggs were bluish, speckled with brown.

As noted above, this handsome Thrush ranges north to the Lower Mackenzie River, where it nests. All the wooded country to the west and south of this to the shores of Bering Sea, and along the coast of the North Pacific south to Washington and Oregon, may be included in its breeding range, thus including within its summer habitat both Arctic and temperate climates, as well as the very dissimilar Canadian and northwest coast faunal provinces.

CYANECULA SUECICA (Linn.) Red-spotted Blue-throat.

On the 5th of June, 1851, Dr. Adams found a flock of seven of these handsome birds feeding about some willows in the vicinity of Saint Michaels. They were very shy, and he succeeded in obtaining but a single specimen. They were not seen afterwards, and the natives were said not to be familiar with them. This is the solitary record by which this interesting species claims place as an American bird. In Northern Siberia, Seeborn found it extending its range to latitude 71° north, and in this List of the Birds of the Lower Petchora, *Ibis* VI, 125, 1876, Seeborn and Harvie Brown write as follows of this species:

The Swedish Nightingale is an exceedingly abundant species in Northern Russia; and in early summer it entivens by its admirable mimicry every patch of under-wood in the forests of pine and juniper on the sides of the valleys near Ust Zylna. It is abundant also in the birch- and-willow thickets and swamps along the river banks, and on the islands all the way north to Stanavoialachta. Even such dips and hollows of the tundra as can boast of a patch of willow-scrub holds a few pairs.

Often we were puzzled by the mimicry of this fine songster. On one occasion, after listening for some time to the well-known musical cry of the Terek Sandpiper, *irr-rr-ehui*, blended with the songs of scores of other birds on approaching we saw our little friend perched high in a willow bush, with throat distended, bill rapidly vibrating, and uttering the *irr-rr-ehui* with perfect distinctness. We have heard the Blue-throated Warbler also imitate, among other bird voices, the trilling first notes of the wood-Sandpiper, or the full rich song of the Redwing. Sometimes he runs these together in such a way as to form a perfect medley of bird music, defying one who is not watching to say whether or not the whole bird population of that part of the forest are equally engaged in the concert at the same time.

Throughout the north of Europe and Siberia this bird breeds. Seeborn gives it as one of the earliest insect-eating species to arrive on the Lower Yenesei. He states also that for a week or two they were very common, but as the snow disappeared they gradually left, only a few remaining to breed. As before stated, he found that they extend their range to latitude 71° north, where they disappeared. It makes its nest in bushes and weeds, generally close to the ground. The structure is a simple one, and contains five or six eggs of a greenish-olive or greenish-blue spotted with a deeper shade of the same color, the spots sometimes being scarcely visible. The eggs measure 0^m, 02 to 0^m, 014 or 0^m, 015. In Northern Europe, the Swedish Nightingale, as this bird is termed, frequents, by preference, the rocky or bush-grown banks of small streams. The following description is taken from specimens in the collection of the National Museum. As the bird represents a genus as well as a species which has never been described in any American work on ornithology, I give the generic characters as well as the specific. It may be prefaced that this genus is closely related to *Saxicola*:

Generic characters.—Bill slenderer than in *Saxicola*; gape bristled; nostrils bare and ovoid; tail about three-fourths of wing; feet, claws, and tarsus long and slender in comparison with



FIG. 1. RED-SPOTTED BLUE-THROAT.

Cyanocitta stelleri
(ADULT MALE)

FIG. 2. KENNICOTT'S WILLOW WARBLER.

Phylloscopus borealis
(ADULT)

Saxicola. The middle toe and claw are contained one and one-third times in tarsus; spurious primary two-fifths of first primary; second primary longest; third and fourth quills are a trifle shorter; tail slightly rounded.

Specific characters.—Adult male. Heligoland, May, 1878. Back brown; feathers grayish at edges and darker anteriorly, especially on the crown, where the dark centers become nearly black; wings of a darker shade of brown than the back; two middle tail-feathers dark brown, the basal half of the remaining tail feathers rusty-red, with their distal portion blackish-brown; the distribution of color on the tail is very similar to the pattern on the tail of the common Redstart or in *Saxicola*. The chin, throat, and the upper breast are bright blue, inclosing a large rusty-red patch on the lower part of the throat; bordering the blue below is a crescentic band of black, succeeded by a band of rusty-red paler than the throat-patch; each of the feathers on the breast is edged with white; the remainder of the under surface is a dingy white; the under wing-coverts are a pale buff; the lores are black, and there is a faint supraloral and ocular line of white. Bill, feet, and legs dark horn-color.

Adult female (Heligoland, May, 1878).—Upper surface almost precisely like that of the male, including the tail and wings; chin and throat white, tinged with pale buff, and this area is bordered by a narrow band of black tipped feathers; this band is followed by a broader one of dark brown, each feather narrowly white-edged. Below this the feathers are faintly dark-tipped, succeeded by dingy-white on the remainder of the lower surface, except on the flanks, where a brown or brownish yellow shade is present. The supraorbital stripe is much more marked than in the male. The lores and ear-coverts are dark with a shade of brownish-yellow on the latter. Specimens in fall plumage exhibit the same pattern of coloration, but the colors are very much paler, especially on the throat of the male. There is a strong wash of buff on the sides of the head, including the cheeks, loreal and supraocular stripe. The flanks and lower tail-coverts are heavily washed with the same.

The dimensions of the two birds just described are as follows:

Sex.	Length of wing.	Length of tail.	Culmen.	Tarsus.
♂	3.10	2.30	.44	1.05
♀	2.75	2.20	.41	.98

SAXICOLA GENANTIE (Linn.). Wheatear.

During the Western Union Telegraph Expedition Mr. Dall saw several large flocks of these birds near Nulato, on May 23 and 24, 1868, and learned from the natives of their abundance upon the stony hill-tops back from the river. This was the first record of the Wheatear from Northwest America, but since this time it has been obtained by several collectors. At Saint Michaels, Norton Sound, I found them to occur in spring and fall rather irregularly. They were not very rare, and the natives informed me that they were common upon the bare mountain tops in the interior, frequenting the summer range of the reindeer. Several specimens secured by me were found about the houses, where they were searching for food. They were never shy, but when pursued skulked among the stones and pieces of drift-wood for protection, and crept in and out among the crevices so quickly that it was with considerable difficulty they could be dislodged and killed. My spring specimens were obtained on the 26th and 28th of May, and in autumn from the 20th to the 25th of August. The Wheatear was also found at Port Clarence, in Bering Straits, at the head of Kotzebue Sound, at Cape Lisburne by Dr. Bean, and at Point Barrow by Mr. Murdoch. In the spring of 1882 they were rather common at the latter place, the first one arriving on May 19, when the ground was still covered with snow, except in a few places. They remained only a few days and passed on to the northeast, and were not seen again by Mr. Murdoch, whose observations confirm the curiously irregular distribution of this bird in Alaska on different seasons. Thus, in 1880, they were not uncommon on the coast from Kotzebue Sound to Cape Lisburne. In 1881 I visited the same district without finding a single individual. In the spring of 1882 they were noted at Point Barrow, and again failed to appear the season of 1883. The specimens secured by Mr. Dall were transmitted

to Mr. Tristram to be compared with European specimens, with the result of determining that birds secured in Lapland, at the same season, were identical with the Alaskan examples. I have made a hasty comparison of my skins with those in the National Museum from Greenland and several Old World localities, and find no differences other than individual.

This species is one of the few which extends its breeding range around the entire northern Polar regions, with the apparent strange exception, however, of the extreme northeastern portion of Siberia. Another remarkable circumstance in the history of this wanderer is the great rarity of its occurrence in the United States during winter, notwithstanding its comparative abundance in the northern portions of the continent during the breeding season. Where these birds pass the winter is one of the numerous ornithological puzzles which still remain to be solved. Single specimens have been taken in Eastern Maine, New York State, and south to the Bermudas, besides several other United States and Canadian localities in autumn; but these rare instances do not account for the considerable number of Stone Chats which are found in the north. A possible, but apparently improbable, supposition is that they pass to Europe by the way of Greenland, in autumn, and thence back again during their spring migration. To do this, however, the bird must leave Northern Europe, cross the Atlantic to Greenland, thence to Arctic America, and traverse the entire northern portion of our continent to become a common summer resident in Northern Alaska. However, the bird is unknown from the Chukchi Peninsula, though I saw a single skin brought off to the Corwin from King Island, in Bering Straits, by a native, in July, 1881, and the next record is from China, northwest of Peking, and again on the Lower Lena. Ust Zylma and Krasnoyarsk are the easternmost records of its presence in Eastern Asia. The bird is unknown on the Aleutian and other islands in Bering Sea, nor has it been taken south of the Yukon any where in Alaska.

In some remarks made by Professor Newton upon various Alaskan birds, and this species in particular, he assumes that the bird reaches Northwest America by the way of Greenland, and considers that this supposition may, in a measure, indorse Petermann's suggestion that Greenland extends across the pole north to the coast of Asia and Alaska. The investigations of the several exploring vessels during the last few seasons in the Arctic have, to a certain extent, disproved this theory, for the Chat arrives at Saint Michaels the last of May, while the lands about the pole are still held by the rigid hand of winter, and are totally unfitted for a bird of this character.

SIALIA ARCTICA (Swains.). Mountain Bluebird.

This species is recorded by Hartlaub from Dejáh, Southeastern Alaska, April 20, 21. As this author states that it was seen only at this point, and on these two days, it would seem to be not at all common even in this portion of the Territory; further north than this it appears to be unknown.

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1839. VIGORS (NICHOLAS AYLWARD). *Ornithology*; by N. A. Vigers, Esq., A. M., F. R. S., &c. In Richardson (John) and others, *The zoology of Captain Beechey's voyage* * * * * * performed in his majesty's ship Blossom * * * * * pp. 13-42, London, mdcccxxxix [1839], 4^o, 12 colored plates of birds.
1842. BLASCHKE (EDUARD). *Topographia medica portus Novi-Archangelensis, sedis principalis coloniarum Rossicarum in Septentrionali America, edita ab Eduardo Blaschke, medicinae doctore* [etc., two lines, followed by quotation two lines]. Accedunt tabulae tres geographicæ in lap. delineatæ. Petropoli. Typis K. Wienhöbneri et Filii. 1842. Printed cover, 2 prel. ll., pp. 1-82, 2 ll., tables and maps. Pp. 22-24 treat of birds, 51 species being enumerated. In the preface the author acknowledges his indebtedness to Dr. Brandt for annotations on birds, and in the text he says again: "The number of wild birds, especially marine birds, is very great, and I will enumerate them according to the classification of the distinguished Academician Brandt."
1847. BRANDT (JOHANN FRIEDRICH). *Fuligulam (Lampronetta) Fischeri, novam avium Rossicarum speciem præmissis observationibus ad fuligularum generis sectionum et subgenerum quorundam characteres et affinitates spectantibus descripsit.* In Imperial Academy of Sciences of St. Petersburg, *Memoirs*, 6th series, vol. viii (nat. sc. vol. vi), pp. 1-19, St. Petersburg, 1849, 4^o, 1 plate. First appeared, in separate form, in 1847. Title from *Catalogue des livres publiés par l'Académie impériale des sciences*, ii, *Publications en langues étrangères*, p. 41, St. Pétersbourg, 1877, 8^o.
- [?] BRANDT (JOHANN FRIEDRICH). *Icones avium Rossicarum, tabula vii, inedita.* The text to these plates was never published, but some impressions were distributed to ornithologists. Plates i-vii represented forty-eight species of birds from Alaska, to which Dr. Otto Finsch has furnished a systematic index in the *Abhandlungen der Wissenschaft-Verein zu Bremen*, 1873, p. 19.
1856. CASSIN (JOHN). *Illustrations of the birds of California, Texas, Oregon, British and Russian America.* Intended to contain descriptions and figures of all North American Birds not given by former American authors, and a general synopsis of North American ornithology. By John Cassin, member [etc., five lines]. 1853 to 1856. Philadelphia: J. B. Lippincott & Co. 1856. Pp. i-viii, 1-298, 4^o, 50 plates of birds.
1858. KITTLITZ (F. H. von). *Denkwürdigkeiten einer Reise nach dem russischen Amerika, nach Mikronesien und durch Kamtschatka von F. H. v. Kittlitz.* Erster [-Zweiter] Band. Gotha. Verlag von Justus Perthes. 1858. 2 vols., 8^o. Some additional observations appear in the *Journal für Ornithologie*, vol. vi, pp. 387-390, Cassel, 1858, 8^o; and a notice or review of the work in vol. vii of the same journal, pp. 45-49, Cassel, 1859, 8^o.

1560. COINDE (JEAN PAUL). Notice sur la faune ornithologique de l'île de Saint-Paul suivie de l'énumération de quelques espèces d'insectes (Coléoptères) des Alcôntiennes et du Kamtschatka; par J. P. Coinde, zoologiste. In *Revue et Magasin de Zoologie pure et appliquée*, 3d series, vol. xii, pp. 396-405, Paris [1890], 8°.
1569. BAIRD (SPENCER FULLERTON). On Additions to the Bird-Fauna of North America, made by the Scientific Corps of the Russo-American Telegraph Expedition. By S. F. Baird.
In *Chicago Academy of Sciences, Trans.*, vol. i, part ii, pp. 311-325, plates xxvii-xxxix, Chicago, 1869, 8°.
In this paper *Phyllopneste lennicotti*, *Troglodytes alasensis*, *Pyrrhula coccyus* var. *cassini*, *Leucosticte littoralis*, and *Sterna aleutica* are described as new to science.
1569. DALL (WILLIAM HEALEY) and BANNISTER (HENRY MARTYN). List of the Birds of Alaska, with Biographical Notes, by Wm. H. Dall and H. M. Bannister.
In *Chicago Academy of Sciences, Trans.*, vol. i, part ii, pp. 267-310, Chicago, 1869, 8°.
This important paper was the first list of the birds of Alaska published in English, and in addition to naming several species new to the North American fauna it gives biographical notes concerning many species but little known at the time.
1570. DALL (WILLIAM HEALEY). Alaska and its Resources. By William H. Dall, Director [etc., two lines]. Boston: Lee and Shepard, 1870.
Pp. i-xii, 1-628, 8°, map and 15 plates.
A nominal list of 212 species, in the appendix.
1571. HARTING (JAMES EDMUND). Catalogue of an Arctic Collection of Birds presented by Mr. John Barrow, F. R. S., to the University Museum at Oxford; with Notes on the Species.
In *Philosophical Magazine and Annals of Natural History*, vol. xxxix, pp. 110-123, London [1871], 8°.
Erythropychus pygmaeus and *Egialitis mongolicus* were noted from the head of Kotzebue Sound, where the Franklin search party, that secured the specimens, wintered.
1571. TRISTRAM (HENRY BAKER). Notes on some Passerine Birds, chiefly Palearctic. By H. B. Tristram, L. L. D., F. R. S.
In *The Ibis*, a Quarterly Journal of Ornithology, 3d series, vol. i, pp. 231-234, London, 1871, 8°.
The palearctic forms obtained by Dall and Bannister in Alaska furnish the subject of some of Mr. Tristram's notes, the specimens having been sent to him for comparison. Mr. Tristram accompanies his remarks with a brief synopsis of the nine species of *Pyrrhula*.
1572. FINSCH (OTTO). Zur Ornithologie Nordwest-Amerikas
In *Naturwissenschaftlicher Verein zu Bremen, Abhandlungen*, vol. iii, pp. 17-86, Bremen, 1873, 8°.
A review of previous literature, with summary.
1873. DALL (WILLIAM HEALEY). Notes on the Avi-fauna of the Aleutian Islands, from Unalaska eastward.
In *California Academy of Sciences, Proc.*, vol. v, pp. 25-35, San Francisco, June, 1875, 8°. Also printed in advance, February 8, 1873.
This paper is an annotated list of 53 species observed by the author during a winter passed in the eastern part of the Aleutian chain. Reissued by the Naturalists' Agency, Salem, Mass.
1874. DALL (WILLIAM HEALEY). Notes on the Avifauna of the Aleutian Islands, especially those West of Unalaska.
In *California Academy of Sciences, Proc.*, vol. v, pp. 270-281, San Francisco, June, 1875, 8°. Also printed in advance, March 14, 1874.
Valuable notes on 45 species observed during the season of 1873. Reissued by Naturalists' Agency, Salem, Mass., 1874, pp. 1-12.
1874. RIDGWAY (ROBERT). Birds new to the fauna of North America.
In *American Naturalist*, vol. viii, pp. 434-435, Salem, Mass., 1874, 8°.
Records "*Falco gyrfalco* Linn.," "*Numenius femoralis* Peale.
1875. CONES (ELLIOTT). Ornithology of the Pribilof Islands. (Based on Mr. H. W. Elliott's manuscripts and collections.)
In Elliott (Henry W.), A report upon the condition of affairs in the Territory of Alaska, by Henry W. Elliott, special agent, Treasury Department, pp. 168-212, Washington, Government Printing Office, 1875, 8°.
This important paper forms chapter ix of the report, and the birds of the Fur Seal Islands are treated in a very thorough manner. *Charadrius fulvus* is first announced here as occurring in America, and *Tringa pitlocnemis* is described.
1875. HARTING (JAMES EDMUND). The fauna of the Pribilof Islands, abridged from the "Report on the Pribilof Group or Seal Islands of Alaska," by Henry W. Elliott; with an Appendix on the Ornithology by Dr. Elliott Cones. London: Reprinted from the natural history columns of "The Field" for private circulation. 1875.
Pp. 1-35, 12°, 1 plate.
1878. ADAMS (Surgeon E.). Notes on the birds of Michaelaski (Saint Michaels), Norton Sound.
In *The Ibis*, a Quarterly Journal of Ornithology, 4th series, vol. ii, pp. 420-442, London, 1878, 8°.
An annotated list of 49 species, in which is announced the first capture of *Cyanocula succia* on this continent. These notes were made in 1850, while Dr. Adams was on one of the Franklin Search Expeditions.
1878. NELSON (EDWARD WILLIAM). The Rock Ptarmigan (*Lagopus rupestris*) in the Aleutian Islands.
In *Nuttall Ornithological Club, Bull.*, vol. iii, p. 38, Cambridge, Mass., 1878, 8°.
This bird has been described since as *Lagopus rupestris nelsoni* Stejneger.

1878. RIDGWAY (ROBERT). Three Additions to the Avifauna of North America.
In *Nuttall Ornithological Club, Bull.*, vol. iii, pp. 37-38, Cambridge, Mass., 1878, 8°.
The three species are *Parus cinctus*, Bodd., *Syrnium lapponicum*, Retz., and *Surnia ulula*, Linn.
1879. B[REWER] (THOMAS) M. [Review of Mr. Edward] Alaus's Notes on the Birds of Alaska.
In *Nuttall Ornithological Club, Bull.*, vol. iv, pp. 52-53, Cambridge, Mass., 1879, 8°.
1879. ELLIOTT (HENRY WOOD). A few sea-birds.
In *Harper's New Monthly Magazine*, vol. lviii, pp. 497-505, New York, 1879, 8°.
A popular account of the most abundant sea-fowl about the Far Seal Islands.
1880. NELSON (EDWARD WILLIAM). An afternoon in the vicinity of Saint Michaels, Alaska. By E. W. Nelson.
In *Nuttall Ornithological Club, Bull.*, vol. v, pp. 33-36, Cambridge, Mass., 1880, 8°.
1881. NELSON (EDWARD WILLIAM). Door-yard birds of the Far North. By E. W. Nelson.
In *Nuttall Ornithological Club, Bull.*, vol. vi, pp. 1-6, Cambridge, Mass., 1881, 8°.
Popular account of a number of species noted about Saint Michaels.
1881. NELSON (EDWARD WILLIAM). Habits of the Black Brant [*B. nigricans*] in the vicinity of Saint Michaels, Alaska.
By E. W. Nelson.
In *Nuttall Ornithological Club, Bull.*, vol. vi, pp. 131-138, Cambridge, Mass., 1881, 8°.
Popular account of the bird's habits in Alaska.
1882. BEAN (TABLETON HOFFMAN). Notes on birds collected during the summer of 1880 in Alaska and Siberia.
In *United States National Museum, Proc.*, vol. v, pp. 144-173, Washington, 1883, 8°.
An annotated list of 77 species. *Empidonax difficilis*, *Buteo borealis calurus*, and *Larus marinus* are added to the Alaskan fauna, but the latter species was introduced through an erroneous identification, as the specimens upon which it was based have been identified since as *Larus schistogus* Stejneger.
1882. ELLIOTT (HENRY WOOD). A Monograph of the Seal-Islands of Alaska. By Henry W. Elliott. Reprinted, with additions, from the report on the fishery industries of the Tenth Census. Washington: Government Printing Office. 1889.
Pp. 1-176, 4°.
(*Cf.* *The Ibis*, October, 1882, p. 600.)
1882. TURNER (LUCIEN MCHAN). On *Lagopus mutus* Leach, and its allies. By Lucien M. Turner.
In *United States National Museum, Proc.*, vol. v, pp. 225-233, Washington, 1883, 8°.
Lagopus mutus althensis is described from the extreme western end of the Aleutian Islands.
1883. HARTLAUB (GUSTAV). Beitrag zur Ornithologie von Alaska. Nach den Sammlungen und Noten von Dr. Arthur Krause und Dr. Aurel Krause. Von Dr. G. Hartlaub.
In *Journal für Ornithologie*, vol. xxxi, pp. 257-286, Leipzig, 1883, 8°.
This is a list of eighty species of birds collected in Alaska by Dr. Arthur Krause, with field-notes.
1883. NELSON (EDWARD WILLIAM). Birds of Bering Sea and the Arctic Ocean. By E. W. Nelson.
In *Cruise of the revenue-steamer Corwin in Alaska and the N. W. Arctic Ocean in 1881*; Notes and memoranda: medical and anthropological, botanical, ornithological, pp. 55-118; Washington, Government Printing Office, 1883, 4°, 4 colored plates.
The American and Siberian shores of Bering Sea and the adjacent Arctic basin, with all the included islands, comprise the field covered by this paper; 192 species are enumerated, with more or less extensive notes upon each.
1883. RIDGWAY (ROBERT). Description of a new Petrel from Alaska. By Robert Ridgway, curator, Department of Birds, United States National Museum.
In *United States National Museum, Proc.*, vol. v, pp. 656-658, Washington, 1883, 8°.
Estrelata fisheri is described from a specimen taken at Kadiak Island.
1884. HENSHAW (HENRY WETTERBEE). On a new gull from Alaska. By H. W. Henshaw.
In *The Auk*, a Quarterly Journal of Ornithology, vol. i, pp. 250-252, Boston, Mass., 1884, 8°.
Describes *Larus nelsoni*.
1884. NELSON (EDWARD WILLIAM). Brief diagnoses of two new races of North American birds. By E. W. Nelson.
In *The Auk*, a Quarterly Journal of Ornithology, vol. i, pp. 165-166, Boston, Mass., 1884, 8°.
Picoides tridactylus alascensis and *Astur atricapillus henahawi*.
1884. NELSON (EDWARD WILLIAM). The breeding habits of the Pectoral Sandpiper (*Actodromas maculata*). By E. W. Nelson.
In *The Auk*, a Quarterly Journal of Ornithology, vol. i, pp. 212-221, Boston, Mass., 1884, 8°.
The first account of the peculiar breeding habits of this species.
1884. RIDGWAY (ROBERT). *Melanetta fusca* (Linn.) in Alaska. By Robert Ridgway.
In *United States National Museum, Proc.*, vol. vii, p. 68, Washington, 1885, 8°.
This records the typical European bird and not the *fusca* previously named as a bird of Alaska, but which is another species.
1884. RIDGWAY (ROBERT). Description of a new Snow Bunting from Alaska. By Robert Ridgway.
In *United States National Museum, Proc.*, vol. vii, pp. 68-70, Washington, 1885, 8°.
Plectrophenax hyperboreus.
1884. RIDGWAY (ROBERT). Descriptions of some new North American birds. By Robert Ridgway.
In *Biological Society of Washington, Proc.*, vol. ii, pp. 89-95, Washington, 1885, 8°.
Parus atricapillus turneri, var. nov., from Saint Michaels.

1884. STEJNEGER (LEONHARD). Remarks on the species of the genus *Cephus*. By Leonhard Stejneger. In United States National Museum, Proc., vol. v ii, pp. 210-229, Washington, 1885, 8°.
Contains remarks on the range in Alaska of *Cephus grylle* and *Cephus carbo*.
1885. MURDOCH (JOHN). [Report on the birds observed at Point Barrow during the stay of the Polar Expedition in 1881-'82-'83.] In Report of the International Polar Expedition to Point Barrow, Alaska, pp. 104-128, Washington, Government Printing Office, 1885, 4°.
This is a valuable addition to our knowledge of the birds of that region. *Rhodostethia rosea* was found common in fall, and *Pelidna subarquata* was taken for the first time in Western America. The range of various other species is considerably extended.
1885. MURDOCH (JOHN). Notes on some species of birds attributed to Point Barrow, Alaska. By John Murdoch. In The Auk, a Quarterly Journal of Ornithology, vol. ii, pp. 200-201, Boston, Mass., 1885, 8°.
An unjustifiable rejection of certain species of birds attributed to Point Barrow by the writer in the Cruise of the Corwin.
1885. NELSON (EDWARD WILLIAM). Counter- "Notes on some species of birds attributed to Point Barrow, Alaska." By E. W. Nelson. In The Auk, a Quarterly Journal of Ornithology, vol. ii, pp. 239-241, Boston, Mass., 1885, 8°.
Reply to Mr. Murdoch's criticism.
1885. STEJNEGER (LEONHARD). Results of ornithological explorations in the Commander Islands and in Kamtschatka. Forms Bull. No. 29 of United States National Museum, pp. 1-382, Washington, Government Printing Office, 1885, 8°, 9 plates.
This excellent report contains numerous references to Alaskan birds.
1885. TURNER (LUCIEN MCSHAN). Notes on the birds of the Nearer Islands, Alaska. By Lucien M. Turner. In The Auk, a Quarterly Journal of Ornithology, vol. ii, pp. 154-159, Boston, Mass., 1885, 8°.
A list of 69 species, with very brief notes.
1886. TURNER (LUCIEN MCSHAN). Contributions to the Natural History of Alaska. Results of investigations made chiefly in the Yukon District and the Aleutian Islands; conducted under the auspices of the Signal Service, United States Army, extending from May, 1874, to August, 1881. Washington: Government Printing Office, 1886.
Pp. 1-216, 4°, plates.

PART II.

MAMMALS OF NORTHERN ALASKA.

BY

E. W. NELSON AND F. W. TRUE.

INTRODUCTION.

The material upon which the following notes are based consists of specimens and field-notes obtained by me during my explorations in Alaska, between the 1st of May, 1877, and the autumn of 1881. During this time my personal observations extended over most of the Bering Sea and Arctic coasts of the Territory, and much of the interior. In addition, many specimens and facts were secured through the cordial co-operation of the fur traders.

This contribution to the history of Alaskan mammals is not intended to do more than convey the information obtained by me while in the Territory, and, in consequence, does not contain any account of a number of species found either on the land or sea within the region covered by my work. As stated in the general introductory remarks, a large portion of the Territory is Arctic or sub-Arctic in climate and in its animal and vegetable life. The southern portion of the mainland offers an exception to this general rule, and, as a consequence, we find a number of species of mammals that reach their northern limit in that portion of the country. Other species, particularly the Sea Otter and some of the seals, have a restricted distribution; but by far the greater number of the mammals are widely distributed. No species of mammal is peculiar to the Territory, although several have their center of abundance located within its limits. Among these may be mentioned the Sea Otter, Fur Seal, Ribbon Seal, Pacific Walrus, and Dall's Sheep. The discovery of this latter form was one of the most important results of my work among the mammals of the Territory.

For remarks upon the distribution of species in connection with certain faunal divisions of the Territory, the reader is referred to the introductory notes to the ornithological portion of this report. Since preparing the manuscript of this report, and too late to be incorporated therein, I have received a letter from my friend, Mr. Rudolph Neumann, the Alaska Commercial Company's agent in the Aleutian Islands, which contains some interesting information concerning some of the mammals of those islands. These remarks I quote entire, as they are an interesting addition to our knowledge of the mammals of that region:

- BLISHNI (NEARER) ISLANDS.—*Attu*: Blue foxes only, very rarely a white one. *Rat Islands*: No foxes.
ANDRAENOFSKI ISLANDS.—*Atka*: Silver, cross, red, and blue foxes; white foxes rare. *Amliia*: *Amliia* foxes are, I suppose, a cross between the silver and the blue foxes; white foxes rare.
FOX ISLANDS.—*Oumnak*: Silver, cross, and red foxes; no white ones. *Unalaska*: Silver, cross, and red foxes; no white ones. *Akoutan*: Silver, cross, and red foxes; no white ones. *Akoun*: Silver, cross, and red foxes; no white ones. *Oumnak*: Silver, cross, and red foxes; no white ones.
SHUMAGIN ISLANDS.—Silver, cross, and red foxes; no white ones.
PRIDYLOV ISLANDS.—Blue foxes; white ones rare.

The Russians brought the blue foxes from Copper and Bering Islands and placed them on *Attu*, *Atka*, *Saint Paul*, and *Saint George* Islands. *Amliia* was stocked with Alaskan silver foxes, but being close to *Atka* I think they must have crossed (interbred) with the blue foxes of that island.

Unalga Island was also stocked with silver foxes, but they have been long since exterminated. One difference between the silver and blue foxes of the mainland and the islands is that the under fur of the island foxes is not so thickly covered with the longer hairs as in individuals inhabiting the mainland. This is also true of the other foxes, but is not so noticeable. Again, the pelts of all foxes, except the blue ones, are generally paler on the islands than on the mainland. The blue foxes are generally better (*i. e.*, darker) here than on the mainland. The best blue foxes come from Saint Paul and Saint George.

The foxes of Unmak, Unalaska, Akutan, Akua, Unimak, and the Shumagin Islands are indigenous. The Kadiak furs are about the same as those obtained from the timbered districts of the Yukon. Sea otters have decreased all along the coast from Japan to Sitka. The western part of the Alaskan Islands is nearly deserted by them, their movement having been to the eastward.

For repeated kindly aid during my residence in the north, I am under obligations to every one of the fur traders and agents of the Alaska Commercial Company with whom I came in contact, and to my associates at Saint Michaels, Messrs. Rudolph and Henry Nemmann and M. Lorenz, is due much of the success which attended my work.

I can never forget the cordial interest with which these gentlemen were ever ready to forward my plans, even at considerable personal inconvenience to themselves.

To Mr. L. N. McQuesten I am under obligations for many specimens from the Upper Yukon, including the types of *Ovis Dalli*.

To General W. B. Hazen and Prof. S. F. Baird I owe the encouragement and support which enabled me to conduct the work in the field and prepare the results for the press.

Owing to my unavoidable absence from Washington, I have been obliged to secure the cooperation of Mr. F. W. True in the preparation of this report.

Mr. True has kindly made a tabular arrangement of most of the specimens secured by me, and in many instances has given measurements and comments upon the species of particular interest. The subjoined introductory remarks and lists of species are also his. The biographical notes are entirely my own.

E. W. NELSON.

SPRINGVILLE, ARIZ., November 25, 1886.

GENERAL CONSIDERATIONS.

The Territory of Alaska being separated from the rest of the continent of America by no barriers which are impassible to mammals, we shall not expect to discover a distinct mammalian fauna within its borders. Lying partly within and partly without the Arctic Circle, and being bisected by the isothermal of 32° F., we shall look in its southern portions for representatives of the north-temperate fauna, and in its northern portions for representatives of the Arctic or circumpolar fauna. The facts bear out these *a priori* conclusions. We find no single species of mammal within the boundaries of Alaska which is not to be found also without those boundaries. Some enter the Territory from the east, or perhaps from across Bering Straits; others from the south. They are the familiar species of the United States, British America, or Siberia and the circumpolar zone generally.

The interest attaching to the mammals of Alaska arises, therefore, not from their novelty, but rather from the fact that they are the northernmost representatives of their species. It is in Alaska, as in Arctic British America, that we find the northern boundaries of the range of a number of American mammals. We find species characteristic of a temperate region contending with the rigors of an Arctic climate, few in numbers, and, as Mr. Allen has pointed out, small in size. On the other hand, we find species rarely or never met with as far south as the United States, having their center of distribution within the Arctic Circle, abundant and of large size.

In 1870 Mr. Dall published a list of the mammals of Alaska, including the aquatic species. This list comprises 70 species and subspecies of recent mammals, of which 25 belong to the orders Pinnipedia and Cetacea. Six of the species, however, are now generally regarded identical with seven others in the list, and two additional species (*Sorex Rossii* and *S. pachypus*) appear never to have been described. The number of valid species and subspecies is, therefore, reduced to 62. The list is as follows:*

<p><i>Sorex Forsteri.</i> <i>Sorex Cooperi.</i> <i>Sorex pachypus</i> (undescribed). <i>Sorex Rossii</i> (undescribed). <i>Lynx canadensis.</i> <i>Vulpes fulvus.</i> <i>Canis occidentalis</i> [= <i>Canis lupus griseo-</i> <i>albus.</i>] <i>Vulpes fulvus decussatus.</i> <i>Vulpes fulvus argentatus.</i> <i>Vulpes lagopus.</i> <i>Mustela Pennanti.</i> <i>Mustela americana.</i></p>	<p><i>Putorius vison.</i> <i>Putorius pusillus</i> [= <i>P. vulgaris</i>]. <i>Putorius noveboracensis</i> } [= <i>P. erminea</i>]. <i>Putorius Richardsoni</i> } <i>Gulo luscus.</i> <i>Lutra canadensis.</i> <i>Enhydra marina.</i> <i>Procyon lotor.</i> <i>Ursus horribilis.</i> <i>Ursus Richardsoni.</i> <i>Ursus americanus.</i> <i>Ursus maritimus.</i></p>
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*The fossil species given by Mr. Dall are purposely omitted here; also the Eskimo Dog, which may or may not be indigenous.

Phoca richardsi } [= *P. vitulina*].
Phoca Pealii }
Pagomys ? larga [= *P. furtida*].
 " *Phoca ? nauticus* [= *E. barbatus*].
Erignathus barbatus.
Erignathus equestris [= *Phoca fasciata*].
Callorhinus ursinus.
Eumetopias Stelleri.
Rosmarus obesus.
Sciurus hudsonius.
Spermophilus Parryi [= *S. empetra*].
Arctomys pruinosus.
Castor canadensis [= *C. fiber*].
Hesperomys leucopus.
Arvicola xanthognathus.
Arvicola Gapperi }
Arvicola rubricatus } [= *Erotomys rutilus*].
Myodes hudsonius }
Myodes grænlandicus } [= *Cuniculus torquatus*].
Myodes trimucronatus }
Myodes helveticus } [= *Myodes obensis*].
Erithrizon dorsatus [= *E. dorsatus epixanthus*].
Lepus glacialis [= *L. timidus arcticus*].
Lepus campestris [Really *Lepus americanus*].
Alea americanus.

Rangifer grænlandicus [= *R. tarandus grænlandicus*].
Cervus columbianus [= *Cariacus columbianus*].
Aploceros montanus [= *Mazama americana*].
Ovis montanus [= *Ovis canadensis Dalli*].
Oribos moschatus.
Balena mysticetus.
Balena Sieboldii [= *B. japonica*].
Balena cullamach [= ?]
Rhachianectes glaucus.
Megaptera versabilis.
Balenopectera velifera.
Sibbaldius sulphureus.
Physeter macrocephalus.
Globiocephalus Scammoni.
Orea ater.
Orea rectipinna.
Delphinus styx (?)
Delphinus obliquideus [= *Lagenorhynchus obliquideus*].
Delphinapterus borealis [= *Leucorhamphus borealis*].
Phocaena vomerina [= *Phocaena communis*].
Beluga sp. [*Delphinapterus catodon*].

Taking for granted that the species believed to be identical are in reality so, the list includes 62 species and sub-species, divided among the different orders as follows: Carnivora, 19; Pinnipedia, 7; Insectivora, 2; Rodentia, 12; Ungulata, 6; Cetacea, 16—total, 62.

Since the publication of Mr. Dall's list, numerous collections of Alaskan mammals have found their way into the National Museum.

In addition to Mr. Nelson's collection, a greater or less number of specimens have been received from Messrs. Turner, Murdoch, Dall, Bean, Fisher, the late Mr. McKay, and others. Among these specimens are represented 12 species and subspecies not given in Mr. Dall's list. These are as follows:

Sciuropterus colucella hudsonius.
Sciurus hudsonius richardsoni.
Spermophilus empetra kodiakensis.
Arvicola riparius riparius.^{*}
Arvicola riparius borealis.
Fiber zibethicus.
Zapus hudsonius.

Lagomys princeps.
Vespertilio lucifugus.
Rangifer tarandus caribou.
Balenopectera Davidsoni.
Phocaena Dalli.
Monodon monoceros.

The total number of species and subspecies hitherto found in Alaska is hereby raised to 74, including the additional families *Zapodidae* and *Lagomyidae*, and the order *Chiroptera*.

Since Alaska reaches further to the north than other portions of the American mainland, except the peninsula of Boothia, it is of interest to know what species are found at its northernmost boundary, and what have a less extended range. With the name of each species in the following list is given the name of the most northern locality in which, according to authentic records, individuals have been observed.

^{*} Following the opinion of Dr. Coles we have made the "*Arvicola rubricatus*, Rich." of Mr. Dall's list synonymous with *Erotomys rutilus*, but it seems probable that Mr. Dall had in mind *Arvicola riparius*.

Species.	Northern limit.	Authority.
<i>Lynx canadensis</i>	Head of Nunatog River (lat. 69° N.).	Nelson.
<i>Canis lupus griseo-albus</i>	Meade River	Murdoch.
<i>Vulpes lagopus</i>	Point Barrow	Do.
<i>Vulpes fulvus argenteus</i>	Head of Nunatog River (lat. 69° N.).	Nelson.
<i>Vulpes fulvus argentatus</i>	Upper Meade River	Murdoch (<i>vide abar.</i>)
<i>Vulpes fulvus decussatus</i>	Head of Nunatog River (lat. 68° N.).	Do.
<i>Mustela americana</i>	Point Barrow	Coxes.
<i>Mustela Pennanti</i>	Lat. 63° N.	Do.
<i>Putorius ermineus</i>	Nunatog River	Nelson.
<i>Putorius vulgaris</i>	Upper Nunatog River	Do.
<i>Putorius vison</i>	do	Do.
<i>Gulo luscus</i>	do	Do.
<i>Lutra canadensis</i>	Nunatog River	Do.
<i>Ehydrys lutris</i>	Nucha, Copper River	Dall & Bean (U. S. Nat. Mus.).
<i>Procyon lotor</i>	Cook's Inlet	Dixon.
<i>Thalassarcos maritimus</i>	Point Barrow	Murdoch.
<i>Ursus americanus cinnameus</i> *	Nunatog River	Nelson.
<i>Ursus horribilis</i>	do	Do.
<i>Ursus Richardsoni</i>	Meade River	Murdoch.
<i>Odobon obesus</i> †	Point Barrow	Do.
<i>Erignathus barbatus</i>	Point Barrow	Do.
<i>Ploca fasciata</i>	Cape Smyth	Do.
<i>Ploca foetida</i>	Point Barrow	Do.
<i>Ploca vitulina</i>	do	Murdoch (<i>vide abar.</i>)
<i>Callorhinus ursinus</i>	Saint Michaels	Nelson.
<i>Eumetopias Stelleri</i>	Saint Matthew's Island	Dall.
<i>Sorex Cooperi</i>	Saint Michaels	Nelson.
<i>Sorex Forsteri</i>	Meade River	Murdoch.
<i>Vespertilio lucifugus</i>	Lake Ilanum	McKay.
<i>Lepus americanus</i>	About lat. 69° N.	Nelson.
<i>Lepus timidus arcticus</i>	Point Barrow	Murdoch.
<i>Lagomys princeps</i>	South of Fort Yukon, 160 to 200 miles.	Nelson.
<i>Erithron dexterus epixanthus</i>	Head of Nunatog River; 69° N.	Do.
<i>Zapus hudsonius</i>	do	McKay.
<i>Hesperomys leucopus</i>	Kadiak	Bischoff.
<i>Arvicola xanthognathus</i>	Fort Yukon	Kenicott.
<i>Arvicola riparius borealis</i>	Cape Lisburne	Nelson.
<i>Erotomys rufus</i>	Porcupine River	Kenicott.
<i>Myodes obensis</i>	Point Barrow	Murdoch.
<i>Cuniculus torquatus</i>	do	Do.
<i>Fiber zibethicus</i>	Head of Nunatog River	Nelson.
<i>Castor fiber</i>	Nunatog River	Do.
<i>Sciuropterus volucella hudsonius</i>	Fort Tongass	Kang.
<i>Sciurus hudsonius hudsonius</i>	Nunatog River; 69° N.	Nelson.
<i>Sciurus hudsonius Richardsoni</i>	Nulato	Nelson's collection.
<i>Spermophilus empetra kodiacensis</i>	Kadiak	Bischoff.
<i>Spermophilus empetra empetra</i>	Cape Smyth	Murdoch.
<i>Aretomys prinosus</i>	Nunatog River	Nelson.
<i>Marmota montana</i>	Copper River	H. T. Allen.
<i>Ovis canadensis Dalli</i>	Cape Thompson	Nelson.
<i>Oribos nanchatus</i>	Mouth of Culville River	Murdoch.
<i>Rangifer tarandus caribou</i>	Point Barrow	Do.
<i>Rangifer tarandus groenlandicus</i>	Head of Kowok River	Nelson.
<i>Alces maculis</i>	Lat. 69° N.	Do.
<i>Caracus columbianus</i>	Sitka	Bischoff.
<i>Balena mysticetus</i>	Arctic Ocean	Scammon.
<i>Balena japonica</i>	Pribilof Islands	Do.
<i>Baleus cillamach</i>	(?)	(?)
<i>Sibbaldius sulphureus</i>	California	Scammon.
<i>Sibbaldius veliferus</i>	Oregon	Do.
<i>Balaenoptera Burdisoni</i>	Arctic Ocean	Do.
<i>Megaptera versabilis</i>	do	Do.
<i>Rhachianectes glaucus</i>	do	Do.
<i>Physer macrocephalus</i>	do	Do.
<i>Plocerna Dalli</i>	Cape Ommaney	Nichols.
<i>Plocerna communis</i>	Glacier Bay	Do.
<i>Delphinapterus catodon</i>	Arctic coast of Point Barrow	Murdoch.
<i>Delphinus styx</i>	North Pacific ⁽¹⁾	Gray.
<i>Lagenorhynchus obliquidens</i>	(?)	(?)
<i>Leucorhynchus borealis</i>	Point Barrow	Murdoch (<i>vide abar.</i>)
<i>Globicephalus Scammoni</i>	(?)	(?)
<i>Orca rectipinna</i>	(?)	(?)
<i>Orca atra</i>	Arctic Ocean	Scammon.
<i>Monodon monoceros</i>	Point Barrow	Murdoch (<i>vide abar.</i>)

* For remarks on the identity of these species, see pp. 257, 258.

† The range of this and some other of the aquatic species, especially the Cetaceans, extends to the edge of the ice-fields.

¹ This may be subsocial. The skull procured by Mr. Murdoch is very much broken and worn.

SYSTEMATIC AND BIOGRAPHICAL NOTES.

FELIDÆ.

LYNX BOREALIS CANADENSIS (Gray). Canada Lynx. (Esk. *Tákh-tá-lik*).

In a series of fifteen adult skulls the largest has a basi-cranial length of 125^{mm} and a zygomatic width of 95^{mm}. It is presumably that of a male individual, but in this, as in the majority of the remaining species to be considered, the sex was unfortunately not ascertained.

The largest skull in the National Museum collection (6216) from Peel River has a length* of 115^{mm} and a width of 89^{mm} only. It is, however, a female. A skull of the European Lynx from Sweden (1034) greatly exceeds in size the Alaskan skull previously mentioned. Its length is 144^{mm} and its width 112^{mm}.

The skull of the Canada Lynx may be distinguished at a glance from those of other American lynxes by the shape of the visible parts of the presphenoid and the position of the anterior condylar foramen. The presphenoid is broadly flask-shaped, and the anterior condylar foramen looks downward and is not confluent with foramen lacerum posterius.

In other American lynxes the foramina referred to are confluent, and the visible portion of the presphenoid is linear or triangular in outline. The European Lynx agrees with the Canada Lynx in these details.

List of specimens and measurements.

Museum number.	Collector's number.		Locality.	Date.	Greatest length.	Greatest width.
	Skin.	Skull.				
21450	1		Mountains near Unalakleet	Winter of 1877-78	116	90
21451	2		do	do	112	89
3	142		Mouth of Tanana River	February, 1880	119	91
4	143		do	do	111	87
5	194		Andromedakl.	do	118	96
6	231		Tanana River	Spring of 1880	113	89
7	232		do	do	112	87
8	233		do	do	125	95
9	234		do	do	113	91
21460	253		do	do	117	90
1	256		do	do	119	87
2	257		do	do	115	90
3	258		do	do	118	90
4	266		Mississ.	do	118	95
5	267		Tanana River	do	114	90

Biographical notes.—The range of the lynx is well defined by the extent of the forest area in Alaska. It is a tree-loving species and rarely leaves the shelter of woods even to extend its forays into the alder thickets which scantily replace the trees near the coast of Bering Sea and the Arctic Ocean. Owing partly to this fondness for a wooded country it is unknown on the islands of Bering Sea, and only reaches the shore of this sea at one point, where the spruce forest extends to the coast at the head of Norton Sound. On the Arctic coast it is found near the shore at one point near the head of Kotzebue Sound. Its range north is coincident with that of the trees, and reaches about latitude 71°.

Lynxes are most numerous along the water-courses of the interior, where close thickets of cottonwoods, alders, and willows, with spruces and white birches irregularly distributed, afford them fine shelter. In these thickets, also, their favorite prey, the northern rabbit, is most numerous. During winter the snow bears good evidence of their habits. Their tracks lead from thicket to thicket, and, at times, from one piece of woods to another, but their irregular wandering is mainly confined to the friendly shelter of the trees.

* Here, and on subsequent pages, the terms "length" and "width," as applied to skulls, refer to the basi-cranial length and the zygomatic width respectively. The basi-cranial length is measured from the anterior margin of the central pair of incisive alveoli to the center of a line joining the surfaces of the two occipital condyles. The zygomatic width is the greatest width between the opposite zygomatic arches.

Being to a great extent nocturnal in their habits, and excessively shy, they are rarely seen, except when trapped, even by the natives, who spend much of their time in the forest.

Mr. McQuesten, a fur trader living at Fort Yukon, witnessed one winter day a combat between a lynx and a red fox, which he described to me as follows: "The lynx sprang upon the fox, in comparatively open ground, evidently trying to capture it for food. The fox instantly made fight, and for a few moments the fur flew right and left. Then a short pause followed and the fight was renewed. A second pause ensued, and after the two had glared at one another for a few moments they slowly withdrew in opposite directions, the hair on each bristling defiance, but each apparently satisfied to close accounts." This lynx was probably weakened by hunger, for a vigorous lynx is certainly more than a match for a fox.

So far as I could learn, they are never known to attack persons, and their principal food is the white rabbit, which is abundant in all the wooded districts of the north. Ruffed Grouse, Ptarmigan, and other birds are preyed upon, but the fur traders and natives agree in stating that the abundance of lynxes in a district is directly proportioned to the abundance of rabbits.

When rabbits increase in a district for a number of years, the yield of lynx-skins is large, until, suddenly, an epidemic breaks out among the rabbits and they are almost exterminated. The succeeding seasons are marked by a heavy decrease in the number of lynx-skins secured by the natives, and until the rabbits become common again the lynxes are scarce. Lynxes are trapped by means of a strong sinew noose at the end of a bent sapling, with a bait and trigger so arranged that when the bait is taken the sapling is freed and swings the lynx up in the noose.

Another mode is to heap up a lot of brush in a pile, 3 or 4 feet high, with a clear space on the ground in the middle, where some fragments of meat are placed. A carelessly-made opening leads to this on one side, and the bushes are laid close on all the other sides. A sinew noose is then made fast to some stationary object and laid at the entrance, so that the animal is almost certain to snare itself in getting the bait. Steel traps are sometimes used in place of the snare in this latter style of trapping.

The district about the mouth of the Tanana and the head of the Kuskoquim River is the center of abundance of this species in Alaska.

The fur traders and Indians of the Upper Yukon claim that the lynxes sometimes unite in parties of five or six and make rabbit drives on the small islands in the Yukon. They claim to have heard the lynxes utter a sharp whistling noise, and to have found their tracks in the snow where the line had swept the island, until each secured its prey, near the farther end. The flesh of the lynx is said by the natives to be white, tender, and excellent eating.

CANIDÆ.

CANIS FAMILIARIS BOREALIS (Desmarest). Eskimo Dog (Esk. *Ki-mukh-tā*).

In the icy regions of Arctic America the dog is indeed a faithful friend and valued ally of man, more so, perhaps, than in any other portion of the world, although his services in other regions have brought him well-earned praise. Without dogs the larger portion of the great Eskimo family peopling the barren northern coast of America would find it impossible to exist in its chosen home.

In winter, the hunter is accompanied by his sledge and dogs on every important hunt. The dogs are invaluable aids in finding the game in many cases, and are used to drag it homeward across the icy hummocks or snowy plains. They haul the sledges laden with household goods and children when a change of abode becomes necessary, and are ever at hand for the unstinted amount of work heaped upon them, spiced with a plenitude of kicks and blows. During the summer months they are forced to shift for themselves, unless put into harness to tow a large boat along the coast, or to accompany a hunter in the chase. On the Alaskan coast, when this latter office is demanded of them, a pair of small leather panniers is strapped upon their backs, in which is placed the small supply of food, and perhaps other small articles needed on the trip. In spite of much ill usage, they are a rollicking lot, full of good nature and playfulness, fond of the society of man, and, like a lot of school-boys, continually winding up their humor in pitched battle. They are

endowed with a well-developed vein of drollery, which they show in innumerable odd acts and manners, affording one much amusement when traveling with them; and each one in a team becomes known by some distinctive trait of character which is as marked in its way as the differences between human individuals. Many of the writer's lonely bivouacs have been made cheerful by the presence of these companions.

A solitary camp-fire under the clear, cold sky of a winter night in the north is made doubly pleasant by the semicircle of bright, intelligent faces of the dogs opposite, inspiring a sense of fellowship not easily expressed. A long residence where the use of these animals is common gives one the power of distinguishing certain traits of character among them by their expression as readily as certain expressions in the human face can be read. They possess a surprising diversity of character and a great amount of reasoning power.

In all Alaska, among Indians and Eskimo alike, the only kind of domestic dog known, with the exception of a few recently introduced by the fur traders, is that called the Eskimo Dog. It is commonly used all over the Alaskan mainland and on the islands of Bering Straits. On the Aleutian and Fur Seal Islands dogs are not used. Those kept by the Indians of the interior of the mainland are less abundantly fed, and consequently more dwarfed and scrubby than those found among the Eskimo on the coast. Among the latter people the food of the dogs is rarely cut down except in case of great necessity, as the ability of the dogs to drag the sledge during their hunts is of vital importance.

A large-sized, intelligent dog commands a good price among the Norton Sound Eskimo, and I have known of from \$10 to \$15 worth of goods being paid for a single animal. The owners in some cases refused to sell at any price. Ordinary dogs bring from \$2 to \$4. The winter fur trade of Northern Alaska is carried on entirely by their aid, some of the trading stations having from one to two hundred dogs employed.

A team of either seven or nine dogs is used. They are harnessed in pairs to a single long leading line, with the most intelligent dog in advance, as a leader. Over average routes along the coast or across country such teams will haul from 350 to 700 pounds on a sledge. In nearly every instance the road must be made through the unbroken snow or over rough ice. Many factors combine to vary the hauling capacity of a team, such as the state of the weather, the condition of the snow, training, etc. During the winter of 1878-79, with a team of seven dogs, pulling a load of over 300 pounds, the writer made a journey of over 1,200 miles in about two months' time, and the last 60 miles of this journey was made, over a bad road, in a continuous pull of twenty-one hours' duration. Such feats as this are by no means rare in the course of the winter's work among the fur traders, and show what powers of endurance these animals possess.

The moon has great influence over the dogs, and during full moon half the night is passed by them howling in chorus. During the entire winter at Saint Michaels we were invariably given a chorus every moonlight night, and the dogs of two neighboring villages joined in the serenade. Their howl is a long-drawn cry, rising and falling in somewhat regular cadence. The chorus of a hundred dogs, slightly softened by the distance, has a wierd, wild harmony in keeping with the surroundings, and produces a strange and stirring effect upon the listener.

The influence of the moon upon the dogs is shown very strikingly also when traveling with them. In many cases, after traveling during the day until at nightfall the dogs were dragging wearily along, I have known them to brighten up when the moon arose, and, pricking up their ears, start off with renewed energy, which did not diminish for many miles. This peculiarity is well known to the fur traders, and they sometimes lie over during the day and travel at night, in order to take advantage of it.

Several large dogs of mixed descent, from Newfoundland and other blood, were kept at Saint Michaels, and it was amusing to hear their attempts to join in the howlings of their Eskimo companions. For a long time their attempts were most ignominious failures, but after some months they succeeded in a passable imitation. The Eskimo Dog has no real bark, but rushes to meet a stranger with a harsh growling and broken howl.

They rarely bite people, except in the case of some unusually surly brutes. Among the thousands of them seen I only remember some half dozen cross, biting dogs. One of these would seize anything within reach in blind fury, at the least provocation. This dog was in one of my teams

during a sledge trip, and at each crack of the whip he would turn and catch the leading rope in his teeth in the greatest rage, and woe to the dog that came within reach of him at such times. He was a perfect terror to my guides and before the end of the journey I was forced to kill him.

They change allegiance very quickly, and whoever feeds them for a week wins their hearts from all former masters. The instances are extremely rare in which they recognize property of their master's or make any attempt to guard it.

When at home in the native villages in winter they keep about the entrances of the houses to enjoy the warmth and often fill the long underground passageway. Going in or out of the house one must, in this case, crawl upon hands and knees over a living carpet, but the dogs never show the slightest sign of ill nature, although an occasional yelp tells when one is crowded too closely. The puppies are usually kept indoors and roll about on the floor with the fur-clad babies in the most fraternal manner. The women take the pups at frequent intervals and pull their limbs in different directions and knead their bodies to render them long-limbed and sinewy, they say.

There is a peculiar disease, very much akin to the madness of dogs in lower latitudes, which the Eskimo Dog is subject to from Greenland to Bering Sea. A dog bitten by another afflicted with this disease becomes afflicted in the same manner in a few days. I made careful inquiry, but could learn of no authentic case where a person had been bitten, although I heard a vague account of a man having died at Pastolik from the effect of such a bite. The natives have the greatest fear of a dog in this condition, yet appear to have a superstitious dread of killing it. Both young and old dogs have the disease, and I have seen a puppy only a few weeks old afflicted with it in the most aggravated form. As a rule the first symptoms appear within four or five days of the time the bite is received. The dog refuses to eat, becomes restless and irritable, his head soon becomes swollen, and his vision is affected. He then has alternating periods of stupid quietness and aimless activity. During the latter he runs blindly about, staggering from side to side, but keeping, with apparent difficulty, a nearly straight course until something turns him. When moving about in this way he bites any dog or other living object in his path and frequently runs blindly into some obstacle from which he starts off in a right angle to his former course. During this time his eyes are fixed and glaring, and his head hangs down as if overweighted, and is slowly swayed from side to side. They are easily avoided, and if kicked out of the way they rarely renew the attack, and never with any spirit. The attack is sometimes preceded by a hemorrhage from the nose and mouth; in rare cases a dog recovers, but usually they die in one or two days from the time of the first symptoms. During some seasons great numbers of dogs die from this cause.

In some parts of the Territory the Eskimo expose their dead close to the village, and the dogs quarrel over the remains, but this disgusting habit is becoming far less common than formerly.

The amount of cold these animals are capable of enduring is remarkable. During a winter sledge journey up an unexplored tributary of the Yukon I was delayed at a village for some days, and during my stay the thermometer ranged from 30 to 35 degrees below zero. Tied to an alder sapling near a hut was a female dog with two pups born the day I arrived. These pups were lying upon the bare snow in the open air without a sign of any shelter from the keen air. One died soon after birth, but the other lived the two following days on its icy bed and was shivering and wriggling about when I left the village, while the parent sat beside it shivering and lifting her feet alternately to keep warm. The dog figures largely in northern mythology and is usually endowed with supernatural powers. The Alaskan Eskimo have a firm belief in the transmigration of souls from men to dogs, and particularly intelligent animals are supposed to be inhabited by the spirit of some person.

CANIS LUPUS GRISEO-ALBUS (Linn.). Gray Wolf (Esk. *Ki-gi-luú-úk*).

This well-known animal is found over all of the Alaskan mainland and on some of the most accessible adjoining islands. When game is plentiful the wolves are correspondingly numerous and hunt in packs, sometimes numbering fifty or more, but usually containing from six to ten individuals.

Formerly, before the Eskimo and Indians were generally supplied with fire-arms, the reindeer were extremely numerous in Alaska and ranged over the country in great herds, always attended

on their feeding grounds by packs of wolves. The introduction of fire-arms has nearly exterminated the reindeer, and the scarcity of the deer is fully equalled by that of the wolves in the coast region of Northern Alaska. Near Saint Michaels wolves were very common ten or fifteen years ago but during the past few years only two or three were noted each winter. About the headwaters of the Yukon and Kuskokwim Rivers they are still numerous, and several hundred skins are secured there every year. Although endowed in the north with all the cunning and success in the chase for which they are noted elsewhere, I could not learn of a single instance in which they had destroyed human life or attempted to do so. Several instances were related to me of forays made by them at night among the dogs at villages, in which some of the latter were carried off and devoured, and in one instance they attacked the dogs at a neighboring post while I was at Saint Michaels, but were beaten off by the latter. The Eskimo sometimes secure the cubs, and some years ago an old Eskimo near Saint Michaels secured several, which he kept until winter and broke them to haul his sledge. They worked well, but became so vicious that they were killed. The natives also claim to have had crosses between wolves raised in this manner and dogs. This is not surprising when the close resemblance between some of the dogs and a wolf is noted, and one can easily believe that such crosses are fertile.

Among several thousand wolfskins brought into Saint Michaels during my residence there only a single albino was seen and this was a beautiful snow-white skin. Large numbers of the black or melanistic variety were brought in, and it is a noteworthy fact that the headwaters of the Yukon yielded a large majority of these black skins, and that from the same district come nearly all of the black fox-skins obtained in Northern Alaska. These dark skins vary in endless gradation from the ordinary gray to a glossy coal-black. As a rule the black skins are considerably smaller than the gray ones and the fur is shorter upon them.

Few or no wolf-skins are shipped from Saint Michaels, and one season a lot was brought there by steamer to supply the local trade. The Eskimo of the entire coast north of the Yukon find difficulty in securing a sufficient number of wolf-skins to border the hoods of their fur coats. The finest wolf-skins with a coat of long, heavy fur will bring a very high price in trade, sometimes netting \$25 or \$30 worth of more marketable skins. The gray skins are the only ones that ever bring a good price; the fur on the black skins is too short and the color is not liked.

The black and gray wolves hunt in the same packs, and are distributed over the same range. The black kind predominates about the head of the Yukon, and the gray variety is most abundant toward the coast region, but the difference seems to be too ill-defined for any definite line to be drawn. The wolf ranges north to beyond the 71st degree of latitude to the Arctic coast, and in Veniaminoff's account of the Territory, written the first part of this century, it is stated that two wolves were killed on Akun Island in 1830, and that they are among the resident animals of Unimak Island. Both these islands are at the extreme eastern end of the Alentian chain, and this animal is unknown elsewhere among these islands.

The wolf is trapped by the Alaskan Eskimo in a peculiar manner, which is also practiced among the Eskimo north of Hudson's Bay. A piece of whalebone about 8 inches long and the size of a flattened lead-pencil sharpened at both ends is soaked in water until it becomes thoroughly softened. It is then bent on itself in folds about an inch long and is tied in this position until dry. The cord is then removed and the coil retains its position. It is then covered about an inch thick with tallow and laid out for the wolf to find. The latter picks up the morsel of fat containing the whalebone, and not being able to chew it gulps it down entire. In a short time the juices and warmth of the animal's stomach act upon the whalebone and it slowly straightens out and the sharp points transfix the stomach, and if they do not enter the heart or lungs and produce death at once they cause the animal such agony that he lies down and becomes an easy prey for the hunter who follows his trail.

The wolf figures largely in the mythology of the Alaskan Eskimo, as it does with the Tinkets of the coast farther south.

Among the Eskimo it is endowed with supernatural powers. Is one of their most prized totemic animals, and the wolf gens is widely spread along the coast and interior.

VULPES LAGOPUS (Linn.). Arctic Fox (Esk. *Kū-tāg-ū-lī-á-g'ák*).

In addition to numerous skulls, the skins of two young individuals were obtained. One of these (No. 13877 (46)), taken at Saint Michaels in August, 1877, is clothed throughout with rather short woolly hair. On the back and the upper part of the extremities it is of a very light bluish or purplish ash color; on the sides and belly, yellowish white. The tail and feet are bluish white.

The second specimen (No. 13878 (57)), taken at Saint Michaels, September 19, 1879, is similarly colored, but the colors are dark. The head and legs are clothed with brownish and white hairs intermingled. The tail is strongly bi-color. The under-fur above is purplish-ash colored at the base and brown at the tip; mingled with it are long white hairs. Below, both under-fur and longer hairs are white.

SKINS.

Museum number.	Collector's number.		Locality.	Date.
	Skin.	Skull.		
*13877	46	8	Saint Michaels.....	August, 1877.
*13878	84	8	.....do.....	September 19, 1879.
*Juv.				

SKULLS.

21425	72	Saint Michaels.....	November, 1879.
6	89	.....do.....	.....do.....
7	90	Saint Michaels.....	November, 1879.
8	91	.....do.....	.....do.....
9	92	.....do.....	.....do.....
21430	93	.....do.....	.....do.....
1	104	.....do.....	January, 1880.

Biographical notes. The White Stone Fox.—Along all of the belt of open coast country north from the peninsula of Alaska around all of the Bering-Sea and Arctic shores of the Territory these beautiful little animals are common residents. They are also found upon such of the islands of Bering Sea as they can reach upon the ice. They rarely find their way to the Fur Seal group, but are numerous on Nunevak, Saint Matthews, Saint Lawrence, and all the islands in Bering Straits. They are extremely numerous in all the open country lying between the Lower Yukon and Kuskokwim Rivers. Thence north to the Kaviak Peninsula they are less common, but in the latter district become numerous again, and are abundant in all the coast country to the north. The wilder and more sterile the country the more abundant this fox appears to be. During my long winter journeys along the coast of Bering Sea the tracks of these foxes were found everywhere; they were distinguishable from those of the red fox by their smaller size.

While cruising along the coast between Bering Straits and Point Barrow, during the summer of 1881, hundreds of their skins were brought off to us by the Eskimo; they were found in equal numbers along the opposite Siberian coast. The broad level tundra and the wildest and most precipitous coast appear to be equally attractive to them. We also found them on Herald and Wrangel Islands. In summer, when the ground is bare of snow, the White Fox is a very conspicuous animal, but its pure white coat is so like the snow in winter that it is almost impossible to follow one with the eye as it runs swiftly across the white expanse. They sometimes make their presence known to travelers during the night, and I recall particularly that on a fine night, in early January, when I camped at the mouth of the Koskoquim River, a number of these animals kept about for several hours, within from 75 to 100 yards of us, uttering an odd, weak, querulous bark. We broke camp before daybreak the next morning, but none of our friends of the previous evening were heard.

Parts of the country where rocky ledges occur are specially frequented by them, as the crevices among the rocks give them welcome shelter. During summer they fare sumptuously upon the breeding water-fowl, eggs, and young birds which are found everywhere, but in winter comes harder work and the ground is carefully searched for stray mice, lemmings, or an occasional ptar-

migan. In early spring, toward the end of March, when the seals begin to haul up on the ice and the first young are born, thousands of these foxes go out seaward and live upon the ice the rest of the season. The young seal's offal, left by hunters and from other sources, gives them more food there than the shore affords at this time.

At this season I have traveled along the coast and seen scores of their tracks leading seaward, and not one directed toward the land. In fall a dead whale or other large sea animal cast ashore forms a general feast for all the foxes and ravens from the country around until its bones are polished.

The young of this species are born in May and June.

Our party scaled the precipitous walls of Herald Island and found these foxes in possession. As we were the first men to reach its summit, and but a single party had touched its shore before us, the foxes were perfectly unsophisticated. A half-grown young one sat on a huge rock over us as we gained the top, and kept uttering a squeaky bark of protest. I climbed up to his perch and followed him as he kept 15 to 20 yards ahead of me until he disappeared over the brow of a precipice of over a thousand feet nearly sheer and concealed himself in some crevice. Their burrows were found everywhere, and about their entrances numerous tufts of freshly-pulled mosses showed the material of which their beds were made. Near the entrance of one of these burrows I inadvertently left a note-book, and when I returned for it an hour later it had disappeared, having been confiscated, no doubt, by the occupant of the hole. Their tracks were also numerous on Wrangel Island, and I do not think any Arctic explorer has yet found a land too desolate and forbidding to shelter the Stone Fox. During very stormy and severe winters they have a difficult task to get food, and are driven to forage in the immediate vicinity of the villages.

While I was at Saint Michaels, one very snowy winter, a white fox came up on a snow-drift and looked from the roof of a warehouse into the court-yard below, where a large number of dogs were lounging about. Some of the dogs spied the intruder, and he was overtaken by a large white dog, after a chase of a couple of hundred yards through the deep snow. The moment the dog came close the fox threw himself upon his back and held up his paws as if to play; the dog stopped short in amazement, and then began to frisk about as if in play with another dog. The rest of the pack came up in a moment, and urged by their cries, the first dog ran in and tried to seize the fox, but the latter caught him by the end of the nose with such a grip that the dog retreated toward the houses howling dolefully and dragging his plucky antagonist with him. It was only when near the houses that the other dogs succeeded in tearing the fox loose, and with him went part of his enemy's nose and lip; a moment later the fox died in the midst of his enemies, overcome by numbers.

The Eskimo trap them with a "figure-four" deadfall made of logs, stones, or slabs of ice or snow. Steel traps obtained from the fur traders are also used.

The young are covered with a dingy or smoky plumbeous fur all summer until the last of September or first of October, when the white winter fur begins to appear. In spring the fur gets worn and is harsh and worthless by the middle of April; it becomes prime again about the end of October.

The Blue Stone Fox.—Although the White Fox is unknown upon the Aleutian Islands, the Blue Fox is found throughout the chain, and also upon the Fur Seal Islands. On the latter islands it is very numerous, and as these foxes have a particularly fine fur here great care is exercised to kill any stray specimens of the White Fox that the ice may bring over in winter, and thus prevent any crossing between the two forms. On the Fur Seal Islands from one to two thousand skins of the Blue Fox are taken annually. Owing to the climatic peculiarities and isolation of these islands the fur of the Blue Foxes taken there is very dark and of an unusually fine quality, bringing in the London market several times the price of a skin from the mainland. This peculiarity is also shared, to a slightly less extent, by the Blue Foxes from the islands of Attu and Atka, at the extreme western end of the Aleutian chain.

On the Fur Seal Islands these foxes are protected to a certain extent and are impudently familiar. When one walks across the uplands the foxes sit by their holes and bark at him, and often follow from place to place, yelping like ill-mannered curs.

At Saint Michaels, among the thousands of skins brought in each year, not over one Blue Fox was observed among every fifteen or twenty White Foxes, and the proportion was sometimes less. I afterwards found this proportion to hold good for the skins seen among the Eskimo of the Bering straits islands and the Alaskan and Siberian Arctic coast in the vicinity of the Straits. Further to the north the Blue Fox becomes more and more scarce. The habits of the two forms are identical.

From the foregoing it appears that at the southern extreme of their range in Alaska, on the peninsula of Alaska, perhaps, and certainly on the Aleutian and Fur Seal Islands, the Blue Fox entirely replaces its white relative, and that as we pass farther north the number of blue individuals decreases steadily, and the white form becomes more numerous proportionally, until near the northern limit of the mainland the Blue Fox is almost entirely replaced by the white form. The color of the White Fox for several months after it is born is very similar to that of the adult Blue Fox, and the summer fur of the adult White Fox is very similar to the adult Blue Fox's normal pelage.

Taking these various points into consideration it appears very probable that the White Fox is a special variety of a species originally made up entirely of blue individuals. Peculiar climatic surroundings (which still exist) have impressed the change upon by far the greater part of the individuals now representing the species. This being the case we find upon the Aleutian and Fur Seal Islands at present the most typical representatives of the species, since there only do we find the blue form in its purity.

VULPES FULVUS FULVUS (Desmarest). Red Fox (Esk. *Ká-bet-ák*).

List of specimens.

SKINS.

Museum number.	Collector's number.		Locality.	Date.
	Skin.	Skull.		
13267	139	129	Saint Michaels.....	February, 1880.
21415			.....do.....	September 30, 1879.
13876	85	9	.....do.....	

* Skin and skull; female.

SKULLS.

21399	73	Saint Michaels.....	November, 1879.
21400	74	.....do.....	Do.
1	75	.....do.....	Do.
2	76	.....do.....	Do.
3	77	.....do.....	Do.
4	78	.....do.....	Do.
5	79	.....do.....	Do.
6	86	.....do.....	Do.
7	87	.....do.....	Do.
8	88	.....do.....	Do.
9	103	.....do.....	Do.
21410	105	.....do.....	January, 1880.
11	106	.....do.....	Do.
12	108	.....do.....	Do.
13	109	.....do.....	Do.
14	130	.....do.....	February, 1880.
15	135	Aurvik.....	Do.
16	136	.....do.....	Do.
17	137	.....do.....	Do.
18	138	.....do.....	Do.
21419	164	Mission.....	Do.
21420	180	Andraenofski.....	Do.
1	181	.....do.....	Do.
2	261	Tanana River.....	Spring of 1880.
3	262	.....do.....	Do.
21432	197	Saint Michaels.....	January, 1880.
1	144	Mouth of Tanana River.....	February, 1880.
4	182	Andraenofski.....	Do.
5	183	.....do.....	Do.
6	184	.....do.....	Do.
7	185	.....do.....	Do.
8	186	.....do.....	Do.
9	187	.....do.....	Do.
21440	188	.....do.....	Do.
1	189	.....do.....	Do.
2	190	.....do.....	Do.
3	191	.....do.....	Do.
4	192	.....do.....	Do.
5	193	.....do.....	Do.
6	196	.....do.....	Do.
7	197	.....do.....	Do.
8	199	.....do.....	Do.
9	226	Mouth of Yukon River.....	March, 1880.

Biographical notes.—The Red Fox of the north is a much handsomer animal than its southern representative owing to its heavier and richer fur and somewhat larger size. Its range covers the entire mainland of the Territory and extends over all of the Aleutian and other islands of the Territory with the exception of the Fur Seal group. It is common on Kadiak Island and on the mainland is one of the commonest fur-bearing mammals north to the extreme Arctic shore line in about 71° of latitude. In the extreme north, however, it is less abundant than elsewhere.

Reynard in the north enjoys a reputation for far-seeing cunning fully as great as he has in the southern part of his range, and he needs all of his sagacity there, since he is hunted from the opening of winter until the strong sunlight in April spoils the value of his fur.

When traveling over the snowy tundra in winter I have frequently seen solitary Red Foxes skurrying away in the distance and sometimes have found one crouching behind a tussock or other place of concealment watching us with cunning eyes as we passed. They will rarely permit a person to approach within rifle-shot of them.

During fairly mild winters, when mice, lemmings, and other sources of food supply are open to them, only a comparatively light catch of Red Fox skins are taken, but during cold, snowy seasons, their ordinary food supply being reduced, they are forced by starvation to pick up the bait about the traps, and in consequence many more skins are secured in such a season than during an open winter.

The Eskimo make use of steel traps and also used, formerly, the coiled whalebone described above as employed for the wolf.

¹In summer the breeding water-fowl furnish an abundant food supply and in winter dead fish or anything else that may be secured is welcomed.

The Russian fur traders claim that these foxes lay up a supply of eggs for winter use. This idea is based on the fact that the foxes are sometimes found eating old eggs on the marshes in winter, but in the instances where I found them doing this the eggs had been found in old nests and dug from under the snow by the hungry animals.

I found that during April and May many of the foxes lost all of the hair from the rump and thighs. This was a mystery until I noted that although the sun was shining brightly and thawing the snow a little directly under its rays, yet in the shade it was freezing. The foxes have the habit of sitting on the ice or snow banks at this season, and while doing this their hair freezes fast so that each time they get up they leave some of their fur behind. This is repeated until the skin is uncovered and, in many cases, becomes sore.

The strong sunlight in April bleaches their hair and renders it brittle and valueless for commercial purposes.

These foxes sometimes go out to sea on the ice in spring in search of food, but they prefer the shore. In trade, one skin of the Red Fox is reckoned to have equal value with two skins of the White or mainland Blue Foxes. The fox has its place in the Eskimo mythology like most other Alaskan animals.

VULPES FULVUS DECUSSATUS (Desmarest). Cross Fox (Esk. *I-thá-jik*).

The range of the Cross Fox in Alaska is almost identical with that of the Red Fox, extending over the Aleutian Islands, the peninsula of Alaska, Kadiak Island, and all the mainland except, perhaps, the extreme northern point of the latter, although I have seen skins brought from close to the 70th degree of latitude.

Among the fur traders a Cross Fox skin is reckoned equal in value to two Red Fox skins. Among the large number of fox-skins brought into Saint Michaels during my residence there, examples were seen presenting almost a perfect gradation between the typical Red and the Black Fox, and in several instances the traders were puzzled how to class a skin.

The Cross Fox is far less common than the Red, occurring in most of the districts in the proportion of about one to seventy-five or one hundred. In others it is less common, while in a few localities it is more abundant than the other species. Its habits are identical with those of the Red Fox.

VULPES FULVUS ARGENTATUS (Shaw). Black or Silver Fox (Esk. *Ká-bré-ák-chíik'-chíik'-pá-lík*, or *Á-g'áú-ú-g'ákké-tok*).

This beautiful animal is much less common than the Cross Fox, into which it grades. Although Black Foxes are taken wherever the Red Fox is found in the north, yet they are of extreme rarity except in a few districts. The Hudson Bay Company obtains many of their finest Black Fox skins from the Lower Mackenzie River country, and the adjacent district in Alaska, on the headwaters of the Yukon and Kuskokwim Rivers, is the most productive ground for this animal, both in number and quality. It is also numerous to the south of this district, and particularly on Kadiak Island and the adjacent shore. Except in the districts named, not more than one Black Fox is taken to every five hundred of the red kind, although occasional Black Foxes occur north to the 70th degree of latitude, and west to the vicinity of Bering Straits and on most of the Aleutian Islands. In trade, a Black Fox skin brings from two to eight or ten times the value of a Red Fox skin, according to its quality. As mentioned before, the district about the headwaters of the Yukon, where the Black Foxes are most numerous, is also most productive of Black Wolf skins.

When the skin of a fox is removed by an Eskimo he makes a short incantation and dismisses the animal's spirit, hoping thereby to remove any ill will it may bear him for capturing it.

MUSTELIDE.

MUSTELA AMERICANA Turton. American Sable (Esk. *Kaf-chí-chu úk*).

Two skins of this species were obtained. They represent very nearly the extremes of variation in color. One skin, No. 13879 (131), from Nulato, is of the usual snuff color clouded with blackish brown, which latter color becomes dominant on the tail and feet. The second skin, on the contrary, is of a light orange tint, the extremity of the tail alone (the feet are wanting) being of a dark brown color. This specimen, No. 13271 (149), is a hunter's skin from Anvik.

Among the skulls obtained, the largest (No. 21395), from Shaktolik, has a length of 88^{mm} and a width of 53^{mm}. It is impossible to say, however, whether it is a male or female. There are in the collection of the National Museum a female skull from Peel River (6087) which has a length of 89^{mm} and a width of 46^{mm}, and two male skulls from Yukon having a length of 88^{mm} and a width of 46^{mm}.

List of specimens and measurements.

SKINS.

Museum number.	Collector's number.		Locality.	Date.	Greatest length.	Greatest width.
	Skin.	Skull.				
13271	149	.....	Anvik	Winter, 1880	mm.	mm.
13879	131	127	Nulato	February, 1880 .....	.....	.....

SKULLS.

21381	.....	127	Nulato	February, 1880 .....	.....	.....
2	.....	139	Mouth of Tanana River .....	.....	76	42
3	.....	140	do	do	74	41
4	.....	141	do	do	75	39
5	.....	171	Mission	do	77	44
6	.....	172	do	do	73	40
21287	.....	173	do	do	84	45
8	.....	174	do	do	85	44
9	.....	175	do	do	84	45
21290	.....	176	do	do	71	40
1	.....	177	do	do	80	41
2	.....	178	do	do	83	50
3	.....	179	do	do	86	45
4	.....	200	Amrangofofski	do	76	41
5	.....	222	Shaktolik	Winter, 1879-80	88	53
6	.....	259	Tanana River	Spring, 1880	82	.....
7	.....	266	do	do	76	41

Biographical notes.—The Marten or Sable is a tree-frequenting species and rarely strays beyond the borders of the northern coniferous forests. Wherever such forests occur in Alaska this animal is more or less common. The lack of trees on the Aleutian and other islands of Bering Sea renders them unknown in these localities, and also in the treeless belt of country bordering the coast of Bering Sea and the Arctic Ocean. The Martens follow the spruce forests, however, where the latter reach the coast at the head of Norton Sound in Bering Sea, and at the head of Kotzebue Sound in the Arctic Ocean. They are also found on Kadiak and the other wooded islands on the Pacific coast of the Territory. From the luxuriant pine forests of the coast in Southeast Alaska, north to the patches of dwarfed black spruces fringing the barren tundra in latitude 68° to 69°, and from the vicinity of Bering Straits east to the British boundary line, the Marten is one of the most abundant and valuable fur-producers of the Territory. In Northern Alaska they are most numerous in the interior away from the dwarfed trees and scraggy vegetation, so general wherever the coast district is approached in this part of the north. Their tracks are sometimes seen about clumps of bushes miles from the nearest tree, but this is very unusual.

Those skins obtained nearest the coast in Northern Alaska are lighter colored, and have shorter, harsher fur than those from farther inland, and a gradual change is readily noted from the region nearest Bering Sea, back to the headwaters of the Yukon. In the latter district and the adjacent interior of Alaska and British America their fur is long, silky, and dark colored in contrast with that of skins obtained nearer the coast.

It should be noted that the spruce forests, with two or three exceptions, do not approach the coast of Bering Sea and the Arctic within from 10 to 50 miles.

The martens of the heavily-wooded portions of Southern Alaska are long-haired and darker than those from the Upper Yukon. Marten-skins are prime from the 1st of November until April. During the first part of winter, however, very few are taken, as the frequent storms and short days render trapping too uncertain.

The Indians, and such Eskimo as live within the tree-limit, go out to trap in February and early March. Each man has a certain district allotted him, which he keeps by common consent from year to year, and in this district he sets a series of "figure-four" deadfalls, extending in some instances over a circuit of 30 or 40 miles. An energetic hunter usually has so many traps that it requires from two to three days to make a circuit. On the best ground a round is made once in from four to six days, and at the end of the season one hunter can rarely count over fifty skins while the majority have less than a dozen each.

For these skins the natives receive about one dollar's worth of goods from the traders. Along the Yukon and the region tributary to it from five to six thousand skins are taken annually. Martens are sometimes hunted with a small dog. The dog follows the fresh trail and trees the animal, and the hunter, following on snow-shoes, shoots it through the head so that the skin is not injured.

As is the case with most furs, marten-skins are not ready to be made up until they have passed through the dyer's hands. The amount of variation in color among these animals is remarkable, and passes from the rich chestnut or blackish brown of ordinary specimens to the creamy white of the albinos that are brought in at times. The most striking variety is of a beautiful rich orange-reddish, which sometimes covers the entire animal, but is more often confined to the posterior half.

Their food consists of mice, small birds, and other game of that character, and necessitates great activity during the winter months. At this season their broad-footed tracks are plentiful in the woods of the interior, but without a dog one has little chance of overtaking one on foot. When cornered or wounded they fight savagely and with effect for so small a beast.

According to the imperfect returns obtained from the traders there have been shipped from all Alaska, between 1867 and 1880, 105,920 marten-skins, a number considerably below the true one owing to lack of records in many cases.

PUTORIUS ERMINEA (Linn.). Ermine (Esk. *Ā-khliú kku.*,

A very good series of skins of this species was obtained, the majority in the winter coat. A male, No. 13902, taken at Saint Michaels in September, is still in the summer coat. A second male, taken October 9, is in the transitional stage; the upper surfaces are still brown, though pale, especially on the legs.

No skulls were obtained.

List of specimens.

Museum number.	Collector's number.	Locality.	Date.	Sex.	Remarks.
13024	9	Saint Michaels	Dec., 1877	♀	Winter pelage.
5	15	Unalakleet	Jan., 1878	♀	Do.
6	8	Saint Michaels	Dec., 1877	♂	Do.
7	20	Nulato	Mar., 1878	♂	Do.
8	16	Unalakleet	Jan., 1878	♂	Do.
9	19	do	do	♀	Do.
13901	41	Fort Reliance	Oct. 1, 1878	♀	Do.
1	5	Unalakleet	.....	.....	Summer pelage.
2	23	do	Summer, 1877	.....	Do.
3	11	Norsem Sound	do	.....	Do.
4	10	do	do	.....	Do.
13890	77	Upper Yukon	Dec., 1878	♂	Winter pelage.
1	81	.....	Nov. 11, 1878	♂	Do.
2	137, 132	Saint Michaels	Feb., 1880	♂	Do.
3	144	do	Mar., 1880	♂	Do.
4	78	Upper Yukon	Oct. 4, 1878	♂	Do.
5	143	Saint Michaels	Mar., 1880	♂	Do.
6	136, 133	do	Feb., 1880	♀	Do.
7	135, 134	do	do	♂	Do.
8	60	do	Dec., 1878	♂	Do.
9	79	Upper Yukon	Nov. 11, 1878	♂	Do.
13900	80	.....	Oct. 1, 1878	♂	Do.
1	82	.....	Oct. 9, 1878	♂	Transitional.
2	10, 86	Saint Michaels	Sept. 30, 1879	♂	Summer pelage.
3	144	.....	Mar., 1880	.....	Winter pelage.
4	150	Cape Norve	Summer	.....	Summer pelage.
13270	170, 279	Kotlik	Mar., 1881	.....	Skin and skull.
	113	Keghtkowiak	Fall, 1879	.....	Skull.
	121	Nulato	Jan., 1880	.....	Do.
	125	do	do	.....	Do.
	62	Kotzebue Sound	.....	.....	Skin.
	63	do	.....	.....	Do.

Biographical notes.—This pretty animal is more or less numerous over all of the Alaskan mainland and on the islands adjacent to the coast. The islands of Bering Straits, Nunevak, the easternmost of the Aleutians, and most of the islands of Southeast Alaska are inhabited by them. Although not very common in some localities, in others they may be classed as abundant. Their numbers in a district depend largely upon the abundance of mice and lemmings, upon which they prey. They appear to have a preference for a partly-wooded country, and in the district back from the head of Kotzebue Sound and about Anvik, on the Lower Yukon, they are more numerous than elsewhere.

Although showing a slight preference for semi-wooded country they are far from rare on the barren open coast belt bordering the Arctic and Bering Sea, where they find shelter among rocky ledges.

They winter at the extreme northern limit of the mainland and appear to be affected but little by the cold so long as their food-supply continues to hold out. In winter they frequently come about the native villages, attracted by the abundance of mice there at that season. At Saint Michaels they were often quartered about the warehouses, where the mice congregated to feed upon the flour stored there.

The great swiftness and prowess of this animal, as exhibited in its habits and the success with which it sometimes attacks and destroys such disproportionately large animals as the white ptarmigan or the northern rabbit, has had a remarkable effect upon the native mind. The Eskimo look upon it with an almost superstitious fear. Its skin is often worn by them as a kind of fetish and it figures in their mythology. It is an important totem and is thought to bring success in the chase to those favored by it.

About the Yukon mouth they take on their winter fur early in October, sometimes before the first snow, and retain it until the last of May or first of June. There is no market for skins of the Ermine, and in consequence they are not trapped except in small numbers.

PUTORIUS VULGARIS Linn. Least Weasel (Esk. *Takk̄-i-yák*).

A specimen of this weasel in the winter coat was obtained on the Upper Yukon in December, 1878. A second individual in summer pelage was captured at Saint Michaels May 25, 1880. A third specimen, captured October 15, was in winter pelage.

List of specimens.

Museum number.	Collector's number.	Locality.	Date.	Sex.	Remarks.
13904	59	Upper Yukon	Dec. 1878	♂	Skin, winter pelage.
.....	132	Saint Michaels	May 25, 1880	♂	Skin, summer pelage.
13905	83	do	Oct. 15, 1878	♂	Skin, winter pelage.
.....	246, 152	do	May 25, 1880	♂	Skull.

Biographical notes.—The Weasel has essentially the same distribution in Alaska as its larger relative. It is much less common than the Ermine and its skins are more highly prized by the Eskimo, among whom it is used as a fetich and is also one of their totemic animals. A skin was brought me from the Upper Yukon by Mr. McQuesten; others were obtained at Saint Michaels, and I saw skins from the Kuskoquim River and from the Kotzebue Sound district and from other localities.

They were seen in use as fetiches among the Eskimo of widely-separated localities and speaking different dialects. The people of the Kaviak Peninsula prize them so highly for this purpose that they frequently pay the value of a marten-skin for one. The boys and young men wear them in their belts in order to become successful hunters, and they are considered to be of great use to the persons who wear them thus.

The quickness and boldness of this animal are remarkable. The only time I ever saw one of these weasels alive was one morning late in May, near Saint Michaels. I was goose-hunting at the time and first saw it close to the tent. The ground was still covered here and there with patches of snow and the Weasel was searching among the dwarf willow stems about a snow-drift, evidently looking for mice. It darted here and there among the willow stems so rapidly that I lost track of it several times. At short intervals it would dart upon the snow and stare at me a moment with its bead-like black eyes and then go on with its search although I was but a few feet away all of the time. My Eskimo hunter came and stood by me, watching its movements with great interest, until I finally went to the tent and got a charge of fine shot and added the little hunter to my collection. It was in full summer pelage.

PUTORIUS VISON (Schreber). Mink (Esk. *I-mûg-û-myû-tûk*).

The series of skulls obtained indicate that the Mink attains constantly a very large size in Alaska. Among the twenty-six skulls there are but three whose length falls below 66^{mm}, one whose length is 75^{mm}, and five, 74^{mm}. Among 54 skulls in the National Museum all whose length exceeds 66^{mm} (viz., 13) are from Alaska. Several adult skulls, from the Saranac Lake, New York (which are at least yearlings), are but 55^{mm} long.

List of specimens and measurements.

SKINS.

Museum number.	Collector's number.		Locality.	Date.	Greatest length.	Greatest width.
	Skin.	Skull.				
*13880	153	(245)	Saint Michaels	March 23, 1880	mm.	mm.
*13881						

SKULLS.

20814	160	Mission	February, 1880		
21269	161	do	do		
21352	201	Andreanofski	do	70	41
21353	202	do	do	70	39
21354	203	do	do	66	36
21355	204	do	do	70	42
21356	205	do	do	74	43
21357	206	do	do	73	43
21358	207	do	do	66	37
21359	208	do	do		
21366	209	do	do	69	40
21361	210	do	do	67	36
21362	211	do	do		
21363	212	do	do	66	36
21364	213	do	do	64	37
21365	214	do	do	71	40
21366	215	do	do	74	44
21367	216	do	do		
21368	217	do	do	73	42
21369	218	do	do	75	43
21370	219	do	do	74	44
21371	220	do	do	74	42
21372	221	do	do	73	40
21373	126	Nalato	January, 1880	65	38
21374	136	Mission	February, 1880	64	36
21375	159	do	do	74	46
21376	161	do	do	71	43
21377	162	do	do	75	44
21378	163	do	do	70	40
*21379	153	Saint Michaels	May 23, 1880	73	43
21380	265	Mission	do	70	43
	126	Nalato	January, 1880		

* Male.

Biographical notes.—The well-known Mink is found abundantly throughout all the northern fur countries where marshes and sluggish streams abound. In Alaska they are found over all the mainland extending north, nearly, or quite, to the coast, in latitude 68° to 70°, and reaching the coast of the Arctic Ocean and Bering Sea to the southward. Their range extends out on the peninsula of Alaska and across to Unimak Island, the nearest of the Aleutian chain, and they are found on some of the islands bordering the coast in extreme Southeastern Alaska.

Although numerous in most parts of the Territory, yet on the low marshy tundras between, and adjacent to, the Lower Yukon and Kuskokwim Rivers and about the head of Kotzebue Sound they occur in the largest numbers. The triangular area of swampy tundra between the Lower Yukon and Kuskokwim forms its center of abundance. The people living there are called "mink people" by the neighboring Eskimo. The country there is very low and flat, and in many places the pools are brackish and tide-water from Bering Sea reaches many miles inland. Over all of its extent marshy lakes, ponds, and sluggish streams mark the country in every direction. These lakes and streams connect with one another to such an extent that travel, except by boat, is rendered impossible in summer. The muddy waters here swarm with myriads of the "Black-fish" of the fur traders, which has been named *Dallia pectoralis* by Dr. Dean. This is a small fish from 4 to 8 inches long, upon which the Mink feeds, and it is the cause of its abundance in this part of the Territory.

Mr. True notes the large size of the Mink skulls from Alaska, and probably the species attains its greatest development here.

In the district described, between the Lower Yukon and Kuskokwim, from ten to fifteen thousand mink-skins are taken annually, yet the supply seems inexhaustible. Steel traps are much used by the natives, although one of their primitive methods is still used very successfully. This method is to make a tight brush or wicker-work fence across a stream or small pond, and

place a wicker-work fyke fish-trap at the opening left for the purpose in the middle. The Minks in trying to pass the obstacle enter the funnel-shaped entrance of the trap and soon drown. In a good locality this may occur several times in a day, and in a number of cases that came to my knowledge the hunter obtained from ten to fifteen Minks at a haul when he raised his trap.

Although the Mink confines itself mainly to a fish diet, yet when opportunity offers it is very destructive to wild fowl. A tame Mink, kept at Saint Michaels, was turned into a room with a ptarmigan which had a disabled wing. Although the Mink was well fed upon fish, yet it no sooner saw the bird than it at once approached and sprang upon and killed its victim with all the ferocity one might expect from a Weasel. Albino specimens occurred about once in every two thousand skins taken by the Eskimo while I was at Saint Michaels.

The Mink is not very common immediately about Saint Michaels, owing to the pursuit of the natives. At certain seasons of the year a few are killed with spears or arrows, but the number obtained in this manner is unimportant. Their fur becomes prime about the last of October, and begins to bleach the last of March, so that April skins have a harsh brittle fur and rusty color and are of little or no value.

A good skin brings the native hunter about 50 cents' worth of goods.

Mink-skins from the Upper Yukon and Kuskokwim Rivers, and thence south through South-eastern Alaska, are much finer and darker than those from the rest of the Territory, but they rarely equal prime Canadian skins. This species is resident wherever found in the north.

Mr. Petroff gives 71,213 as the number of mink-skins obtained in all of Alaska, except the southeastern portion, between 1870 and 1880, but from the number taken at Saint Michaels during my residence there I am convinced that this does not represent one-half the number actually exported, while thousands of worthless skins are taken every year and remain in the natives' hands.

GULO LUSCUS (Linn.). Wolverine (Esk. *Kaf-chik*).

The two skulls of this species obtained are of large size, one having a length of 147^{mm} and the second of 144^{mm}. The former is evidently the skull of an old male. There is in the National Museum a similar skull from Fort Anderson, known to be a male, which exactly equals this in length, but is a little narrower, *i. e.*, 98^{mm}, as against 101^{mm}.

One of the peculiarities of these skulls is the variation in shape exhibited by the auditory bullae. They are not only not alike in the two specimens collected by Mr. Nelson, but in one of the skulls, No. 21479, the two bullae differ widely from each other in contour. This peculiarity is still more strongly marked in other specimens in the National Museum collection. It is observable also in other species of the family.

List of specimens.

Museum number.	Collector's number.	Locality.	Date.
21478	111	Unalakleet	Fall, 1879.
21479	224	Month of the Yukon River	March, 1880.

Measurements.

	21478.	21479.
	<i>mm.</i>	<i>mm.</i>
Basal-cranial length	147	144
Zygonatic width	101	98
Least width between orbits	34	.....
Width between outer surfaces of canines	40	35
Length of "palate"	79	77
Anterior margin of canine to posterior margin of last molar	54	49
Breadth between exoccipitals	90	83
Greatest length of mandible	104	99
Greatest vertical length of mandible	52	49
Breadth of superior incisors (together)	22	19
Height anterior nares	24	21
Width anterior nares	21	20

Biographical notes.—The Wolverine is one of the most detested animals found in all the fur country. Its life is a continual warfare against all living things, and every man's hand is against it. They invariably steal the bait from traps whenever they have the opportunity, and very rarely do they get caught. Should they find an animal in the trap they make short work of it, and in Northern Alaska, as elsewhere in the fur country, they sometimes take up a line of traps so persistently that the hunter is forced to abandon it and look for a new route. They frequently follow a sledge party in the interior for days, visiting every camp as soon as it is abandoned, in order to pick up the scraps left, and anything left in a tree for safe-keeping is sure to be destroyed if the Wolverine can get at it. The fur traders usually outwit them by a very simple plan. They place the articles they wish to leave in a tree, and then remove the outer bark of the tree for 5 or 6 feet from the ground. The frost renders the smooth, bare trunk so hard that the animal's claws cannot obtain a hold and he is unable to climb the tree in consequence. Their greediness over-matches their cunning at times, and a fur trader told me of an instance where a returning trapper caught one of them in his cabin so gorged upon the dried meat he had found that he was unable to escape through the chimney, by which he had entered, and so died ignominiously at the hands of the enraged hunter. It is almost impossible to render a provision *cache* safe from them if it is left for any considerable length of time.

I was assured by a fur trader who passed many years on the Kuskokwim that during very severe winters, when the ponds freeze so that the beavers are confined to a narrow space about their houses, the Wolverines sometimes dig through the roofs of the beavers' houses and kill the inmates.

Marten trappers sometimes mourn the destruction of an entire set of traps in a day, and when one of these pests is caught there is great satisfaction.

The Yukon Indians have a superstitious dread of this animal, and on one occasion that came to my hearing a hunter found a Wolverine caught and hung between heaven and earth in one of his lynx-traps, about which the Wolverine had been prowling. Such an unusual occurrence as this at once aroused the Indian's suspicions of bad medicine, for who ever heard of a Wolverine being caught in so simple a trap! Straightway the Indian returned home, and a grave consultation was held among the elders of the village. It was finally decided that the hunter might take the animal from the snare, but to avert possible bad consequences he was instructed to abuse the white men all of the time, so as to make the spirit of the Wolverine believe it was owing to their agency that he had been trapped. The hunter then returned with a companion to the trap and removed the animal, repeating as he did so nearly his entire stock of English in saying "G— d— the Americans, G— d— the Americans," over and over again until well away from the accursed spot.

The Wolverine is found over the entire mainland of Alaska, but is most numerous about the headwaters of the Yukon and Kuskokwim Rivers. They are not rare wherever spruce timber occurs, but are very uncommon on the open coast barrens, although they occur there, and extend their range north to the extreme limit of the mainland at times.

Although their tracks are among the most common ones seen when traveling in the wooded interior of the country in winter, yet the animal is always invisible, and ever on the alert to reap some gain from the visitor to his domain.

The Eskimo prize the skin of this animal very highly for trimming their fur clothing, and one good skin about equals in value a fine gray wolf-skin.

This animal figures in the Eskimo folk-lore, always typifying combined cunning and prowess, and it is one of their totemic animals.

The skins of this species exhibit an almost endless amount of variation, specimens from the Upper Yukon averaging very much darker than those from nearer the Bering Sea and Arctic coast.

LUTRA CANADENSIS (Turton). North American Otter (Esk. *Tsñi-kák*).

There is nothing especially noteworthy in the four skulls of this species contained in the collection under consideration. One, No. 21482, is rather large, having a length of 113^{mm}, but is surpassed in size by other specimens in the National Museum collection. No. 21480, though much

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smaller (length 104^{mm}), appears to be considerably older. The teeth, especially of the mandible, are much worn, and the canines are reduced to mere stumps. The region of the occipital condyles exhibits signs of disease, but the remainder of the skull is normal.

List of specimens.

Museum number.	Collector's number.	Locality.	Date.	
21480	112	Unalakleet	Fall of 1879	Skull.
21481	165	Mission	February, 1880	Do.
21482	195	Andracnofski	do	Do.
21483	263	Tanana River	Spring, 1880	Do.
.....	221	Yukon mouth	March, 1880	Do.

Measurements.

	21480.	21481.	21482.	21483.
	mm.	mm.	mm.	mm.
Basal-cranial length	194	108	114	105
Zygomatic width	73	63	76	.....
Length of "palate"	49	50	51	48
Width of interorbital constriction (least)	29	21	23	17
Height of nares	17	16	18	17
Width of nares	16	16	17	15
Anterior margin of superior canine to posterior margin last molar.	35	36	37	35

Biographical notes.—This species is one of the most common and valuable fur-bearing mammals in the north. It occurs in all the streams and lakes of the Alaskan mainland, excepting only the barren coast region bordering the Arctic from Point Hope to the Mackenzie River. In Southern Alaska they are found upon Kadiak and the Shumagin Islands and upon Unimak, the easternmost of the Aleutians, as well as upon Nunevak Island, further to the north. Its range reaches to the vicinity of latitude 69° in the interior.

They prefer streams or ponds in which fish are plentiful, and there they usually keep two or three holes open from the bank under the ice in winter. These holes are often cunningly concealed by some natural object or by an overhanging snow-drift. The entrances to these holes are favorite places for placing a trap, so that the animal is caught when going in or out. A steel trap is used, or a strong square net is stretched across the opening under water, and made fast so that the otter will become entangled in its meshes and drowned.

A district frequented by them is easily found in winter, as they move about considerably and leave a conspicuous trail in the snow. Toward the end of winter they frequently make a burrow in a large snow-drift, and sometimes a party of five or six will be found occupying the place. Such parties usually consist of the two old ones and the last season's young. When the natives find such a place they get strong clubs and stand at the entrance while a companion goes to the farther side and drives the animals out and they are brained.

Instances sometimes occur of their following fish into wicker fish-traps and being drowned, but this is rare. Now and then one is found moving about in winter and shot, but the greater number are caught in steel traps at the entrance to their holes in the sides of streams or ponds.

When traveling through soft snow they move by a series of short leaps, and if frightened they make rapid progress for such short-legged animals. At such times, however, a dog can easily run one down, but when brought to bay they make desperate battle and are usually killed with a heavy club or a gun.

An otter was one of the chief actors in a strange accident which occurred near the Yukon mouth during my residence in the north. A hunter went out to inspect his fish traps, and, failing to return in the course of a day or two, his friends began to look for him. He was found lying dead by the side of a small lake with his throat torn open and the tail of a dead otter firmly grasped in both hands. One of the otter's feet was fast in a steel fox-trap, and it was supposed that on his way home the hunter came across the otter in the trap and having no weapon with him and being

a powerful young man he tried to swing the otter over his head and kill it by dashing it against the ground, but when in mid-air it turned suddenly and caught him by the throat, with the result as described.

The districts where the "blackfish" are abundant on the Lower Yukon and Kuskokwim form the center of abundance of the otter in Alaska. There they frequent brackish pools and tide creeks, like the mink. Petroff states that between 1870 and 1880 there were 18,964 of land-otter skins shipped from Alaska, but this falls far short of the real number.

ENHYDRIS LUTRIS (Linn.). Sea Otter (Esk. *Ā-mi'-kuk*).

List of specimens.

Museum number.	Collector's number.	Locality.		
21652	Sanak Island	April, 1877	Skull.
21653	Unalaska, Aleutian Islands	Do.	Fœtal. alc.

Measurements.

	21652.	21653.
	mm.	mm.
Basal-cranial length	125	126
Zygomatic width	109	109
Width of interorbital constriction	26	29
Length of "palate"	59	60
Anterior margin of canine to posterior margin last molar	45	44
Height anterior nares	26	23
Width anterior nares	28	28

Biographical notes.—In 1760-'65, when Bering and his party first explored the Aleutian Islands, they found the Sea Otters so numerous that the Aleuts wore long mantles made of their skins, and a scrap of old iron was enough to secure the finest skin. In 1840 Veniaminov wrote that the Sea Otters in these islands "are distinguished above everything on account of their great value and small numbers. * * * There was a time when they were killed in thousands, now only by hundreds. There are plenty of places where before there were great numbers of Sea Otters; now not one is to be seen or found. The reason for this is most evident; every year hunted without rest they have fled to places unknown and without danger."

When the Fur Seal Islands were discovered these animals were very numerous, and two sailors killed five thousand there the first year. The next year less than one thousand were killed, and from the end of the next six years to the present day the Sea Otter has been unknown there. From the Aleutian Islands south to Oregon the Russians found these otters so numerous that they were obtained in numbers running from two to three thousand skins per year in many places, and in 1804 Baranov sailed from Alaska with a single cargo of fifteen thousand skins. At that time the district about Unalaska Island furnished about one thousand skins annually. In 1826 only fifteen skins were taken there; in 1835 about one hundred were taken, and at the time of the transfer of the Territory in 1867 the entire Aleutian chain, with the adjacent coast south, only yielded to the Russians from six to eight hundred skins annually. In 1873 the Americans secured nearly four thousand skins from this same region, and in 1880 and 1881 from six to eight thousand skins are estimated to have been secured on the same ground. This great increase in the catch during the later years is entirely due to the greater vigor with which the animal has been hunted, and the introduction of fine long-range rifles. Good rifles now replace, to a great extent, the primitive spears.

There is little doubt that in the course of a few years, under the present regulations and mode of hunting, this valuable animal will be exterminated, and in place of affording the Aleuts a livelihood will leave them dependent upon the Government.

During the last few years the catch of Sea Otters has produced in the neighborhood of three-quarters of a million dollars annually to the companies engaged in trading in the Aleutian Islands and the coast to the southeast.

The Sea Otter was found formerly all along the Aleutian chain, but they are now almost or quite unknown over a great part of this ground, and their principal resort at present is among the reefs and outlying islets surrounding Sanak Island, near the eastern end, and on the Pacific side of the Aleutian chain. The Aleutian hunters are brought to this point from the entire length of the chain in vessels belonging to the trading companies, and are landed with their kyaks or seal-skin canoes and their implements of the chase. Here they remain for months, scouring the sea in all directions or lying upon rocky points and islets, awaiting the approach of an otter within long rifle-shot. Shot after shot is fired at the otter's head until one takes effect, and the body is brought in by the surf. The noise of the waves on the rocky shore drowns the noise of the gun and so prevents the animal becoming alarmed until it is hit.

The otters have a habit of rising with their head and nearly half their body out of the water, while they deliberately examine the shore they are approaching, and this usually gives the hunter an opportunity for a fatal shot.

While the writer was at Sanak Island in May, 1877, a large hunt was being arranged, and some twenty-five or thirty men were preparing to go to a hunting place some 10 or 15 miles to seaward in their small skin canoes. In a hunt of this character the boats form in a long line on the hunting ground and then sweep the sea, watching for an otter. The moment one is seen the nearest hunter throws his spear and stops where the animal went down. The other hunters make a wide circle and watch for the animal's reappearance. This manœuvre is repeated until the otter becomes exhausted and is an easy prey.

Of necessity the hunters have rules governing the hunt, and one of the most important is that when an animal is struck by several spears the owner of the spear nearest the head has the prize.

In some places when the hunters go ashore after a successful hunt it has been the custom of the Russian priests to be at the landing place, and after inspecting the catch to collect tithes at once. As a result some of the finest skins went into the hands of the priests and from them found their way into the hands of the traders at a round price.

In winter, when heavy gales sweep the Pacific from the north, the otters take refuge upon the rocks lying out at sea, and frequently thrust their heads into bunches of kelp to protect them from the wind and spray. As the gale shows signs of breaking some of the best and most daring hunters leave Sanak and run down before the wind to these rocks, and under cover of the roar of wind and sea they land, and, creeping silently up to the cowering otters, kill them by striking them on the head with a heavy wooden club.

Elliott mentions an instance in which two brothers secured seventy-eight otters in less than two hours in this manner, and I learned of a number of instances in which a smaller number were secured. Another mode of capturing these animals was practiced by the Atka and Attu Aleuts at the western end of the chain before the otters were almost exterminated there. Nets from 16 to 18 feet long and from 6 to 10 feet wide were spread on kelp beds frequented by the animals, and when the latter came ashore they became entangled in the coarse meshes and seemed paralyzed by fear, so that they were easily taken by the hunter. Sometimes several were taken at once in a single net, and although the otter is a powerful animal yet they did not struggle sufficiently to injure the net in the least. These nets were also set in holes and caves at the base of water-washed cliffs, where otters were known to "haul out."

When the otter is surprised on shore it starts at once for the water, and can only be stopped by being killed. On land they move with a waddling motion if not alarmed, but if startled they progress by a succession of short leaps.

The traders at Sanak told me that the greatest care is exercised to keep all signs of human occupation away from the beaches where the otters come out, and when the wind blows toward the hunting-ground all fires are extinguished, as the animals have an acute sense of smell and are very shy. They rely more upon the sense of smell than either upon sight or hearing.

They sleep lying upon their backs in the water, and at such times the female carries her young clasped in her fore-arms.

They are shorter and more heavily built animals than the land otter, and according to Elliott are more like a beaver, with the skin in loose folds.

They range from $3\frac{1}{2}$ to 4 feet long in the flesh, but after the skin is removed by a single cut across the hind legs it is turned and stretched until nearly double its original length.

Many of the finest skins have a grizzled or silvery gray muzzle, and the gray sometimes extends to the nape, but the rest of the body is covered with a beautiful, soft, dark, velvety brown or brownish-black fur, with scattered white-tipped hairs over the body in some cases: in others the color is unbroken.

The natives say that the single young one is brought forth in fine weather on kelp beds and that the young are born in every month of the year. They are odd little grizzled or brownish animals at this time and it is not until the third year that their fur becomes prime.

The females are very attentive to their young and protect them when threatened by clasping the young in their fore paws and turning their own back to the danger. Elliott's account of their playfulness, both with their young and with small objects, such as fragments of kelp, which they toss about while lying on their backs in the water, was corroborated by several persons well acquainted with the animal.

Their food consists of shell-fish, sea urchins, kelp, and perhaps fish.

In former times this species ranged over nearly all of Bering Sea, but they are unknown there at present.

From the Eskimo of Norton Sound and Bering Straits I had definite accounts of them, and from the latter place some of the people claim that these animals occurred there very rarely up to within a comparatively few years. The Sea Otter's range is steadily decreasing. They are now limited to the Pacific or southern side of the Aleutian chain and thence south along the coast, but are rarely found on the southern part of their range, where a merciless fusillade is kept up whenever one approaches the coast. They are numerous at present only at the extreme end of the Aleutian chain in Alaska. There, about Sanak Island and the Stunagin group to the eastward, is their center of abundance. The once prolific grounds at the extreme western end of the Aleutian chain is now almost entirely deserted by the otters.

The fur of these animals has greatly increased in value during the past few years. From \$80 to \$100 in cash were paid by traders to the Aleuts in 1881 for particularly fine skins, and from this down to a dollar or two for very young, poor skins. The finest skin sold in London from the catch of 1880 brought £95 sterling or about \$475 a value unequalled by any other fur bearing animal in the world.

Arguing from the fact that the annual yield of Sea Otter skins has been about the same for some years past it is claimed by some that the number of the animals must be the same, or the supply equal to the demand. This idea is erroneous, however, since, with the increase in value of its fur, there has been a steady and perhaps disproportional increase in the vigor and persistence with which its pursuit has been carried on. Taking this in consideration it is evident that under existing conditions the Sea Otter is doomed to rapid extermination. White men with improved rifles are joining in the chase, and some of them make an income of several thousand dollars a year as a return for their marksmanship. Certain Treasury regulations restricting the capture of these animals already exist but they are imperfect and almost entirely ignored. The Aleuts depend almost wholly upon this animal for their support, and once without the Sea Otter they will become dependent on the Government for a large portion of their supplies each year. These animals could be as thoroughly protected as is the fur seal if proper regulations were framed and provisions made for their rigid enforcement. All the expenses arising from such protection could be met by a tax of one or two dollars upon each skin.

URSIDE.

THALASSARCTOS MARITIMUS (Linn.). Polar Bear (Esk. *Nú'-'nu-ók*).

Biographical notes.—As is well known, this species has a strictly maritime distribution. On the mainland coast of Alaska it is almost unknown in summer, even along the extreme northern shore. In winter it is rather common from the mouth of the Mackenzie River to Bering Straits, with the exception of Kotzebue Sound, where the unbroken character of the winter ice prevents it from securing food.

As the Arctic ice closes the sea north of Bering Straits in October and November large numbers of Polar Bears are brought down on the floating pack and pass through the Straits with the ice and reach Saint Lawrence and Saint Matthew Islands, where they are numerous all winter. During severe winters, when the pack ice extends farther south than usual, a single specimen sometimes reaches the Fur Seal Islands, but this is rare. On such seasons they reach the mainland coast of the Territory south to the Yukon mouth, although they are extremely rare on the coast south of the straits.

In the summer of 1880 a half-grown young Polar Bear was killed near Saint Michaels in August, a very unusual occurrence; none had been killed there for many years.

In spring the bears keep along the border of the pack ice and with it pass north through the straits and into the Arctic ocean. Every season, however, large numbers of these animals remain on Saint Matthew Island, where they appear to be permanent residents, as they are, to a much smaller extent, on Saint Lawrence Island.

During the summer of 1874 Mr. Elliott and Lieutenant Maynard found these bears extraordinarily common on Saint Matthews, where Mr. Elliott estimates that there were several hundred at the time of their visit in August. This island is only about 22 miles long and is very narrow. It is essentially Arctic in its flora, the lowlands being covered with small flowering plants, grasses, and mosses, while the hills and ridges are bare and rocky. As their boat approached Hall's Island, just off Saint Matthews, sixteen of these bears were seen, ten of which were on the beach together. The party from the vessel killed fifteen or twenty bears and were satisfied to leave the others undisturbed. The flesh of those killed was pronounced very good eating, perhaps owing to their food being mainly vegetable matter at this time and so rendering the meat less rank than usual. The bears were easily killed and did not show fight in a single instance, and as they were not at all shy there was but little excitement in hunting them. They were fat and were easily approached to within a few yards when asleep, but if they scented the party they at once took flight toward the hills at a good speed. When surprised they arose and sniffed at the party as if curious to learn whether they were friends or foes. This was on August 9, and the females and cubs, usually two, were by themselves. Small parties of three or four young males were scattered about and the old males were found singly. One of the latter measured 8 feet from nose to tail and was estimated to weigh from 1,000 to 1,200 pounds. The muscles of the fore-arm just back of the carpal joint measured 24 inches after the skin was removed. The bears were "all eating grass and roots, digging or browsing, or else heavily sleeping on the hillsides." "Their manner of browsing is very similar to the action of a hog engaged in grazing." Their well-beaten trails crossed the island in every direction.

The foregoing notes present this great bear in quite a different light from the fish and seal-eating animal usually described, and the good condition of the bears obtained by this party showed that they found an abundance of nutritious food on the almost barren slopes of the island.

On the Siberian shore the southern limit of this species is in the vicinity of Plover Bay, just opposite Saint Lawrence Island. On both shores of Bering Straits I found many white bear skins among the Eskimo, which had been obtained in winter, and they were also numerous among the natives along the north coast of Siberia.

The Chukchis, of the North Siberian coast, hunt these bears with dogs and lance, precisely as was the mode formerly in Greenland.

The Eskimo of Saint Lawrence Island and the American coast are well supplied with fire-arms, which they use when bear-hunting. In winter, north of the straits, the bears often become thin and very savage from lack of food.

A number of Eskimo on the Alaskan coast show frightful scars obtained in contests with them in winter. One man, who came on board the *Corwin*, had the entire skin and flesh torn from one side of his head and face, including the eye and ear, yet had escaped and recovered.

One incident was related to me which occurred near Point Hope during the winter of 1880-'81. Two men went out from Point Hope during one of the long winter nights to attend to their seal-nets, which were set through holes in the ice. While at work near each other, one of the men heard a bear approaching over the frosty snow, and having no weapon but a small knife, and the bear being between him and the shore, he threw himself upon his back on the ice and waited. The bear came up in a few moments and smelled about the man from head to foot, and finally pressed his cold nose against the man's lips and nose and sniffed several times; each time the terrified Eskimo held his breath until, as he afterwards said, his lungs nearly burst. The bear suddenly heard the other man at work, and listening for a moment he started towards him at a gallop, while the man he left sprang to his feet and ran for his life for the village and reached it safely. At midday, when the sun had risen a little above the horizon, a large party went out to the spot and found the bear finishing his feast upon the other hunter and soon dispatched him. Cases similar to this occur occasionally all along the coast where the bear is found in winter.

In July and August, 1881, while the *Corwin* was cruising among the ice near Wrangel and Herald Islands, we saw a considerable number of these animals and killed several of them. They were usually upon the ice, and as we drew near made off at a lumbering gallop. Although clumsy in their motions, yet they progressed with surprising speed across the rough and broken surface of the ice. They are difficult to kill unless hit in the head, and a gun of heavy caliber is required to do good work.

A female killed by the writer, the skin of which is in the National Museum, must have weighed 1,000 pounds, and the male, which I shot a few minutes earlier and lost among the floating ice, was very much larger. With this female was a yearling cub, and when the pursuit became pressing and the cub began to tire, she swam behind it with her fore paws one on each side of its back, thus shielding it from danger and urging it along. She continued to do this even after a ball had shattered her spine above her hips, and until wounded in various places and finally disabled.

They swim boldly far out to sea, and while the *Corwin* lay at anchor off the ice during a heavy gale in August, a bear came swimming off to us in the face of the sleet and wind. He had probably smelled our smoke and came off to reconnoiter, but a warm reception changed his mind and he turned and vanished in the fog again. The flesh of the bears we killed was tough and rank. They are guided more by scent than by eyesight, and frequently swim silently along the edge of the ice searching for their prey. Finding a seal basking on the edge of the ice, they rise suddenly between it and the water, crush its skull with a blow of the paw, and feast upon it at leisure. The whalers claim that they capture fair-sized walruses by creeping up to the latter, while they are asleep on the ice, and dragging them away from the water.

With the possible exception of the Californian Grizzly, these bears are unquestionably the most powerful of their kind. In summer they rarely attack man, and usually fly from him. One old whaling captain, who has since been lost with ship and crew among the ice, was surprised by one while he was cutting tasks from some walruses on the ice; the bear came at him open-mouthed, but a blow from the ax laid his skull open and closed the fight.

There is no record of the White Bear on the Aleutian Islands, where it is unknown; and, except on Saint Lawrence and Saint Matthew Islands, they are virtually unknown south of Bering Straits in summer.

URSUS AMERICANUS Pallas. Black Bear (Esk. *Tún-í-gúk-í-lik*).

Mr. Nelson obtained a skull from Nulato which differs in no way from skulls of the Black Bear from the State of New York. It is adult but not old, the fronto-parietal and other sutures being plainly marked and the cusps of the molars but little worn. Its dimensions are as follows:

Measurements.

[Skull No. 21491 (250); Nulato.]

	Millimeters.
Basio-cranial length.....	261
Zygomatic width.....	166
Least distance between orbits in front.....	94
Distance between post-orbital processes.....	91
Length of nasal.....	68
Length of "palate".....	144
Anterior margin of canine to posterior margin of last molar.....	169
Greatest length of mandible.....	190
Height of mandible from extremity of angle to center of coronoid margin.....	81

List of specimens.

Museum number.	Collector's number.	Locality.	Date.	
21491	198 250	Andrenefaki..... Nulato.....	Autumn, 1879	Skull. Do.

Biographical notes.—Throughout the Territory, wherever trees and large bushes occur, this animal is found, but it is far more numerous in the interior than near the coast. North of Bristol Bay they very rarely reach the immediate vicinity of the sea, but occur on the peninsula of Aliaska and the adjacent island of Unimak. They are unknown on the remainder of the Aleutian chain and the islands of Bering Sea, but occur on Kadiak Island and southward along the coast. The headwaters of the Yukon and Kuskokwim Rivers seem to be their center of abundance in Northern Alaska, although hundreds of their skins are obtained each year at Nulato and Anvik.

In November, or the last of October, when severe weather begins, these bears find some sheltered cleft or cavern in the rocks, where they prepare a bed of grasses and other soft material and retire to hibernate until warm weather in April and May thaws them out again. On the Upper Yukon the Indians shoot, spear, or trap them, and some of the bravest and most powerful hunters sometimes attack and kill them with a hunting knife. This is not often tried, however, and before the hunter makes the attack he wraps a blanket or his hunting shirt around his left fore-arm, and, with the knife in his right hand, meets the bear. As the latter rises upon his haunches the protected arm is thrust out for the bear to seize with teeth and claws, and at the same time the fatal thrust of the knife is made under the guard thus formed.

In winter or spring, when the Indians find a bear's den, the entrance is nearly closed with logs, leaving a hole large enough for the bear to thrust out his head. The bear is then stirred up until he awakes and rushes to the entrance of his den in a rage and receives a blow from an ax or a bullet that kills him on the spot. The young men sometimes make the logs fast about the entrance, so that the bear cannot escape, and then take the maidens of their choice out and let them shoot the bear when it thrusts its head out of the small hole left for that purpose.

The Indian dogs are very useful in searching for these hiding places, and sometimes find them under a considerable depth of snow. In spring these bears frequent the banks of streams, where the dead or disabled salmon cast ashore afford them an abundance of food. Later in the season the blueberries and other fruits growing on the hillsides furnish them forage, upon which they fatten and become excellent eating. The fur traders all tell of occasionally seeing black bears with a white spot on the chest in front; this white area is sometimes quite large.

Both Eskimo and Indians give bears credit for great knowledge and cunning. A hunter of the former people religiously refrains from speaking in a disrespectful manner of a bear, and is also

very careful not to tell any one if he intends going on a bear hunt. They believe that the bear would be instantly aware of their intention should they speak of it, and a person who speaks disrespectfully of bears or makes sport of them in any way is in danger of being attacked by them when he goes into the hills on his next hunt.

The Black Bear figures very often in the religious dances of the Eskimo, and among the masks obtained by me along the coast of Bering Sea are a number representing the head of this animal.

Veniaminov, in writing of the animals of the Aleutian Islands, states that these bears were found on the easternmost of the islands.

From Elliott's translation of this account I quote the following notes, which refer also to the Cinnamon Bear: "The hunters are only afraid of those which have torn ears." Speaking of their habits on the mainland, he says that "At the time of salmon running in the rivers, bears generally go there and capture fish." "The bears go into the water above their knees, stand up opposite the stream, and watch a fit opportunity when they can grab or snatch the fish, which, when they see it near, they instantly strike at with their paws, and most always hit; then they either throw or carry their prey to the beach and return to continue their work, until they have as many as they want." The bears only eat the head, as this is the fattest part of the fish.

URSUS AMERICANUS CINNAMONEUS Bachman. Cinnamon Bear. (Esk. *Tá ká-ká*).

Biographical notes.—This animal has a more general distribution in Northern Alaska than its black relative. The wooded country, the bare, rocky mountain sides and the desolate barrens appear to be almost equally favored by them, though at times an abundance of food draws them toward certain districts. The fur traders from the entire course of the Yukon bring many of their skins to Saint Michaels each spring, and the Red Bear is well known to all the mainland coast tribes of the Territory from near the extreme northern part of the Arctic coast southward. They are reported as being extremely numerous about the head of Bristol Bay, also at various points along the peninsula of Alaska and the adjacent Pacific coast to the eastward.

Although the natives, both Eskimo and Indian, do not consider the Black Bear a very formidable antagonist under ordinary circumstances, yet the Red Bear is almost universally dreaded among them for its fierce and relentless temper. They have the reputation of exhibiting their ferocious character even without provocation, and if wounded they become very dangerous. Many native hunters will permit this bear to pass undisturbed unless they have him at great disadvantage.

In common with the other kinds of bears this animal figures in the Eskimo and Indian legends.

They feed upon the same berries and fish as does the Black Bear, and in certain districts about the peninsula of Alaska in June and July, regular paths are trodden along the banks of the larger streams where they search for the exhausted salmon which swarm in the streams at this time.

In some instances when a natural shelter cannot be found in which they can pass the winter the bears go intelligently at work to make one. Along the Pacific coast of the Territory this shelter is often formed by an excavation on a steep hillside, but in the Lower Yukon Valley, where the soil is perpetually frozen within a short distance of the surface, they are forced to adopt another measure. Fragments of wood, long branches, and brush are piled up into a dome-shaped mass in some secluded spot in the woods, and under this the bear ensconces himself for the winter, and the first snowfall puts a good roof over his quarters.

During the winter of 1879-'80 a couple of Indian boys were out hunting ptarmigan below Anvik, on the Yukon, with an old shot-gun, and one of them felt the snow give way beneath his foot in passing over a slight hummock in the woods. Finding a small opening extending down several feet the boys got a long stick and began poking about in it. Very soon a large Cinnamon Bear began stirring about and thrust his head partly out of the hole the boys had made, but, owing to his brush-house being frozen fast to the ground, he was unable to get further, and one of the boys placed the muzzle of the gun close to his head and killed him with bird-shot. The meat of this animal was lean and tough, but was not noticeably rank in flavor.

The skin of this species is of very little commercial value compared with that of the Black Bear. The traders buy but few of them and they are used by the natives for making dog harnesses, also for sleeping mats and for flaps to hang in the inner doors of their houses.

As with the Black Bear their hibernation lasts from October to April.

During the cruise of the Corwin I saw skins of this animal among the Eskimo north to the vicinity of Point Barrow on the Alaskan coast, and on the Siberian side skins of what appeared to be a precisely similar animal were rather common among the natives both on the Arctic and the Bering Sea coasts. According to the Chukchi these skins were obtained in the neighboring hills, and in some cases the bears were killed with the long lance, which all of the men there carry.

A few days before we visited the head of Plover Bay a Red Bear came down from the hills and smelled around a skin tent pitched on the shore, and when he came to a spot where a pile of blubber lay just inside he coolly tore a hole in the tent-cover and thrusting in his head made a feast while several women and children sat on the farther side of the tent shivering with fear. The men were all absent at the time, so bruin walked off unmolested when he had finished.

The reindeer herders all carry long lances to protect themselves and their deer from these bears.

The amount of individual variation in the color of the fur of the Red Bear is extremely great and extends from various shades of brown to a bright cinnamon-red.

URSUS HORRIBILIS Ord. Grizzly Bear (Esk. *Tū-kū-kā*).

Biographical notes.—Wherever the Red Bear occurs in Alaska there is found also a bear of about the same size but colored and marked precisely like the "Silver-tipped" Grizzly of the Central Rocky Mountain region of the United States. The Grizzlies and the Red Bears of the Yukon Valley offer an interminable amount of individual variation in color. The skins intergrade so that I have frequently thought they formed but extremes of the same species. The Red Bear varies from light rufous to a dark chestnut and reddish or cinnamon brown. The Grizzly often approaches the latter color very closely, but is nearly always easily distinguishable by the gray tips on the hairs. At times this is quite obsolete, and again it is present to an extreme degree, rendering the skin a light gray or silvery brown.

Skins of both the Red and the Grizzly Bear average very much larger than those of the Black Bear, so far as I could judge from the large number brought into Saint Michaels from the surrounding region during my stay there.

Owing to the superstitious fears of the natives I found it nearly impossible to secure bear skulls, and as I was confined to the vicinity of Saint Michaels during summer I was unable to make any comparisons of these animals in the flesh.

As a rule the fur is longer upon the Grizzly than upon the Red Bear.

The habits and distribution of the two are nearly identical.

Both species find their extreme northern limit well within the Arctic circle in about 69° in Alaska. As the Black and the Barren Ground Bear reach about the same latitude it will be seen that the inland range to the north of all these bears laps the coastwise range of the Polar Bear by seven or eight degrees.

Petroff found the "Brown Bear" (by which name he refers to both the Cinnamon and Grizzly) very common on Kadiak Island and on the shores of Cook's Inlet on the mainland, where the largest specimens occur. A skin of one killed in the vicinity of Kenai Mission in the summer of 1880 was 14 feet and 2 inches long. He further states that brown bears occur in parties of twenty or thirty on the mountains bordering the western side of Cook's Inlet.

URSUS RICHARDSONI Aud. & Bachm. Barren Ground Bear (Esk. *Tū-kū-kā*).

Biographical notes.—This little-known animal occurs about the headwaters of the Yukon, and in fact all along the eastern boundary of the Territory from about 68° south. From the rarity of its skin among the large number of bear-skins brought to Saint Michaels each year by the fur traders, the species may be considered very rare in the region mentioned. I did not see a skin from below the mouth of the Tanana River on the Yukon, nor could I learn of its occurrence on the Pacific slope of the Alaskan Mountains.

In Petroff's Report on the Population, Industries, and Resources of Alaska, Census Office, 1884, he classes the Cinnamon and the Grizzly Bears together under the heading of Brown Bears, or *Ursus richardsoni*, and ignores the existence of the present animal.

The very light color of this species would render the name of Yellow Bear suitable for it.

The half-dozen skins which came under my notice were all very heavily furred, and of a dingy yellowish, in some cases approaching a whitish, but not in the least suggesting an albino. The fur was dense and matted in all, and very much heavier than on the other bears taken at the same time and place. The skins are not large, appearing to average about the size of a well-grown Black Bear, and never reaching the great size of a large Cinnamon Bear.

The facts regarding its distribution were secured from the fur traders, who could not furnish anything regarding its habits. The latter are probably not peculiar unless the animal's light color and heavy fur indicate that it spends a smaller part of the winter in its den than the other species, which is not likely, as its range is in the part of the continent where the cold in winter is very great and long periods of very low temperature prevail.

PROCIDÆ.

ERIGNATHUS BARBATUS (FABR.). Bearded Seal (Esk. *Mik-klük*).

Three skulls of this seal were obtained. No. 20783, adult, though not old, has the teeth worn down to the roots, a condition which seems to be arrived at quite early in this species. Nos. 21466, 21467, having a basiscranial length of 191^{mm} and 187^{mm}, respectively, are still young; the occipito-sphenoidal and other sutures are still open.

List of specimens.

Museum number.	Collector's number.	Locality.	Date.	
20783	7	Saint Michaels	September, 1878	Skull.
21466	12	do	October, 1879	Do.
21467	51	do	Fall of 1879	Do.
.....	82	do	.....	Do.
.....	276, 157	do	September, 1880	Skin and skull.
13929	130, 191	do	October, 1879	Fatal skin and skull.
21468	65	Sledge Island	.....	Skin.
.....	56	Cape Prince of Wales	.....	Do.

Measurements of three skulls.

Museum number.	Collector's number.	Basiscranial length.	Breadth at anterior pre-occipital arches.	Greatest breadth at zygomatic arches.	End of pterygoid hamuli.	Inner edge of last molar.	Mouton audiotorus.	Glensid process.	Palato-maxillary suture to end of pterygoid hamuli.	Length of alveolar border of maxilla.	Length of nasal bones.	Anterior breadth of nasal bones.	Breadth of nasal bones at fronto-maxillary suture.	Breadth of skull at canines.	Least breadth of skull interorbitally.	Breadth of posterior nares (transversely).	Breadth of anterior nares (transversely).	Greatest breadth of skull at auditory bullæ.	Length of brain case.	Greatest width of brain case.	Length of lower jaw.	Front edge of ramus to posterior edge of last molar.
20783	7	215	129	124	125	77	155	146	51	77	41	21	14	46	23	33	23	87	99	106	143	63
21466	12	191	122	122	106	66	139	129	45	64	46	23	15	36	24	23	30	76	91	105	124	52
21467	51	187	116	116	102	66	142	124	41	65	39	20	11	31	22	35	29	84	95	107	121	51

Biographical notes.—The present species is the largest of the hair seals found on the Alaskan coast, and the males reach a weight of six or eight hundred pounds; the females are somewhat smaller. Its distribution is more northerly than that of the Harbor Seal. On the south the limit of its range coincides very closely with the northern limit of the range of the Sea Lion.

The Bearded Seal is rather common along the Alaskan coast of Bering Sea south to Bristol Bay, but it is not found on the Aleutian Islands nor about the Fur Seal group, except possibly as a winter visitor with the pack-ice about the latter islands. On the coast south of Cape Vancouver they are far less common than north of that point.

Wagner's record of this animal from Sitka, as quoted by Allen (*N. A. Pinnipeds*, p. 669), is certainly erroneous, as this species is unknown from the American shore of the North Pacific. This record probably arose through a misunderstanding.

Sitka was formerly a central distributing point of supplies for the Territory, and then, as now, the Bearded Seal skins from Bering Sea were an article of commerce prized by the natives of the coast and islands, so that the presence of a skin at Sitka does not necessarily imply that it was captured there. This species is particularly fond of the ice-pack, and the warm water of the Pacific about Sitka would not be very attractive to an animal which winters in the Arctic pack.

From Cape Vancouver north through Bering Straits and along the coast to Point Barrow, they are found rather commonly, but always less numerous than the Harbor Seal. Like the latter species they are valuable to the Eskimo, to whom their flesh and oil furnish food. Their skins are the most highly prized kind for covering the kayak and umiak and for boot-soles, and when cut into strips make a very strong and durable cord.

They keep offshore and about the outlying islands and outer reefs more than does the Harbor Seal. In autumn, however, they come into bays and along shore, so that in September and October many of them are taken in nets set off the points. During March, April, and May they are hunted along the seaward edge of the shore-ice before it breaks up, and also among the moving pack-ice. At this latter season they haul up on the ice and are shot, or are shot or speared in the tide-cracks or among the loose ice. When killed in the water at this season they do not sink, owing to the thickness of their blubber.

Their food consists mainly of fishes, judging from the stomachs of those I saw at Saint Michaels; from the stomachs I obtained some small deep-water fishes almost intact.

The young are born from the end of March to the first of May. They appear disproportionately large when first born, and will weigh in the neighborhood of 100 pounds. One young Bearded Seal which I saw brought in by an Eskimo, who claimed to have removed it from the mother, had the body entirely covered with the stiff steel-gray hairs, such as they have after being born, and no signs of the woolly coat, such as the newly-born Harbor Seal exhibits, were to be seen.

These animals move about with the pack-ice to a great extent, but they do not appear to have any defined migratory movement, as they are found in Bering Sea all summer, although the pack-ice usually disappears there in June, and Murdoch found them wintering in the vicinity of Point Barrow when the ice was broken enough to permit, so they may be classed as resident wherever found on the Alaskan shore. They are in no way gregarious, but sometimes two or three will be found in company.

The young are dark silvery gray, becoming lighter on the lower surface, and an appearance of indistinct mottling is often found. The muzzle of both young and old is of a peculiar reddish color, which is more marked in the adults and sometimes extends back to the eyes. The adults are nearly uniform in color, being only a little paler below, and without spots or mottling in all the specimens seen by me. The usual color is a silvery yellowish or very light grayish color, and almost yellowish white in many instances. The sexes are alike, except that the female is smaller than the male.

The flesh of this species is excellent eating when freshly killed, and the blubber is tasteless and much like very fat pork. If kept a few days, however, the flesh and blubber become rank and repulsive to any but an educated taste.

During the summer of 1881 we found this species at Saint Lawrence and the Bering Straits Islands and upon the Siberian Arctic coast west to North Cape, but they were not seen near Wrangel or Herald Islands, although they undoubtedly occur there.

On the Siberian coast of Bering Sea we found them from the Straits to Plover Bay, and they have been taken south to the mouth of the Amoor River on that coast.

PHOCA FASCIATA Zimmermann. Ribbon Seal (Esk. *Käs-ghû-lik*).

Collector's number.	Locality.	
145	Cape Vancouver	Clothes bag.
64	Cape Prince of Wales	Skin.

Biographical notes.—This is the handsomest and least known of the Alaskan seals. They are found commonly at only a few points on the coast of Bering Sea. Their southern limit on the mainland coast is reached about the rocky shores of Nunevak Island and Cape Vancouver. Stray individuals may occur about the mouth of the Kuskokwina River, but if so they are very rare. About Cape Rumiantzoff, or Romanzoff, just south of the Yukon mouth, they are rather common in winter, and some are said to remain there all summer. At the Yukon mouth and about the shores of Norton Sound they are extremely rare, but they sometimes occur off the rocky headlands when the ice breaks up in spring, about the last of May or first of June. About the shore and islands of Bering Straits they are rather common in spring and fall, going and coming with the pack-ice.

The Eskimo living in the straits and along the adjacent coast make many of their skins into clothes-bags, which are prized on account of the ornamental character of the coloring. The largest specimens must attain a length of about 6 feet.

During the cruise of the *Corwin*, in the summer of 1881, we saw these seals repeatedly upon the border of the ice-pack along the northern coast of Siberia and near Wrangel and Herald Islands. They were rather common in the vicinity of the two last named places and were usually found basking singly upon a fragment of ice in the loose drift before we reached the main pack.

The contrasting dark chestnut-brown and light markings render them very conspicuous objects, and they are easily recognized at a long distance when lying upon the ice. They were not shy, and several times the steamer came within a hundred yards before they noticed it. They would then raise their heads and after a deliberate stare tumble into the water, and were seen for some time swimming with the head well raised and intently watching the vessel.

We did not see them near Point Barrow, but Mr. Murdoch notes them as stragglers there, and two were killed during his stay at that point.

The Eskimo prize the skin of this species very highly, and the people of Bering Straits carry them along the coast in every direction to barter them with the people whose territory does not yield them.

The skins are tanned with the hair on and are entire, except for a slit in the abdomen. This slit is provided with eyelet holes for lacing it up, and thus is improvised into what is considered a fashionable traveling bag among the Eskimo. These bags are used for storing extra clothing, furs, or other valuable articles likely to be lost or injured by lying about in the house or while traveling.

On the Siberian coast south of Bering Straits this species ranges far to the southward, even reaching the Kurile Islands.

Scaunton says that the natives of the Aleutian Islands recognized this species as sometimes occurring there, but I never heard of an instance of its being taken either there or at the Fur Seal Islands, and it must be extremely rare, if it occurs there at all. This species is more migratory than any of the other hair seals of Bering Sea. They keep with the ice-pack to a great extent, and the Eskimo living in Bering Straits informed me that they were common there only in fall and spring. In fall they come down from the north with the ice-pack and pass to the southward, and in spring, as the pack retreats through the straits to the north, it is accompanied by these seals. The examples seen by us in the pack during the summer of 1881 were all males.

The females are very much lighter colored than the males and the "ribbon" chestnut markings of the male are but faintly outlined on the female. From the fact that this species ranges so much farther south on the coast of Siberia than it does on the opposite American coast, and that

all of the numerous specimens seen by us in the pack were just north of the Siberian coast, it appears that this species is much more numerous and more widely distributed on the Asiatic shore than on the adjoining American coast.

Although we saw only males in the pack-ice, yet the females must summer there also, since the people obtain both females and young there with the males in the migration.

PHOCA FETIDA Fabricius. Ringed Seal (Esk. *Īsh-ó-g'ik*).

This species occurs with *P. vitulina* at Saint Michaels. Five skulls were obtained, one, No. 21473, having the crowns of the teeth entirely worn away.

The species was obtained by Mr. Murdoch at Point Barrow, but has not apparently been reported hitherto as far south as Norton Sound.

The specimens referred to are from Unalakleet and Saint Michaels. In the smallest skull, No. 21471, having a basi-cranial length of 145^{mm}, the occipito-sphenoidal suture is still open. In proportions they agree entirely with specimens from the North Atlantic, as will appear upon comparison of the subjoined measurements with those given by Allen.

A young individual, about 630^{mm} from nose to tail, agrees very closely with a yearling brought from Cumberland Gulf by Mr. Kumlien. The basal portion of the hairs is not so dark, the whiskers are less full, and the claws are unworn; otherwise the two specimens present a similar appearance.

Measurements of five skulls of *Phoca fœtida*.

Museum number.	Collector's number.	Basal-cranial length.	Breadth at mastoid process.	Greatest breadth of zygomatic arches.	Earl of petrosal foramen.	Highest edge of last molar.	Metatarsal auditories.	Glenoid process.	Palato-maxillary suture behind.	Length of nasal bones.	Anterior breadth of nasal bones.	Breadth of nasal bones at fronto-maxillary suture.	Breadth of cranium at canines.	Least breadth of skull interorbitally.	Transverse width of posterior nares.	Transverse width of anterior nares.	Length of molar-case.	Greatest breadth of incisors.	Length of lower jaw.	Front edge of ramus to posterior edge of molar.
21471	99	145	91	86	74	43	99	91	35	30	10	6	21	7	23	19	67	81	89	39
21473	116	172	167	167	89	53	120	112	40	.....	11	.....	.....	.....	.....	.....	.....	.....	.....	.....
21472	89	172	166	166	90	53	122	112	39	40	11	.....	.....	.....	.....	.....	.....	.....	.....	.....
21470	11	173	191	191	94	56	121	112	40	39	12	.....	.....	.....	.....	.....	.....	.....	.....	.....
21469	119	164	98	98	83	53	114	109	38	42	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

List of specimens.

Museum number.	Collector's number.	Locality.	Date.	Remarks.
21471	99	Saint Michaels	October, 1879	Skull.
21473	116	.....do	January, 1880	Do.
21472	89	.....do	November, 1879	Do.
21470	11	.....do	October, 1879	Do.
21469	119	.....do	1889	Do.

Biographical notes.—The Ringed Seal is an abundant winter resident in the northern half of Bering Sea, its range reaching the mouth of the Kuskokwim River and extending thence in a westerly course across the sea in a line coinciding with the southern edge of the ice-pack. When the ice leaves the shore in spring, and the pack-ice is drifting along the coast in May and the early part of June, these seals are found in considerable numbers among the ice well offshore. They gather in large bunches on large ice-cakes and are hunted there by the Eskimo. The latter wear a shirt made of white sheeting and paddle cautiously up to a piece of ice on which the seals are gathered, and disguised in their white dress are able to land and get among the seals before the latter are alarmed. A stout club is usually employed on such occasions, and sometimes a man will secure a number. This style of hunting is practiced off the Yukon mouth and thence northward, at least to the northern shore of Norton Sound.

In Norton Sound the males become very rank after the last of March, and the Eskimo say that only a part of them are able to eat its flesh at this season, as it makes some of them ill.

The greater number of the animals which congregate on the ice are males, according to the natives. These animals are resident throughout the summer in the northern part of Bering Sea.

In fall they coast along the shore, and many of them are netted, and after the ice forms nets are set through the ice about tide-cracks or near their breathing-holes. Others are spread about these latter places.

Among the skins of this species brought into Saint Michaels a considerable number of melanistic examples were seen, some of which were nearly black, with the dark rings almost completely concealed in the general color.

I found this to be one of the most common species along the Siberian coast, both north and south of Bering Straits, and about Saint Lawrence Island. Mr. Murdoch also records it as the only common species of seal at Point Barrow, where it is resident throughout the year.

This species is but imperfectly migratory in Bering Sea; though some come and go with the ice-pack through Bering Straits, the main body is resident throughout the year.

After the ice leaves the mouth of the Yukon in spring these animals ascend that stream 30 or 40 miles, and are quite numerous on the sand-bars in places far above tidal action. They are shy at this time and difficult to approach while hauled out.

This species is probably the most abundant of any of the hair seals over all the northern shores of Bering Sea and the adjacent Arctic basin.

PHOCA GRÆNLANDICA Fabricius. Harp Seal.

Biographical notes.—The only example of this species seen by me while at Saint Michaels was a young specimen of the second or third year, on which the dark "saddle" marks were just becoming apparent. This skin was brought me from Cape Prince of Wales, on the American side of Bering Straits, where it had been taken in the spring when the ice-pack began running north. The native who brought it said that they were not common there, and seemed to consider it the young of the Ribbon Seal. Unfortunately this skin, with those of two Ribbon Seals from the same locality, decayed in the pickle while awaiting my return from the north, so no detailed description could be made. The skull was crushed and destroyed by the hunter.

This is undoubtedly the seal known to the Norton Sound Eskimo under the name given above, and of which I had vague and unsatisfactory accounts.

From the fact that among the many thousand seal-skins seen by me during my residence and travel along the shore of Bering Sea there was but one of this species, it may be safely considered that this seal is of excessive rarity there.

Mr. Allen, in his monograph, mentions that Temminck records having examined three skins of this species from Sitka; but, considering that we have no subsequent record of its capture in that now well-known region, and that it is unknown from the Aleutian Islands and is of such extreme rarity in Bering Sea, that record can be safely considered as more than doubtful. Pallas and Steller both record this species from Kamtchatka, where, like the Ribbon Seal, it may be resident.

During the cruise of the *Corwin* in the summer of 1881 I was fortunate enough to add a little to the known distribution of the "Saddle-back." While cruising among the ice about Wrangel and Herald Islands several adults were seen, some of which were within a very short distance of the vessel. On August 12, in particular, while we were steaming through the pack off the shore of Wrangel Island, two of these seals were seen close alongside. One came up within 20 yards of us and gazed curiously at the vessel as it pushed against a slowly-yielding mass of ice.

The chestnut-brown of the animal's head was very conspicuous, and I called Captain Hooper's attention to it, whereupon he said that he had seen a number of these animals in the pack along this coast while there the previous year. This is good evidence that the "Saddle-back" is a regular and not uncommon summer resident in the ice-pack northwest of Bering Straits, and it probably winters there as well. South of Bering Straits its range appears to coincide very closely with that of the Ribbon Seal, but it is very much less common. Now that attention is called to its presence in this region, future explorers may find it more or less widely distributed, particularly along the Asiatic coast.

PHOCA VITULINA Linn. Harbor Seal (Esk. *Nai-yik'*).Measurements of four skulls of *P. vitulina*.

Museum number.	Collector's number.	Basiscranial length.	Breadth of mastoid process.	Greatest breadth of zygomatic arches.	Anterior edge of intermaxilla to—	Glomol process.	Palato-maxillary suture to end of prepygoid hamuli.	Length of nasal bones.	Anterior breadth of nasal bones.	Breadth of nasal bones at fronto-maxillary suture.	Breadth of skull at canines.	Least breadth of skull interorbitally.	Transverse breadth of posterior nares.	Transverse breadth of anterior nares.	Length of brain case.	Greatest breadth of brain case.	Length of lower jaw.	Front edge of ramus to posterior edge last molar.			
21474	49	163	102	91	85	50	114	107	37	38	11	10	28	11	28	32	73	86	102	40	Young
21477	100	159	104	85	80	54	110	104	35	34	14	10	26	12	29	32	73	85	99	46	Do.
21475	50	164	100	91	83	55	112	105	35	37	12	9	27	11	27	32	73	81	101	49	Do.
21476	982 1284	170	101	94	88	58	117	110	40	39	13	10	28	11	29	35	70	84	106	50	Do.

List of specimens.

Museum number.	Collector's number.	Locality.	Date	
21474	49	Saint Michael's	Fall of 1879	Skull.
21477	100	.....do	October, 1879 ..	Do.
21475	50	.....do	Fall of 1879	Do.
22476	982	.....do	October, 1879 ..	Do.
	1284	.....do	September, 1877.	Skin.
}	47	.....do .....	.....	.....
	55	.....do .....	.....	.....
}	451	.....do	October, 1878 ..	Young of No. 50. Fetus in alcohol.

Biographical notes.—This species is a widely-spread and common one along the entire coast of Alaska, except on the extreme northern portion, where it is comparatively rare. It is not abundant about Point Barrow, but from the vicinity of Cape Lisburne south to Bering Straits it is very common. In Eschscholtz Bay, at the head of Kotzebue Sound, we found them common in the summer of 1881, and they were also numerous along the Arctic coast of Siberia from the straits to North Cape. South of the straits in Bering Sea this is a common species everywhere along both the American and Siberian coasts, and along the Aleutian Islands as well as the Fur Seal group and the other islands of this sea. They are also common along the coast of the Pacific from the Aleutian Islands, east and south, to the southern point of the Territory.

As a rule they are found singly, and are shot upon the ice or speared in the water. After the last of May they are rarely shot in the water, as at that season their coat of blubber is very thin, and they sink at once.

Rocky islands, like those of the Aleutian chain and the Fur Seal group, are favored by these animals, but in the former islands they have been driven away from many places by persistent hunting. They are less disturbed on the Fur Seal Islands, and are more common there than in any other locality known to me. There, according to Elliott, they gather into groups of thirty individuals, or thereabouts, on the shore, keeping close to the water-line, ready to plunge in at the first alarm. They are resident there, and bring forth their young on the outlying rocks in spring. North of these islands the young are born upon the ice during April and May.

The Eskimo obtain many of the young at this season, and when only a few days old they are odd-looking little beasts. They are covered with a thick coat of slightly curly or "crinkled" white hair an inch or so long. This hair is silky, and makes very warm, handsome mittens.

The adults make round holes through thin places in the ice, working from below, or come out through the tide cracks and remain basking in the sun on the edge of the openings a large portion of the time at this season.

Before the young are born the parents are shy and watchful when hauled out on the ice, and after the young appear they become doubly wary. At this time the foxes and ravens wander about on the ice and destroy many of the young before they learn to take care of themselves. When a pup

seal is found with its parent off her guard or absent it has little chance for its life. A little later the ravens are joined by the Glaucous Gull, and at all times the White Bears hunt the seals, both young and old, with success.

When the ice leaves the coast the Eskimo hunt the seals in their kyaks, using a light spear, until toward midsummer, when the seals move offshore or go to far-outlying reefs and points. When the cold storms begin in September they return along shore again and enter the inner bays and sheltered coves. At this time many rawhide nets, with large meshes, are set off the rocky points, and large numbers of the various species of hair seals are taken. Later, when the sea is frozen over, nets are set about the breathing holes with some success. These breathing holes are usually made by the seals when the ice is formed or is but a foot or so thick. At first it is a circular opening, a foot or more across, but the spray and vapor thrown up by the seal as it rises to breathe soon builds a dome of frostwork over the hole with a small orifice in the center. The hunters go out and search for these openings, and when one is found they push a long straw down into the water, with one end projecting through the top of the hole, and then, spear in hand, wait for the seal. The latter pushes up the straw when he rises to breathe, and the spear is driven through the frail roof and into his head. Then, holding the victim by a strong cord attached to the spear-head, the hunter breaks the ice and drags out his victim.

Next to *Phoca fetida* this is the commonest hair seal in Alaska, and is of great value to the Eskimo. This species, with *P. fetida*, furnish most of the Eskimo with food and material. From their skins they make all of their fine rawhide lines and net-twines, most of their kyak covers, their waterproof boots, trousers, mittens, and clothing bags, besides other articles. Their flesh and oil fill out the coast hunter's scanty store and carry him through the terrible northern winters.

They are partly migratory, a portion of them following the ice-pack through the straits in spring, and returning with it in fall, but the majority of the individuals are resident wherever found. The young are about 3½ feet long in fall and weigh about 50 pounds. They are very pretty animals at this age, their large soft eyes and handsomely shaped heads, with their beautiful coat of dark, silvery-gray hair, indistinctly mottled and spotted with darker color, forming a very attractive combination.

With *P. fetida*, this species ascends the Yukon in summer, and several instances are known to me of their being taken over 300 miles above tide-water in this stream. They also go far up the Kaskoquim River at this season. The seals reported as occurring in the fresh-water lake of Hianna, back of Bristol Bay, and also in another lake south of the Yukon, are undoubtedly either this species or *Phoca fetida*.

CALLORHINUS URSINUS (Linn.). Fur Seal (Esk. *A-tak*).

Biographical notes.—This is by far the most valuable fur-bearing animal of Alaska, and probably of the world. The annual catch of 100,000 skins on the Alaskan Fur Seal Islands of Saint Paul and Saint George yields from \$1,000,000 to \$2,000,000 in the London market, according to the demand, and for some years past the sum has closely approached the latter figures. From forty to fifty thousand skins are taken on Copper and Bering Islands, on the Siberian coast, each year, and a few thousand more are taken by native and white hunters along the coasts of the Pacific during the migrations.

The range of this seal is becoming more and more restricted in Bering Sea. Formerly it was taken every summer along the coast of Norton Sound and sometimes about the southern entrance to Bering Straits.

The old Eskimo along the eastern coast of Bering Sea know it well and recognize a piece of its skin on sight, while it has a distinctive name in all the coast dialects north to the vicinity of the straits.

In July, 1877, a male Fur Seal hauled up on the rocks within 200 yards of Saint Michaels and remained some time. It became frightened and took to the water, where I shot and killed it. This was the only one seen during my stay there, but the Eskimo said that formerly they were regular but rare summer visitors to that vicinity. At present they sometimes wander to the vicinity of

Cape Romanzoff, but are mainly limited to the vicinity of the Fur Seal Islands in summer and the bays and passes of the eastern Aleutian Islands during the migrations. During the summer they are unknown south of the Aleutian Islands and are unknown north of them in winter.

On the first of May each year the old males begin to go north through the passes in the Aleutian Islands and seek the beaches on the Fur Seal Islands. About a month later the main body arrives and millions of these intelligent animals are then found crowding the shore line of Saint Paul and Saint George wherever suitable ground occurs. The males take their places on the shore first, the stronger ones near the water and the weaker further back. As the females land the males fight desperate battles over them and the victors take them by the back with their teeth and place them close alongside themselves where they can guard them from possible rivals. This goes on until many of the stronger males have a harem numbering from fifteen to forty-five members, according to Elliott. In preserving this from intrusion by surrounding males, which are on the alert to steal females from one another, they sustain many severe wounds and are sometimes killed. The females also sometimes fall victims to the fury of the combatants.

For about three months from their landing these seals remain on shore without a single visit to the water and consequently without tasting food. When they land they are fat, and during this long fast they must exist by the absorption of their oil.

During August they commence to move to and from the water, and the sea about the islands swarms with them. They are very playful in the water, particularly the half grown young, and the manner in which they frolic about and leap from the water is very amusing. Many of them remain about these islands until forced away by the weather, the last remaining until the end of December. In September, 1851, when we steamed by these islands, the water swarmed with the seals, while the shores were shaded a dun brown by the thousands which still occupied their sloping sides.

When the seals leave these islands they pass south through the Aleutian chain and a portion of them straggle along the coast southward to California. Only a comparatively small number are found there, however, and as they certainly do not winter about the Aleutian Islands their main wintering ground is still unknown. This uncertainty has led some sailors familiar with the animal's habits to imagine that they go to some unknown island in the middle of the North Pacific. Vessels have even cruised there in search of such an island, but it has never been found. The intelligence exhibited by these animals in returning each spring from their wide-spread roaming over thousands of miles of the stormy Pacific is marvelous.

On the first of May, 1877, as we steamed northward, and while over 100 miles from the nearest of the Aleutian Islands, quite a number of Fur Seals were seen heading for the nearest pass and almost in a direct line for the two small islands where they make their summer home. The damp, cloudy, and foggy weather, which is almost unbroken about the seal islands in summer, is congenial to the seals and a sunshiny day causes them great discomfort. About the seal islands their natural enemies are confined to an occasional Killer Whale.

On these islands the animals are surrounded and driven back from the shore in droves or "pods" by the Aleuts, and at a designated spot are brained with clubs and their skins removed, packed in salt, and in the course of time shipped to the London market by way of San Francisco.

The skins when taken from the animals are thick and have a heavy layer of blubber on the inner side. On the outer side they are covered with coarse hairs, which conceals the fine inner fur and give it an appearance entirely unlike the fur when ready for the fashionable wearer. In the hands of the manufacturer the fat is removed, and the skin shaved down until the roots of the heavy outer hairs are cut so that these hairs can be readily removed, leaving the soft under fur. This fur is then cleaned and dyed, when it is ready to be made up.

The males weigh about 400 pounds and the females from 75 to 100.

EUMETOPHIA STELLERI (Lesson). Steller's Sea-lion (Esk. *Wí-nák*).

Biographical notes.—The only place in Alaska where this fine sea-lion is found in abundance at present is about the Fur Seal Islands. Elliott estimated that in 1873 some twenty-five thousand of these animals were occupying the beaches on Saint Paul and about one-third of that number on Saint George Island.

Formerly they were abundant all along the Aleutian chain. They are now so scarce among these islands, and the ones that are found there frequent places so difficult of access, that the Aleuts seem very few of them each year. They are still rather common at a few points along the north shore of Unimak Island and the peninsula of Alaska, while small parties are found scattered all along the Aleutian chain, hauling up on certain rocky points and shelves facing the sea, most of which are well known localities to the Aleuts.

In May, 1877, I saw a small party on the rocks on the north shore of Akoutan, and during the same month a fierce storm outside brought a few of them into the harbor at Unalaska. North of the Fur Seal Islands they are extremely rare or unknown at present, although I learned from the Eskimo of their occasional occurrence north to the Yukon mouth and about the shore of Nunevak Island. From the Aleutian Islands eastward and southward they occur all along the coast to California, where their range overlaps that of the southern species.

Large males of Steller's Sea-lion are from 11 to 12 feet long, according to Mr. Elliott, and weigh about a thousand pounds. The females are much smaller, and weigh about four or five hundred pounds.

After the annual catch of fur seals is secured on the Seal Islands, a drive of several hundred sea-lions is made to procure the skins used in covering the large native boats or umiaks. A few years ago this drive was made very easily, and an abundance of animals found, but at present they are becoming much fewer, and it is almost or quite impossible to secure the full number. It is probably a matter of but a few years before they will become rare or unknown upon these islands, where they were formerly more numerous than anywhere else.

Like the fur seal, this animal is migratory, arriving at its breeding-grounds on the Fur Seal Islands in May, and the last of them leave there when the severe winter weather begins, about the first of January. Their migration is not so general as that of the fur seal, as some of them are found about the Seal Islands the entire winter during mild seasons.

Mr. Elliott claims that the flesh of a young sea-lion is tender, juicy, and something like veal, but becomes rank and tough when the animal approaches maturity. The same may be said of the flesh of the fur seal. The first of the latter meat I ever ate was at Unalaska, and as there was a flock of sheep there at the time I was entirely deceived, thinking I had been eating mutton until told that it was young fur seal. The meat had the color and flavor of good mutton.

The natives of the Seal Islands claim that nearly seventy years ago the sea-lions alone occupied nearly all of the shore line of Saint George Island, and numbered several hundred thousand individuals. By direction of the Russians they were driven off repeatedly until they left the place, and the shore was then occupied by fur seals.

These northern sea-lions have a "deep base growl and a prolonged, steady roar," quite unlike the barking note so characteristic of the southern sea-lion of the California coast. To the natives of the Fur Seal and Aleutian Islands this animal is of the same value as the walrus is to the Eskimo of the coast to the northward. Its skin, flesh, intestines, bones, sinews, and oil all come into play as food or in the simple manufactures of the Aleuts.

Like the fur seal they have a dreaded enemy in the Killer Whale, which pursues and captures them at sea and about their rocky resorts. The native hunters when at sea frequently see them leaping high out of the water in useless endeavor to escape their pursuers. At such times they say it is dangerous for an umiak or other small boat to be in the vicinity, as the animal, in its terror, will sometimes leap into and wreck the boat. They are hunted with gun and spear in the Aleutian Islands, but, like most seals, if shot in the water in summer they will sink at once, owing to the small amount of fat on them at that season.

In common with the fur seal, this species has the habit of swallowing stones. Mr. Elliott found stones weighing a pound or two in their stomachs, and preserved one stomach containing over 10 pounds of such stones.

In the North the young are brought forth in June.

ODOBLEXUS OBESUS (Ill.). Pacific Walrus (Esk. *Ā jĕ-rūk*).

Biographical notes.—The range of this unwieldy animal does not extend south of the Bering Sea shore of the Aleutian Islands. They are unknown there, except on Unimak, the easternmost of these islands, where they sometimes occur in winter. Along the adjacent shore of Bristol Bay, on

the northern side of the Alaskan Peninsula, are several well-known hauling grounds which they visit for a short time each year, about the middle of June. Elliott states that some thirty or thirty-five years previous to 1873 they were sometimes killed on the islands of the Pacific, between Unimak and Kadiak.

From Bristol Bay north to the southern mouth of the Yukon they are rather numerous for a time in spring, just as the ice breaks up, and again in fall, in September and October, before the coast becomes ice-bound. Some winter off the coast between Nunevak Island and Bristol Bay. The coast between the Yukon mouth and Golovina Bay is rarely visited by them now, although they were formerly common there in fall and spring. In Bering Straits they are very numerous every fall and spring, moving south before the ice-pack in autumn, and following it as it retreats into the Arctic in the spring. During nearly all the year a few individuals, mostly males, are found about Walrus Island, off Saint Paul, of the Fur Seal group, where they were formerly abundant. They are also about Saint Matthew Island nearly or quite all of the year, and occur in great abundance about Saint Lawrence Island during the migrations. At the latter periods they are also numerous along the Siberian coast of Bering Sea and the straits. North of the straits they are widely spread in summer, but keep in the close vicinity of the ice-pack.

During the summer of 1881 we found them along the Siberian coast west to Cape North, and thence north to Wrangel and Herald Islands, and along the pack easterly to the Alaskan coast, near Cape Lisburne, and thence north to Point Barrow, but they were not seen away from the vicinity of the ice.

They are hunted by the Eskimo in kayaks, with ivory-pointed spears and the usual seal-skin line and floats. When the animal is exhausted by its efforts to escape the hunters draw near and give the death stroke with an iron or flint headed lance.

On the south shore of Bristol Bay men are landed from vessels in June and left to watch for the Walruses to haul up on the beach at certain points. When a "pod" or herd of them is well ashore one or two old bulls are usually left to watch for danger while the others sleep. The best shot among the hunters now creeps up, and by a successful rifle-shot or two kills the guard. The gun is then put aside, and each hunter, armed with a sharp ax, approaches the sleeping animals and cuts the spines of as many of them as possible before the others become alarmed and stampede for the water and escape. Sometimes the entire herd is captured in this way, but when the alarm is once given the hunters give the survivors all the room necessary to escape, for nothing can stop them.

Several hundred of these animals are sometimes killed in a few days, and after their tusks, containing a few pounds of ivory each, are cut out the carcasses are left and the ground is deserted until the following spring.

The visit of the Walruses to the beaches of Bristol Bay occurs in June, and they remain there only a few days and sometimes only a few hours. I know of one party of hunters who camped a month on one of these hauling grounds waiting for the Walruses. Finally, becoming tired of staying in camp, all hands went egging one day and returned to find, much to their disgust, that the Walruses had been there and vanished again.

In spring and fall they are numerous about Cape Newenham and along the shore just north of the mouth of the Kuskokwim. In this district the water is very shallow, and when the natives find a herd of Walrus in one of the small bays they surround them in kayaks, and, by making a great noise, frighten the animals, so that they will go ashore as soon as they discover that they cannot escape by diving. Once ashore they are killed with lances or guns. A "drive" of about thirty animals was secured near Cape Vancouver in the fall of 1878.

According to the natives living along this strip of coast, the young Walruses are born early in spring, when the ice breaks up, during April and May. They report the Walruses as being very timid and inoffensive animals at all other seasons, but say that the hunters give a female Walrus with young a wide berth at this time. The female becomes very savage, and, like a bear with her cub, she has only to catch sight of an intruder upon her domain to make an attack.

One hunter told me of an instance in which he and a companion, both in kyaks, had an encounter with one of these animals. They were hunting among the drift ice off Cape Vancouver one day in spring, when his companion saw and killed a young Walrus without knowing that the old one was about. A moment later the parent arose from the water and catching sight of them entered a hoarse, bellowing cry and swam rapidly towards them. Both hunters paddled for their lives to a large piece of ice close by and lauded upon it just in time to escape their pursuer. Here they were kept prisoners nearly the entire day, and every time they tried to leave, thinking their enemy gone, they were pursued and forced to return to the ice again.

The people of Bering Straits often meet vicious Walruses at this season. In one instance which came to my hearing a Walrus broke a hole in the top of a man's kyak with its tusks, but the man escaped. Numerous tales are told of their pursuing hunters.

Along the Arctic coast of Alaska and Siberia they are numerous in summer, keeping with the pack-ice and moving offshore with it. In Kotzebue Sound they are unknown or very rare, but are taken in considerable numbers from Point Hope to Point Barrow. In autumn they all leave this region and pass through Bering Straits, wintering along the southern edge of the pack-ice in Bering Sea. While we were cruising along the edge of the ice-pack in the Arctic, north of the straits, in July and August, 1881, we frequently saw large numbers of Walruses upon the ice lying in bunches, which are called "pods" by the whalers and walrus-hunters.

The hearing of these animals is so defective that a man can creep up on the leeward of a "pod," and if he kills the animal on guard at the first shot he may then proceed to kill the entire lot, as they do not heed the report of the gun in the least. A gun carrying a 45-caliber ball is often used, but a 50-caliber is better for this work. A shot striking the nape so as to enter the base of the skull or to shatter some of the cervical vertebrae is almost the only one which is instantaneously fatal, owing to the thickness of the skull in front and on the sides and the animal's tenacity of life. Their sense of smell is claimed to be very acute, and the hunters are careful to approach them from the leeward side. When basking on the ice they keep near the water and tumble clumsily in at the first alarm.

As we coasted along the north Siberian shore in July a number of them were seen as we steamed along the edge of the pack. They were all on small ice-cakes, and as we drew near they would raise their heads and gaze at us a moment and then slide backwards off the ice and disappear in the most amusing manner.

We saw many females with their young in various parts of the Arctic during July and August, and the jealous watchfulness of the mothers was noticeable. The young nearly always swam directly in front of its parent, and in diving the latter carried the little one down by resting her tusks on its shoulders and forcing it under the water. An adult male measured by Mr. Elliott on Walrus Island was nearly 13 feet long with a girth of 14 feet about the shoulders.

When the Russians first occupied the Far Seal Islands the walrus was very numerous there, but the seal hunters soon drove them from Saint Paul and Saint George. On Walrus Island they were not troubled, and Mr. Elliott found a herd of about five hundred bulls in possession there up to 1874; since then they have greatly diminished in numbers there, and will eventually entirely disappear. Their skin is a mottled yellowish-brown, with very short, rough bristles scattered over it. It is wrinkled into folds all about the neck and shoulders. The animal's posteriors are disproportionately small as compared with the anterior half of the body. The males exceed the females in size and reach a ton or more in weight.

The tusks of the female are long and slender and are usually curved inward so that the points nearly touch. The tusks of the males are shorter and stouter, with the ends several inches apart. The largest pair of tusks I ever saw weighed 16 pounds, and they were far larger than the average.

The tusks are used in digging clams, also to aid them in climbing upon the ice or to land on a rocky shore, and in their battles are used as effective weapons. From the pouch of a walrus Elliott took over a bushel of clams, many of which were not crushed.

I have heard the walrus-hunters say that these animals, when on shore, often keep guard by gathering in a body, and then as the leader falls asleep his head drops and he prods the next animal with his tusks; as the latter falls asleep he repeats the performance, and so there is one of the animals continuously on the alert.

To many of the Eskimo, especially on the Arctic shores, this animal is of almost vital importance, and upon Saint Lawrence Island, just south of Bering Straits, over eight hundred Eskimo died in one winter, owing to their missing the fall Walrus hunt while on a prolonged earouse upon whisky obtained from a whaling ship.

To these northern people this animal furnishes material for many uses. Its flesh is food for men and dogs; its oil is also used for food and for lighting and heating the houses. Its skin when tanned and oiled makes a durable cover for their large skin boats; its intestines make waterproof clothing, window-covers, and floats. Its tusks make lance or spear points or are carved into a great variety of useful and ornamental objects, and its bones are used to make heads for spears and other purposes.

The middle of August, 1881, we spoke a Walrus-hunter on the edge of the pack, off Cape Lisburne, and found that he was leaving the hunting ground, complaining that the pack-ice was so thin that when a Walrus was shot the blood from the wound thawed the ice, and caused the edge to break, resulting in the loss of the game before its tusks could be cut out.

The continual pursuit these animals have suffered during the past few seasons has rapidly thinned them out and, owing to the restricted basin which they inhabit, it is only a matter of a few years when they will become comparatively rare where formerly abundant, and unknown in many of their former localities.

To-day it is safe to say that the number of these animals in existence is not over 50 per cent. of the number living ten years ago, and a heavy annual decrease is still going on.

SOREX COOPERI Bachman. Cooper's Shrew (Esk. *U-gu-gi-nák*).

The identification of the shrews while the family is in its present confused condition is very laborious, and the determinations are far from satisfactory. The specimens collected appear to belong to Bachman's *S. cooperi*. They present considerable differences in proportions and coloration, however, which may or may not be indicative of specific distinctness. In the following table of alcoholic specimens it will be observed that number 14976, though agreeing with the other four specimens in the length of the feet, head, and tail, appears to be considerably larger (*i. e.*, the head and body taken together are longer). It should be observed, however, that this specimen appears to have been compressed and thus elongated:

Museum number.	Length of head and body.	Length of tail vertebra.	Length of tail with hairs.	Length of fore foot.	Length of hind foot.	Length of head.
14976	Mm. 57	Mm. 45	Mm. 48	Mm. 10	Mm. 13	Mm. 22
14974	45	45	48	9	13	20
14975	47	50	52	10	14	20
14977	49	41	45	9	13	21
14972	41	35	39	8	11	20

List of specimens.

Museum number.	Collector's number.	Locality.	Date.	Remarks.
14590	17, 110	Saint Michaels.....	Oct. 29, 1879	Skin and skull.
14591	18, 111	do.....	Oct. 29, 1879	do.
14972	424	.....	.....	Alcoholic.
14973	424	.....	.....	do.
14974	424	.....	.....	do.
14975	424	.....	.....	do.
14976	424	.....	.....	do.
14977	424	.....	.....	do.
.....	70	.....	.....	Skull.
.....	97	Saint Michaels.....	Dec. 17, 1879	do.
.....	67	do.....	Dec. —, 1878	Two skins.

Biographical notes.—This, the smallest of northern mammals, is found over all of the Alaskan mainland and is abundant everywhere except perhaps along the extreme northern coast line. In the Yukon district and about Saint Michaels I found that they were difficult to discover in summer, owing to their small size and retiring habits.

In fall the first severe weather brings them about the trading stations and native villages, and there they forage and penetrate every corner of the houses with all the persistence of the domestic mouse. Scores of them were killed about our houses at Saint Michaels every winter, and they

were equally numerous at the other stations throughout the interior. The natives reported them as also numerous in the Bering Straits and Kotzebue Sound districts, but I do not know of their occurrence on the islands of Bering Sea. An abundance of specimens were brought me from along the entire course of the Yukon and from the valley of the Kuskoquim.

These odd little beasts are omnivorous in the widest sense, and insects, meat, fat, flour, or seeds all go to make up their winter bill of fare.

Among the specimens taken in the houses at Saint Michaels I found considerable variation in the size, color of pelage, and in the teeth, but this appeared to be purely individual. After snow-falls they travel from place to place by forcing a passage under the snow, and frequently keep so near the surface that a slight ridge is left to mark their passage. On the ice of the Yukon I have traced a ridge of this kind over a mile, and was repeatedly surprised to see what a direct course the shrews could make for long distances under the surface. These minute tunnels were noted again and again crossing the Yukon from bank to bank.

These little adventurers sometimes tunnel far out on the sea ice, and the Norton Sound Eskimo have a curious superstition connected with such stray individuals. They claim that there is a kind of a water shrew living on the ice at sea which is exactly like the common land shrew in appearance, but which is endowed with demoniac quickness and power to work harm. If one of them is disturbed by a person it darts at the intruder, and burrowing under the skin, works about inside at random and finally enters the heart and kills him. As a consequence of this belief the hunters are in mortal terror if they chance to meet a shrew on the ice at sea, and in one case that I knew of a hunter stood immovable on the ice for several hours until a shrew he happened to meet disappeared from sight, whereupon he hurried home, and his friends all agreed that he had had a very narrow escape.

The Point Barrow party secured a single specimen of another species, *S. Forsteri*, from Meade River, but did not find it near their station, so it is apparently uncommon along the most northern and desolate parts of the mainland coast.

LEPUS TIMIDUS ARCTICUS (Linn.). Polar Hare (Esk. *Kai-okh'-hlik*).

List of specimens.

Museum number.	Collector's number.	Sex.	Locality.	Date.	Remarks.
13887	129	♂	Saint Michaels.....	January 3, 1860.....	Skin and skull.
.....	141	.....	.....	.....	Skin.
15017	49	♀	Nulato.....	Spring of 1878.....	Do.
13886	42	.....	Saint Michaels.....	February, 1878.....	Do.
.....	5	.....	do.....	Winter of 1877-78.....	Skull.
.....	52	.....	do.....	Fall of 1879.....	Do.
.....	109	.....	do.....	January, 1880.....	Do.
.....	115	.....	do.....	do.....	Do.
.....	117	.....	Nulato.....	do.....	Do.
.....	131	.....	Saint Michaels.....	do.....	Do.
.....	225	.....	Yukon.....	March, 1860.....	Do.
.....	247	.....	Saint Michaels.....	do.....	Do.

Biographical notes.—This fine hare is widely distributed in Northern Alaska. It is numerous in all of the open coast country from the mouth of the Kuskoquim River to the Kotzebue Sound district. From this latter point north along the Arctic coast these hares are more and more scarce, until in the vicinity of Point Barrow, where they are unknown, according to Mr. Murdoch. In the interior, however, wherever open barrens are found along the Kuskoquim and Yukon Rivers and to the northward, the Polar Hare is more or less common. On the Bering Sea islands they are unknown except on the islands immediately adjoining the mainland, such as Saint Michaels and Nelson's. The open country of the Yukon delta is their place of greatest abundance so far as I was able to learn. There, in May, 1879, I found them very common. The snow was nearly gone, and while traveling along the small channels between the islands in the pale twilight which marks the nights at that season we saw many hares playing about on the banks. They were often in small parties of from three to five or six, and were not very shy. They were just losing the white winter fur, and, like the surrounding country, were mottled with gray and white.

While camped in this vicinity at that time I found them to be almost entirely nocturnal in their habits, rarely moving about in daytime even during the gloomy days when the sky was

obscured by dense, low-lying clouds. Although they are nocturnal in their habits, yet they see very well in the day, and it is extremely difficult to surprise one in its form. Usually it spies the hunter before he gets within gunshot and leaves the spot in great haste.

During most of the year these animals are essentially solitary, but during April and May they gather into small parties, and sometimes as many as a dozen or more may be found on a single hillside. At this season the beds of creeks and other hollows are filled with slush and water, covering the ice below. This water is frequently several feet deep, and in many instances I saw places where these hares had come down the bank and, judging from their tracks, had plunged in without hesitation and swum across to the opposite side. Their tracks showed by the shortness of the jumps as they approached the water that they were in no way frightened or forced to cross. In one case a stream over 30 yards across was thus passed by one of these animals.

In October they again resume their winter dress. The new snow now preserves their tracks and they once more become an object of pursuit to the Eskimo hunter. They are very shy all winter, and unless surprised and shot in their forms are very difficult to obtain.

The hunters usually go out after a new fall of snow and trail the hare to its form. The hare starts off at a run before the hunter gets within gunshot and the latter follows at a slow trot upon his snow-shoes. This is frequently kept up for a half dozen miles, or perhaps more, until the hare becomes exhausted, and finally allows the hunter to get within easy range and secure the prize. At other times the hunter's breath is exhausted first and he returns home minus the hare. I may say that this was usually the writer's experience.

Were it not for its black ear-tips and large eyes this hare would be very difficult to see in winter, even when sitting on the open snow-covered plain. Their legs are much shorter, and the entire animal is heavier built, than the "jack rabbit" or hare of the western plains, but their weight is about the same. As a consequence they cannot approach their southern congener in the matter of speed.

Their fur is very abundant, and in winter is nearly as light and soft as swan's down. Wolves, foxes, gyrfalcons, and snowy owls are the natural enemies they are forced to guard against. Their skins are very fragile, so that their handsome fur is but little valued. It is used for clothing to a small extent. Their flesh is excellent eating.

During the rutting season some are snared by the hunters, who set fine-meshed sinew nets in places much frequented by them.

In severe winter weather they seek the shelter of willow or alder patches on the slopes of sheltered ravines or in other comfortable situations, but as a rule they are characteristic of the open Arctic barrens, and on the wide expanse of desolate snow their tracks are among the few evidences of life the traveler finds in crossing the Alaskan tundras in winter.

During one winter at Saint Michaels my friend, Mr. Rudolph Neumann, had one of these animals for a pet. It was kept in the dining-room at the fort and became quite domesticated. It was very mischievous, and would sit up before a person and beg for food, and if ignored would attract attention by striking one's legs with its fore-paws. Owing to being teased it finally became ill-tempered, and would strike one's hand a painful blow with its fore-foot when displeased. Eventually it came to a tragic end, as seemed to be the fate of all pets reared about the fort.

LEPUS AMERICANUS AMERICANUS (Erxleben). Northern Varying Hare (Esk. *Mû-gâ-gu-âk*).

List of specimens.

Museum number.	Collector's number.	Sex.	Locality.	Date.	Remarks.
.....	158, 371	.....	Lower Yukon	September, 1880.	Skin and skull.
13882	140	.....	Anvik	February, 1880.	Skin.
13883	141	.....	do	do	Do.
13884	142	.....	do	do	Do.
13018	17	♂	.....	.....	Do.
13019	18	♀	.....	.....	Do.
.....	113	.....	Nulato	January, 1880.	Skull.
.....	119	.....	do	do	Do.
.....	145, 157	.....	Mouth of Tanana River	February, 1880.	13 skulls.
.....	227, 244	.....	Mouth of Yukon River	March, 1880	18 skulls.

Biographical notes.—The ground frequented by this species is the complement of that occupied by the Polar hare. The latter avoids wooded places and the former delights in dense thickets in the midst of such forests as the far north affords. The area over which the spruce forest extends in Alaska covers at the same time nearly the entire range of this rabbit. The few found beyond the limits of the spruces in alder and willow thickets are merely stragglers.

At several points on the coast of Norton Sound, between the Yukon mouth and Golovina Bay, where the spruces approach the shore, these rabbits are numerous, and their range extends, on the Kaviak Peninsula, nearly to the shore of Bering Straits, and also reaches the shore of Kotzebue Sound in one or two places. North of this they occur only in the interior, reaching to about latitude 69°. From this point south to the Alaskan Mountains, and from the peninsula of Alaska east to the British line, they are common or abundant everywhere that spruce or other forests and thickets are found. The dense growth of alders, willows, and cottonwoods on the islands and banks of the Yukon along its entire course forms a favorite shelter, where they are found in great numbers. Some years ago they became excessively abundant along the Upper Yukon, but an epidemic broke out among them one winter and nearly exterminated them throughout several hundred miles of country, and many died elsewhere. Since that time, although becoming more and more numerous each year, they have not reached anything like their former numbers.

Great numbers of them are snared by the Eskimo and Indians by means of sinew nooses set in their runways, and in spring many are taken by organized drives. To make one of these drives all of the inhabitants of a village unite. They proceed to one of the wooded islands in the river, in March or April, before the snow is gone, and after the women have set a multitude of snares at one end of the island all hands proceed to beat the island from the opposite end. The men and boys use guns and shoot as many as possible, but all that are caught in the snares belong to the women, who usually secure the lion's share of the spoils.

These rabbits furnish the main food supply for the Canada Lynx. Not infrequently the fur trader or Indian hears the sharp cry of a rabbit as it is caught by a lynx in the thicket, but a few drops of blood and the tell-tale tracks leading from the spot are the only apparent evidences of the tragedy.

The fur of this species is almost valueless, and is used for clothing only by the poorer natives. Unlike the large hare this species is not a swimmer, and when the spring freshets flood the low bottoms along the Yukon it takes refuge upon any support offered, and will remain prisoner within a few yards of the shore rather than trust itself to the water.

LAGOMYS PRINCEPS Richardson. North American Pika.

The Alaskan specimens are remarkable principally for the paleness of the fur. The head and back are but slightly tinged with fulvous, and the under parts are nearly pure white. The size is large, the flat skins measuring about 8 inches.

List of specimens.

Museum number.	Collector's number.	Locality.	Date.	Remarks.
14383	163	160 to 200 miles south of Fort Yukon..	Summer of 1880....	Skin.
14384	164	.....do.....	.....do.....	Do.
14385	165	.....do.....	.....do.....	Do.

Biographical notes.—Three skins of this hardy species were brought me from the Upper Yukon by Mr. McQuesten. These specimens were taken on the tops of the mountains lying to the south of Fort Yukon and near the Arctic Circle. The Indians of that region report them to be common everywhere in the highest ranges, where they are usually found above timber line. From native accounts their habits appear to be identical with those of their relatives found in the mountains of Colorado and elsewhere in the West. I showed these skins to a fur trader, who has lived many years on the Kuskoquim River, and he recognized them at once, and reported that they are also numerous on the Alaskan Mountains south of that river, and extend their range to the vicinity of the peninsula of Alaska.

Mr. True notes that the Alaskan specimens are larger and paler than more southern examples, and a larger number of specimens may prove that the northern end of the Rocky Mountains affords a geographical race of this animal nearly coincident in its range with the northern form of the Mountain Sheep.

ERETHRIZON DORSATUS EPIXANTHUS (Brandt). Porcupine (Esk. *I-lhää-ko-chik'*).

List of specimens.

Museum number.	Collector's number.	Locality.	Date.	Remarks.
1975	43	Golovina Bay	November, 1877.....	Skin.
.....	44 juv.	.....do.....	.....do.....	Do.
.....	45	Unalakleet	August, 1877.....	Do.
.....	26	Nulato	March, 1878	Fatal.
21489	{ 166 } { 275 } { 167 }	Tanana River.....	Fall, 1889	Skin and skull.
21487	{ 176 } { 176 }	.....do.....	.....do.....	Do.
21488	179	Mission	February, 1890.....	Skull.

Biographical notes.—Throughout Alaska, wherever timber is found growing, this animal is more or less common. They range to the extreme northern limit of the spruce forests in the vicinity of the sixty-ninth degree of latitude, where they endure the most extreme cold, and feed upon the bark and twigs of the cottonwoods, alders, and other deciduous trees and bushes. They are very common along the Upper Yukon, whence the fur traders brought me a number of skins and skulls. They are nearly as common, however, throughout the entire wooded interior. At the head of Norton Sound, where the spruce forest reaches the shore of Bering Sea, they are common, and they are found occasionally in alder patches along the entire Alaskan coast of this sea. They are found at times close to the Arctic coast, about the shores of Kotzebue Sound, and are numerous on the coast of Southeastern Alaska, bordering the Pacific. In winter they are usually discovered in the tree-tops, sometimes in a spruce, but usually in a cottonwood or birch.

Although I have traveled many days in succession, in winter, through districts where the porcupines were known to be common I did not see one alive, nor did I see any tracks which could be referred with certainty to them. From this negative evidence I came to the conclusion that they must be very quiet at this season.

The Indians and Eskimo are very fond of its flesh, and, with the exception of the wolverine, are its only enemies. When the former capture one they singe it thoroughly over the fire and so dispose of the spines, thus rendering the removal of the skin an easy matter.

MUS DECUMANUS Pallas. Common Rat.

Biographical notes.—The House Rat is less numerous and not so widely spread in the Territory as is the common mouse. They are unknown north of the Aleutian Islands, and only occur there at Unalaska, where they sometimes get ashore from ships. These stragglers are soon disposed of by means of trap or gun, so that none are resident there. In Southeastern Alaska they have become resident in considerable numbers at Kadiak and Sitka and probably at other more recent towns in that part of the Territory.

MUS MUSCULUS Linn. Common Mouse.

Biographical notes.—This well-known species has been imported into the Territory, and is common at Sitka, Kadiak, Unalaska, and the Fur Seal Islands. They are unknown at Saint Michaels and along the Yukon and other interior points, where their places are filled by the native species. They are more or less common in all of the towns occupied by white men in the southeastern part of the Territory.

ARVICOLA RIPARIUS BOREALIS (Rich.). Little Northern Meadow Mouse (Esk. *A/-tslin-ük*).

If the small northern meadow mouse is to be recognized as a subspecies of *Arvicola riparius*, all the specimens in this collection may safely be included in it. Dr. Coues gives 4.43 inches as the average length of the head and body of the specimens of *A. riparius* from the Eastern United States which he examined. Of twenty-five skins of individuals, apparently adult, in this collection, the head and body of nine (Series A) measure 3 inches and less; of fourteen (Series B), more than 3 inches and less than 3.5 inches; and of two (Series C), more than 3.50 inches and less than 4 inches. The average length of the tail-vertebrae of eight of the nine specimens first mentioned is .99 inch, and of twenty-three specimens out of the whole series, 1.10 inch. Dr. Coues's average for the same measurement in his series of eastern specimens is 1.59.

In Series A the color is light, and the specimens exhibit a decided uniformity. In Series B and C the color is somewhat darker, but the variation is not great.

List of specimens.

Museum number.	Collector's number.	Locality.	Date.	Remarks.
<i>Series A.</i>				
13573	104, 22	♂ Saint Michaels....	Oct. 25, 1879	Skin and skull.
13583	107, 23	♂ "do.....	Oct. 25, 1879	Do.
14307	105	♂ "do.....	Oct. 25, 1879	Skin.
14368	106, 26	♂ "do.....	Oct. 25, 1879	Skin and skull.
14369	109, 20	♂ "do.....	Oct. 25, 1879	Do.
14578	121, 81	♂ "do.....	Nov., 1879	Do.
14579	122, 85	♂ "do.....	Nov., 1879	Do.
14580	123, 83	♂ "do.....	Nov., 1879	Do.
14592				
<i>Series B and C.</i>				
12037	4	♂ Saint Michaels....		Skin.
13574	108, 30	♂ "do.....	Oct. 25, 1879	Skin and skull.
13576	126, 94	♂ "do.....	Dec. 10, 1879	Do.
13579	117, 45	♂ "do.....		Do.
13582	100, 273	♂ "do.....	Nov. 10, 1880	Do.
13923	58	♀ "do.....	Feb., 1879	Skin.
14396	102, 37	♂ "do.....	Oct. 25, 1879	Skin and skull.
14576	112, 40	♂ Fort Reliance....	()	Do.
14371	113, 41	♂ "do.....	()	Do.
14372	114, 42	♂ "do.....	()	Do.
14373	115, 43	♂ "do.....	()	Do.
14374	116, 44	♂ "do.....	()	Do.
14375	118, 46	♂ "do.....	()	Do.
14376	119, 47	♂ "do.....	()	Do.
14377	120, 48	♂ "do.....	()	Do.
14382				
.....	19	♂ Saint Michaels....	Oct., 1879	Skull.
.....	109, 278	♂ "do.....	Mar., 1881	Skin and skull.
.....	101, 31	♂ "do.....	Oct., 1879	Do.
.....	23	♂ Fort Reliance....	()	Skin.
.....	36	♂ "do.....	()	Do.
.....	37	♂ "do.....	()	Do.
.....	38	♂ "do.....	()	Do.
.....	39	♂ "do.....	()	Do.
.....	134	♂ "do.....	Jan., 1880	Skin and skull.

Winter of 1878-79.

Biographical notes.—The present species is abundant and widely spread over all of the Alaskan mainland, and also upon many of the Aleutian Islands and the rocky islands in Bering Straits. A large number of specimens were brought me from the Upper Yukon, and others from Nulato, Anvik, Kotlik, and other places on the Lower Yukon and from the Kuskokwim River. I also found them numerous about the shores of Bering Sea and the Arctic Ocean from the mouth of the Kuskokwim River to Cape Lisburne.

It is the most common mouse in the Territory, and is abundant everywhere except upon some of the Bering Sea Islands, among which the Fur Seal group may be included.

When winter approaches they gather stores of small bulbous roots, sometimes secreting a peck or more in one place. These stores are usually hidden just under the moss on a small knoll or under the base of a large grassy tussock.

The Eskimo women and children search for these hiding places with a pointed stick just before winter sets in, and sometimes secure a considerable amount of the roots, which are boiled and eaten

as a delicacy. When boiled these roots have much of the taste of a boiled unripe sweet potato, and are very pleasing to the palate after the long abstinence from fresh vegetables one necessarily undergoes while living in the north.

During the winters when the snow remains on the ground from fall until spring comparatively few mice come about the houses until spring, when they are always numerous there. At intervals there comes a winter in which, during December or January, there is a thaw, and melts off all the snow. The water then percolates into all their burrows and storehouses, and the succeeding severe cold freezes everything solid for the remainder of the winter. This leaves the little fellows without shelter or store with which to meet the remaining cold months. They are then eaten by foxes and other animals, and many are frozen, while scores of them swarm about the trading-posts and native villages.

Their skins are used by the native children to make blankets and clothing for dolls, and the little boys make toy traps in which they snare them just as their fathers take larger animals.

These mice are omnivorous, and when two or more are confined in the same box the stronger usually kill and partly devour the weaker ones the first night.

The specimens of *Arvicola* from the vicinity of Saint Michaels were, as a rule, smaller and a shade lighter colored than those from the Yukon region, and these peculiarities seemed to hold good all along the coast of Bering Sea wherever I saw specimens. This difference was so marked that I noted it in my field-book, and I am of the opinion that a careful comparison of specimens will result in separating the meadow mouse of the barren coast region of Bering Sea and the Arctic from that of the wooded interior and British America.

In Mr. True's accompanying tabular arrangement of the specimens obtained by me he notes this variation, and his "Series A" represents the Bering Sea form, while the "Series B and C" represent the common interior form, some of which are also found with the others along the coast; but I did not see any examples of the small coast form from interior localities.

EVOTOMYS RUTILUS (Pallas). Red-backed Mouse (Esk. *A^p-tsin-ûk*).

Dr. Coes gives 3.33 inches as the average length of head and body in a series of sixty-seven individuals of this species from Arctic regions. Sixteen skins in the collection under review give an average of 3.2 inches, which approximates very closely to the same.

The average length of tail-vertebrae in Dr. Coes's series was "hard upon 1.10 inches." In our series we determine it to be 1.05 inches. The largest skin has a length of 3.8 inches and the smallest of 2.8 inches.

List of specimens.

Museum number.	Collector's No.		Sex.	Locality.	Date.	Remarks.
	Skin.	Skull.				
13577	87	21	♂	Saint Michaels, Alaska.	Oct. 26, 1879	Skin and skull.
13581	124	89	♂	do	Nov. —, 1879	Do.
14351	88	24	♂	do	Oct. 26, 1879	Do.
14352	89	53	♂	do	Oct. 26, 1879	Do.
14353	90	28	♂	do	Oct. 26, 1879	Do.
14354	91	29	♂	do	Oct. 26, 1879	Do.
14355	92	32	♂	do	Oct. 26, 1879	Do.
14356	93	33	♂	do	Oct. 26, 1879	Do.
14357	94	34	♂	do	Oct. 26, 1879	Do.
14358	95	35	♂	do	Oct. 26, 1879	Skin.
14359	96	14	♂	do	Oct. 26, 1879	Skin and skull.
14360	97	15	♂	do	Oct. 26, 1879	Skin.
14361	98	15	♂	do	Oct. 26, 1879	Skin and skull.
14362	99	16	♂	do	Oct. 26, 1879	Do.
14363	100	19	♂	do	Oct. 26, 1879	Do.
14364	127	93	♂	do	Dec. 16, 1879	Do.
14365	133	90	♂	do	Jan. —, 1880	Skin.
.....	.....	90	♂	do	Dec. 16, 1879	Skull.
.....	132	.....	♂	do	Jan. —, 1880	Skin.

Biographical notes.—This is the prettiest species of mouse found in the north, and is common and widely distributed over nearly all of the Alaskan mainland. From the mouth of the Kuskoquim north to Kotzebue Sound along the coast and throughout the interior it is everywhere numerous, as is attested by the specimens obtained by me and by the numbers of their skins I saw among the native children during my sledge journeys.

So far as I was able to learn their habits are almost identical with those of *Arvicola*, with which they are associated. They lay up stores of roots for winter, cover the barren tundras with a network of tunnel-like passages, and are driven in severe seasons to find refuge and food about the trading-posts and the native villages. They are found in about equal numbers with the arvicolas, and, like the latter, are omnivorous, and will destroy one another when confined together. None of these mice were obtained by the Point Barrow party, and the bleak barrens along the extreme north coast are doubtless very rarely, if at all, frequented by them.

MYODES OEENSIS BRANTS. Lemming (Esk. *Ki-túg-á-mi-ú-túk*).

List of specimens.

Museum number.	Skin.	Skull.	Sex.	Locality.	Date.	Remarks.
13580	159	272	ju. ♂	Saint Michaels	Nov. 10, 1880	Skin and skull.
14389	125	84	ju.	do	Nov. —, 1879	Do.

Biographical notes.—This hardy little animal ranges over all of the Alaskan mainland except along the heavily-wooded northeastern extremity. They are found, also, more or less commonly upon nearly or quite all of the Aleutian Islands, and are abundant upon Saint George Island, but are unknown on Saint Paul, the adjacent and largest of the Far Seal Islands. They are also found on Nunavak, Saint Lawrence, and the Bering Straits Islands. They are abundant on the peninsula of Alaska, and thence north around the entire northern coast of the Territory. In the interior also they are found in all of the moss-covered open country forming the Arctic barrens or tundra. Although numerous in most localities where the ground is sufficiently dry, they are particularly abundant in some districts. Sanak and Saint George Islands are covered with a network of their runways. On the mainland also scattered centers of abundance are found, but these vary from year to year. Lemmings are inconspicuous and not often seen even when one is traveling over a country where they are very numerous. At long intervals they appear in large numbers, making one of their strange migrations, and are accompanied by hawks, owls, and various predatory mammals, all uniting in the destruction of the travelers.

The Eskimo told me of an instance of this which took place not many years ago, and said that the Snowy Owls were very abundant all the following winter, and nested very commonly along the coast about Saint Michaels the following spring. Like the arvicolas the Lemmings lay up stores of small bulbous roots for winter use.

Several were brought me alive at Saint Michaels and were kept as pets for some time. They were very amusing, inoffensive little creatures, and from the first allowed me to handle them freely without attempting to bite. They were confined in a deep tin box and made almost incessant efforts to escape. Whenever I extended one finger near the bottom of their box they would stand erect on their hind legs and try to reach it with their fore-paws. If successful they would climb up into my hand, and from it to my shoulder without a sign of haste or fear, but with odd curiosity kept their noses continually sniffling and peered at everything with their bright bead-like eyes. They were very expert in walking upon their hind legs, taking short steps and remaining erect a considerable length of time if anything above their heads interested them. I often held my finger just out of their reach and they would stand up, and in trying to reach it would make little leaps up, sometimes clearing the floor half an inch.

When eating they held their food in their fore-paws. Like the arvicolas they are omnivorous, and in winter frequently come about the houses. The Eskimo children use their skins for doll clothing and blankets. On the islands of Bering Straits their skins were particularly numerous among the children.

This species is abundant about Point Barrow and along the most barren parts of the Arctic coast of the Territory.

CUNICULUS TORQUATUS (Pallas). White Lemming (Esk. *Ki-lûg-û-mî-û-tâkû*).*List of specimens.*

Museum number.	Collector's number.	Sex.	Locality.	Date.	Remarks.
13388	56	♂	Lower Yukon.....	January, 1879....	Winter skin.
14388	.....	.....	.....	.....	Do.
13889	57	♀	Lower Yukon.....	January 1879....	Do.
13395	25	.....	Fort Yukon.....	Summer of 1877..	Summer skin.
14386	148	.....	Sledge Island.....	.....	Four spring hunter's skins.
.....	289	.....	.....	.....	Skull.
.....	128/	.....	Saint Michaels.....	April 10, 1889....	Skull and skin.
.....	135/	.....	.....	.....	.....

Biographical notes.—The distribution of this species is very nearly the same as that of the common lemming, except that it does not occur along the southern part of the latter's range. It is unknown also upon the Aleutian and Fur Seal Islands. On Saint Lawrence and the Bering Straits Islands and adjacent coasts it is very common. From the mouth of the Kuskoquim River north to the extreme Arctic shore of the Territory, and from Bering Straits to the British boundary line, it occurs more or less commonly, according to the locality.

Specimens were brought me by the fur traders from above Fort Yukon and from Nulato, Anvik, and Kotlik, along the course of the Yukon, and also from the Kaviak Peninsula and about Kotzebue Sound. A few were taken near Saint Michaels, but they were not numerous there. They are more plentiful about Bering Straits than any other district visited by me, if the number of their skins among the native children can be taken as a guide.

The children about the straits had hundreds of their skins in both summer and winter fur, about equally divided. About Saint Michaels they are much less abundant than the common lemming and they rarely came about the houses. Murdoch found them very common at Point Barrow, where their habits were the same as those of the common lemming.

The Norton Sound Eskimo have an odd superstition that the White Lemming lives in the land beyond the stars and that it sometimes comes down to the earth, descending in a spiral course during snow-storms. I have known old men to insist that they had seen them coming down. Mr. Murdoch records this same belief as existing among the Point Barrow Eskimo.

FIBER ZIBETHICUS (Linn.). Muskrat (Esk. *I-lig'û-icûk*).*List of specimens.*

Museum number.	Collector's number.	Sex.	Locality.	Date.	Remarks.
15021	6	Juv. ♂	Saint Michaels.....	December, 1877..	Skin.
.....	66	.....	Kotzebue Sound.....	.....	Black skin.
.....	53, 69	.....	Saint Michaels.....	Fall of 1879....	Seventeen skulls.

Biographical notes.—The distribution in Alaska of the Muskrat and the Mink is the same. Wherever bogs and ponds or running water occurs, except along the extreme northern coast line, they may be found more or less commonly. The marshy country between the Lower Yukon and Kuskoquim Rivers is their place of greatest abundance, although they are almost equally common about Selawik Lake, near the head of Kotzebue Sound, and up the Nunatog River. Their habits in the north are the same as those of their kind living in lower latitudes, except that in the north they are forced to endure the severe winters and remain under their icy covering for six or more months each year. They share the sluggish streams and the countless pools and lakes of the tundra with the mink, which they outnumber.

From the slight market value of their skins they are not sought by the fur traders at present, but their abundance may be estimated from the fact that over 25,000 of their skins were obtained yearly by the fur traders about the Yukon delta some years ago when their skins were a marketable commodity. Like the mink they are equally numerous in the fresh-water streams and ponds of the interior or in the tide creeks and brackish pools of the marshy country bordering Bering Sea.

They occur upon the peninsula of Alaska, and Nunevak and Saint Michaels Islands, but are not found upon any of the other islands of Bering Sea. Like the mink they are trapped in small steel traps or in wicker fish-traps, and many are speared from canoes or shot with pronged arrows.

Their skins are used for making fur clothing and blankets or robes, and are only bought by the fur traders for the purpose of bartering them off in other localities for marketable furs. Among the many thousands of their skins seen by me there were only a very few albinos. Melanistic individuals were much more common, but were mainly taken in certain districts. South of the Yukon black Muskrats are very rare, but near the head of this river and about Selawik Lake a number of black skins are taken each year. An average of twenty-five or thirty such skins were obtained each year during my residence at Saint Michaels.

CASTOR FIBER LINN. Beaver (Esk. *Pūl ōk-tūk*).

List of specimens.

Museum number.	Collector's number.	Locality.	Date.	Remarks
14963				Skin.
14552	447	Tanana River		Fetal.
21454	264	do	Spring of 1886	Skull.
21455		do		

Biographical notes.—The range of this species covers all of the mainland of Alaska excepting only the belt of barren coast country bordering the Arctic Ocean from Point Hope north, and east to the British line. From the peninsula of Alaska north to Bering Straits they are only occasional visitors at present to the immediate vicinity of the sea-coast, although they were formerly very common in the streams and ponds a few miles back from tide water, and are still taken there in small numbers.

During my residence at Saint Michaels two Beavers were killed on the salt marshes between there and the Yukon mouth. One of them was speared in a tide creek close to the sea, and the other was taken in a brackish pond. Such cases are now rare and only include stray individuals.

The clear streams of the interior, bordered by alders and willows, and the numerous lakes and ponds are their favorite resorts. As a rule the large streams are avoided, owing to the great change in level they are subject to at different seasons. The wooded portion of Northern Alaska may be taken as covering the area in which the Beaver is most numerous, and beyond the tree-limits they become less and less common as the forest is left further behind.

Being one of the most valuable fur-bearing animals of the Territory, the Beaver has been hunted with such vigor, particularly since the American occupation of the country, that at present its numbers are very much diminished and are becoming less each year.

The continued pursuit by the natives is the main factor in this decrease, but one or two exceptionally unfavorable winters within the last ten or fifteen years have aided in their destruction.

During one winter in particular the snow melted suddenly in midwinter, and, flooding the low ground and raising the streams, drowned large numbers of them in their houses or under the ice. Then the wolverines dug into the tops of some of their houses and killed some, and during the succeeding cold weather the water froze in their houses and filled them so full of ice that the Beavers were made prisoners and starved, or were shut out from their shelter and food supply.

The year immediately following such a winter shows a very marked falling off in the yield of beaver skins, according to the fur traders. In autumn the beavers gather a large store of willow and alder twigs and sticks for winter use and strengthen their dome-shaped houses so as to render them more habitable during the cold months. Old beaver meadows or flats, with ruins of the dams and domed houses, are not uncommon throughout the interior, though one of present occupation is much more rarely found.

The natives, both Indian and Eskimo, catch Beavers in steel traps set at a frequented spot, or shoot them from a concealed place near their house or dam. In winter they often cut a square piece from the top of a house, giving a view of the interior, and then run a slender stick into the chamber, with one end projecting. The earth is then replaced over the hole, and spear in hand the hunter awaits the return of the Beaver. The motion of the stick tells when the animals

have returned, and throwing aside the cover the hunter spears one of the Beavers. If the one nearest the exit is struck the passage is blocked and the others are easily killed. In this way sometimes all of the occupants of a house, numbering a half dozen or so, are taken.

Another and very strange way of hunting them is sometimes practiced on the Lower Yukon. As winter advances and all of the lakes are covered with a heavy layer of ice, some of the small ponds drain away so that a sheet of ice covers the empty bed of the pond like a flat roof. The hunters cut a hole through the ice, and if beaver tracks are seen in the mud on the bottom, they take stout clubs and descend under the ice in search of the animals. The house is usually at one end of the lake, and the poor animals are soon routed therefrom. They are then pursued over the floor of their icy prison and brained by the hunter. The peculiar conditions required for this work, and the danger of the icy covering falling in upon the hunter, render this style of hunting rather uncommon.

The natives of Eastern Siberia prize the fur of the Beaver very highly for trimming their fur clothing, precisely as the Alaskan Eskimo prize the fur of the wolverine. As a consequence a large number of Alaskan beaver-skins are taken across Bering Straits every summer by the Eskimo and traded to the Chukchees for the skins of the tame reindeer, which are much finer and make more durable clothing than the skins of the wild reindeer.

The Siberian natives come for several hundred miles in the interior to be at the annual meetings, which occur at Bering Straits for this purpose.

Even before the discovery and occupation of Alaska by the Russians, this intercontinental trade existed, and various articles of Siberian produce or trade were carried across the straits and highly prized by the Eskimo.

Among the fur traders of British America the beaver-skin has long served as the unit of trade, and one skin (or 25 cents in value) refers to the former value of a beaver-skin. Opposition and the growing scarcity of the beaver now renders a beaver-skin more valuable.

In Alaska the unit of trade called "a skin" is the pelt of a marten or American Sable.

Castoreum was an article of commerce some years ago, but is not collected at present. There is official record of nearly half a million beaver-skins being shipped from Alaska since it was occupied by the Russians, but this is far below the actual number.

SCIURUS HUDSONIUS HUDSONIUS (Pallas). Red Squirrel (Esk. *K'i-gu-ik*).

This, the common squirrel of Alaska, is represented in the collection by a series of eleven skins, having the normal coloration with one exception. This latter specimen was taken with a number of the others at Fort Reliance, September 17, 1878. The color of the back, instead of being tawny, approaches Indian red, and there is a tinge of this color over all the upper parts. A similar color obtains in *S. gerrardi*, but in that species it is far deeper and more fiery. Two additional specimens depart from the normal coloration of *S. hudsonius*, and belong to the variety of that species next mentioned.

List of specimens.

Museum number.	Collector's number.	Sex.	Locality.	Date.	Remarks.
13012	7	♂	Nulato.....	January, 1878.....	Skin.
13013	21	♂	.....	.....	Do.
13015	38	♂	Nulato.....	Spring, 1878.....	Do.
13096	69	♂	Fort Reliance.....	October 16, 1878....	Do.
13097	70	♀	.....do.....	October 15, 1878....	Do.
13098	71	♀	.....do.....	October 16, 1878....	Do.
13099	72	♀	.....do.....	September 12, 1878..	Do.
13040	73	♀	.....do.....	September 17, 1878..	Do.
13011	74	♀	.....do.....	.....do.....	Do.
13012	75	♀	.....do.....	.....do.....	Do.
13013	76	♀	Upper Yukon.....	October 14, 1878....	Do.
13014	.....	.....	.....do.....	.....do.....	Do.
13015	.....	.....	.....do.....	.....do.....	Do.
13016	.....	.....	.....do.....	.....do.....	Do.
13017	.....	.....	.....do.....	.....do.....	Do.
21188	62	.....	.....do.....	.....do.....	Skull.
.....	126	.....	.....do.....	.....do.....	.....
.....	169	.....	.....do.....	.....do.....	.....
.....	277	.....	Anvik.....	January, 1881.....	Skin and skull.
.....	71	.....	Nulato.....	.....do.....	Skull.
.....	120	.....	.....do.....	January, 1880.....	Do.

Biographical notes.—Everywhere on the Alaskan mainland, north of the main range of the Alaskan mountains, and where spruce or other trees are found, this pretty squirrel abounds. It reaches the shore of Bering Sea at the head of Norton Sound and is found near Bering Straits on the Kaviak Peninsula. It approaches the Arctic coast near the head of Kotzebue Sound, and in the interior extends its range north to the extreme limit of the forest in about latitude 69°.

Specimens were brought me from the headwaters of the Yukon and from various points along its course to the delta. They are very common about Nalato, and also upon the headwaters of the Kuskokwim. From Andraersky up to Anvik, on the Lower Yukon, I found them common everywhere, and their tracks, leading from tree to tree, were found wherever I went, while the snow was frequently covered with scattered chips and scales from cones which they had rattled down from their perches. Skins from this region vary but little from those taken in New England or other parts of its range far to the south.

Their habits are the same everywhere. The most intense cold of the northern winter does not keep them in their nests more than a day or two at a time.

SCIURUS HUDSONIUS RICHARDSONI (Bachman). Richardson's Chickaree (Esk. *K'igvik*).

List of specimens.

Museum number.	Collector's number.	Sex.	Locality.	Date.	Remarks.
13914	22	♀	Nulato .....	.....	Skin.
13916	39	♂	.....do	Spring, 1878.	Do.

Biographical notes.—Beyond the fact that my collection contains two specimens of this form from Nulato, on the Lower Yukon, I know nothing of the distribution of this squirrel in Northern Alaska.

SPERMOPHILUS EMPETRA EMPETRA (Pallas). Parry's Spermophile (Esk. *Ch'igik*).

In addition to several skins of the normal coloration, a melanistic individual was obtained at Fort Yukon in the summer of 1877. The under parts in this specimen are black throughout. The central line of the back is also black, but the shoulders, the sides of the neck, and the tail are gray, owing to the admixture of hairs having a subterminal bar of white.

List of specimens.

Museum number.	Collector's number.	Sex.	Locality.	Date.	Remarks.
.....	162	.....	Kotzebue Sound	Summer, 1850	Skin and skull.
13022	13	.....	Norton Sound	Summer of 1877	Skin.
13023	24	.....	Fort Yukon .....	.....do	Do.*
13269	1511	♂	Cape Nome	1879	Skin.
13020	1365	.....	Norton Sound	Summer of 1877	Do.
13020	12	.....	Norton Sound	Summer of 1877	Do.

* Melanistic.

Biographical notes.—From the peninsula of Aliaska and Unimak, the easternmost of the Aleutian Islands, north along the coast of Bering Sea and the Arctic Ocean to Point Barrow, and occupying a belt extending back from the coast, this little animal is irregularly abundant. Its distribution over this area is very unequal, and while it may cover all of the hill-sides in one district, not a single individual can be found in another place which is apparently just as well suited to their wants. Usually it is plentiful wherever found, but the coast-line about the northern shore of Norton Sound and Bering Straits is particularly favored by them.

Their handsomely-mottled gray and buffy-brown skins are much prized by the Eskimo and Indians for making light summer coats, and as a consequence the marmots are hunted by them in

various ways. Many thousands of them are killed each year to supply the demand, but their numbers do not appear to lessen. Their skins are an important article of intertribal barter.

When the snow is nearly gone—toward the end of May, and sometimes earlier—they come out of their holes and run about over the snow until it is covered with a network of runways. At this time the hunters snare them in great numbers by means of a strong green stick one end of which is planted firmly in the snow and the other bent over and fastened by means of a trigger and sinew noose. The noose is stretched across the runway and the first passing marmot gets his head into it, springs the trigger, and is swung into the air, where he remains until the hunter makes his round. Each trapper has many of these snares, and on some days many marmots are taken.

When these animals first come out of their burrows in spring their fur is full, soft, and of a clear grayish cast, but exposure to the glare of the sun and snow bleaches it so rapidly that in ten days, or thereabouts, it becomes a dingy reddish brown and is very harsh and brittle.

In the summer of 1881 I found them abundant on the hills overlooking the Arctic Ocean from Kotzebue Sound to Cape Lisburne, and Murdoch found them at Point Barrow. Their habits are similar to those of their allies farther south. They burrow in colonies on the hill-sides and rarely wander far from home, but always appear ready to dive into the shelter of the earth at the first alarm. They are also abundant upon the Siberian side of Bering Straits, and upon the hill where we planted our flag on Wrangel Island were many of their burrows. They are found at intervals throughout the interior, always frequenting bare, open hill-sides and never occupying wooded places. Their distribution in the interior is as irregular as it is on the coast, and large districts may not have an individual in it while an adjacent district swarms with them. There are none about Saint Michaels or the Yukon delta.

ARCTOMYS PRUINOSUS Gmelin. Hoary Marmot, Whistler.

Biographical notes.—The fur traders brought me a few skins of this species from the Upper Yukon, where they are rather common. They were reported to frequent rocky and rather hilly or mountainous country along the headwaters of the Yukon, and are fond of basking on jutting ledges over streams.

The fur traders call them "whistlers" from their habit of uttering a shrill whistle when alarmed. The natives of the Kuskokwim Valley obtain many of their skins from the Alaskan range, where they report them to be abundant.

The Whistler is found in these mountains nearly to the coast of Bering Sea, but does not elsewhere approach the coast north of the peninsula of Alaska. At Kotzebue Sound I saw a great many of their skins made up into clothing and worn by the Eskimo from the headwaters of the Kowak and Nunatog Rivers. These people reported them to be abundant there among the hills in about latitude 68°.

OVIS CANADENSIS DALLI Nelson. Dall's Mountain Sheep (Esk. *Ph-nūik*).

This variety of the Mountain Sheep was described by Mr. Nelson in the Proceedings of the National Museum, vii, 1884, p. 12, under the name of *Ovis montana dalli*. It appears, however, as has been recently pointed out, that Shaw's name, *O. canadensis*, which was used in 1802, has precedence over Cuvier's *O. montana*, and necessarily supplants the latter. The trinomial proper to Dall's sheep is, therefore, *O. canadensis dalli*. Mr. Nelson's diagnosis (*l. c.*) is as follows:

This form can be recognized at once by its nearly uniform dirty-white color, the light-colored ramp area seen in typical *montana* being entirely uniform with the rest of the body in *dalli*. The dinginess of the white over the entire body and limbs appears to be almost entirely due to the ends of the hairs being commonly tipped with a dull rusty speck. On close examination this tipping of the hairs makes the fur look as though it had been slightly singed. This form also has smaller horns than its southern relatives, but how the two compare in general size and weight I am unable to say.

Regarding the size of the two varieties it is now possible to offer some facts. The specimens of Dall's sheep in the present collection are the mounted skins of a male and female. There are additional specimens in the Museum collection, from the Chigmit Mountains, collected by the late

Mr. C. L. McKay. They comprise a skin of an adult male and one of an adult female and the horns and scalp of a second female. In the following table the proportions of Mr. Nelson's specimens are compared with those of a specimen of the normal variety from Montana:

Measurements.	Ovis canadensis.		Ovis canadensis dalli.	
	14517.	13266.	13265.	20786.
	Montana.		Fort Reliance.	
	♂.	♀.	♀.	♂.
	Cm.	Cm.	Cm.	Cm.
Tip of nose to base of tail along the curves	185.41	162.65	147.32	.....
Tip of nose to eye	22.86	17.78	15.24	.....
Tip of nose to base of ear	23.02	29.21	24.13	.....
Length of horn around the curves	77.47	83.82	32.86	64.77
Circumference of horn at base	44.45	29.28	13.46	31.24
Circumference of hoof at the base	26.67	21.08	21.69	.....

Mr. McKay's specimens, from the Chigmit Mountains, present the following proportions. Nos. 13652 and 13653 are flat skins:

Measurements.	No. 13653.	No. 13652.	No. 14083.
	♂ adult.	♀ adult.	Horns ♀.
	Cm.	Cm.	Cm.
Length from point between the horn-cores to base of tail	139.5	123.5	.....
Length from point between the horn-cores to extremity of nose .....	.....	18.5	.....
Length of horn around curves	94.5	39.0	17.5
Circumference of horn at base	28.5	.....	12.0
Distance between the points of the two horns	58.5	.....	.....

If any conclusion is warranted by these few data, it is, perhaps, that the Alaskan sheep is considerably smaller than its southern relative, and that it carries to the extreme the variations in the shape of the horn (extension and decrease in diameter at the base), observable in northern examples of the normal variety, *O. canadensis (typicus)*.

It would be interesting to know the southern limit reached by Dall's sheep.*

List of specimens.

Museum number.	Collector's number.	Sex.	Locality.	Date.	Remarks.
20786	248	♂	Fort Reliance	Fall, 1879	Skull.
20787	249	.....	.....	.....	Lower jaw.
13265	155	♀	Fort Reliance	Winter of 1879-'80	Skin and skull.
13266	154	♂	.....do .....	.....do	Do.

Biographical notes.—The discovery of this fine animal is one of the most valuable results of my work in the north. It is limited to the higher mountain ranges of the Territory, except in the extreme northern portion, within the Arctic Circle, where it ranges down nearly to the sea-level. Following the main range of the Rocky Mountains it is found in the southeastern part of the Territory and north along these mountains to the point where the chain swings to the west, and along its western extension, known as the Alaskan range, it is numerous nearly to the head of Bristol Bay. In this portion of the mountains Dall's Sheep is found upon the Pacific slope as well as on the northern side. I could not learn of its occurrence on the peninsula of Alaska, although some individuals may be found there.

* See a letter by Lieutenant Allen on the Ruminants of the Copper River Region in *Science*, vol. vii, p. 57.

Owing to the absence of suitable mountains these sheep do not occur between the Lower Yukon and Kuskokwim Rivers, but inhabit the bluffs and high mountains along the Yukon above Fort Yukon, and across to the headwaters of the Tanana and Kuskokwim Rivers.

The three type specimens, and the only ones I obtained, were brought me from some mountains lying about 100 miles southwest of Fort Yukon. They were secured by an Indian under the direction of Mr. L. N. McQuesten, the Alaska Commercial Company's agent in that region. The animals were killed in the fall and the skins hung in a tree until the following spring when they were brought to the Yukon by boat and turned over to Mr. McQuesten, and finally into my hands.

When the traders ascend the Yukon in July or August they frequently see some of these animals upon a rocky bluff overhanging the river above Fort Yukon, and by making a circuit and getting above the sheep they have killed several of them there. North of the Yukon they are next found in the Romanzoff Mountains, from which point they range west to the Kaviak Peninsula near Bering Straits. They are also found abundantly along the courses of the Kowak and Nunatog Rivers and thence northwesterly to the vicinity of the Arctic coast, near Cape Lisburne, and elsewhere.

In August, 1881, I saw two of them some 5 or 6 miles inland from Cape Beaufort. When first seen they were feeding on a grassy hill-side not over 600 feet above the sea-level. I approached within about 200 yards of them when a slight breeze sprang up and they winded me and immediately ran up a ravine to the top of a low mountain and disappeared. During this season, while cruising along this coast from Kotzebue Sound to Point Barrow, hundreds of mountain sheepskins were seen among the Eskimo, and when asked whence these came they always pointed toward the head of the Nunatog River, in the interior. The Kotzebue Sound Eskimo also claim that these sheep are very numerous up the Nunatog. All of the skins of this animal seen by me among the Eskimo from the Kuskokwim River to the Arctic coast were of the uniform dingy whitish color characteristic of the race. The hairs are tipped with a speck of rusty color, which, upon close examination, gives the hairs the appearance of having been slightly singed at the tips. On the Mackenzie River Richardson found the mountain sheep ranging down to the delta of that stream. They were undoubtedly of the present race.

On the Siberian side of Bering Straits a species of mountain sheep is known to inhabit the mountains back of Saint Lawrence and Plover Bays, but at the time of our visit there the natives had none of their skins. Some of their horns that the natives had were very slender and very similar to the horns of the Alaskan sheep, and I am inclined to think that the sheep on the two sides of the straits will be found to be very closely related if not identical.

The horns of the sheep are made into spoons, ladles, and other articles by the Eskimo and are highly prized. The skins are not valued so highly as those of the reindeer, owing to the hair being coarse and brittle.

MAZAMA MONTANA (Ord). Rocky Mountain Goat.

Biographical notes.—The range of this species is limited to the main range of mountains in the southeastern part of the Territory. A fur trader who lived a number of years on the Pacific coast, in the district between Kodiak Island and Mount Saint Elias, told me that in some parts of the main range, extending along the coast, the goats were rather numerous, occurring in flocks among the cliffs and most rugged parts of the mountains. He related that in fall, when the mountains were covered with snow, the goats were forced to a lower level, and the Indians then hunted them very successfully. South from this district they are found all along the main range. The fur traders who have ascended the Tanana River claim that there are mountain goats in the high mountains about the head of that stream, which is possible, but if so, this is the extreme northern limit of its range in Alaska.

RANGIFER TARANDUS GRÖENLANDICUS (Kerr). Barren-ground Caribou, Reindeer (Esk. *Tuá-tú*).

Two skulls of this species were obtained, one of which, No. 21489 (223), is that of a fawn, believed to be one year old. The basi-craural length is 274^{mm}. All the sutures, including the

occipito-sphenoidal, are plainly marked. The last two superior and inferior molars are still concealed in the alveoli.

List of specimens.

Museum number.	Collector's number.	Sex.	Locality.	Date.	Remarks.
.....	5	♀	Unalakleet	Winter of 1880	Skull.
21489	223	Juv.	.....do	Winter of 1879-80	Do.

Biographical notes.—This deer, as its name implies, is found on the vast barrens or tundras of Arctic America. Where miles of moss-covered plains, broken by rolling hills or bare, rugged mountains, with marshes and ponds in the hollows, characterize the landscape in the far north, this Reindeer is almost certain to be found, or to have been an inhabitant of the district only a few years ago. In Alaska they are found along the Pacific coast from a point nearly opposite Kodiak Island west to the island of Unimak, and thence all around the Alaskan shore of Bering Sea and the Arctic, in the treeless belt which borders all of this coast line. It is also numerous on Nunevak Island, but on none of the other Bering Sea islands is it found. They also occur throughout the interior of the Territory at various places, where the bush and tree covered areas give place to open plains and sterile ridges.

When the American Telegraph explorers visited Alaska in 1866-67, Reindeer were found everywhere, and herds containing thousands of individuals were no uncommon sight. They were very abundant on the hills and valleys bordering upon Norton Sound, but to-day their former abundance is indicated only by the number of antlers scattered over the country and the well-marked trails worn on the hill-sides or leading across the valleys, showing where they passed from one feeding-ground to another.

When the Americans first obtained control of the Territory fire-arms were unknown among the natives, and when first the natives obtained guns they kept the traders supplied with meat at the rate of two charges of powder and ball for a deer. One winter, just preceding the transfer of the Territory, an enormous herd of Reindeer passed so near Saint Michaels that a 6-pounder loaded with buckshot was fired at them, killing and wounding a number of them. As soon as fire-arms were introduced among the people they began to slaughter the deer with true aboriginal improvidence. Hundreds were killed for their skins alone, and nearly as many more were shot down and left untouched, merely for the pleasure of killing.

In the course of a few years this indiscriminate slaughter began to tell, and during the years I passed at Saint Michaels and in exploring the country in which they were so abundant formerly, I failed to see a single living Reindeer. I saw their tracks a few times during my sledge journeys, and each fall and winter from two to a dozen were killed within 50 miles of Saint Michaels. They were very abundant on Nunevak Island in 1877 and 1878, but are nearly exterminated there now.

Eskimo from over a hundred miles along the coast in each direction went to Nunevak in summer, and, in company with the natives resident on the island, took thousands of adult skins for several seasons, until they suddenly found that Reindeer were not left in sufficient numbers to pay for hunting.

Reindeer are still very numerous on the peninsula of Aliaska and the adjacent district, but a few winters since many of them died from some contagious disease, and I am told that they are becoming scarcer every year there. They are still abundant also in the district about the head of the Kowak River and on the extensive barrens to the east and west of there, reaching to the Arctic coast. The Eskimo of the coast and the Indians of the interior are hunting them so murderously from two sides that it is only a question of a short time until they will be as scarce there as they are elsewhere.

In the summer of 1880 one man from Point Barrow took about five hundred skins, and many others took nearly as large a number. Only a few stragglers now remain on the Kaviak Peninsula and in the country between the Yukon and Kuskokwim Rivers.

Where these deer are numerous they have a habit of migrating from one district to another at uncertain times and for no apparent reason, so that a place where they are plentiful one season may

only have a few of them the next. The fall is usually the time for this movement, and they generally advance against the wind. Their sense of smell is very acute, and they are thus warned of danger ahead. They follow their leader in a long irregular file, and are like a lot of sheep in their blind determination to continue in his footsteps, even in the face of an enemy.

One ingenious method the Eskimo practice in hunting them is as follows: When two natives find a herd of Reindeer they get to the leeward of them, and then if no cover offers a good opportunity for stalking the game, the hunters start off directly for the deer, and in plain sight, except that one hunter walks as close behind the other as possible, keeping step with him. The deer soon spy them and start to make a wide circuit about the hunters. The latter now swerve from their course just enough to appear to be continually heading off the deer. The latter soon change their walk to a trot and from this to a run, as the hunters still appear to be heading them off. As soon as the deer start to run the rear hunter drops behind the first knoll, and the one in front runs to head the deer off, but they soon pass him, and are almost certain to pass within gunshot of the concealed hunter, and sometimes almost run over him before they see him, they are watching the other one so closely. The concealed hunter now fires into them and the other hunter hides himself at once, and the chances are greatly in favor of the frightened herd running within gunshot of him. Several deer are frequently killed in this way out of a small herd.

Strong fences are sometimes built across the lower end of a rocky gorge which opens into a valley above, and then a drive is made when a herd wanders into the valley. In this way several hundred are known to have been taken at once. In a case of this kind, every deer that is inclosed is killed, although only a fraction of the number can be utilized. They are also snared by strong rawhide nooses which are set among clumps of bushes frequented by them so that their antlers become entangled while browsing, and they are held until the hunter comes.

About the headwaters of the Yukon the Indians build a wide V-shaped fence with a pound or inclosure at the small end into which they make successful drives whenever the deer are sufficiently numerous.

When Mr. Dall came down the Yukon in the spring of 1867, he saw over four thousand skins of reindeer fawns hanging up in a village near Anvik, and at present scarcely half a dozen deer, old and young, are taken yearly in that district.

The skins taken in summer are valued at about one dollar each among the fur traders, who buy them in one part of the country and trade them for furs in other parts. The summer skins are softer and have finer fur than the winter skins, and are, consequently, more in demand for fur clothing. Winter skins have long, coarse, and brittle fur, and the skin itself is heavier and of a poorer quality than those taken during the summer months. Summer skins are covered with dark-brown fur, sometimes shaded with dark chestnut, while the winter fur is brownish-gray with the light color predominating. The fawns in spring are covered with a pretty coat of yellowish, or buffy fawn color.

Reindeer flesh is fine grained and slightly dry, but better than ordinary deer meat.

So far as I could learn, none of these animals are, or ever have been, domesticated on the American side of Bering Straits. On the Asiatic side of the straits, up to the very water-line, the people estimate the wealth of themselves or neighbors by the size of their reindeer herds, and the people who, from lack of these, are forced to live in villages on the coast and to subsist on the product of the sea, are looked upon as an inferior class, of but little consequence. In rare instances melanistic skins of the wild deer were seen, but none were seen showing any signs of albinism. This is a little singular, when white and piebald deer are so common among the tame herds across the straits.

RANGIFER TARANDUS CARIBOU (Kerr). Woodland Reindeer; Caribou.

Biographical notes.—The fur traders of the Upper Yukon frequently told me of a reindeer which frequented the wooded country about the headwaters of that stream, and which was larger and darker than the deer found on the barrens and along the coast country. The only evidence I ever saw to corroborate this consisted of a number of summer skins which the traders from the Upper Yukon had with them and were using for beds

These skins were very noticeably larger (by about one-third) than the skins of the deer taken on the coast, and agreed in being uniformly much darker than skins of the barren-ground reindeer. This form undoubtedly largely, if not entirely, replaces the barren-ground reindeer in the wooded country about the head of the Yukon, and perhaps on the extreme upper part of the Kuskoquim. I could learn nothing of its habits, except that it frequents the wooded country, like the moose. This is the form found on the wooded Pacific slope about Kenai Peninsula, according to Petroff.

ALCES AMERICANUS Jardine. Moose (Esk. *Tun-tù ùk*).

Biographical notes.—Being pre-eminently a woodland species, this fine animal is unknown upon any of the Aleutian or Bering Sea Islands, and the Yukon mouth is the only point where it ever approaches the shore of Bering Sea. It is unknown near the Arctic coast, but may occur on the Pacific slope of the Alaskan Mountains, in the Cook's Inlet and Copper River district. North of the Alaskan range of mountains, which closely follows the Pacific shore line, the Moose is a well-known animal throughout the interior wherever the spruce and white birch forests occur. They range to the tree limit in latitude 69° and from Bering Sea at the Yukon mouth to the British boundary line. They are more common along the large water-courses, where the heaviest forests are found, than elsewhere, and they are most numerous about the headwaters of the Yukon and Kuskoquim Rivers. They lead a roaming life, and where they may be numerous one season none are found the next.

The fur traders and Indians claim that the Moose has been found west of Fort Yukon only within the last twenty-five or thirty years, and that only within the last ten years have they been killed below Anvik and Mission, on the Lower Yukon.

A few years ago a single Moose was shot in the Yukon delta close to the sea, which is the only record I have of its occurrence so far to the west. During the winters of 1879, 1880, and 1881 moose were numerous from Paimut to Mission, on the Lower Yukon, and the Eskimo living there killed a number of them, although they afterwards were in fear of the Indians living higher up the river. They dreaded the vengeance of the Indians, as the Moose is considered as belonging to their territory. It is possible that the claims of the natives are true, and that the Moose has extended its range to the northwest within the last few decades, since the southeastern part of its range has become more and more restricted. This animal also occurs in Eastern Siberia, but does not reach the vicinity of the straits, owing to the lack of forests there.

During the summer months the Moose is rarely hunted in the forest, but is occasionally killed on the banks of the larger streams or while swimming across them. In winter they wander about from place to place, eating the tender twigs from the cottonwoods, white birches, and willows, until the increasing depth of snow forces them to unite in small herds of varying size on the best feeding-ground, and thus make a "yard," where they may be easily stalked. They rarely unite in this manner until 3 or 4 feet of snow has fallen. During some seasons they never "yard" at all, and when spring approaches or a very heavy snowfall occurs they are at the mercy of the hunter who strikes their trail. In spring the warm days settle the top of the snow, and a cold spell following forms a heavy crust on the snow—strong enough to bear a man, but through which the moose breaks at every step. Under such circumstances the hunters easily run the huge animal down and spear or shoot it.

After a very heavy snowfall the hunters go out on snow-shoes in search of their trails. When one is found the swiftest runner, stripped to a light hunting shirt and breeches, and carrying a light shot-gun loaded with ball, starts off on the track, while the women and slower runners follow. The Moose sometimes runs 8 or 10 miles before it can be brought to bay and shot. The hunter then turns back and returns to camp at a good round pace to avoid freezing in the intense cold. The followers cut up and drag the carcass into camp on sledges.

Small dogs—stunted examples of the Eskimo breed—are often used in this style of hunting if there is a light crust on the snow. In autumn the hunt is managed in a different manner. The hunter tries to stalk his game in the dense spruce thickets; but the Moose is very wary and usually takes alarm and starts off at a swift trot, his hoofs making a great clatter before he is seen. The hunter, knowing the country, at once runs across to the further side of the basin or valley

from where he started the game, and takes position where he can command a broad piece of forest. The Moose makes a wide circuit, and very frequently returns close by his enemy, and falls a victim to this habit. Dressed moose-skins are used for making lodge-covers, clothing, and cords.

The introduction of fire-arms among the natives has rapidly diminished this fine animal, and its extinction in Alaska is but a matter of comparatively a few years.

According to Petroff, the Moose crosses the Alaskan mountains and is found on the Pacific slope about Kenai Peninsula.

DELPHINAPTERUS CATODON (Linn.). White Whale (Esk. *S^o-t^o-uk*).

In one of the two skulls of young females obtained at Saint Michaels the primitive shape of the teeth is well shown. The principal mass of the tooth consists of an irregular, compressed cylinder of cement. From the top of the cylinder protrudes the tongue-shaped extremity of the small rod of dentine which forms the core of the tooth. In the older specimen the dentine core is worn down to level of the cement, the top of which is also worn away so that the whole tooth is conical.

The proportions of the skull vary so much in the White Whale that comparisons of these young specimens with others from the North Atlantic are of no especial value in throwing light on the question of the number of existing species of *Delphinapterus*.

List of specimens.

Museum number.	Collector's number.	Sex.	Locality.	Date.	Remarks.
.....	4	.....	Saint Michaels	October.....	Skeleton.
22207	268, 156	♀ juv.	do	September.....	Skull and skin.
22208	269	♀ juv.	do	October.....	Do.

Measurements.

	Museum number, 22207; collector's number, 268 ♀.	Museum number, 22208; collector's number, 269 ♀.
	Millimeters.	Millimeters.
Total length (greatest)	465	427
Length of beak from base of maxillary notches	219	187
Breadth of beak at base of notches	149	137
Breadth of beak at its middle	90	81
Breadth of intermaxillaries at same point	52	45
Greatest breadth between outer margins of intermaxillary proximally	102	106
Length of superior tooth-line	173	152
Last tooth to base of maxillary notch	50	45
Tip of beak to anterior margin superior nasal opening	316	297
Tip of beak to extremity of pterygoids	598	570
Breadth between orbital processes of frontal	225	217
Breadth between hinder margins of temporal fossae	596	593
Length of temporal fossa	162	155
Depth of temporal fossa	67	61
Total length of mandible	345	315
Length of symphysis of mandible	58	55
Length of tooth-row of mandible	159	144
Depth between angle and coronoid process	86	86
	10-19	8-8
Number of teeth	10-9	7-7

Biographical notes.—This species is the most abundant as well as one of the smallest cetaceans found along the Alaskan coast north of the Aleutian Islands. From Bristol Bay north to Point Barrow and thence east to the mouth of the Mackenzie River it is a common summer resident. It is particularly numerous about the mouths of rivers, and frequently ascends the larger streams far above tide-water. The severe Arctic winters force them to become migratory over much of their range. They move south in fall as the pack-ice comes down from the north in October, and winter in large numbers on the coast of Bering Sea from Cape Vancouver south. They appear to have a far greater liking for the mouths of the fresh-water streams and shallow coast, such as are found on the American side of Bering Sea and the Arctic, than for the cold and deep water found on the Siberian shore.

In January, 1879, while sledging near the mouth of the Kuskoquim River, a considerable number of White Whales were seen one evening among the broken ice near shore. They were in an irregular school containing twenty or more individuals. They are seen sometimes in winter off the Yukon mouth when the ice is driven off shore or broken up.

At Point Hope, on July 20, 1881, the females were seen swimming up and down the shore singly, each with two or three males keeping close alongside. Each female was accompanied by a young of the year, which kept close above its mother's back or just behind her. When one of the females was shot and ran ashore the young one swam back and forth at a distance for some time, raising its head well out of water at intervals to see its parent.

At Saint Michaels the first ones seen in spring usually arrive between the 5th and 10th of June, soon after the ice moves off shore or leaves the inner bays. This is the spawning time for the herring which swarm along the shore, and the White Whales follow them into all the bays and inlets. On calm June mornings great schools of these whales, numbering from twenty to over a hundred animals, are frequently seen in the bay at Saint Michaels, and their glistening milk-white color shows handsomely against the dark green water. These visits to the bay were usually made from 3 to 6 o'clock a. m., and a little later in the season between midnight and 3 or 4 in the morning. Whenever they feed during the day flocks of Kittiwake Gulls usually hover over them ready to pick up the fragments of fish which escape from the whales' jaws as they masticate beneath the surface.

About the middle of June the first young are seen. For the first few weeks after their birth they are very small, and have a great bulging forehead, which extends beyond a vertical line from the end of the jaws. Their color is a dark livid bluish or dull bluish green, so dark that they look almost black when seen at a distance in the water. They keep close to their mothers, and the latter swim very carefully, the young usually resting on their backs just beside the thin upward extension of the skin, which appears like a false fin. During the remainder of the season they are generally distributed along the coast. The closing of the bays and streams by ice the last of October drives them off shore and south each autumn.

During the middle of August, 1881, these whales were abundant close along the shore of the Arctic from Kotzebue Sound to Point Hope. At the latter place the Eskimo shot several with rifles as they swam close to the beach, and told us that the whales visit the shore here every year at this season to pair. They are very abundant in Kotzebue Sound at times and the Eskimo kill them from their kyaks. They frequently drive them around in the shallow water at the head of the sound and kill them with spears and lances. About Norton Sound in Bering Sea they are hunted and speared from kyaks or are shot from some jutting point near which they pass when entering or leaving some small bay or cove.

In order to disable the animals at once they must be shot through the spinal column, otherwise they will swim a long distance and be lost. As a rule they are rather shy of a boat and are not easily approached, but on several occasions when I have been sailing along the coast in a whale-boat I have seen them come close alongside, and in one instance the animal raised its eyes well out of the water and stared at us steadily for several seconds.

The Eskimo set large strong-meshed nets, heavily weighted, off outlying points for these animals, and in rough weather they are easily taken. In calm weather they see and avoid the nets. Small ones are sometimes caught in seal-nets in autumn. It was one of our amusements at Saint Michaels to set a "Beluga" net, dividing the prizes among the natives. This sport ceased, however, when a school of "Belugas" struck the net one day and by their combined strength reduced it to shreds.

Along the low, flat coast from Saint Michaels to the Kuskoquim River are many tide creeks running back into brackish marshes. From midsummer until these streams freeze over they abound in tom-cods. In pursuit of these the White Whales go up these streams regularly every night after darkness has settled over the land for an hour or two, and while camping on the banks of these streams I have heard dozens of them blowing with a quick, forcible, hissing or sighing sound as they hunted up and down the creek. They hunt about the Yukon mouths at night in the same way and are found just off shore among the flats and sand-bars during the day.

The Eskimo at the Yukon mouth go off in kyaks just as the tide turns and pursue the Belugas until they become confused in the shallow water and get hard aground and are left by the falling tide. Like the Hair Seal the Beluga wanders far up the Yukon, and I know of two instances of their being killed above Anvik, and another has been taken just below Nulato, several hundred miles from the sea.

On one occasion near Saint Michaels two natives found a White Whale held fast between two large pieces of ice. They secured clubs, having no better weapons, and proceeded to beat the animal to death. This they finally did, and afterwards one of the men told me that all the time they were pounding the poor beast on its back and ribs it kept uttering a sharp squeaking cry like the noise made by a mouse, but louder.

The flesh of a young Beluga is tender and not unpalatable, but is rather coarse and dry. The fat, or blubber, is clear and white, and is considered to be much superior to seal-oil by the Eskimo and Indians. The intestines are made into waterproof garments or floats, and the sinews are very much prized. Their small ivory teeth are carved into toys or ornamental pendants. The skin is made into strong lines or very durable boot-soles. When well cooked the skin is considered choice eating and is really pleasantly flavored. This refers to the epidermis, which is nearly half an inch thick, soft, and has a flavor recalling that of chestnuts.

As already noted these animals are very dark colored when young. They become lighter each year until the fourth or fifth season, when they are a pale milky bluish, and about the sixth or seventh year they are a uniform, clear milky white. A small disk around each eye is the lightest colored spot on young animals. The knob-like projecting forehead of the young Beluga becomes less and less conspicuous until when they are six or eight years old the jaws have grown so as to extend several inches beyond it. The young are about 3 feet long the first month, and the largest adult I saw was 13 feet in length and must have weighed nearly as many hundred pounds.

It is claimed that the Beluga of the North Atlantic and adjacent Arctic Ocean reaches a length of 18 feet. From the great number of these animals I saw in Bering Sea and adjacent Arctic Ocean, I am satisfied that in that region they never reach a length of over 14 or possibly 15 feet at the extreme. The average adults seen by me ranged from 10 to 12 feet long, and a 13-foot specimen was examined by a dozen or more old Eskimo, who united in declaring it to be a very large one.

Mr. Murdoch saw large schools of these animals near Point Barrow, and records the fact that they pass to the northeast by the Point as soon as the ice opens offshore sufficiently. He mentions the passing of one herd which contained several hundred individuals. An adult female measured by Murdoch was 12 feet long.

MONODON MONOCEROS Linn. Narwhal.

Biographical notes.—The icy sea from Point Barrow to the Mackenzie River forms the western limit to the range of this strange animal. Along this part of their range we know but very little concerning them. To the eastward of Point Barrow, about the mouth of the Colville River and elsewhere, various English explorers have noticed their teeth among the natives.

At Point Barrow Mr. Murdoch saw no living specimens, but saw some of their ivory in the possession of the natives, who recognized drawings of the animal and said they were sometimes killed there.

ORCA sp. ? Killer Whale (Esk. *Ak-k-uk*).

Biographical notes.—In the North Pacific, all along the Aleutian chain and the Alaskan mainland coast, this voracious animal is common. It is also numerous in the passes and along the northern side of the Aleutian Islands. North of this they are of much less frequent occurrence.

In May, 1877, from the time we approached within about 400 miles of the Aleutian Islands until we entered Unimak Pass the "Killers" were very common. They were almost invariably in small parties of from three to fifteen individuals and swam side by side in perfect order while they cut through the water with great speed. They swam so close to the surface that the long

curved dorsal fins were in view most of the time, all rising and falling with the swell of the ocean in perfect unison. The rakish cut of these long fins and the regular motions of the animals, as though they were guided by a single impulse, reminded me of accounts I had read of the fleets of piratical crafts that greeted some of the early navigators among the South Sea Islands.

I saw many others among the Aleutian Islands during the last of May and first of June. Their abundance there at this time may have been due to the fact that the fur seals upon which they prey were then passing northward in great numbers. In June a few were seen near the Fur Seal Islands.

Mr. Morton, one of the revenue agents on the Fur Seal Islands, told me that the Killers sometimes make a raid upon the seals close to the shore at these islands. On one occasion he was standing on a bluff overlooking the sea when a Killer pursued a seal close inshore. The seal made the most desperate efforts to escape and finally leaped far out of the water only to fall into the jaws of its pursuer as it came down. In a moment the seal had disappeared down the throat of the whale and the latter vanished.

Although not abundant north of the Fur Seal group, yet these are well known animals to the Eskimo along the coast, from the peninsula of Alaska to Point Barrow.

The long hunts made at sea by these people render them familiar with the habits of the Killer and it holds a prominent place in their mythology. Its ferocity and swiftness in pursuit of its prey have produced a strong impression upon the Eskimo mind and they credit it with various supernatural powers and regard it as a close relative of the wolf.

During the summer of 1881 none of these animals were seen by us north of Bering Straits, but at Point Barrow I found several unmistakable models of them carved from wood among the fetiches of a whale-hunter. I also received accounts of it from the Kotzebue Sound Eskimo while at Saint Michaels.

The dorsal fin of this animal appears to be a very sensitive member, as on one occasion I saw one's fin struck by a rifle-ball, whereupon the whale threw over half its length out of the water and went down head foremost in the midst of a mass of foam.

BALENA MYSTICETUS Linn. Bowhead Whale (Esk. *A-glo-eñk*).

Biographical notes.—Although the palmy days of the whale-fishery are past, yet the present species still exists in northern waters in sufficient numbers to afford profitable employment for a considerable fleet. The open basin of the Arctic Ocean north of Bering Straits is the main fishing-ground for this whale within the region covered by this work, although a few are taken in Bering Straits and just to the south in Bering Sea. These are few in number, however, and the chase is only followed there incidentally as the vessels go to and from the regular fishing-grounds farther to the north.

"Brit," as it is called, or the vast numbers of small crustaceans and other small invertebrates which congregate in broad patches and form the food-supply of the Bowhead, is found scattered everywhere in patches over the North Pacific, but is most abundant along the northern coasts of this ocean. It is found on both sides of the Aleutian Islands, over all of Bering Sea, except the eastern third, and over all of the adjacent Arctic basin. The shallow water on the eastern shore of Bering Sea is so filled with sediment and mingled with the fresh water of the rivers emptying therein that "brit" is rarely found there, and as a consequence only an occasional stray Bowhead is found. Some whaling for this and other species was formerly done about the Aleutian Islands, but this has ceased long since.

To-day the whaling-ground of the North Pacific is located along the Kurile Islands and thence north along the Asiatic shore into Ochotsk Sea. There is no regular whaling-ground in Bering Sea at present, although whales are quite numerous there at times along the Siberian coast. The Arctic basin north of Bering Straits is the center of abundance of the Bowhead in summer at present, and there the whaling-fleet gathers each season. The hunt is usually most productive along the broken edge of the pack-ice or at no great distance therefrom.

During some seasons these animals are numerous, and the fleet fills up and goes south with a rich booty, and again nearly all the vessels leave the coast lightly loaded after an entire

season's work. As a rule the Bowheads congregate in some particular part of the sea, and it is the object of the whalers to discover this place and then to follow the whales until they get a cargo of oil and whalebone. In one part of the season the whales may congregate near the North Siberian coast or near Wrangel and Herald Islands, and in autumn they are generally found along the American coast from Point Barrow to Point Hope.

The belt of open water bordering the American coast from Icy Cape to the mouth of the Colville River is a favorite resort during the last part of summer and until winter sets in. From Icy Cape to Point Barrow the coast is low and sandy and backed by shallow lagoons. The southern part of this strip of coast is known as the "graveyard" among the whalers, from the great number of vessels that have been forced ashore or crushed by the ice here. Some years ago a large part of the fleet was caught here and over five hundred men were cast ashore, but they were all rescued by other vessels later in the season. Thirty-three ships were lost here in a few hours, and the sailors on two ships that were caught in the ice, but not crushed, numbering some seventy men, refused to leave and have never been heard of since.

Just before our arrival at Point Barrow in 1881 a vessel had been lost there, and hardly a season passes without the loss of one or more vessels. The fall of 1879 two vessels were lost in the ice, and a part of our season's work in 1881 was to search for them.

On the north coast of Siberia we obtained a number of relics from the natives there, and learned that the preceding fall a party of hunters had found a vessel frozen in a great piece of ice drifting along the coast. The masts and all of the upper works had been cut up for fuel, and peering down into the cabin through the skylight the hunters saw a corpse floating about in the water that covered the floor, and in the berths lay three others, mute witnesses of the fearful fate that had overtaken all of the ship's company. From these examples it can be seen that the whaler's lot is one full of danger and privation, even up to the present day. In spite of the great risk men return year after year, until they accumulate a fortune or perish miserably. The excitement and perils of their occupation exercise a fascination over many of the old captains that keeps them in the business years after they are in good circumstances and old enough to retire.

The use of the bomb-gun and bomb-lance has rendered the capture of a whale a much simpler matter than it was in the days of the harpoon and hand-lance. Now a boat is pulled within a certain distance, and a single shot either kills the huge animal instantly or so weakens it that it becomes an easy victim. Ten or twelve years ago some whaling vessels wintered in Plover Bay, on the Siberian coast, and the natives there learned the use of the bomb-guns. They managed to secure one of these guns, and the next winter secured several whales in the following odd manner:

The tide running into the bay kept an open channel in the middle of the mouth of the bay after the head was frozen over. Planting their gun on the edge of this channel, the natives waited, and when a whale passed slowly by, heading up the bay, they fired into him. The animal, startled by the shock, in every instance swam desperately ahead and perished under the ice farther up the bay. In a few days the gases forming inside the huge body inflated it until it finally became so buoyant that it would break through the thin ice and be discovered by the people on the lookout. The Eskimo of Bering Straits and thence north to Point Barrow hunt them successfully in their light seal-skin kyaks, and also in the larger umiak.

The implements used are usually an ivory barb with an iron or flint point, attached to a strong line, which latter has an inflated seal-skin float at the other end. A long haft of wood is used to propel the barb; and when the first coil of line runs out another is attached to it near the float, with another float attached to it; and in the end the whale may be dragging from six to a dozen floats and several small boats, until he finally becomes exhausted, and one or two boats are able to approach and lance him with flint or iron pointed lances.

From Icy Cape to Point Barrow the coast is so low that only a short view can be obtained to seaward. Near all of the summer camping places on this coast the Eskimo have taken drift logs, a dozen or more feet long, and, after notching steps in their sides, have erected them for lookout stations. At frequent intervals a man ascends these to look for whales or to sweep the horizon for a sail.

While cruising along the coast these posts usually gave us the first notice of a native camp, and when we drew near we usually found some one occupying the perch.

The Eskimo of Saint Lawrence Island and the islands and coasts of Bering Straits are bold whale-hunters, and are sometimes employed for the season on the whaling-ships. One sturdy young fellow from the Siberian shore had gone to San Francisco with a vessel and remained all winter. He liked the country there, he said; but, as he expressed it, "Merican too damn much work." So he returned to his squalid hut on the shore of Plover Bay.

The Bowhead, and some other marine mammals, undoubtedly pass from the Greenland coast to Bering Straits and *vice versa*. From an Eskimo on the coast of Kotzebue Sound we obtained a harpoon bearing an English stamp. This weapon was taken from a whale captured by the Eskimo on the shore of Kotzebue Sound in the fall of 1880. This harpoon was shown to every whaling captain we met during the summer, and, without exception, they were emphatic in the statement that no such iron was ever used by any vessel in this part of the Arctic Ocean, but that it was a common pattern with the English whalers on the Greenland coast. As each whaler has a private mark on his irons, which all of the other whalers working in the same region know, there is no doubt that the captains were right, and that the iron in question had been brought from Greenland, in the body of the whale, by way of the Northwest Passage. Another fact, which is in direct confirmation of the idea that whales pass from Bering Sea to the Greenland coast and back, is that a year when whales are scarce in the Greenland seas they are numerous about Bering Straits, and *vice versa*.

PART III.

59.7 (198)

5

FIELD NOTES ON ALASKAN FISHES,

BY

EDWARD W. NELSON,

WITH ADDITIONAL NOTES.

BY

TARLETON H. BEAN.

LIST OF ILLUSTRATIONS.

- XIII. Alaskan Plaice (*Parophrys ischyru**).
XIV. Fig. 1. Butter-fish (*Muraenoides ruberrimus*).
2. Barbot (*Lota maculosa*).
XV. Fig. 1. Wolf-fish (*Anarrhichas lepturus*).
2. Tufted Blenny (*Chiralophus polyactcephalus*).
XVI. Fig. 1. Angled Sturgeon-fish (*Brachyopsis dodecaëdrus*).
2. Northern Sculpin (*Cottus arillaris*).
XVII. Fig. 1. Dusky Sculpin (*Cottus niger*).
2. Four-spined Sculpin (*Cottus quadricornis*).
XVIII. Crested Sculpin (*Cottus quadrifidus*).
XIX. Green fish (*H. rogrammus ordinatus*).
XX. Nelson's White-fish (*Coregonus nelsonii*).
XXI. King Salmon (*Oncorhynchus tshawytscha*).

INTRODUCTION.

By EDWARD W. NELSON.

The notes and collections upon which the present paper is based were secured at intervals, and whenever opportunity offered, during my entire residence in the north. They cover a period from May, 1877, to October, 1881. Through my own work and the co-operation of the fur traders I secured specimens from various parts of the interior, extending from Bering Sea to Fort Yukon and from the Kniskoquim River north to Point Barrow. Unfortunately lack of time and means forced me to be satisfied with such results as could be obtained in the intervals of the main work in which I was engaged. These circumstances rendered anything but superficial results impossible and good results should repay a thorough reworking of this region. These remarks refer more particularly to the fresh and brackish water area, since I can claim to have examined very little beyond that. Owing to unavoidable circumstances I have been forced to place the identification and description of my alcoholic material in other hands. I have been fortunate in securing the co-operation of Dr. T. H. Bean, whose familiarity with many of the species in their native waters gives him a peculiar advantage in dealing with this material.

EDWARD W. NELSON.

SAINT JOHN'S, ARIZ., February 12, 1887.

By TARLETON H. BEAN.

Mr. Nelson was prevented by ill health from carrying out his intention of making an exhaustive report upon his Alaskan fishes. His collections, color sketches, and notes were, therefore, left in my hands, with the request that I would identify the species and prepare a paper for publication. I have made some remarks upon certain of the fishes, which represent especially interesting additions to the fauna or to our knowledge of the development of a species. There are fifty species in Mr. Nelson's collection, one of which has recently been named in his honor.*

Notwithstanding the small number of new species in Mr. Nelson's collections, they contain numerous fishes of quite as much importance, representing, as they do, elements of the fauna which, for a long term of years, have failed to appear or have not been certainly known to exist within the Territory. In the first category may be mentioned *Cottus axillaris* and *Cottus quadrifilis* of Gill, which have been practically lost sight of for nearly thirty years. Of species new to the Alaskan fauna Mr. Nelson took *Parophrys ischyurus*, whose range is thus extended from Puget Sound to Unalaska; *Muraenoides ruberrimus*, which was known from Kamchatka; *Chirolophus polyacteocephalus*, another Kamchatkan species of doubtful relationship, and *Brachyopsis dodecaëdrus*, the third of a series of little known and rare Kamchatkan fishes. Another valuable specimen is a

* An expedition in 1880, under the auspices of the U. S. Coast Survey, brought back several new fishes which Mr. Nelson had in his collection. These species were described while Mr. Nelson was still in the field.

young *Stichæus punctatus*, showing a stage in its development by which I was able to recognize *Notogrammus rothrockii* as a still less developed phase of the same species. The young of *Anarrhichas lepturus* was also secured.

There is another important feature of Mr. Nelson's collections, which is the presence of large series of the Salmonide, especially *Thymallus* and *Stenodus*, as well as *Cottidae*, *Chiridae*, and of *Lota maculosa*, *Lycodes turnerii*, and *Ammocetes aureus*.

Mr. Nelson's notes relate to locality, date of capture, native names, information obtained from natives about the movements of species, colors of the fresh specimens, and such other matters as would claim attention in the field. He made, also, color sketches of some of the species.

A complete list of his species follows:

- | | |
|--|--|
| 1. <i>Gasterosteus pungitius</i> L. | 26. <i>Heragrammus asper</i> Steller. |
| 2. <i>Pleuronectes stellatus</i> Pall. | 27. <i>Heragrammus ordinatus</i> Cope. |
| 3. <i>Pleuronectes glacialis</i> Pall. | 28. <i>Heragrammus superciliosus</i> Pall. |
| 4. <i>Parophrys ischyrius</i> J. & G. | 29. <i>Heragrammus decurcatus</i> Pall. |
| 5. <i>Borogadus saida</i> Lepech. | 30. <i>Ammodytes personatus</i> Grd. |
| 6. <i>Plenogadus uraga</i> Kôlreut. (<i>Tilesia gracilis</i> Sw.) | 31. <i>Esax lucius</i> L. |
| 7. <i>Lota maculosa</i> L. S. | 32. <i>Dallia pectoralis</i> Bean. |
| 8. <i>Lycodes turnerii</i> Bean. | 33. <i>Osmecrus deuter</i> Steind. |
| 9. <i>Stichæus punctatus</i> Fabr. | 34. <i>Mallotus villosus</i> Müller. |
| 10. <i>Lumpenus anguillaris</i> Pall. | 35. <i>Coregonus lauretta</i> Bean. |
| 11. <i>Anoplarchus atropurpureus</i> Kittlitz. | 36. <i>Coregonus merkiti</i> , subsp. |
| 12. <i>Muraenoides ornatus</i> Grd. | 37. <i>Coregonus kennicottii</i> Milner. |
| 13. <i>Muraenoides ruberrimus</i> C. & V. | ? <i>C. richardsonii</i> Günther. |
| 14. <i>Chirolophus polyactoccephalus</i> Pall. | 38. <i>Coregonus nelsonii</i> Bean. |
| 15. <i>Anarrhichas lepturus</i> Bean. | 39. <i>Coregonus quadrilateralis</i> Rich. |
| 16. <i>Brachyopsis dodecaëdrus</i> Tiles. | 40. <i>Thymallus signifer</i> Rich. |
| 17. <i>Cottus leucipterus</i> Kner. | 41. <i>Stenodus mackenzii</i> Rich. |
| 18. <i>Cottus quadricornis</i> L. | 42. <i>Salvelinus namaycush</i> Walb. |
| 19. <i>Cottus polyactinocephalus</i> Pall. | 43. <i>Oncorhynchus chonicha</i> Walb. |
| 20. <i>Cottus niger</i> Bean. | 44. <i>Oncorhynchus keta</i> Walb. |
| 21. <i>Cottus humilis</i> Bean. | 45. <i>Oncorhynchus nerka</i> Walb. |
| 22. <i>Cottus axillaris</i> Gill. | 46. <i>Oncorhynchus kisutch</i> Walb. |
| 23. <i>Cottus quadrifilis</i> Gill. | 47. <i>Oncorhynchus gorbuscha</i> Walb. |
| 24. <i>Uranidea microstoma</i> Lock. | 48. <i>Clupea mirabilis</i> Grd. |
| 25. <i>Hemilepidotus hemilepidatus</i> Tiles. | 49. <i>Catostomus catostomus</i> Forster. |
| | 50. <i>Ammocetes aureus</i> Bean. |

The whole number of species of fishes now known in Alaska is one hundred and thirty-five, of which Mr. Nelson added six. Since the publication of my review of the Alaskan fishes in Bulletin 27, National Museum, section F, page 4, the following new members have been discovered: *Hippoglossoides exilis*, *Lumpenus fabricii*, *Muraenoides ruberrimus*, *Aspidophoroides güntherii*, *Brachyopsis dodecaëdrus*, *Cottus decastrensis*, *Cottus axillaris*, *Cottus quadrifilis*, *Cottus quadricornis*, *Coregonus nelsonii*, *Salvelinus namaycush*, and *Raia stellulata*.

TARLETON H. BEAN.

NOTES ON ALASKAN FISHES.

GASTEROSTEUS PUNGITIUS Linn., subsp. **BRACHYPODA**. Stickleback (Esk. *I-luk-chugák*).

32931. Andraevsky. Twenty-three specimens.
32955. (119.) Yukon River, winter 1877-78. Two specimens.
32885. (78 a.) Saint Michaels, summer 1877.

Several hundred Sticklebacks from salt pools near Saint Michaels.

This is an extremely abundant species from Bering Straits south to the Kuskokwim River in all the brackish pools, tide creeks, and adjacent pools and sluggish streams of fresh water. In the marshy country between the mouths of the Yukon and the Kuskokwim they are particularly numerous, and are caught in great numbers in dip nets, forming an important item in the food-supply of that district. They are larger there than elsewhere, attaining an average of about 2 inches in length.

Charles Peterson, a fur trader, told me that the last of October one season he was on a stream connecting the lakes of the Cape Vancouver district with the Lower Kuskokwim and saw a continuous line of these fish about 5 inches wide passing up from the Kuskokwim to these lakes upon each side of the stream.

About Saint Michaels the Sticklebacks always leave the small streams and gather along the sea-shore in schools as cold weather approaches.

PLEURONECTES STELLATUS Pallas. Rough Flounder (Esk. *O-ghá ghú*).

32912. (29, 290.) Saint Michaels, June 16, 1881.
32821. (51.) } Spiny-skinned Flounders with square black spots on border of fins
32822. (52.) }
32851. (1.) Unalaska.

Rough Flounder (Unalaska; Aleut, *Oa-hok*).—A curious species, with large rough scales scattered over the upper surface, with bare skin between; color light olive, a little darker on operculum. The fins are light reddish orange, with black bars extending from the body to the tip of the fins. Also on the tail the same. The bases of these spots slightly color the white of the under surface. This species grows to 20 or more inches in length and weighs several pounds. Under pectoral and ventral fleshy red.

- 32914 (83). Saint Michaels, August, 1877.

Rough-backed Flounder.—This species has very nearly the same habits as its smooth-backed relative about the shore of Norton Sound, where it is the more common of the two species, and attains by far the larger size.

PLEURONECTES GLACIALIS Pallas. Smooth-back Flounder (*Nú-tágh-ú-nák*).

29929. (255.) Smooth-skinned Flounder. Saint Michaels, Alaska, August 20, 1880, 1 fathom.
29930. (291-292.) Smooth-skinned Flounder. Saint Michaels, Alaska, June 16, 1881.
32826. (28.) Saint Michaels, Norton Sound, July 24, 1877.

Punctulated Flounder.—The entire upper surface, head, and body dark olive green, with rather coarse black dots or punctulations scattered thickly over the head and body. Upper ventral and

pectoral olive-brown. Caudal, dorsal, and anal light brown, with a pale yellowish tint. The dorsal, ventral, and caudal are marked with a series of irregularly-defined dark spots. Iris bright yellow.

3249. (36.) Saint Michaels, Norton Sound, August 1, 1877.

3250. (37.) Saint Michaels, Norton Sound, August 1, 1877.

(36.) Much like the preceding, except that the dark mottling and spots on the fins are nearly obsolete. General color a grimish or olive clay, with darker shadings or cloudiness; each scale with a small dot or punctulation covering its outer or posterior border.

(37) Spots very distinct over the body. The anal is bordered by a band of dingy brown, fleshy at base.

3271. (82.) Saint Michaels, August, 1877.

In winter these fish retreat to deep water along the coast of Norton Sound, but in spring as the ice leaves the shore they return, and are common in 2 or 3 fathoms during the rest of summer. They are more numerous about the 10th of June than at any other season. In fall they leave the vicinity of the shore the last of September as the cold begins to affect the water. They are generally distributed along the Alaskan coast from the Aleutian Islands north to Kotzebue Sound.

PAROPHRYS ISCHYRUS Jordan & Gilbert. (Plate XIII.)

3293. (2.) Unalaska.

Plain-colored Flounder (Unalaska; Aleut, *Tudaminkh*; Russian, *Kam-but*).—Found in abundance along sandy shores in from 3 feet to several fathoms. In life, dull olive on upper surface, with obsolete golden-brown spots scattered sparingly and irregularly over the upper surface, and also on fins and tail, but always very dull and obscure. The border of body of scale has a dark dotted line, which gives a dark tinge to the whole body. The fins are also finely spotted along the rays at each joint. Iris yellow.

BOREGADUS SAIDA (Lepech). *Slender Tom-cod*.

3293, 3294. Kigiktoiwik, Norton Sound, November 20-27, 1878. Original numbers, 135 to 144.

(Unaleet, *Kath-yû-ûk*; Kigiktoiwik, November 29 to 27, 1878).—Rather numerous for a few days, when they are taken with the common Tom-cod. The natives say that a specimen is rarely taken at Saint Michaels, but they occur every year at Kigiktoiwik.

Colors: Back and sides, tail, and all the fins and under jaw finely punctulated with black dots, becoming so numerous on the outer portion of dorsal fin and tail that when the fins are closed the outer third appears uniform blackish from the numerous dots, as is, also, the tail, but both are a little lighter of base. The lower fins are white, with fewer of the dots, which are most numerous near the extremity. Ventral surface extending up to a trifle above the lateral line is silvery-white, becoming plumbeous silvery, and gradually decreasing in distinctness from below upward, the reverse being the case with the light olive of the dorsal surface, which extends nearly to the lateral line.

PLEUROGADUS NAVAGA (Köllreuter). Tom-cod (*Waukhuie*, Russian; *I-ká-klú úk*, Esk.).

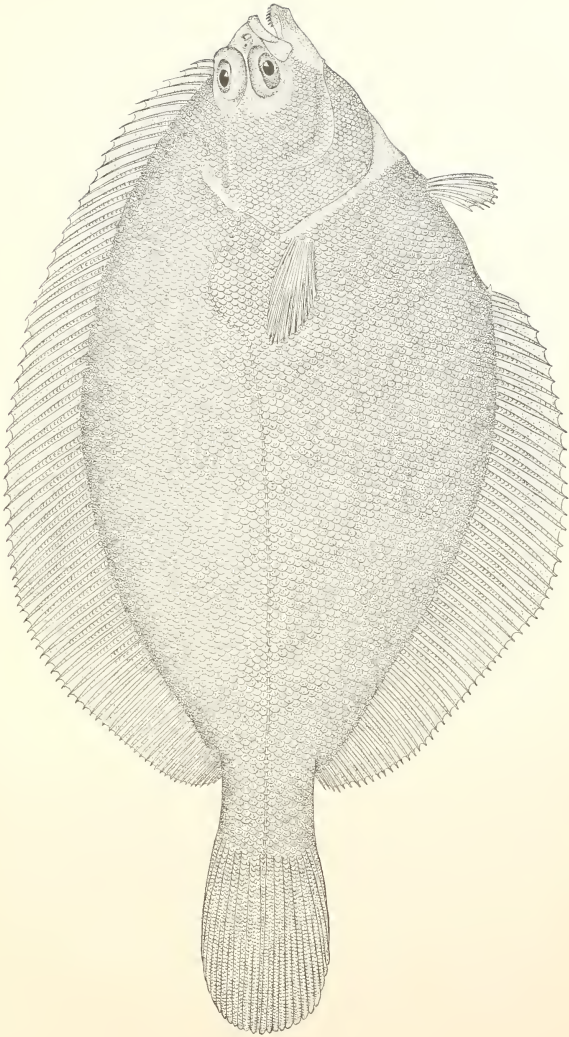
3282. (65.) Saint Michaels, April 11, 1878. Original of painting.

3283. (69.) Saint Michaels, April 11, 1878.

3295. (81.) Saint Michaels, summer, 1877.

3295. (87a.) Saint Michaels, September, 1877.

This species is abundant everywhere from Kotzebue Sound south along the coast to Bristol Bay. In fall, directly after the ice covers the sea along shore, they are extremely abundant, and with a single line the natives about Norton Sound take from 150 to 200 pounds per day, and in spring, during the month of May, they are equally abundant. They ascend all tide creeks to the upper limit of brackish water, and about Cape Vancouver great numbers of them are taken in dip-nets. They are packed away and frozen in grass bags and kept in great quantities for winter use



Alaskan Flounder (*Parophrys ischyrus*)



FIG. 1. Butterfish (*Merconoides subcristatus*).

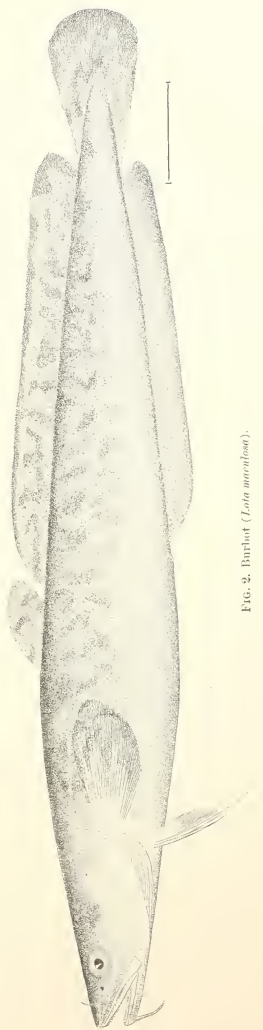


FIG. 2. Barbot (*Loxia maculosa*).

by the Eskimo of the eastern coast of Bering Sea, and are next to or perhaps equally important with the Dog-salmon in the position it occupies in the food-supply list. It is particularly valuable from the fact that, except during the severe winter months, it is rare that a mess of these fish cannot be secured when all other food fails.

LOTA MACULOSA (Le S.). Losh (Esk. *Mou-ig i-nûk*). Plate XIV, Fig. 2.)

29917. (254.) Nulato, March, 1881. Losh.

32823. (48.) Nulato, January, 1878.

The specimen had the usual profusion of olive on a yellowish-olive ground.

32902. (99, 100.) Andraevsky, Yukon River, winter, 1877-78.

32915, 32916. (241-242.) Kotlik, January 20, 1881.

Nelima or *Losh*.—Mottled irregularly, with dark areas separated by reticulating and irregular lines of yellowish; dingy whitish on ventral surface.

32957. (317.) Fort Reliance, Upper Yukon. Losh.

For about a month in the Lower Yukon this fish runs, commencing directly after the river freezes over. The large ones are confined to the main rivers, only small individuals running up the small tributary streams. They are abundant in both the Yukon and Kuskokwim Rivers, and are taken in brackish water at the mouths of both these streams where they debouch into Bering Sea.

During midwinter the Losh is very numerous in the Lower Yukon, and is taken in the fish-traps almost to the exclusion of other fish at that time. It is eaten raw or boiled by the natives, both Eskimo and Indian, and is a valuable item in the yearly food-supply of these people.

LYCODES TURNERI Bead.

32879. (67.) Norton Sound, winter, 1877-78.

Said by the natives to be not very common. The specimen collected was brought frozen during the winter, and the skin had dried considerably, so that the colors were not well marked. The entire upper surface of head of a dark purplish shade. The ground color of entire upper surface of body a lighter shade of the same, barred transversely with light irregular chain like bands of whitish with a blue tint. These bands are coarsely and irregularly reticulated with dark, which gives them a peculiar braided or chain-like appearance. The first of the bands passes in a curved line intermediate between head and body on the occipital region, extending back and down behind the pectorals, where it unites with the second chain. The third and fourth bands also unite along the abdominal line. The remaining bands all cross the tail and are much narrower and less distinct than the four anterior ones. The abdomen is mottled with bluish white spots along the sides. The main color is a livid purple. Fins all purplish-olive, except where crossed on back and caudal peduncle by the light bands.

STICHEUS PUNCTATUS (Fabr.).

[*Sticheus* (?) *rothrockii* BEAN, Proc. U. S. Nat. Mus., iv, 146 (based on specimens less than 14 inches long and doubtfully assigned to a new genus, *Notogrammus*).]

[Mr. Nelson's specimen is 2.1 inches long and exhibits many of the characters of the adult. The row of pigment spots under the dorsal base is nearly obsolete, and the squamation is complete, showing the form of lateral line observed in the full grown fish. The coloration, too, approaches more nearly to that of the adult. The caudal is rounded. It is probable that the emargination of the caudal mentioned in my description of *Sticheus* (?) *rothrockii* is the result of mutilation in most cases, although it was noticeable in freshly-caught specimens.—T. H. BEAN.]

32228. (43.) Small Sand-fish. Saint Michaels, August 31, 1877.

Entire body, except the abdomen, which is white, a uniform alternation of white spots surrounded by pale brownish-olive, forming a tessellated pattern, the brownish covering the most

space, and in this are irregularly set the white markings. In a band extending under the eye from the tip of the under jaw to the posterior margin of operculum and bounded below by the lower border of the dentary are a series of five or six, more or less distinct, rather pale, vertical bars extending at right angles to the axis of the body. The last one on jaw is scarcely more than a dot. They gradually increase in size posteriorly and are well defined under the eye. Entire ventral surface of head, abdomen, and caudal peduncle dull white. Upper surface of head reddish olive-brown. The white under and dark upper surface of head are divided by a band passing from tip of snout through eye and back to the operculum, which is entirely covered by it. Pectorals orange-reddish, crossed by nearly obsolete bars of darker. Tail the same color, crossed by five distinct vertical bars of darker, the outer of which is nearly obsolete. Dorsal the same shade of pale olive-brownish as main part of body, with five widely-separated, nearly round blue spots, which bear on their outer posterior side a bright orange spot. Anal slightly tinted with flesh color and crossed by ten rather pale, slightly oblique bars. Ventrals nearly obsolete and white. Eyes very protruding and dark.

LUMPENUS ANGUILLARIS (Pallas) Arrow-fish.

32948. (357.) Norton Sound, April 2, 1881.

Small minnow-like fish from Norton Sound, April 2, 1881; very rare. From median line down colorless including the long anal fin. The pectoral fins are pale lemon-yellow and the caudal has a dingy shade of orange. From median line up the color is a very pale olive, marked along the median line by a series of eight to ten irregular and poorly-marked but distinct linear spaces covered with minute dots. These spaces occupy the following linear position, while midway between them and the dorsal line on fore half of body is a similar but more obscure series of four or five areas becoming very indistinct toward middle of length and gradually disappearing when two-thirds from head to tail. The median line of dotted spaces also grows less distinct until almost obsolete near the tail. On each side of the dorsal line, and bordering the long dorsal fin the entire length, extends a series of black dotted spaces more distinct than either of those on the sides. The dorsal series begins from a small pentagonal dark figure on top of head just back of eyes and on median line of head. The pentagon has a colorless space in center. Between the indistinct pentagon and the tail are nine to ten elongated irregular and indistinct pairs of these spaces; from the anterior border of each eye, a fine dark line of minute dots extends around the snout, almost meeting its fellow in front. The cheeks and opercles are finely punctulated with dark dots.

Fin rays: Dorsal fin extends from close to occiput to base of caudal and contains sixty-seven spiny rays. The anal fin extends from anus to base of caudal and numbers two spiny rays followed by from thirty to thirty-five soft rays.

32945. (146.) Kigiktoiwik, November, 1878.

Arrow fish.—Rare. A few are caught all along the coast. Light olive above, white below. A pair of dark lines pass from a point on the occiput along either side of the long dorsal fin and terminate at the posterior extremity of the dorsal. On the top of head back of and between eyes an oval heart-shaped space is inclosed by a dark line (which appears to be a continuation of the dorsal pair of lines). The apex of the head extends forward and a single dark line passes from it midway between eyes; just back of nares it divides and each branch extends in a curved line out and forward a trifle, then bends on itself and extends backward in a curved line over the eye, then back along the outer margin of dorsal surface and parallel to the median line, but much less distinct, for a considerable part of the length; forming on the snout and exactly parallel to the last named line is another pair which are prolonged on either side of snout and upward to anterior border of eye, back of which it is continued parallel to the other lines and forms a median lateral line. Narrow golden iris, anterior and outer borders of dorsal spines black, forming the culminating dark line.

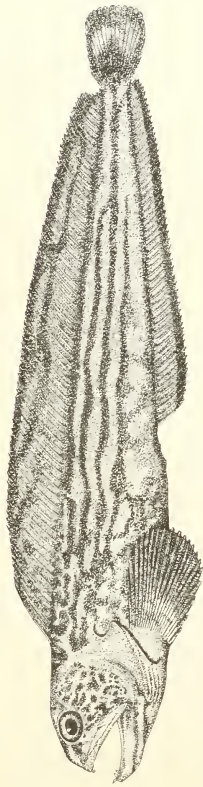


FIG. 1. Wolf-fish (*Anarhichas lepturus*).

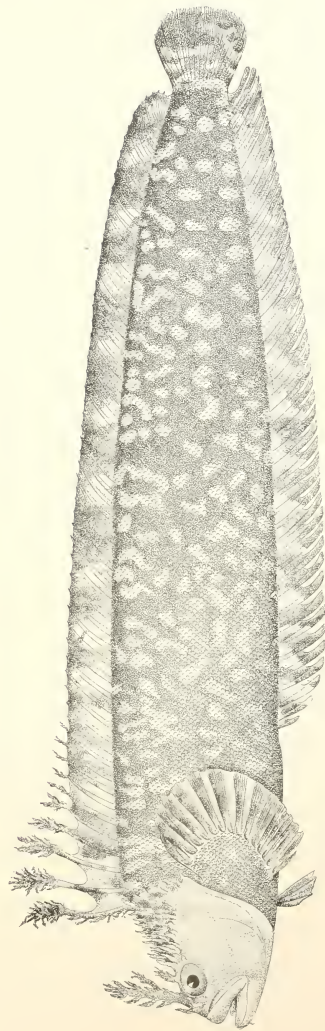


FIG. 2. Tufted Blenny (*Chirolophus polyaetiocephalus*).

ANOPLARCHUS ATROPURPUREUS (Kittlitz). Purple Blenny.

32958. (255, 286, 288.) Saint Michaels, summer, 1880. Sand-fish.
32973. (27a.) September, 1877.

MURÆNOIDES ORNATUS (Grd.). Spotted Gouuel.

32974. (27a.) September, 1878.

MURÆNOIDES RUBERRIMUS (C. & V.). Butter-fish. (Plate XIV, Fig. 1.)

32978. (77, 78.) Unalakleet, Norton Sound, summer, 1877.

[This beautiful species was imperfectly known from Kamchatka, but not before from Alaska. The brilliant color is persistent in alcohol. In our specimens the dorsal spines vary from 92 to 95.—T. H. BEAN.]

A specimen was brought me from Kigiktoiwik on October 15, 1877, and on October 27, 1878, where, according to the Eskimo, they find it and one or two other species lying nearly dormant under large stones that are left exposed near shore by extraordinary low tides.

CHIROLOPIUS POLYACTOCEPHALUS (Pallas). Tufted Blenny. (Plate XV, Fig. 2.)

32936. (54.) Saint Michaels, September, 1877.
32934. (27.) Saint Michaels, September, 1877.

ANARRHICHAS LEPTURUS Bean. Wolf-fish (*Kā-chū-kluk*). (Plate XV, Fig. 1, juv.)

29900. (333.)
29910. (261, 262, 264, 265.) Saint Michaels, May, 1881.

• *Wolf-fish*.—Nos. 261 and 262 were caught May 23; Nos. 264 and 265 are ♂ and ♀, Saint Michaels, May 24. The smaller (265) is the ♀ and is dirty yellowish mottled and indistinctly blotched. The ♂ is uniformly covered with small irregular bluish-black spots, separated by irregular vermicated dirty whitish lines, that give the whole fish a finely-marbled appearance. The iris of both is hazel.

29911. (220, 221.) Saint Michaels, June 1, 1880.

Saint Michaels, June 1, 1880, just as ice is breaking up; around rocky points in 2 to 3 fathoms of water.

(220) Twenty-five inches long, $5\frac{1}{2}$ inches deep posterior to base of pectoral, which is $8\frac{1}{2}$ inches from tip of snout; $3\frac{1}{4}$ inches deep at anus, and $4\frac{1}{4}$ inches deep just in front of anus. Anus midway between snout and end of caudal peduncle.

(221) Length, $23\frac{1}{4}$ inches; snout to posterior tip of pectoral, $7\frac{1}{2}$ inches; body, $4\frac{1}{2}$ inches deep at posterior tip of pectoral, $3\frac{1}{2}$ inches deep just in front of anus, and $2\frac{3}{4}$ inches deep just back of same.

Color: Iris yellow; the entire body a dark leathery-olive brownish, clouded with indistinct shading of blackish, and a close inspection shows numerous irregular black spots and dots, none of which exceed $1\frac{1}{15}$ to $1\frac{1}{12}$ of an inch in diameter and are very obscure. The fins are similarly marked and colored, but are all much darker than the rest of the body, which, however, at a short distance, has a blackish tinge. The eye is encircled posteriorly and inferiorly by a series of eight to ten large distinct mucous pores. The thick fleshy lips are above smooth and on lower jaw bordered with well-marked papillae. The two parts of the upper jaw are movable independently of each other.

32919. (130.) Kigiktoiwik, October 25.

This specimen was taken from under a rock at low tide at Kigiktoiwik, October 25. Colors dark reddish brown, becoming lighter on ventral surface, and with numerous fine irregular lines on head in front and below eye and on the lips, chin, and abdomen, sides, also on dorsal and anal. Caudal a trifle darker than body with no markings. Dorsal almost black along outer half, same as body on inner half, variegated by irregular light lines rather coarser than on abdomen and head. A series of faint light spots of about the size of eye, but with ill-defined borders, extend from front of dorsal to its posterior extremity on the dorsal surface and in a line parallel to the dorsal fin.

32977. (44.) Young. Saint Michaels, October 15, 1877. [D. 83 or 84.]

Specimen seven inches long. Ground color of body dull white, with a fleshy tint, becoming silvery on the head. The pattern of marking consists of an irregular series of very dark brown, nearly black, blotches of varying size, but usually large and irregular shape, and separated by a network of the light ground color on the anterior third of body, except the abdomen, which is dull olive-brown, the caudal portion, occupying a little over one-half the length of the body, has the blotches engaged to a series of longitudinal stripes of dark and light—five of the former and four of the latter. The upper and lower dark stripes border the dorsal and anal fins. The two dark stripes next the central one disappear near the caudal peduncle. The width of the dark bands varies, especially the central one, which shows alternating rounded expansions and contractions. Pectorals black, with a light spot on upper part of basal portion, from which extends an indistinct rectangular dark spot upon the anterior face of fin on each side of the anal. On the sides of the abdomen, and surrounding it to the white spots in front of the vent, as well as on the ventral surface of the caudal peduncle, is the same dark grayish olive as on the back, but nearly hidden and obscured by numerous and very minute punctulations. Fins: Ventrals very dark brownish, nearly black at tips, with about a half dozen white spots of large size on outer half. Anal translucent, but nearly entirely obscured by an overlying layer of punctulations, which only leave a few spots free; the tip and the clear spots have a golden tint. Caudal transparent, with a golden tint, more decided on the rays near the tip. The ground color is overlaid by a dark irregular band, extending across the end and sending slight arms into the middle of the fin, partly inclosing clear spaces. First dorsal black, with one or two transparent spots. Second dorsal colored like the tail, but the dark mottling is spread over the entire fin, inclosing the clear spaces in the form of spots. Pectorals a clear golden yellow, crossed by a wide, irregular anastomosing jet-black band, which occupies nearly half the fin and divides the transparent ground into spots, bars, and blotches.

BRACHYOPSIS DODECAËDRUS (Tiles). Angled Sturgeon-fish. (Plate XVI, Fig. 1.)

32967. (237.) Unalakleet. [D. ix; 7; A. 13.]

Specimen from fresh-water creek at Unalakleet, close to the sea. Another specimen of this fish was taken from the stomach of a large seal (*Mukluk*). Color of upper surface and sides a pale dingy watery olive-brownish. Below white.

First dorsal, nine spines, with bar of blackish brown covering one-fourth the fin along the upper or distal border. A second bar of the same divides the fin longitudinally in half and parallel to the other bar but narrower. Second dorsal, seven rays, with the dark markings of the first dorsal repeated in an indistinct way; excepting the dark markings both fins are transparent. Pectorals in an indistinct way; excepting the dark markings both fins are transparent. The first row occupies the transverse, with four series of black spots upon the rays as follows: The first row occupies the rays near their distal ends, and then follow three other series, dividing the fin into fourths very equally. The inner series is nearly obsolete. Ventrals of two rays with a narrow dividing membrane nearly black. Anal thirteen rays. The posterior four with membrane covered with a dark blotch; the rest translucent. Tail dark olive-brown or blackish, paler nearer body.

32964. (284.) From stomach of Hair Seal, March, 1881.

Same as number 237 [32967]. A strange little fish with series of plates like a miniature sturgeon.

COITUS TÆNIOPTERUS Kner. Thread-fined Sculpin.

39921. (293.) Saint Michaels, June 16, 1881.

39922. (305.) Saint Michaels, June 17, 1881.

39924. (294.) Saint Michaels, June 16, 1881.

32918. (21.) Saint Michaels, July 23, 1877.

The entire upper surface olive-tinged, very dark on body, shoulders, and head; on sides small dots and blotches of golden yellow show indistinctly through the olive. On sides of abdomen, immediately back of the pectorals, is a vertical irregular bar of pure satin white, which widens



FIG. 1. Angled Sturgeon-fish (*B. inermis* waterhousei).



FIG. 2. Northern Sculpin (*Cottus asotus*).

below, covering the chest and extending in a median line to ventral. On each side of this median line and extending to the olive of sides is a large patch of golden orange, which is very bright in life. The lower surface of caudal peduncle is crossed by 4 or 5 white bars, or rather irregular blotches. The under surface of head is white, variegated with small dots and spots of dark-brown, which extend to the white of chest. One spot covers the isthmus, and there is one in front of base of each ventral. The branchials are covered with these dark punctulations. The pectorals are purplish-brown, with irregular bars of very pale golden or greenish yellow. The ventrals are of a fleshy tint with several satiny white spots. The anal is olive-brown, fleshy-shaded toward base, and crossed by a row of golden spots along tips of membrane, and a golden-yellow bar from anterior ray, nearly to last, through the middle. The last ray and membrane white at tip and base and yellow between.

Tail very dark brown with a slight golden tint, with a row of transparent spots across middle and a few near base.

First dorsal very dark brown, with two median, transparent spots and the last two membranes dull golden, dark spotted. Second dorsal dark-brownish, with a few small golden spots scattered irregularly over the surface.

32928. (29.) Saint Michaels, July 24, 1877.

Along each side of the abdomen is a band of bright golden, with a pale yellowish tint. The colors are all bright.

32929. (80.) Saint Michaels, summer, 1877.

32936. (79.) Saint Michaels, summer, 1877.

32937. (45.) Saint Michaels, November 7, 1877.

Mottled Sculpin.—Length 8 inches. Norton Sound. Entire dorsal surface of head and body presenting a grayish color, caused by a marbling formed of fine or minute whitish spots and reticulating lines, which are scattered profusely over the dull olive-brown on the head, and olive-yellow or leaden on the back and surface of caudal peduncle. Lower surface of head very pale yellow, tinted with numerous faint and minute punctulations of dark. Chest and throat colorless, sending an arm of white upward and slightly inclined backward behind the pectorals. In some cases this arm is divided about midway in its length, forming an elongated spot in place of its upper half. Behind these spots or arms of white on the sides and under surface of abdomen are other large irregular spots, sometimes uniting and varying much in size and shape, but always well marked and usually 3 or 4 on each side, the last two extending upward from near the vent or just anteriorly to it. Obliquely above and behind the vent on caudal peduncle are a few small and irregularly placed white spots.

32941. (129.) Saint Michaels, May 2, 1878.

The pattern of fin and side coloration varies considerably in shade and outline. The pinkish on tail is absent on this specimen, but the anterior 5 or 6 long rays of second dorsal have the outer two-thirds deep crimson red.

COTTUS QUADRICORNIS Linn. Four-spined Sculpin. (Plate XVII, Fig. 2.)

32962. (259.) Saint Michaels, April 26, 1880.

32964. (260.) Saint Michaels, July, 1880.

32965. (258.) Saint Michaels, April 26, 1880.

Sculpin found over clay beds in bottom of the canal in about 1 fathom of water. Uniform dull olive-green on entire upper surface, which has a slight mottled appearance. Dorsal and caudal fins irregularly mottled with dark on the translucent membrane, though the first dorsal is uniformly colorless, except shading near base. Mingling with the dark mottling on second dorsal and tail is an irregular mottling in less abundance of dull pale gamboge-yellowish, the latter color most marked on the rays. Ventral surface dull livid white. Pectorals crossed with 5 irregular vertical zones of blackish, becoming regularly narrower from the broad marginal band to the line like basal one. These zones are separated by narrow bars of gamboge-yellowish, rather dull on upper border and brightening to a bright yellow, entirely occupying the 4 inferior rays and lower edge of fin. Ventrals colorless. Anal has a pale dull and very irregular mottling of brownish and yellowish.

32903. (290.) Saint Michaels, April 26, 1880.

Dorsal surface a slightly-mottled olive greenish. First dorsal, translucent and vaguely shaded with dark. Second dorsal translucent and marked with 3 to 4 very indistinct irregular series of dark mottlings, forming an irregular bar from the first ray backward and downward toward base of last ray. The dark markings are spaced by irregular and dull spaces of pale dull gamboge-yellow. Caudal fin crossed by 2 or 3 broad, pale, and irregular bands of dark blotchings, spaced by a deeper shade of yellow than on dorsal, and the yellow taking a shade of orange near ventral border of fin, especially near the insertion of the latter in caudal peduncle. Lower surface white; silvery on ventral half of caudal peduncle, and with a brassy tinge on sides of abdomen next the dark color of upper surface. The mottling is most distinct along this line, which is just below median line where the two colors of dorsal and ventral surface intergrade. Branchiostegal rays and membrane shaded with light purplish violet. Pectorals crossed by 4 irregular anastomosing bars of blackish with a blotch of the same on the base of fin. The outer bar broadest and about two-thirds of distance from base of fin to edge, the part of fin beyond being vaguely mottled with an irregular extension of this band; the inner band is the narrowest and one-sixth of fin length from base. The dark markings are separated by an equally irregular series of 4 bands of yellow, which gradually change from pale dull gamboge near upper surface to a dark orange on lower border of fin, especially on the 4 inferior rays, which are wholly orange. The dark also becomes more intense near the lower part of fin. The ventrals are a fleshy orange. The anal has its rays purple tinted with 3 to 6 very irregular indistinct series or bands of pale yellowish and pale purplish extending across fin from near first ray or anterior border backward and downward toward last ray.

COTTUS POLYACANTHOCEPHALUS Pallas.

32930. (11.) Uvalaska. Sculpin (*Ko-loo-nadukh, Ram-suk*). Common about Uvalaska.

Sides crossed by 2 wide obscure purplish brownish bands which diverge on the back and extend to the 2 dorsals. The bands meet on the sides of the abdomen and spread under the large pectoral. The base of caudal is a light purplish brown. The space between and about the illly defined bands is lighter and thickly mottled over the remainder of the upper surface of the body by a similar but lighter purplish than the bands. The ground color is a light clay, which on the shoulders, nape, and head has a reddish orange tinge. Along the sides and extending on the pectorals and the operculum and across the top of the head is a series of light spots which are a rich orange-yellow on the head, and on the base and posterior portion of the pectorals. The spots are round and pure milk white. The white of the abdomen is encroached on by the dark of the sides, leaving white blotches and spots, and on the caudal peduncle the spots become much smaller and almost obsolete. The dorsal fins have large irregular dark brownish blotches. The tail is spotted and blotched with dark at the base. Near the end it is crossed by a wide blackish vertical bar. The tip is a pale orange-yellow. The anterior parts of the pectorals are thickly mottled with a dirty smoky brown not relieved by any spots. The ventrals are white, crossed by 3 dark bands.

COTTUS NIGER Beab. Dusky Sculpin. (Plate XVII, Fig. 1.)

32941. (121.) Saint Michaels, June 2, 1878. Subject of a color sketch.

32942. (125.) Saint Michaels.

COTTUS HUMILIS Beab.

29919. (304.) Saint Michaels, June 17, 1881.

29920. (303.) Saint Michaels, June 17, 1881.

32927. (26.) Saint Michaels, July 24, 1877.

Dorsal surface olive, brightened by golden-yellow reticulating lines, which become brighter and more conspicuous along the sides. Between the reticulating lines are black spots, which are also more distinct on the sides. Below, on ventral surface, the color is plain white, as is also the lower surface of head. The white on the lower part of the sides of head and of lips is obscured by crowded punctulations which give the cheeks a plumbeous shade. The maxillaries are tinged slightly with yellow. Iris yellow, with orange pigment showing. The rest of head like back; ven-

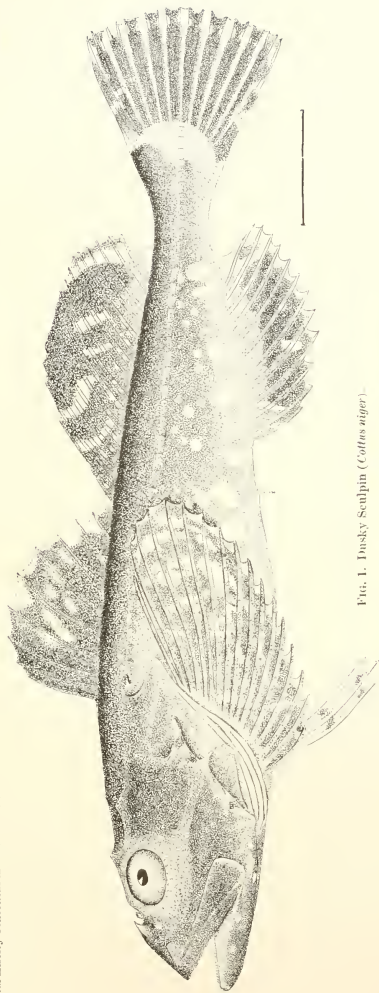


FIG. 1. Dusky Sculpin (*Cottus niger*).

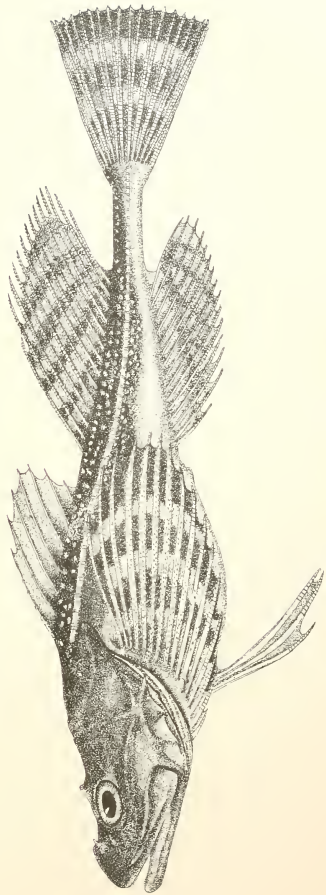
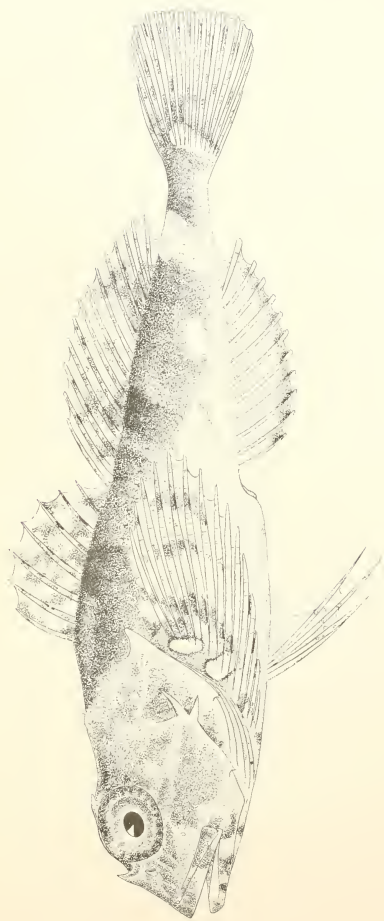


FIG. 2. Four-spined Sculpin (*Cottus quadricornis*).



Crested Sculpin (*Cottus quadripflis*).

trals white. Anal the same, with transparent blotches. Pectorals pale fleshy on outer half and with slightest possible golden tint on upper and basal half. Membrane colorless, except for the fine punctulations, which are scattered over the surface and here and there form irregular spots, and on the basal portion a large blotch. On lower side of cheeks and immediately in the rear of the mouth are two bright yellow spots, the posterior one being on the angle of the projecting cheek-bone. Dorsals transparent, except for two or three irregular dark blotches, formed of minute dots, which are also scattered more sparingly over most of the surface. Caudal slightly inclined to a fleshy tint and crossed vertically by 2 irregular bars of dark brown. The end of peduncle is obscured by an irregular dark blotch.

32906. (122.) Saint Michaels, June 2, 1878.

32907. (123.) Saint Michaels, June 2, 1878. Subject of a color sketch.

32908. (124.) Saint Michaels, June 2, 1878.

This fish is of a greenish clay color, nearly uniform on the upper surface, and thickly mottled with dark spots which vary in size on different specimens. The fins are yellowish with dark markings, and the tail is the same with 4 cross-bars of black, the outer of which is much paler than the others.

COTTUS AXILLARIS Gill. ? Northern Sculpin. (Plate XVI, Fig. 2.)

32960. (183.) Saint Michaels, October 4, 1879.

32972. (174.) Saint Michaels, September, 1877.

Extremely common, occurring with *Ammodytes*.

COTTUS QUADRIFILIS Gill. (Plate XVIII.)

32961. (182.) Saint Michaels, October 4, 1879.

32963. (187.) Saint Michaels, summer, 1880.

32943. (145.) Kegikrowik.

URANIDEA MICROSTOMA Lockington.

32969. (266.) Mouth of Tanana River, spring, 1880.

HEMILEPIDOTUS HEMILEPIDOTUS Tiles.

32834. (2.) Unalaska, May, 1877.

32835. (3.) Unalaska, May, 1877.

Deep-water Purple-spotted Sculpin.—Taken in large numbers by the natives in company with the so-called Rock Cod about rocky points in a few fathoms of water. Ten to 13 inches is the average length. The exact tint of the ground color varies, but is usually a pinkish-purple, which extends over the top of the head and body around the caudal peduncle; all the fins except the ventrals are bright pinkish-purple, variegated with other colors, as mentioned below. The abdomen and under surface of head are white, more or less tinged with golden yellow on the latter, and sometimes a tinge of the same on lower surface of the caudal peduncle. The under surface is profusely spotted with fine roundish specks and rounded spots and blotches of purplish-brown. The ventrals are white with pink spots or blotches. Sometimes they are golden-yellow with similar spots. The iris is a light purple with darker pigment in blotches. The entire upper surface is covered with spots and small blotches of a varying shade of purplish-brown, which extends over the fins as well as the body. The tips of the pectorals are fleshy-red, and across the fin are 3 irregular light purplish-brown bands. Across the body extend 5 dark bands rather irregular in contour and size. The first crosses the first dorsal, the next 3 are along the second dorsal, and the last is on base of caudal, and generally sends out an arm and unites on side of peduncle with the preceding band. The tips of the fins are often a bright purple, which becomes dull livid purple toward the body. The purple assumes a pink tint about the jaws and sides of the head. In some specimens the space between the bands along the back is without definite spots, and is of a brownish-olive. In this case the spots on the bands and sides are apt to take a golden tint. In large specimens the colors become darker and there is a tendency in the light colors of the lower parts to become a golden yellow.

32971. (437.) Young.

HEXAGRAMMUS ASPER Stellér.

29941. (228.) Saint Michaels, August 20, 1880. One fathom.
 29942. (229.) Saint Michaels, August 20, 1880. One fathom.
 29943. (306.) Saint Michaels, June 16, 1881. Kelp-fish.
 29944. (307.) Saint Michaels, June 17, 1881. Kelp-fish.
 32832. (30.) Saint Michaels, July 23, 1877.
 32833. (32.) Saint Michaels, July 23, 1877.
 32862. (37.) Saint Michaels, July 23, 1877.

(Notes on original Nos. 20, 22, 27.)

Rock Cod (Norton Sound, Saint Michaels, July 23, 1877).—Light olive-brown, with an inclination toward a yellowish tint on center of scales on back. Back and sides covered with numerous dark bluish spots scattered irregularly over the surface, each occupying about 3 or 4 scales. These spots also extend over the opercular bones. Head olive, fading below into pale yellowish. Ventral surface dark leaden, fainter on caudal peduncle. The olive-brown of back fades into a lighter and more golden tint on sides. Tail pale olive with a pale yellowish band crossing its middle in an arc. Anal and ventrals leaden blue, much like the color of abdomen, but rather brighter. Pectorals pale yellowish with an olive tint. Entire base of dorsals bright golden-orange with numerous irregular bars or rows of spots of the same, extending upward to border and obliquely forward. The spaces between these are occupied by pale drab, which becomes darker toward the anterior portion, and on the first 4 membranes is nearly or quite black. Nose and cheeks pale olive; top of head very dark.

(22) A second specimen a trifle larger than No. 20. (Same locality, July 24.)—In this specimen the dark spots on sides are less conspicuous, and a steely greenish line is present on a considerable portion of the sides along the lower lateral line; below this, along the entire length, is a golden-olive space, becoming brighter below to ventral surface, where it is abruptly outlined against the slightly lighter dusky-white of the outer margin of abdomen, which, over chest and along median portion to tail, is dark plumbeous. A narrow light band separates the dark outer part of the anal from body. The lower half of the pectorals is plumbeous, the upper half a golden olive. The entire head from eyes down has an orange-yellow tint, which is obscured, but becomes brighter to lower margin of opercular bones, under which the color is very apparent.

32920. (35.) Saint Michaels, August 1, 1877.

This specimen was brought me as soon as taken from the water, and I had opportunity to see a remarkable change in the colors; for, while I held it struggling in my hand, the dull, blackish brown color which covers the sides and back of the fish while in the water became overspread with a beautiful bright golden orange, covering entirely the other colors, and relieved only by spots which took a more brassy luster. In a few minutes the fish had entirely metamorphosed itself. The brassy spots mentioned above that were on the fish when taken from the water were nearly black.

On taking the fish up to make notes upon it the next morning I chanced to touch it with a cloth, when, to my astonishment, the golden color adhered to it, and by passing the cloth over the fish a few times I found that I had restored the original colors nearly as in nature. A golden tint, however, was still evident about the borders of the scales. The side which was exposed to the air had nearly assumed its original colors, but the side which rested upon the board was still bright golden when I took it up in the morning.

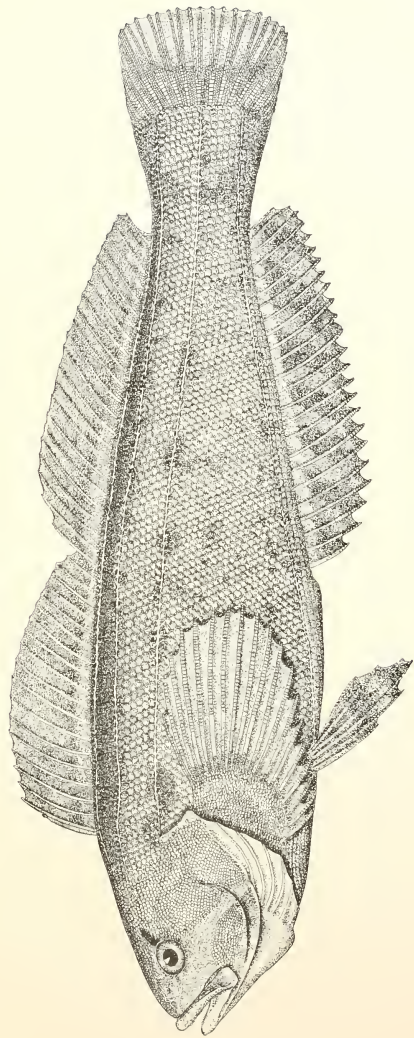
32935. (30.) Rock Cod.

HEXAGRAMMUS ORDINATUS (Cope). Green-fish. (Plate XIX.)

32830, 32831, 32866, 32919. (*Pa-hli'-ku*). Unalaska, May, 1877. Aleut, *Ti'-pook*.

(Notes on original Nos. 6 ♂, 9 ♂, 10 ♀, 14 ♀.)

Common about kelp-beds near shore. Ground color a varying shade of olive. The scales on sides and back profusely punctuated with brown dots, which in some specimens almost entirely obscure the olive. The sides are irregularly flecked with rather numerous silvery spots. The flesh



Green Fish (*Hecagrammus orientalis*).

of the male is green and the colors brighter. The dorsal of the female shows the palest possible golden tint and is bordered by a narrow dark line. In the male the lower half of the dorsal is the same shade as the back. The upper half is dark brown in striking contrast. The pectorals and ventrals are barred with purplish-brown on a yellow ground. The anal is a shade of yellow crossed by 4 or 5 oblique dark bars. The tail is marked like the dorsal. The breast has a tinge of golden. In the male the ventrals are bluish-black on outer half.

No. 14 is very dark; the abdomen, breast, and under part of head golden. The flesh is greenish. The brownish is in obscure blotches.

No. 6 has the fins barred and mottled very light brown. The general color is very light brownish olive. The top of the head and nose is bluish-black. On the anal, ventrals, and pectorals the markings are nearly or quite obsolete. The silvery spots of the preceding example are replaced by white.

On Nos. 9 and 10 the sides of the head are flecked and mottled with whitish, and on No. 9 the lower surface of the head is a rich golden-orange, becoming reddish-orange on the branchiostegals. These fish are common but not abundant around the shore of Norton Sound. They come inshore from deep water the first of June each year and retreat again as cold weather approaches.

HEXAGRAMMUS SUPERCILIOSUS (Pallas).

32825. (5.) Unalaska, May, 1877.

The male of this species is very beautiful, the ground color being a varying shade of bright carmine red, a large portion of which is hidden by an overlying shade of black, or in many cases a dark brown. The red shows in from 6 to 8 more or less broken bands on the sides, extending from the abdomen in front and from the anal behind obliquely up and back. In some cases the red is visible through the brown on the back, giving a rich madder tint. At times the red becomes an orange shade and again a brick red or a scarlet. The lower parts are also red and brown marked, the former color predominating and covering all the breast and under surface of head. The lips are a dull purplish red. The top of the head is a dull madder red, extending back to the first dorsal. The spots along the dorsal parts are a little more purplish than on the sides, and the red is to a great extent replaced by a greenish tint varying from a light to a very dark, and sometimes becoming almost a white. A bar extends obliquely down and back from the eye, first greenish then red. The dorsals are dark purple, mottled with large bluish-white blotches. The tips are a lighter purple. The tail is a livid purplish-red, darker at base. The pectorals are a livid purple, darker at base and light at tips, and crossed by three poorly-defined dark-bluish bands. The base is dark with irregular red blotches. The ventrals are very dark purple with a few red spots. The anal is also very dark with red blotches. The flesh throughout as well as the interior of head and intestines are green. They are said to be very good eating.

32864. (4.) Unalaska, May 30, 1877.

Common Red-banded Russian Rock Trout. Very common in a few fathoms of water off small rocky points about Unalaska. The ovaries fully developed May 30. Females 17 to 15 inches long. Ground a pale blue, which is to a great extent obscured by a varying shade of brown, which in a large specimen was nearly black and faded on other specimens to a much lighter shade, sometimes tinged with a dull reddish on the shoulders and sides of head. The blue is visible through the brown of the sides and back in irregular spots and blotches. The latter mostly confined to the sides. Sometimes the blotches on the sides are of a satiny white. The arrangement of colors on the back, tail, and head give a peculiar mottled appearance. On the head the blue appears as reticulations, with dark brown and sometimes golden-brown spots and blotches. The dorsals are bluish, with large spots and blotches of brown on the membrane and covering a larger part of the fins. The pectorals are dull yellow above and fleshy below, sometimes much darker and duller, with a purple tint, which becomes decided on lower part. Under parts pale dirty white, with a fine brownish mottling, and the abdomen, chest, and lower parts of head with a dull golden-yellow tint. Lower fins fleshy, yellowish, with dark shading. Front of lips a dull brick reddish. In

some specimens a bluish line extends from posterior base of eye to anterior border of operculum, and a second line shows on the upper part of operculum, but in others these lines are obsolete. The flesh of female is white.

HEXAGRAMMUS DECAGRAMMUS (Pallas).

32853. (7.) Unalaska, May 30, 1877.

A single specimen brought in May 30. This specimen, 17 inches long, has almost exactly the shape of a codfish. The ground color is a pale livid blue, which extends up about one third the distance on the dorsals and caudal. The lower third of the fins is spotted with golden-brown spots, which occupy nearly all the surface of the upper two-thirds, leaving a few blue spots along the rays. The blue is more prominent on the posterior dorsal. The tail rays are a dull livid blue, becoming yellowish at end with brownish membrane. The pectorals are a dirty yellowish, the upper half much the brighter, the lower half becoming a dingy bluish with a yellowish shade. The ventrals are a dirty pale bluish at base and becoming very dark at tips. The anal is a dirty ochery-yellow throughout with slightly fleshy tips. The under surface is pale dirty whitish, purest along the anal, a dirty yellowish tint obscuring the white on lower surface of head, chest, abdomen, and sides. The lips are dull olive-brown, the nose having the same tint, which makes it darker than the rest of the head. The entire upper surface is covered with small golden-brown spots, which are so numerous that the ground color has the appearance of reticulating lines.

Pyloric œca, 18. Intestines short, equal to length of body. The ovaries were undeveloped in the above specimen May 30.

AMMODYTES PERSONATUS Girard.

32933. (147.) Saint Michaels, fall, 1878.

Silver-sides. (Saint Michaels, fall of 1878). It is occasionally washed ashore by the waves.

32970. (283.) Saint Michaels, September, 1880. Arrow-fish.

At every very low fall tide great numbers of these fish were washed on shore or confined in little pools left by the retreating tide. These and Sticklebacks were the common species that were brought to their young by the Sea Parrots at Stewart Island, on September 8, 1879.

ESOX LUCIUS Linn. Pickerel (*Chuk'-chuk*).

32938. (94, 95, 96, 97.) Andraevsky, Yukon River, winter, 1877.

DALLIA PECTORALIS Bean. Blackfish (*L-mäü'-ük*).

32984. (88.) Andraevsky, Yukon River, winter, 1877-78.

32985. (90.) Andraevsky, Yukon River, winter, 1877-78.

32986. (92.) Andraevsky, Yukon River, winter, 1877-78.

32987. (93.) Andraevsky, Yukon River, winter, 1877-78.

"Blackfish" of the natives. Very numerous in pools along the Lower Yukon.

32947. (267, 268.) Mouth of Tanana River, spring of 1880.

32976. (89, 91.) Andraevsky, winter, 1877-78.

[For an account of the "Blackfish" see Nelson in Fishery Industries, U. S., Section I, 1884, page 466.]

This species, though individually insignificant, exists in such numbers in all the sluggish fresh-water streams and shallow lakes from the vicinity of Kotzebue Sound on the north to the mouth of the Kuskoquim River on the south, and extending up these streams as far as suitable surroundings permit, that it forms a very important source of food-supply. I have been informed of their presence as far as the mouth of the Tanana, on the Yukon, and know by personal observation of their occurrence for over 100 miles up the Lower Kuskoquim and throughout the intermediate region. It is in the low country last mentioned that they are most abundant.

A native population of nearly three thousand persons rely upon this fish for one of their most abundant and certain sources of food-supply. The fish is caught in wicker-work traps set in their haunts with a wicker fence leading into it on either side. In many of the muddy and grass-

grown ponds and streams the water fairly swarms with these "Blackfish," and during the fall, especially after the ice forms, immense numbers are taken and packed in grass bags, containing from 40 to 100 pounds of fish, and these bags are then allowed to freeze and are then either packed in a turf-covered pit or stored in a square-framed storehouse erected upon four posts. These fish are afterwards used to a great extent for dog-food as well as eaten raw or boiled by the natives. It is extremely difficult to form an estimate of much value regarding the amount of these fish used per annum, but it is within fair limits to say that for the three months, October, November, and December, an average of 1,500 pounds per day are taken by the natives of this region. This amounts to 138,000 pounds, or 69 tons.

During the remainder of winter many are taken, but the success of the fisherman depends upon the character of the season, &c., and the amount secured for the remaining nine months may be put at one-half that of the first-mentioned amount, or 103.5 tons for the annual catch.

The part of the country between the Lower Yukon and Kuskokwim, where this fish most abundant, is also the most densely-peopled district inhabited by the Eskimo in Alaska.

On January 1, during a winter expedition south of the Yukon delta, I found these fish swimming in the shallow rain-water that covered the frozen surface of the ponds and lakelets. The females examined at this time were very large with spawn. The Eskimo say that in shallow pools these fish bury themselves in the mud and lie dormant through most of the winter, but where the water is deep they do not. They are the main food-supply of mink and otter in the region where they abound. They are a sluggish fish and very tenacious of life.

OSMERUS DENTEX Steindachner. Smelt (*III-ko-ög-ú-ník*).

29933, 24934, 24935, 29937, 29938. Original numbers 230-234. Smelt, Saint Michaels, August 20, 1860. 1 fathom.

(Notes on original numbers 23, 24, 25, 31, 32.)

Rainbow Herring (Saint Michaels, Norton Sound, July 24, 1877).—The most beautiful fish I have yet seen from these waters. Dorsal surface pale olive, the borders of scales outlined by darker. From outer border of the olive to the lateral line the color is purple, then deep mazarin blue becoming a changeable violet and gold, then silvery with a violet tint. These colors pass from the olive of the back insensibly into one another and rival the rainbow in the beauty and the delicacy of arrangement. From the lateral line, about half way down to the abdomen, is a pure silvery with the slightest possible shade of rose, which changes to greenish according to the angle it is viewed from. Between this and the ventral surface is a band of slightly-varying width of pure satiny white with a rich silvery sheen, which changes to a satiny rose color of the most delicate tint when turned at a different angle. Below on the ventral surface is a pure satin white with but slight luster. The dorsal and caudal are transparent, the rays only being a golden-olive. The lower fins are colorless, the pectorals alone showing a slight golden tint on outer tips. All the colors mentioned as occupying the body extend longitudinally the entire length from the eyes to the tail. The top, front (or snout), and under surface of head being plain olive. The rich colors of the sides are even present in the iris.

32917, 32927. (84, 85.) Saint Michaels, August, 1877.

32939. (86.) Saint Michaels, August, 1877.

32837, 32838, 32873, 32926, 32916.

Abundant along shore from Kotzebue Sound to the mouth of the Kuskokwim, from about the 10th of September until into November. They are numerous in tide creeks and inner bays all along shore at this time. The last of August, 1878, I found the Sea Parrots (*Mormon*) bringing young smelt 4 or 5 inches long to their young on the outer islets off Stewart Island.

MALLOTUS VILLOSUS (Müller).

32949. (270-282.) Golovina Bay, June, 1850.

Said to be extremely abundant.

COREGONUS LAURETTÆ Bean.

29901. (246.) Nulato, Yukon River, March, 1851.

COREGONUS MERCKII, subsp.

32891. (113.) Andraevsky, Yukon River, winter, 1877-78.
 32892. (117.) Andraevsky, Yukon River, winter, 1877-78.
 32921. (112.) Andraevsky, Yukon River, winter, 1877-78.
 32932. (114.) Andraevsky, Yukon River, winter, 1877-78.
 32923. (115.) Andraevsky, Yukon River, winter, 1877-78.
 32925. (118.) Andraevsky, Yukon River, winter, 1877-78.
 32932. (310.) Andraevsky.
 32954. (312.) Andraevsky.
 32955. (313.) Andraevsky.
 32956. (315.) Andraevsky.

COREGONUS KENNICOTTI Milner. Whitefish (*Muksun* of Russians; *Kaw-okli-tu* of Esk).

[? *Coregonus richardsonii* GUNTHER, Cat. Fish. Brit. Mus., vi, 185.]

[This species, described by Dr. Günther in 1866, has been considered identical with the common Whitefish of the Great Lakes, *C. clupeiformis*, but the common Whitefish has not been taken in Alaska or "Arctic North America," so far as we know. It is highly probable that a re-examination of the types of *richardsonii* will show that they are the species now bearing Kennicott's name.—T. H. BEAN.]

29904. (232.) Saint Michaels, Canal, November 8, 1880.

Unusual size for this species here. I am told that they get much larger in some lakes at Nulato.

32852. (55.) Saint Michaels, spring, 1877. Blunt-nosed Whitefish.

32893, 32894, 32903, 32904.

(Notes on original Nos. 131 to 134.)

Small-headed Whitefish from canal near Saint Michaels, where they are very numerous just after the canal freezes over in the fall, when many are speared and trapped in wicker traps. The latter method is rarely practised, however, and only by natives who have lived on the Yukon. These specimens were taken the 1st of November, 1878, and in the same lot were many others of the same kind and about one-third as many of the large Shoveled-jawed Whitefish so numerous at the Yukon mouth in winter—Russian name *Nelma*.

Upper surface dark brownish olive, becoming satiny white on flanks and abdomen and over all a steelish-blue luster above and silvery below. Pectorals, ventrals, and anal dark-bluish black; sometimes the black is only on the outer portion of the pectorals. Dorsal and caudal brownish-olive, with darker margins often nearly as dark as the lower fins, and sometimes the dark color occupies nearly all the dorsals and a large portion of the caudal.

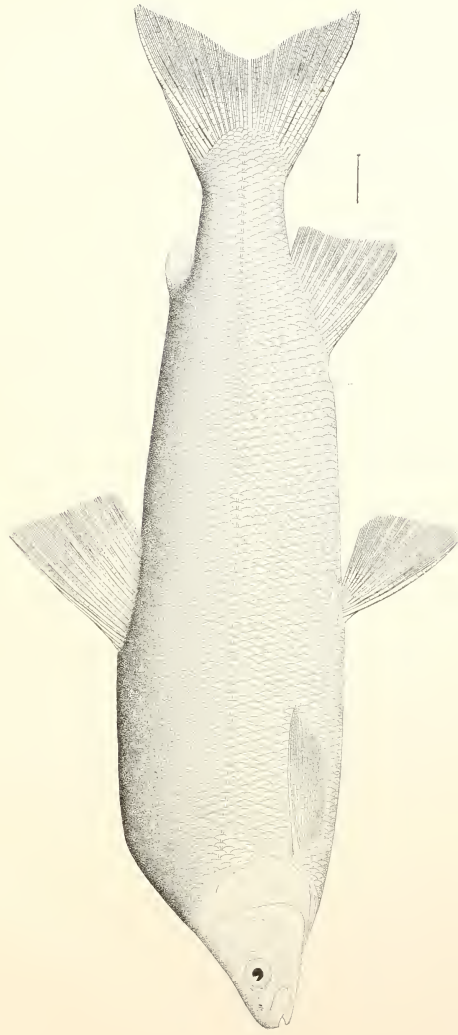
This species is common at different seasons, both along the coast of Bering Sea and in the Yukon and Kuskokwim Rivers. They run in considerable numbers up the large rivers in the first part of winter for the two or three weeks following the run of Lampreys. They are common also just before ice makes in the large streams, and many are taken in gill-nets, although very few are ever secured in fyke-traps for some reason.

I also saw a number of Whitefish taken in gill-nets on the north coast of Siberia in August, 1881, which I considered to be this species.

In spring, during June, the Whitefish of various species run up the small streams.

COREGONUS NELSONI Bean. (Plate XX.)

29898. (243.) Nulato, Yukon River, March, 1881.
 29903. (249.) Nulato, Yukon River, March, 1881.
 32889. (110.) Andraevsky, Yukon River, winter, 1877-78.
 32890. (111.) Andraevsky, Yukon River, winter, 1877-78.
 32893. (107.) Andraevsky, Yukon River, winter, 1877-78.
 32900. (108.) Andraevsky, Yukon River, winter, 1877-78.
 32901. (109.) Andraevsky, Yukon River, winter, 1877-78.
 32950. (308.) Andraevsky, Yukon River, June, 1881.
 32951. (309.) Andraevsky, Yukon River, June, 1881.
 32953. (311.) Andraevsky, Yukon River, June, 1881.
 32953. (106a.) Andraevsky, Yukon River, winter, 1877-78.



Nelson's White-fish (*Coregonus nelsoni*).

COREGONUS QUADRILATERALIS Rich. Whitefish (*Sigi* of Russians).

32854. (65.) Nulato, Yukon River, March, 1878.

Slender Whitefish.—Below white; sides to lateral line light flesh color, approaching roseate. Scales with fine specks, which make the color darker; above lateral line olive with silvery and steel blue luster. Lower fins orange shaded. Tail and dorsals olive.

32855. (50.) Unalakleet River, January 30, 1878.

Slender Whitefish.—This specimen was obtained of a native, who said they were abundant at this time (January 30, 1878) in the river, but do not stay until spring. The fish is remarkably slender, and has a very pointed snout, which I have seen in no other whitefish. The color of the back is the usual olive and the ventral surface white. On the sides between the white and olive and underlying, but nearly disguising the latter color, is a band of salmon-reddish the entire length of body, and occupying about one-fourth the surface of each side. A very beautiful and graceful species.

This species is confined to fresh-water streams and lakes, only rarely occurring about the limits of tide-water, so far as I could learn. It is abundant from the rivers tributary to Kotzebue Sound to the Kuskokwim River, and from the vicinity of the coast of Bering Straits well up the Yukon. With the other Whitefish they run up the Yukon and its tributaries in June, and in fall, when the ice covers the streams, they descend to the deeper parts of the streams, and at the latter season are taken in large numbers in fyke-traps. The following description is taken from a fine lot of these fish, taken from a fish-trap on the Lower Anvik River on November 20. The notes were made before the fish had lost any of their life-tints:

Silvery white on the ventral surface and extending up on the sides to meet the olive-greenish of the dorsum. Entire sides overlaid with a more or less bright rose color of an extremely delicate shade, which shows beautifully upon the silvery background.

All of the scales on the dorsal surface are bordered with dark, giving a reticulated appearance there. The pectoral, ventral, and anal fins are all fleshy-reddish.

Tail and dorsal dusky, with fleshy-reddish shade; sides of head silvery. In very bright examples the fleshy color on the fins becomes almost blood-red and shades off upon the surrounding scales even from the dorsal fin.

When viewed at one angle the silvery color on the sides extend nearly to the dorsal line, but seen at another angle it only reaches the lateral line.

THYMALLUS SIGNIFER (Rich.). Grayling (*Che-lukh-pat-g'uk*).

29950. (253.) Nulato, Yukon River, March, 1881. Grayling.

32868, 32869, 32870, 32880.

(Notes on original Nos. 56 to 60.)

Grayling.—Nulato and Andraevsky. Yukon River and tributaries. Nos. 56, 57, and 58, Nulato; 59 and 60, Andraevsky.—The specimens were brought in a good state of preservation, and the following description gives a fair idea of the appearance: Color of all the specimens nearly the same, a shade of dark bronze purplish becoming pale steel-blue or flesh-tinted brown on viewing from different angles. No. 60 is a trifle lighter colored. The above color extends over the entire dorsal surface, a little darker on back, and fades slowly as it approaches the abdomen.

Separating the plumbeous-white of the abdomen from the color of the sides is a line of rusty or sometimes ochery-brown, much darker than the adjacent color of the sides. These lines commence below the pectorals and extend to the vent, becoming almost obsolete in some specimens back of the ventrals.

Extending along the median line of the abdomen from the gular point to near the ventrals is a faint line of brownish. The tail, anal, and pectorals nearly uniform bluish, sometimes appearing nearly black, at others whitish tinted. The ventrals are the same color, with 5 parallel bars of rose pink crossing the open fin at right angles with the body. The first of these bars only borders the anterior edge of the fin. The dorsal becomes proportionally larger in the older specimens. In all it is dark blue with a row of pink, probably crimson, spots extending the whole width of the fin on the membrane between the rays. The spots are brighter colored farther back on the fin.

32571. (47.) Nulato, Yukon River, January, 1878.

(Notes on original No. 47.)

Grayling.—Nulato, Yukon, Alaska. Specimen brought frozen in January, 1878. Color, dull purplish-brown, very dark, with traces of black spots along sides. Fins nearly black. Dorsal greatly developed. Eye golden-brown. A light fleshy tint is apparent on the sides of head and body about shoulders.

32930. (152.) Andraevsky, spring, 1878.

This is a fresh-water species, straying occasionally into the brackish water near the mouths of streams on the Arctic coast or along the shore of Behring Sea. They are very common about Nulato in spring, but are not numerous at other seasons. They are one of the characteristic and common species in all the clear streams tributary to the Lower Yukon, and to Behring Sea and the Arctic coast thence north.

In midsummer, 1881, when hunting near Cape Lisburne, on the Arctic coast, I saw a number of these fish in a small stream. They kept in the pools, and when I drew near swam hurriedly about, trying to escape. I watched them from concealment for some time, but did not see them open the large banner-like dorsal fin either while they were unaware of my proximity or when alarmed by me. This fin lay closely folded along the back in both cases. This fin is probably a sexual character, as it can scarcely have a practical function. The creek where I found these Grayling is a tributary of the Kowak River, which flows into Kotzebue Sound. These fish are caught by the Eskimo with small, brightly ornamented hooks, and also in nets and traps of wicker-work. The following is the description of the life colors of a fine male, which was written down directly after taking the subject, with several others, from a fish-trap in Anvik River on November 20:

Scales, on the sides and back, with golden bronze reflections. On the sides, extending longitudinally through the middle of each scale, is a bar of light color, thus forming a series of light lines along the body. Extending back from the head for about half the length of the fish is a straggling series of ten or fifteen black spots, each covering about half of a scale. The ventral surface dingy white, with irregular dingy dotting in minute points. From pectorals to ventrals on each side extends a bar of from two to three scales in width of dark golden bronze, fading quickly to brown after death. Back of ventrals this line is to be faintly traced.

In fine specimens, mainly on the posterior half, particularly near the tail, the body is shaded with purple, bluish-green, and dark livid blue, the latter color covering the entire tail. This collection of colors gives an iridescent appearance to the posterior part of the body. The anal fin is colored a lighter shade of the same tint as the tail. Five narrow bars of pink extend diagonally across the upper surface of the ventral fins from near their bases to the outer borders; these bars show nearly white on the under surface of these fins. The ground color of these fins is dingy bluish-green, punctulate with minute white specks on the under surface. Pectorals dingy olive, with a dark-purplish shade. Head olive-brown, with bright-blaish and greenish-purple reflections from the opercula. Dorsal fin purplish, darkest on posterior half. From front to back on the membrane of this fin extend five or six pretty regular series of light spots in so many rows. These spots are small in front and larger posteriorly. Their color is light purple in front, but changes posteriorly to bright purplish, red, green, indigo, and violet, sometimes blending and sometimes separate, so as to form a beautiful combination difficult to describe.

The fin on its posterior half also becomes much more intensely colored with shades of greenish and purple. The upper and outer border of this fin is narrowly edged with pink. It is impossible to convey by description the beautiful array of colors this species presents when first taken from the water, most of which quickly fade after death.

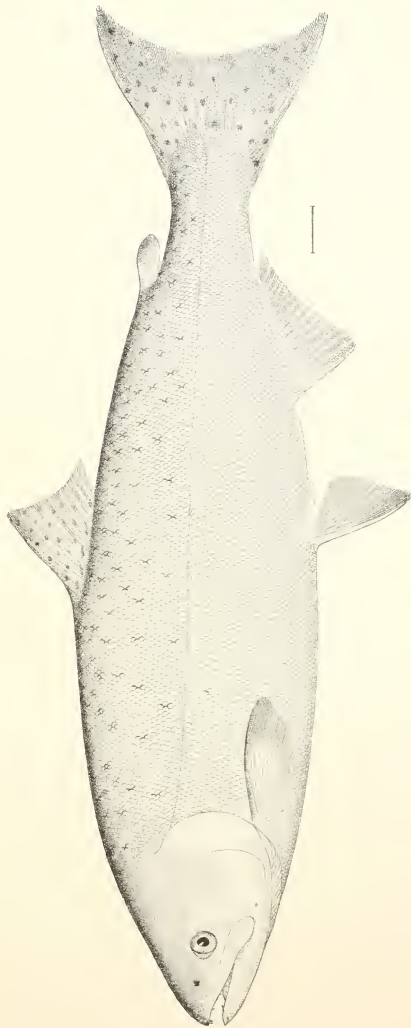
STENODUS MACKENZII Richardson. Whitefish (*Nelma* of Russian; *Chi* of Esk.)

29884. (239 and 240.) Kotlik, January 20, 1881.

Nelma, or *Large Whitefish*.—Lower half silvery white, and shaded by dusky olive on upper half. Lower fins pale or colorless. Upper fins dusky.

29889. (255 and 256.) Nulato, March, 1881.

A native brought one of these fishes from Selawik Lake this winter (1880-'81), which weighed forty-odd pounds and was nearly 4 feet long.



King Salmon (*Oncorhynchus tshawytscha*).

32861. (61.) Andraevsky, March, 1878.

Young Nelma.—Entire undersurface and sides silvery white above the lateral line, changing to steel blue. The dorsal line olive, also the top of head the same. Tail, dorsal, and adipose dorsal olive; the other fins colorless.

32924. (116.) Andraevsky, winter of 1877-78.

Whitefish (*Nelma* of the Russian traders).—Specimens of this fine Whitefish were seen from various points along the Yukon, also on the Kuskokwim and from Kotzebne Sound. They are taken abundantly in the brackish water at the mouth of the Yukon at certain seasons and often in tide creeks about Saint Michaels. In spring about the time the ice is running down the Yukon this fish runs for a few days up all of the tributary streams that communicate with small lakes, where the *Nelma* passes the summer. In autumn about the time the Yukon freezes over they run back again and are caught abundantly for a few weeks in fyke-traps up as high as Anvik at least. They reach a large size, frequently weighing from 35 to 40 pounds. These fish are taken with hook as well as in traps and nets.

42. SALVELINUS MALMA (Walb.). Salmon Trout *Ika-thluk-pik*.

32895. (120.) Golsova River, October 25, 1878.

♂ Salmon Trout, from Golsova River, October 25, 1878.

The interior of the mouth is black; but when fully opened, exposing the partially concealed membranes at the angles, under the tongue and the branchiostegals, these surfaces appear white.

32910. (127.) Golsova River, October 25, 1878.

Is a ♀ of the same species, but the colors have faded on the spots, &c. The spots were white two days after her capture and the body uniform steel-blue, with a rosy tint on flanks and pale yellowish white on ventral surface. The head is colored like the body, with an olive shading on the upper surface. Pectorals fleshy brown. Ventrals pinkish white, bordered on outer extremity. Anal like ventrals. Dorsal, adipose dorsal, and tail bluish-olive. Eye golden-yellow.

32911, 32-12. (128, 129.) Golsova River, October 25, 1878.

Appear to be exactly like 127, except being a trifle smaller and, as usual in the *Salmonidae*, slenderer, and with more obtuse nose in consequence. Traces of pink and rose show along the sides of abdomen and faint pink is visible on most of the lateral spots.

The lateral line extends in a straight line the entire length on both specimens.

The first of June, 1877, Salmon Trout were rather numerous about the mouths of streams flowing into the bay at Unalaska, and young ones from 2 to 3 inches long were numerous in the creeks. Salmon Trout run in the Yukon and other streams with the salmon in June and July, but are most numerous in fall just before and after the streams freeze over. Few are taken later than November and from then until the ice leaves in spring. They are abundant and widely distributed. They are taken, like the salmon, in nets or traps. During August, 1881, we found the natives taking them in gill-nets along the north coast of Siberia. The last of September, 1881, we caught a number of trout in the streams flowing into the bays about Unalaska. Only small examples could be taken with a hook baited with salmon-eggs, but specimens weighing as much as a pound or more were readily secured with a brown hackle. They are game and offer good sport on favorable days.

43. ONCORHYNCHUS CHOUICHA, (Walb.). King Salmon, Chowichee Salmon (*Täg-á-shák-ichák*). (Plate XXI).

32846. (15.) Saint Michaels, July 20, 1877.

King Salmon (*Chowichee*, Russian; *Tageshakhpak*, Esk.).—Length, 38 inches; depth, 8½. Color, bright silvery on sides and below, becoming nearly white on abdomen. The back and top of head a clear olive greenish. This species is taken along the shore of Norton Sound immediately after the ice disappears in spring, my earliest date being June 6, 1877. On the Lower Yukon, up,

at least, to Anvik, the largest of these salmon run during the few days just preceding and following the breaking up of the ice, and thence on until the end of the season they decrease gradually in size and quality. They are usually very abundant in the Yukon and run far up above Fort Yukon, reaching 1500 miles or more from its mouth. Only the larger individuals, however, reach the upper part of the river. At Anvik they begin running about the 12th of June, and the season is virtually over the middle of July. At Andraevsky, lower down the river, the season is a little earlier. At Saint Michaels their season is usually over by the 10th of July.

The middle of June, 1879, a number of these salmon were brought into Saint Michaels and were found to have from one to two half-digested herrings in their stomachs. Their ovaries at this time are fully developed.

These fish attain a very large size, although specimens weighing over 60 or 70 pounds are rarely taken on the coast. Charles Petersen, a fur trader living at Anvik, told me of one example taken there that weighed 140 pounds, and thinks they sometimes weigh a third more than that.

The Anvik natives say that there are land-locked King Salmon living in Shageluk Lake that are like the river Salmon, except that the lake fish are black-skinned in place of the usual color.

[These are Lake Trout, *Salvelinus namaycush*.—T. H. Bean.]

44. ONCORHYNCHUS KETA (Walb.). Hyko Salmon (*Ná-ká*).

29892. (223.) Saint Michaels, July 24, 1880.

Abundant July 1 to 25 or 30, when the run is nearly over. The principal salmon in this vicinity, but equaled by the preceding in the rivers.

29894. (225.) Saint Michaels, July 26, 1880. Hyco, female.

29895. (227.) Saint Michaels, August 6, 1880. Hyco, female.

? 32844. (16.) Saint Michaels, July 20, 1877. Hyco.

32896. Locality not given.

32898. Locality not given.

This to the Eskimo is the most valuable food-fish found about the shores of Bering Sea and the Lower Yukon and Kuskokwim Rivers, owing to its great numbers. Upon its abundance during the summer depends in a great measure whether the following winter shall be one of plenty or of famine and scarcity.

This species commences to run about the middle of June, and moves in great schools along the coast and up the rivers for about a month, after which stragglers are more or less numerous but constantly decrease in numbers until ice makes in the fall. The Kotzebue Sound Eskimo were netting them along shore on July 15, 1881. On the Lower Yukon the main run is between the last of June and end of July. The last of August each year many are still caught about the shore of Norton Sound. They are rarely taken before June 12 at Saint Michaels.

On July 24, 1878, I saw many of them breaking in a tide creek near Saint Michaels. I do not know that any are taken with a hook. The usual means of capture along the coast is the gill-net, and along the rivers the same net or a wicker fish-trap. Their flesh usually dries salmon-red and is the ukali of the fur traders of Alaska.

45. ONCORHYNCHUS NERKA (Walb.). Red Salmon (*Crassnie Ryba* of Russian; *O-kogh-ú-lik* of Esk.).

32843. Saint Michaels, August 20, 1877.

32845. (17.) Norton Sound, July 20, 1877.

Purple Salmon.—Length of adult female, 24. Depth, 5½. Form stout. Sides purple from just over lateral line to a line extending directly back from pectorals to the tail and just missing the outer border of ventrals. The purplish also covers the tail, making it a dull livid purple. The ventral surface of body to outer border of pectorals and ventrals and to tail, silvery white, the outer portion of this with a purplish suffusion, especially on the caudal peduncle, where the purple of the sides is much paler. Dorsal region above the purple is olive-green, rather dark. The sides and back are covered with innumerable fine punctulations, which make those parts considerably darker than they would otherwise be. The upper surface of head is a dark translucent greenish, almost bluish-olive, which becomes lighter on the sides, where it reaches to the border of the under

jaw in line with the pectorals. Under surface of head pale bluish, finely speckled with darker. The entire lower jaw, inside and out, a livid bluish, as well as the upper surface of the tongue and anterior inner margin of the upper jaw. Tail, anal, and dorsals a dull purplish tinge. Ventrals slightly purplish and finely dotted or specked. Pectorals dark olive, purple-tinted between the rays.

32-48. (18.) Norton Sound, July 20, 1877.

Silver Salmon, female.—Entire body bright metallic silvery, back tinged with a clear olive-green, becoming darker on head and dorsal line. A band occupying the ventral surface of body from outer border of pectorals and ventrals a satiny white with a metallic luster. Interior of under jaw bluish-green, also top of tongue. Sides of head silvery, with greenish tinge. Fins and tail with numerous minute dots, which make the color of the upper fins dark olive. The lower fins are a clear semi-transparent light olive, fading to translucent white on the inner portion.

This is the least common of the Salmon taken on the coast of Norton Sound, and is next in quality to the King Salmon. It is taken in gill-nets irregularly through the season with the other small Salmon. It is a more abundant species in the Lower Yukon, where the main run occurs about the middle of August and usually lasts for a week or ten days, although in some seasons the run only lasts two or three days.

Some of these fish are little inferior in quality to the King Salmon.

Above Mission, on the Yukon, all kinds of Salmon are commonly caught in a large dip-net, which is held under water while the fisherman drifts down-stream in a canoe until he feels a fish in the net.

46. ONCORHYNCHUS KISUTCH (Walb.).

29893. (236.) Female. Saint Michaels, September 8, 1880.

Run of this fish from September 1. Clear olive-green above, silvery white below. Fins all more or less dusky; inside of mouth livid dark green.

? 32824. (38; 39.) Saint Michaels, August 20, 1877.

Humpback Salmon, *Dog Salmon*; (Esk. *Chy-u-yak*).

38. Female. Length, 29 inches; depth, $7\frac{1}{2}$; width, $3\frac{1}{2}$.

39. Length, $28\frac{1}{2}$ inches; depth, $6\frac{1}{2}$; width, 3.

Colors rather dark above the sides and abdomen, tinted with a light fleshy purple approaching pinkish red; otherwise as in the following description of a specimen not preserved:

Ventral surface silvery white, fading on sides into a slightly darker shade of the same. From above a light purplish red tint is seen on sides and from below it appears of a faint coppery luster. Median dorsal line olive, this shading down in some specimens nearly to lateral line, and with a decided greenish tint. Sides of head silvery, finely dusted with minute plumbeous dots. Olive above and white below.

Pectorals white at base below and dark at tips, the posterior surface of the same nearly black. Ventrals white, with faint fleshy tints below, dark above. Anal light at base fading into fleshy then into dark, which occupies most of the outer half. Tail dark brownish-olive. Dorsal peduncle bluish-black, lighter at front of base. Dorsal a trifle lighter than tail. Iris pale yellow.

? 32825. (42.) Saint Michaels, August 21, 1877.

Female. *Large Silver-mouth* (Esk. *N-ká*).—Length, 29; depth, $7\frac{1}{2}$; width, 3. Fins as in Nos. 40 and 41. Head same as last, but brighter green on top. Back olive with violet green reflections, which become silvery or steel blue when viewed at different angles from below. When silvery a faint coppery tint is noticeable. Below the lateral line only silvery; a slightly darker shade near lateral line is observed. Ventral surface white.

? 32829. (41.) Saint Michaels, August 20, 1877.

No. 40. Female. Length, 25 $\frac{1}{2}$.

No. 41. Length, 25.

Fins exactly as in the preceding (39), except, perhaps, a trifle lighter. Below pure silvery white, extending on sides to lateral line, but here underlaid by a slight plumbeous tint, becoming

darker as the line is approached. Above lateral line the color changes to a bright metallic steel blue, becoming very intense as the median dorsal line is approached. Along the dorsal line, however, the color is a dull bluish-olive, produced by a heavy olive shade over the blue. Top of head dark olive, fading into silvery on sides, which are finely and thickly sprinkled with dark dots. Below white. Iris very pale golden-yellow.

? 3247. (19.) Norton Sound, July 20, 1877.

Smelter Salmon. Male.—Length, 25 inches; depth, 5 inches.

Back olive green, with a silvery luster on each scale. The olive fades away below the lateral line, but is invaded from below by irregular blotches of light silvery or of a delicate rosy pink, which extends from the abdominal region. Top and sides of head tinted olive green, fading as on body. A faint coppery tint to the silvery on opercular bones. The lower surface is made darker by the numerous fine dots. Dorsals, pectorals, and caudal dull clayey olive. Ventrals olive with a light spot on tip. Anal bluish-olive, with similar light spot on tip.

32507. Locality not stated.

47. *ONCORHYNCHUS GORBUSCHA* (Walb.). Hump-backed Salmon (*Gorbushka* of Russian; Esk. *Ták-k-ták*).

29890. (221.) Saint Michaels, July 27, 1880.

Dorsal surface dull olive bluish, with a tinge of purple along side on lateral line. Upper fins and tail uniform bluish olive. The bluish of the upper surface becomes rapidly replaced by white below the lateral line, but the whole side has a dingy bluish-white appearance, though each scale is silvery white. Top of head greenish olive; sides of same purplish olive; beneath pure white. Pectoral fins bluish black, with white base close to body. Ventrals: Anterior half of upper surface a little lighter than pectorals, the rest of this fin dingy white. The dorsal surface above lateral line, from occiput to tail, including dorsal fin, and the entire tail irregularly but profusely marked with oblong black spots at intervals of about one-fourth to one-third of an inch. The spots on the back have their greatest diameter at right angles to the lateral line. On the tail the spots are rather more numerous, are rounder, and have their longest axis parallel to the lateral line. The spots on the back are about twice as long as wide. Iris pale yellow.

(In a specimen fresh from water the whole upper half with fins is strongly shaded with a purplish or reddish tint.)

29891. (226.) Saint Michaels, July 29, 1880.

29897. (222.) Saint Michaels, July 24, 1880.

Young male. This species is rather uncommon here but very numerous at this season at Unalakleet.

The *Gorbushka* are first taken about the middle of June along the coast of Bering Sea, and are rather numerous until the end of July, with more or less common stragglers until late in fall. They run at the same time and in about equal numbers in the rivers well into the interior. The *Gorbushka* is less regular in its appearance than the other species of small salmon in the Yukon. Some years only a few will be taken, and again they will run in such excessive numbers in the Lower Yukon that the wicker fish-traps must be emptied several times a day. The flesh of this species dries orange yellow. This is the least palatable of the salmon, being dry and tasteless.

48. *CLUPEA MIRABILIS* Girard. Herring (Esk. *Í-ká-thlu-ák-k-pák*).

29887. (295-292.) Saint Michaels, June 16, 1871.

Herrings from spawning bed on reef.

32572. (53.) Saint Michaels, spring, 1877.

On June 9, 1877, I saw a large school of herrings in Unalaska Harbor, and on the 10th of the same month and year they were noted for the first time that season at Saint Michaels, in Norton

Sound. At this latter place in 1878 and 1879 they first appeared on the 12th, and ran until the 16th. During the run they keep close to the shore, so that a person can stand on the beach and spear them as they pass, and many are caught in seines by the Eskimo. Near Cape Vancouver many are caught in gill-nets and dip-nets at this season. During the run schools of Belugas or White Whales follow along shore and feast upon them. In 1881 the herrings did not appear at Saint Michaels until June 15, and on the 19th the run was over. At this time these fish form a continuous line along the beach, passing from south to north in unbroken succession, spawning on the sea-weeds and rocks from above low-tide mark to a fathom below it. They enter all the inner bays and swarm about every reef and rocky point.

The water boils with them along shore as they struggle about in a dense mass among the short sea-weed in spawning, and they can be easily caught in one's hands. The females move slowly among the weeds and press in the midst of them, depositing their eggs, which adhere to whatever they come in contact with by means of a gummy secretion, with which they are coated. Thrusting my hand under water for a half minute was sufficient for it to be covered with eggs.

During all of the spawning time the milt of the males discolors the water to an opaque dirty milky hue for from 2 to 4 fathoms from shore.

The temperature of the water in the midst of the spawning fish was $44^{\circ}.2$. A large portion of the eggs deposited during high tide were exposed to the sun and air at ebb so that they dried, and the following high tide washed them off the weeds and they were lost. The amount thus destroyed would equal at least 25 per cent. of the eggs deposited.

In Sauer's account of the Billings Expedition, at the end of last century, he states that on June 7, at the harbor of Saints Peter and Paul, in Kamchatka, he saw the herrings spawning on sea-weeds along shore, so that at ebb tide a portion of them were exposed. He adds further that the herrings return to that coast in fall, but that the spring fish are largest.

It may be noted here that the water of Norton Sound, where I saw these fish spawning, is very far from being as salty as the sea water on the coast of Kamchatka, owing to the proximity of the Sound to the Yukon mouth, from which it appears that the herrings of this region are somewhat indifferent as to the quality of the water on their spawning beds.

49. CATOSTOMUS CATOSTOMUS Forster. Pipe Fish (*Tropka* of Russians).

29006. (250-252.) Nulato, March, 1881.

32859. (49.) Nulato, January, 1878.

Description of a specimen which was not kept. Length, 19 inches, dorsal 10; anal 7; scales, 17, 115, 14. Color, dull plumbeous on back and sides, fading gradually into white on the lower surface. Extending along the lateral line is a band of light pink or rose color, gradually fading on the posterior half. Iris golden. Head, above and on sides, bluish purple. Nose much prolonged. Lips very prominently papillated. A series of small papillae extend from under the eye out to the snout on either side. Proportions: Head a trifle over 4 times in entire length. Eye, $8\frac{1}{4}$ in head, $3\frac{1}{2}$ in interorbital space. Depth of head $1\frac{1}{2}$ in length of same. Height of dorsal a little more than base and $1\frac{3}{8}$ in length of head. Pectoral, $1\frac{3}{8}$ in head. Ventral, $1\frac{3}{8}$ in head. Anal, $1\frac{1}{2}$ in head. Caudal, $1\frac{1}{2}$ in head. Caudal peduncle, width 3 in head. Depth of body, $1\frac{1}{4}$ in head. From eye to end of snout 2 in head.

The contour of head reminds one strikingly of a Sturgeon.

32888. (101-106.) Andraevsky, Yukon River, winter, 1877-78.

32950. (314, 316.) Andraevsky, Yukon River, sr all creek.

32954. juv. Andraevsky, Yukon River, winter, 1877-78.

The Russian name is derived from the peculiar shape of the head.

This is an abundant species throughout Northern Alaska in all the streams, so far as I could learn. Specimens were brought me from the Yukon at various points and from other streams, and the first of September, 1881, I saw quite a number of them taken in a seine by the Eskimo from the brackish estuaries of streams flowing into Kotzebue Sound.

50. AMMOCCETES AUREUS Bean. Lamprey Eel (Esk. *Ná-mug-á-shúák*).

32840. (73.) Mission, Yukon River, winter, 1877-78.
32841. (76.) Mission, Yukon River, winter, 1877-78.
32874. (70.) Mission, Yukon River, winter, 1877-78.
32875. (71.) Mission, Yukon River, winter, 1877-78.
32876. (72.) Mission, Yukon River, winter, 1877-78.
32877. (74.) Mission, Yukon River, winter, 1877-78.
32878. (75.) Mission, Yukon River, winter, 1877-78.

Ordinarily soon after the ice sets in the Yukon, and rarely just before this occurs, these fish run up the Yukon in large numbers, reaching at least up to Nulato. They keep in the middle of the river and move up against the swiftest part of the current and run in a dense body. So compactly do they run that the natives use either a stick, with two short cross-bars at the lower end, or a dip-net to throw them out on the ice. By means of these implements great numbers of them are caught, although it is claimed that the eels only require about an hour for the main body of them to pass any given point. The Yukon Eskimo have holes cut in the ice, and continuous watch is kept when the time for their run approaches, and as soon as they appear the alarm is given and every one runs out on the ice with stick or dip-net, and, making holes in the thin ice, secures as many as possible while the fish pass their station, and then they run upstream a half mile or so and make another hole and secure as many more as possible, and thus follow the slowly-moving fish for a long distance. In 1879 the run began at Anvik on the evening of November 26. They are extremely oily, and the natives use the oil for eating and for lamps as a substitute for seal oil.

PART IV. 515479 (1891)

INSECTS.

REPORT UPON THE DIURNAL LEPIDOPTERA COLLECTED IN
ALASKA BY E. W. NELSON,

BY

W. H. EDWARDS,

WITH AN INTRODUCTION

BY

E. W. NELSON.

INTRODUCTION.

The present account of the butterflies collected by me has been kindly prepared by Mr. Edwards, at my request. As will be seen from the list, the specimens were taken either at Saint Michaels or along the Arctic coast from Kotzebue Sound north. Along this latter coast I found butterflies more numerous than I had ever seen them on the coast of Bering Sea. In neither district, however, were they very common. The list of species is smaller than it would otherwise be from the fact that during the months of June and July at Saint Michaels I was so pressed with work in other directions that only the scantiest attention was paid to collecting butterflies. In fact I took only such specimens as occurred in the immediate vicinity of the station. The specimens taken along the Arctic coast in the summer of 1881 were all secured by means of my hat. In consideration of these facts, the writer was surprised to find that the collection contained two new species, *Pieris Nelsoni* and *Argynnis Butleri*, besides some rare and little known forms. This should encourage future explorers in that region to pay greater attention to the collection of these insects.

At Saint Michaels the warm weather of June and the first two weeks of July cover the butterfly season, and we only found butterflies along the Arctic coast during July.

The raw misty weather so characteristic of the last half of summer on the east coast of Bering Sea is entirely unsuited to the life of these frail insects, and scarcely one can be found then. Mild weather prevails much later in the season about the shores of Kotzebue Sound, and in the interior, North of Kotzebue Sound, on the Arctic coast, the season is similar to that at Saint Michaels, but is shorter. The Point Barrow party failed to obtain a single butterfly, so they must be very rare at that bleak and desolate locality.

SPRINGERVILLE, ARIZ., November 25, 1886.

E. W. NELSON.

DIURNAL LEPIDOPTERA COLLECTED IN ALASKA.

Family PAPHIONIDÆ.

Subfamily PAPHIONÆ.

Genus PAPHIO Linnæus.

PAPHIO MACHAON Linn., var. ALASKA Scudder.

This form seems to be abundant at Saint Michaels, and was found high up the Yukon River by Dall. The most easterly point at which it has been observed is Rupert House, Hudson's Bay. It would appear to fly over the boreal regions west of Hudson's Bay, but it was not taken by Mrs. Ross at Fort Simpson some years ago, though a very large collection of butterflies was made there. Captain Geddes did not find it along the line of the Canadian Pacific Railroad nor in the Peace River district in 1883, nor did the late Mr. Crotch take it in British Columbia, though he collected as far to the north as Bald Mountain. It is the same form, apparently, which flies in the Himalayas and other parts of Eastern Asia, confounded with *Asiaticus* Ménétriés, which is the name of an aberration only. There is some variation in color among the examples from Saint Michaels, most being pale yellow. But one male is deep yellow, and so is like the Hudson's Bay examples so far observed.

Subfamily PIERINÆ.

Genus PIERIS Schrank.

PIERIS NAPI Linn. Winter form *Bryonie* Ochsenheimer.

A number of examples were taken at Saint Michaels, 1878, at dates from June 2 to July 7. They are all of small size, the males expanding 1.5 inch, the females 1.6 inch. The male is white; on the under side the hind wings are either white or faint yellow, the nervures heavily edged with gray-brown, just as in examples from Lapland. The females are much obscured on upper side by gray, and the nervures are broadly edged with gray. Two Lapland females are yellow, obscured by brown; so also are some examples from the Alps, but I have not found Alaskan females of this hue. The winter form of *Napi* flies over the entire boreal part of the continent. It is single-brooded, and to the south, on the Pacific slope, is replaced by the winter form *venosa* Scudder, its summer form there being *pallida* Scudder. Mr. Mead took many examples of both sexes of *Bryonie* on Newfoundland. The species there is two-brooded, and the butterflies of the second brood in markings lie between *venosa* and *pallida* of the west. I called this Newfoundland summer form *Acadica*, *Papilio* 1, p. 87, 1881. The butterflies of the winter form on this island are nearly twice as large in superficial area as the Saint Michaels examples.

PIERIS NELSONI Edwards.

One male taken at Saint Michaels June, 1881. The species is near *Callidice* Esper, but differs in the coloration of the under side, which is gray-brown instead of green; and on upper side, in the shape of the cellular spot, which is a short oval, instead of a long curved bar; also in the presence of a spot in the sub-median interspace. Mr. A. G. Butler informs me that the British Museum collection contains a similar male labeled "North America." I named the species after Mr. E. W. Nelson, and figured it in *Butterflies of North America*, volume 2, part 10, plate 1, of Pieris, 1883.

Genus COLIAS Fabricius.

COLIAS HECLA Lefebvre var. HELA Strecker.

One male and one female were taken at Kotzebue Sound July 14, 1881. The male is similar on both surfaces to an example which I have from Greenland, but the female is much more yellow than a Greenland female and another from Cumberland Island, and less obscured by black on both surfaces than these. The under side is of the same yellow-green hue of the male. The species seems to be restricted to the Arctic regions, but flies from Greenland to Alaska.

COLIAS CHIPPEWA Edwards.

One white female taken at Saint Michaels August 6, 1878; one white female and one yellow female at Kotzebue Sound July 14, 1881. These are all of same size and style of marking as the female figured in *Butterflies of North America*, volume 1 (under the name of *Helena*, which name was found to have been preoccupied and *Chippeca* was substituted for it). The under side of hind wing in this species has the discal spot small, silvery, with no border. The examples originally described were taken at Fort Simpson, and probably the species flies over the boreal and Arctic regions to the northwest.

Family NYMPHALIDÆ.

subfamily NYMPHALINÆ.

Genus ARGYNNIS Fabricius.

ARGYNNIS FREYA Thunberg.

One male and one female, taken at Saint Michaels, do not differ from Colorado and Labrador specimens. *Freya* follows the Rocky Mountains as far as South Colorado, at high elevations. One male was taken at Kotzebue Sound July 13, 1881, and is very black.

ARGYNNIS FRIGGA Thunberg.

One male and one female, taken at Saint Michaels, do not differ from examples taken at Fort Simpson, but are somewhat larger than all I have seen from Labrador. This species also flies in the Rocky Mountains and Colorado.

ARGYNNIS BUTLERI Edwards.

This species I described in the *Canadian Entomologist*, volume xv, page 32, 1882, from one male taken at Kotzebue Sound July 14, and another at Cape Thompson July 19, 1881. It is allied to *A. chariclea*, from which it "differs in the redder coloration and much heavier markings on the upper surface; the basal area is blacker, the spots and stripes much thicker. Below the markings are altogether darker than in *chariclea*, whether of Europe" (or America).—Butler. Mr.

Butler informed me that the example sent him for determination agreed perfectly with one in the British Museum collection, labeled "Nova Zembla;" also with two of the Grinnell Land series, included under Mr. McLachlan's varieties of *chariela*.

Subfamily SATYRINÆ.

Genus EREBIA Dalman.

EREBIA FASCIATA Butler.

One female taken at Kotzebue Sound July 14, 1881. This is an exceedingly rare species in our collections. I have seen but two examples of it before the arrival of this from Mr. Nelson. It is the largest American species of the genus, the male almost black on upper side, the female dull russet over the disks of both wings. On the under side of both sexes is a band beyond middle of both wings, brownish on fore wing, gray on hind wing; and next to the base is a brown area on fore and a gray one on hind wing; the area between the brown and gray is black, a band in fact, with jagged or irregular edges. Mr. Butler's description in the Catalogue of Satyridæ of the British Museum Collection, 1868, gives the locality as "Arctic America," and beyond this nothing appears to be known of the locality of the species.

EREBIA DISA Thunberg, var. MANCINUS Doubleday and Hewitson.

Examples from Kotzebue Sound July 14. One is labeled "Arctic Ocean," July 17; another, "Cape Thompson, Arctic Ocean," July 19, 1881. Others are from Saint Michaels. The species would seem to be common in Northern Alaska; I have seen several examples taken at Saint Michaels in former years. There is much variation in the markings of the under side in a series, some examples being banded much as in *fasciata*; others have the bands obsolescent. Kirby credits *disa* to boreal Europe and boreal Asia, and Rocky Mountains of America. Probably boreal America (northwest) is the correct locality.

Genus CHIONOBAS Boisduval.

CHIONOBAS TAYGETE Hübner. BOOTES Boisduval.

Of this, two males and one female are from Saint Michaels, not differing from the Labrador type. Probably the species flies through the boreal regions across the continent.

Family LYCENIDÆ.

Subfamily LYCENINÆ.

Genus LYCENA.

LYCENA PSEUDARGIOLUS Boisduval. Arctic form, VIOLACEA Edwards.

Two males from Saint Michaels. The species has two Arctic (or winter) forms, the other being *Lucia* Kirby. The latter was taken on the Yukon River by the expedition under Dall, as Mr. Scudder reports. (Pr. Bost. Soc. N. History, 1869.) These two forms fly from Alaska to New England. Where the species becomes two-brooded, in Canada and the Northern United States, the summer or second brood is *L. neglecta*, quite a different butterfly in appearance. Farther to the south other forms present themselves, and under some of these the species is found even in Mexico. I have given a full account, illustrated by figures, of all the phases of this species in Butterflies of North America, volume 2.

I subjoin a list of all species of butterflies so far known to have been taken in Alaska. Doubtless many more remain to be discovered, especially in the southern parts of the Territory. In

drawing up this I have been aided by Mr. Henry Edwards, who inspected the collections made by Messrs. Bischoff and Harford about ten years ago.

- | | |
|---|--|
| 1. <i>Papilio Taranus</i> Linn. | 19. <i>Argynnis epithore</i> Bois. |
| 2. <i>Papilio eurymedon</i> Bois. | 20. <i>Argynnis Butleri</i> Edw. |
| 3. <i>Papilio Machaon</i> , var. <i>Alaska</i> Scud. | 21. <i>Argynnis Myrina</i> Cram. |
| 4. <i>Parnassius Nomiou</i> Fisch. | 22. <i>Argynnis frigga</i> Thunb. |
| 5. <i>Parnassius Eversmanni</i> , Mén.
♀ <i>Wosnesenski</i> Mén.
♀ <i>Thor</i> H. Edw. | 23. <i>Melitaea Helria</i> Scud. |
| 6. <i>Pteris Napi</i> , form <i>Bryonia</i> Ochs.
<i>Pteris Napi</i> , var. <i>Halda</i> Edw.
<i>Pteris Napi</i> , form <i>venosa</i> Scud. | 24. <i>Melitaea Pulla</i> Bois. |
| 7. <i>Pteris Nelsoni</i> Edw. | 25. <i>Phyciodes Mylitta</i> Edw. |
| 8. <i>Anshocharis lanceolata</i> Bois. | 26. <i>Grapta faunus</i> Edw. |
| 9. <i>Anshocharis ? Reakirtii</i> Edw. | 27. <i>Grapta gracilis</i> Gr.-Rob. |
| 10. <i>Colias interior</i> Scud. | 28. <i>Fanessa Antiopei</i> Linn. |
| 11. <i>Colias Chippewa</i> Edw. | 29. <i>Pyraucis Cardai</i> Linn. |
| 12. <i>Colias Hecla</i> , var. <i>Hecla</i> Str. | 30. <i>Cananympia Kodiak</i> Edw. |
| 13. <i>Colias eurytheme</i> , form <i>Keewaydin</i> Edw. | 31. <i>Erebia Discoidalis</i> Kirby. |
| 14. <i>Colias ? Pelidae</i> Bois. | 32. <i>Erebia fasciata</i> Butl. |
| 15. <i>Danaus Archippus</i> Fab. | 33. <i>Erebia disa</i> , var. <i>Maneinus</i> Doubl.-Hew |
| 16. <i>Argynnis Bischoffi</i> Edw. | 34. <i>Chionobas Taggete</i> Hübn. |
| 17. <i>Argynnis Freya</i> Thunb. | 35. <i>Chrysophanus Dorcas</i> Kirby. |
| 18. <i>Argynnis Boisduvalii</i> Somu. | 36. <i>Lycena Kodiak</i> Edw. |
| | 37. <i>Lycena pseudargiolus</i> ,
form <i>Lucia</i> Kirby.
form <i>Flolacea</i> Edw. |

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