

Jas. F. Gaillie, Jr.
Feb. 6, 1931

U. S. DEPARTMENT OF AGRICULTURE
BUREAU OF BIOLOGICAL SURVEY

NORTH AMERICAN FAUNA

No. 27

[Actual date of publication, October 26, 1908]



A BIOLOGICAL INVESTIGATION OF THE ATHABASKA-MACKENZIE REGION

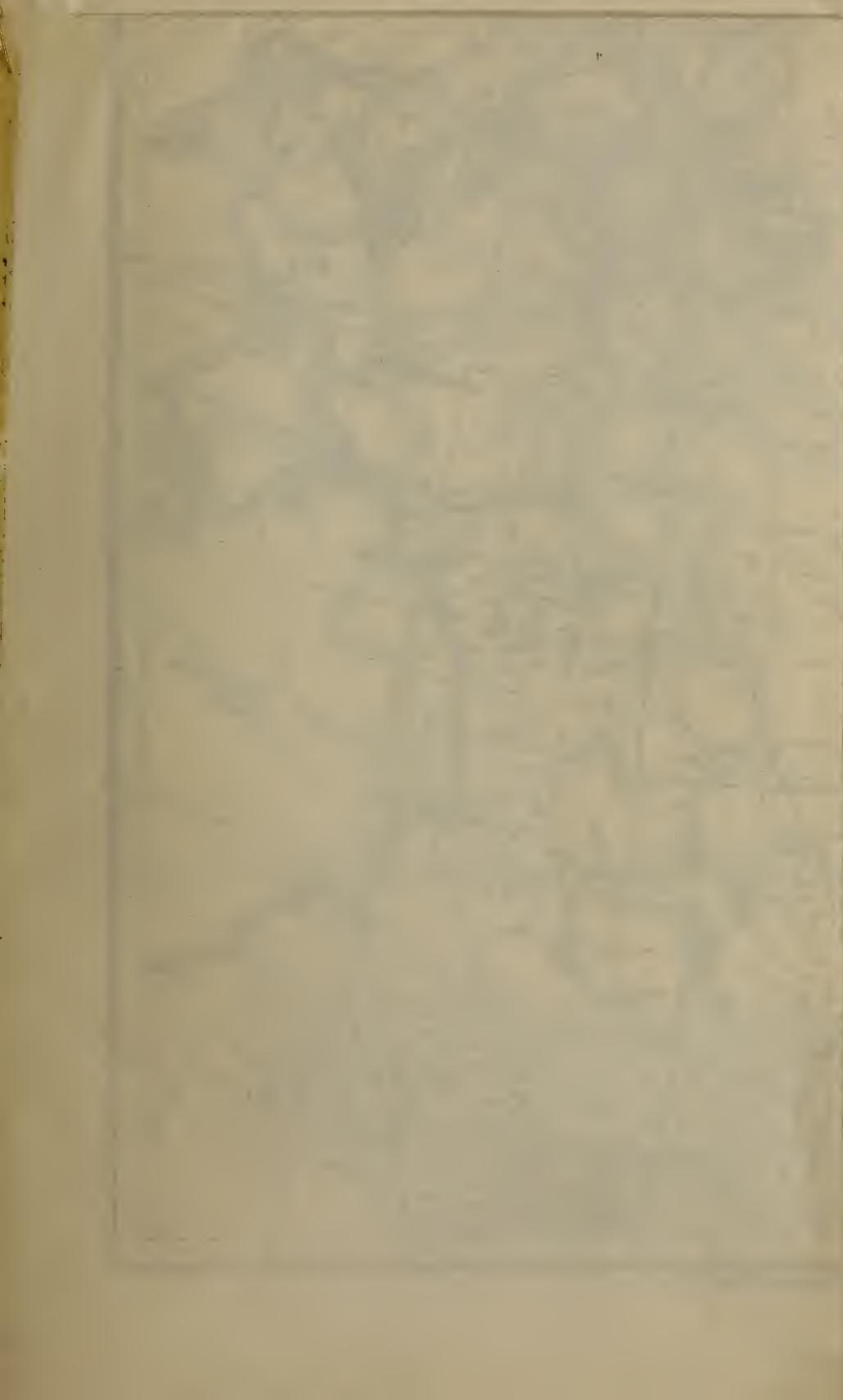
BY

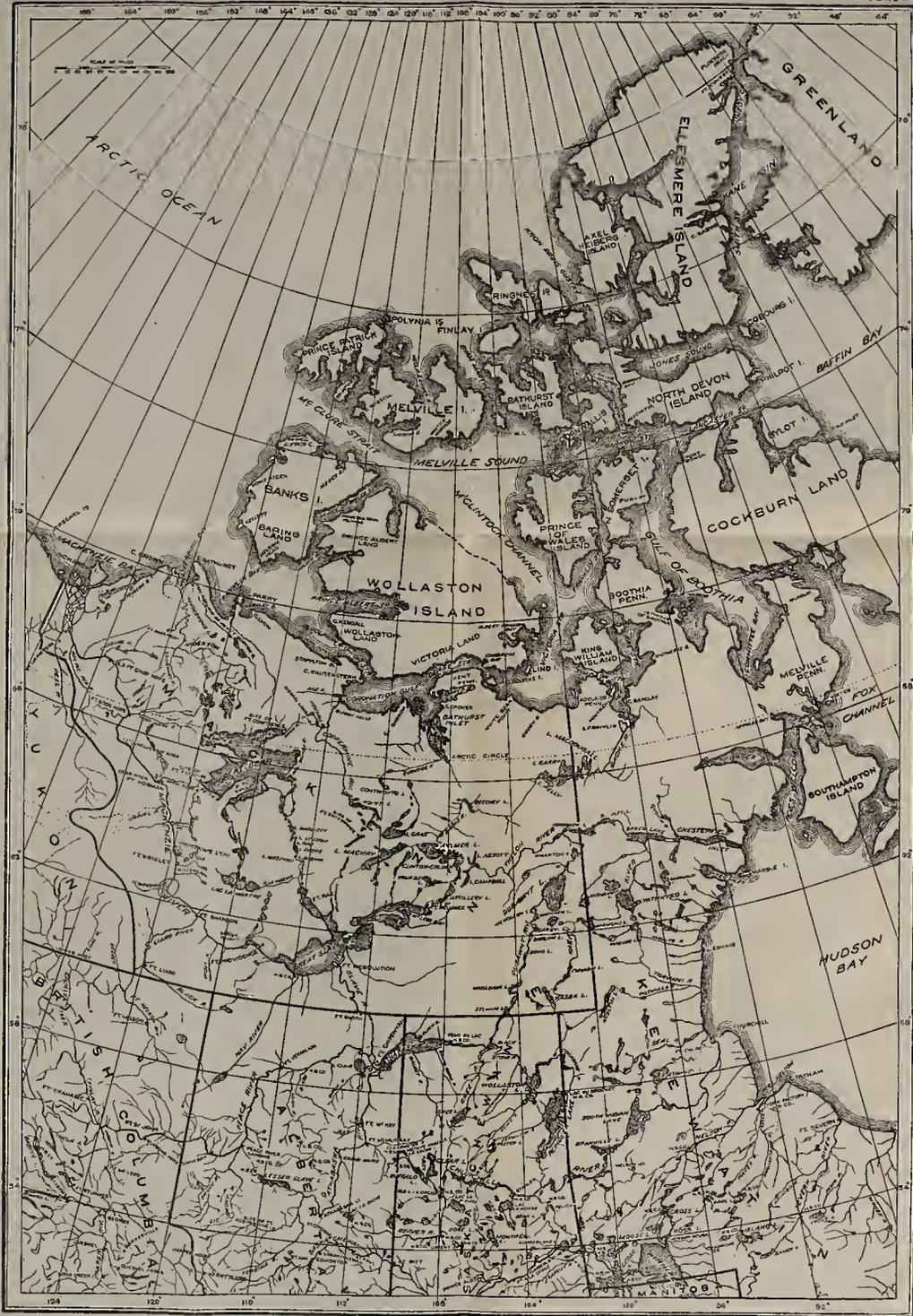
EDWARD A. PREBLE
ASSISTANT, BIOLOGICAL SURVEY

Prepared under the direction of
Dr. C. HART MERRIAM
CHIEF OF BUREAU OF BIOLOGICAL SURVEY



WASHINGTON
GOVERNMENT PRINTING OFFICE
1908





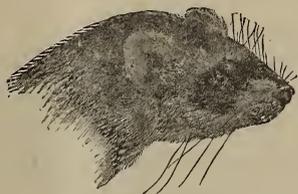
MAP OF THE ATHABASKA-MACKENZIE REGION.

U. S. DEPARTMENT OF AGRICULTURE
BUREAU OF BIOLOGICAL SURVEY

NORTH AMERICAN FAUNA

No. 27

[Actual date of publication, October 26, 1908]



A BIOLOGICAL INVESTIGATION OF THE ATHABASKA-MACKENZIE REGION

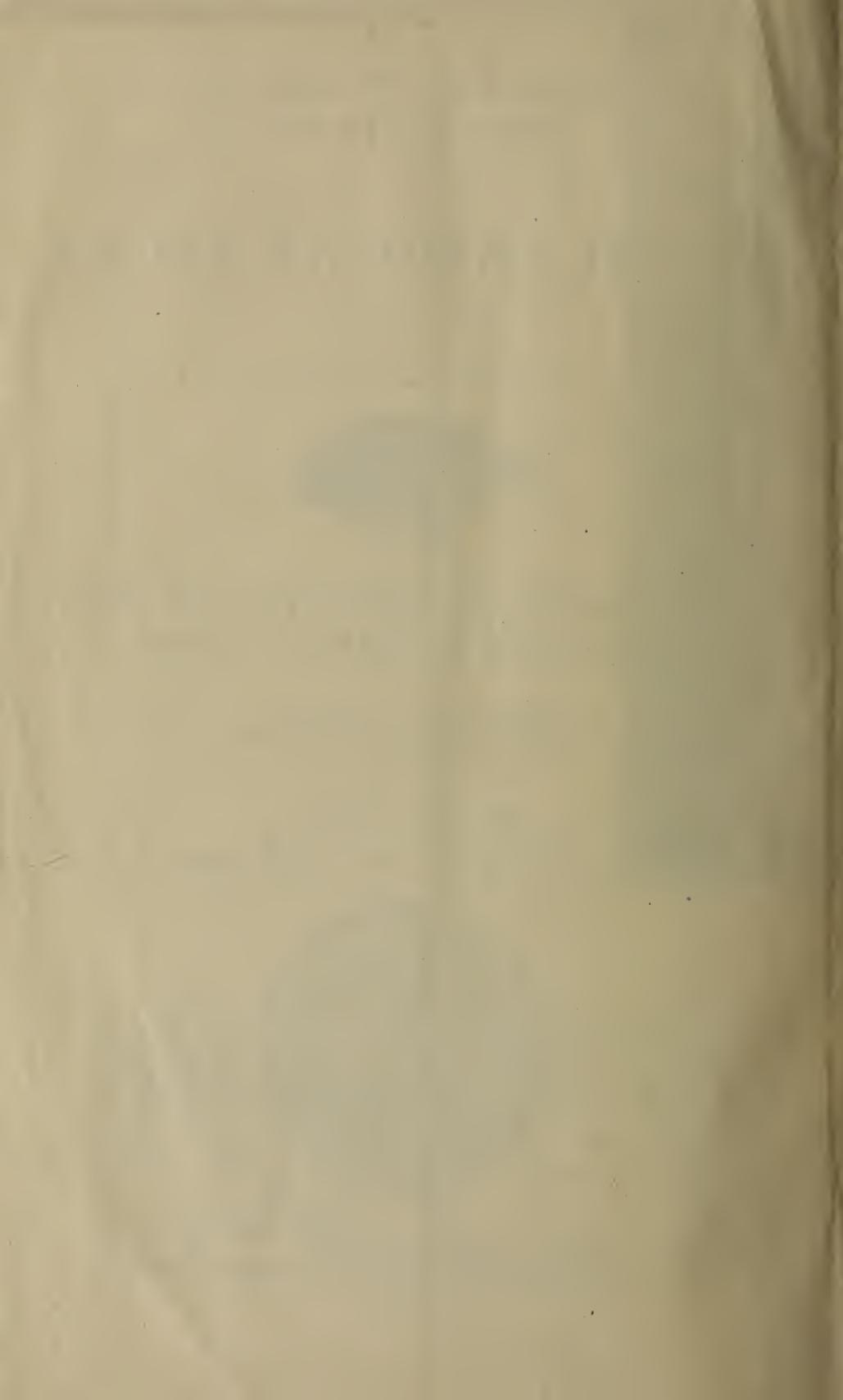
BY

EDWARD A. PREBLE
ASSISTANT, BIOLOGICAL SURVEY

Prepared under the direction of
Dr. C. HART MERRIAM
CHIEF OF BUREAU OF BIOLOGICAL SURVEY



WASHINGTON
GOVERNMENT PRINTING OFFICE
1908



LETTER OF TRANSMITTAL.

U. S. DEPARTMENT OF AGRICULTURE,
BIOLOGICAL SURVEY,
Washington, D. C., April 13, 1908.

SIR: I have the honor to transmit herewith, for publication as North American Fauna No. 27, a report on the natural history of the Athabaska-Mackenzie region, by Edward A. Preble. It is based mainly on the results of two expeditions conducted by the author in the interests of the Biological Survey—the first in 1901, the second in 1903-4. The report was completed by Mr. Preble in the fall of 1906, but owing to the condition of the printing fund was not sent to the printer until April, 1908. During the interval a large number of additional notes were incorporated, so that it now represents the state of knowledge of the region in the spring of 1908. The facts here brought together fill a broad gap in our knowledge of Boreal America, and connect the work previously done in the Hudson Bay region on the east with that in Alaska on the west, on which the Biological Survey is still engaged.

Respectfully,

C. HART MERRIAM,
Chief, Biological Survey.

HON. JAMES WILSON,
Secretary of Agriculture.

CONTENTS.

	Page.
Introduction	9
Itinerary	11
Expedition of 1901	11
Continuation of investigations during 1903 and 1904	13
Physical geography and climatology of the Mackenzie Basin	16
The Athabaska Valley	17
The basin of Athabaska Lake	21
The Peace River Valley	23
The basin of Great Slave Lake	26
The Liard River Valley	30
The Mackenzie River Valley	32
Seasonal phenomena in Mackenzie Valley, 1903-4	37
Seasonal phenomena at Fort Simpson, winter 1903-4	37
Seasonal phenomena on Mackenzie below Fort Simpson, summer 1904	41
The basin of Great Bear Lake	42
The Barren Grounds	46
Life zones of the Athabaska-Mackenzie region	49
Arctic zone	50
Hudsonian zone	51
Canadian zone	52
Previous explorations and collections	54
Earliest explorers, Hearne and Mackenzie, 1770-1793	54
Franklin, 1819, to Simpson, 1839	57
The Franklin search expeditions, 1845-1855	64
Kennicott's expedition, 1859, and its results	70
Later expeditions, 1862-1907	74
General account of routes traversed by Biological Survey parties during 1901, 1903, and 1904	85
Route between Edmonton, Alberta, and mouth of Mackenzie	85
Tables of distances	109
Route between Great Slave and Great Bear lakes	110
Note on boundaries of region treated	125
Mammals of the Athabaska-Mackenzie region	126
Birds of the Athabaska-Mackenzie region	251
Reptiles and batrachians of the Athabaska-Mackenzie region	500
Fishes of the Athabaska-Mackenzie region	502
Trees and shrubs of the Athabaska-Mackenzie region	515
Bibliography	535
Index	559

ILLUSTRATIONS.

PLATES.

	Page.
PLATE I. Map of Athabaska-Mackenzie region	Frontispiece
II. Map of life zones Athabaska-Mackenzie region.....	50
III. Fig. 1.—Main channel of Athabaska at Grand Rapid. Fig. 2.— Left bank of Athabaska at Grand Rapid.....	88
IV. Fig. 1.—Fort Chipewyan, Athabaska Lake. Fig. 2.—Shore of Athabaska near Fort McMurray. Fig. 3.—Athabaska Land- ing.....	88
V. Fig. 1.—Uprooted trees, result of landslip. Fig. 2.—View in muskeg. Fig. 3.—Slide terraces, Athabaska River.....	92
VI. Fig. 1.—Road on Smith Portage. Fig. 2.—Grove of aspen poplars, Athabaska River.....	92
VII. Fig. 1.—Slave River near Smith Landing. Fig. 2.—Bank worn by current, Slave River. Fig. 3.—Foresting on island, lower Slave River.....	96
VIII. Fig. 1.—Fort Smith, Slave River. Fig. 2.—Fort Resolution, Great Slave Lake. Fig. 3.—Hay River post, Great Slave Lake	96
IX. Fig. 1.—Summit Loon Island, Great Slave Lake. Fig. 2.—Bay near Fort Rae. Fig. 3.—Fort Rae, Great Slave Lake.....	100
X. Fig. 1.—Fort Simpson, Mackenzie River. Fig. 2.—Fort Providence, Mackenzie River. Fig. 3.—Camp of Slavey Indians near Fort Providence	100
XI. Fig. 1.—Mount Camsell from Mount Tha-on'-tha. Fig. 2.— Mount Tha-on'-tha from mouth Nahanni River.....	104
XII. Fig. 1.—Summit Mount Tha-on'-tha. Fig. 2.—Junction of Nahanni and Mackenzie.....	104
XIII. Fig. 1.—Fort Good Hope, Mackenzie River. Fig. 2.—Fort Wrigley, Mackenzie River. Fig. 3.—Main buildings at Fort McPherson.....	108
XIV. Fig. 1.—Muskeg pond, height of land. Fig. 2.—Lake and mountain country near Lake St. Croix	108
XV. Fig. 1.—Rapid near MacTavish Bay. Fig. 2.—Rapid on Lower Grandin River	118
XVI. Fig. 1.—Sandy bay near Leith Point. Fig. 2.—Rocky shore west of McVicar Bay. Fig. 3.—Semibarren shore near Leith Point	118
XVII. Fig. 1.—Biological Survey camp near Leith Point. Fig. 2.— Shore of sandy bay west of McVicar Bay	122
XVIII. Fig. 1.—Bank of upper Bear River. Fig. 2.—Trapper's cabin near Fort Franklin. Fig. 3.—Mount Charles, Bear River ..	122

	Page.
PLATE XIX. Map of distribution of Barren Ground caribou (<i>Rangifer arcticus</i>)	138
XX. Map of distribution of Parry marmot (<i>Citellus parryi</i>) and related forms	162
XXI. Fig. 1.—Snare set for rabbit (<i>Lepus americanus</i>). Fig. 2.—Rabbit in snare. Fig. 3.—White spruce denuded by rabbits..	200
XXII. Fig. 1.—Lynx (<i>Lynx canadensis</i>) in snare. Fig. 2.—Snare set for lynx	210
XXIII. Fig. 1.—Nest and eggs Arctic great horned owl (<i>Bubo v. subarcticus</i>). Fig. 2.—Nests of cliff swallow (<i>Petrochelidon lunifrons</i>)	372
XXIV. Fig. 1.—White spruce near Leith Point. Fig. 2.—Dwarfed trees, upper slopes Mount Tha-on'-tha.....	518
XXV. Fig. 1.—Mat of <i>Dryas integrifolia</i> . Fig. 2.—Wild roses (<i>Rosa acicularis</i>)	528

TEXT FIGURES.

FIG. 1. Athabaska River near La Biche River	17
2. A brulé or fire-swept forest, Athabaska River	18
3. Valley of stream filled with ice.....	42
4. Fort Anderson, Anderson River. (From sketch by Petitot).....	72
5. Boulder-paved shore, Athabaska River.....	89
6. Roche Trempe-l'eau, or Rock by the Riverside.....	104
7. Bear Rock, at mouth of Bear River.....	105
8. Entrance to Ramparts, Mackenzie River.....	106
9. Lower end of Ramparts, Mackenzie River.....	107
10. Map of former distribution of elk (<i>Cervus canadensis</i>).....	129
11. Map of distribution of moose (<i>Alces americanus</i>).....	131
12. Map of former distribution of bison (<i>Bison bison</i> and <i>B. b. athabasca</i>)..	144
13. Map of distribution of musk-ox (<i>Ovibos moschatus</i>).....	151
14. Scales of cones collected by red squirrel (<i>Sciurus hudsonicus</i>).....	171
15. Nesting pond of red-throated loon (<i>Gavia stellata</i>)	258
16. Creeping juniper (<i>Juniperus sabina</i>)	519

A BIOLOGICAL INVESTIGATION OF THE ATHABASKA-MACKENZIE REGION.

By EDWARD A. PREBLE.

INTRODUCTION.

The greater part of Boreal America falls naturally into three great regions—the region tributary to Hudson Bay, that drained by the Mackenzie and its tributary rivers, and that whose waters unite to form the Yukon. The present report deals with the natural history, especially the higher vertebrates, of the second of these great areas. Though not offering to the student of geographic distribution so many problems as the Alaska region, where the various combinations of boreal, humid, and alpine conditions have resulted in the differentiation of many well-marked races, the region drained by the Mackenzie in many respects is the most interesting of these great natural divisions. Many mammals, some of them among the most valuable of the fur-bearing species, range over it, and also extend over large portions of adjoining areas. Within its borders live the last wild herds of that all but extinct species, the American bison, while another equally notable ruminant, the musk-ox, abounds on its Barren Grounds, where probably it is destined to make its last stand.

In the spring, when its rivers and swamps are freed from the grasp of the long Arctic winter, the region becomes the resort of millions of birds which hasten to breed within its borders. These include representatives, and in some cases the bulk of the individuals, of most of the migratory game birds, which are of great economic importance in the United States, where many of them winter.

Though explored nearly a century later than Hudson Bay and consequently not furnishing so many species new to science (for many animals first described from Hudson Bay are common to both

regions), the interior region richly repaid an examination of its zoological wealth. As is often the case, the desire for the promotion of trade, here evidenced by the long search for a feasible Northwest Passage, played an important part in the exploration of the region. In the narratives of the hardy pioneers of the North are recorded many observations on the native animals, enabling the later student to compare the present and former status of many species.

The first white man to enter the Mackenzie region was Samuel Hearne, of the Hudson's Bay Company, who in the years 1770 and 1771 made a journey on foot from Fort Prince of Wales (now Churchill) on Hudson Bay, to the mouth of Coppermine River. Nearly twenty years elapsed before another explorer penetrated beyond Great Slave Lake. In 1789 Alexander Mackenzie, of the Northwest Company, an early rival of the Hudson's Bay Company, followed to its mouth the great river which now bears his name, thus being the second white man to set eyes on this part of the Arctic Ocean. Following his notable exploration was a period of thirty years, during which our knowledge of the geography and natural history of that part of Arctic America remained at a standstill. Then, with the first journey of Franklin, in 1820, began a series of explorations which extended over a period of about thirty years, in connection with which the study of the natural history and geography of the country was carried on as systematically as the time and resources of the explorers allowed. During these various journeys, the zoological results of which were published both in systematic works and in the narratives of the various explorations, the sum of knowledge concerning the natural history of the region was greatly increased.

In 1859 Robert Kennicott visited the Mackenzie region and remained three years. That gifted naturalist, sent north in the interests of science by Professor Baird, of the Smithsonian Institution, so impressed the various officers of the Hudson's Bay Company with whom he came in contact that they forthwith became zoological collectors, and during the next few years sent to the Smithsonian Institution thousands of mammals, birds, eggs, and other specimens, in this brief period probably adding more to our knowledge of the natural history of this part of the great Northland than had been accumulated since it was first entered. Unfortunately Kennicott was called to other fields, where he died in 1866, and no report on this work was ever published. Still, during the thirty-odd years since these collections were made, many additions to knowledge have resulted from the elaboration by others of the extensive material thus accumulated.

Although much had been accomplished, yet at the close of the nineteenth century much remained to be done. The unprecedented activity in the study of the geographic distribution and variation of animals, the migration of birds, and the economic relations of the

various species to man, displayed during the last decade or two in other parts of North America, rendered a more detailed study of this northern region desirable. The recent increase in knowledge of the zoology of Labrador, the Hudson Bay region, and Alaska left the great interior region drained mainly by the Mackenzie (see Frontispiece) the most neglected large area in North America. The need of material from this area became so urgent that the Biological Survey, in the early spring of 1901, determined to send there one of its trained field naturalists to obtain representative collections of the mammals, birds, and plants. This was the more necessary since the early material, consisting mainly of alcoholic specimens or skins without flesh measurements, is not now in a condition satisfactory for comparison. As it was evident that only a part of the region could be satisfactorily examined in a single season, it was determined to make first a reconnaissance of the region about Athabaska and Great Slave lakes. Accordingly, in the spring of 1901 I was detailed for this service, accompanied, as on the trip to Hudson Bay, by my brother, Alfred E. Preble, then of Tufts College, Massachusetts.

ITINERARY.

EXPEDITION OF 1901.

As on our previous trip,^a arrangements were made with the Hudson's Bay Company, whose trading posts are scattered over nearly the whole of British America, to furnish subsistence and means of transportation. Realizing that it was desirable to start as early in the season as possible, in order that the time of arrival of the migratory birds could be noted, we left Washington on April 23, 1901, and reached Edmonton, Alberta, the termination of our railroad journey, on April 29, having stopped over a day at Winnipeg, Manitoba, to confer with the officers of the Hudson's Bay Company. After perfecting plans and securing supplies we left Edmonton on the afternoon of April 30 for Athabaska Landing, a small settlement and trading post on Athabaska River, nearly 100 miles distant by wagon road to the north of Edmonton, where our journey by canoe was to begin.

Because of the marshy character of the country, which had been liberated only a short time from the grasp of the semiarctic winter, the roads were almost impassable, and five days were consumed in reaching Athabaska Landing. The Hudson's Bay Company's scow, sent annually to Fort Chipewyan on the opening of navigation, was ready to depart, and on May 6 we left Athabaska Landing by canoe in company with the scow, on which a part of our heavy baggage

^a See N. Am. Fauna, No. 22, 1902.

was shipped, as the rapids which begin about 155 miles below can not be run by a heavily loaded canoe.

Being delayed somewhat by stormy weather, and by portaging at the Grand Rapid, we reached Fort McMurray on May 14, and the mouth of the Athabaska three days later. Athabaska Lake to the eastward of the delta and the portion between the mouth of the Athabaska and Fort Chipewyan had been open only a few days, and was still full of floating ice, which under the influence of the strong current was hurrying toward the outlet. The traverse among the grinding floes to Fort Chipewyan was made during the night of May 17. Here we remained until June 5, moving camp twice in order to work the different kinds of ground in the vicinity. On June 5 we started down Rocher River, and entering Slave River, as the stream is called after uniting with the Peace, descended it to Smith Landing, stopping for a few days at several favorable points. We left Smith Landing June 18, and crossing the 16-mile portage to Fort Smith, spent ten days investigating the fauna in that vicinity.

Leaving Fort Smith on June 29, we descended Slave River to Great Slave Lake, collecting a little on the way, and reached Fort Resolution on July 4. Here we worked in company until July 9, when I left my brother to examine the place more thoroughly, and crossed to Fort Rae, making collections on the way, and arriving July 18. The next ten days I spent in the vicinity of Fort Rae, securing a good representative series of the small mammals and many interesting birds.

On July 29 the steamer *Wrigley*, returning from the mouth of the Mackenzie, reached Fort Rae. The next day at daylight I went aboard and arrived at Fort Resolution the following morning, where I was joined by my brother. With our united collections we left Fort Resolution on the afternoon of August 1, when the *Wrigley* resumed her journey, and steaming continuously, except when a stop was made to 'wood up,' reached Fort Smith on August 3. On August 5 we crossed Smith Portage to Smith Landing, where the Hudson's Bay Company's steamer *Grahame*, which plies between that point and Fort McMurray, lay moored to the bank. A stop of a day at Smith Landing was improved by adding to our collection. Leaving on the afternoon of August 6, we reached Fort Chipewyan on the evening of the next day, and Fort McMurray on the evening of August 10.

We left Fort McMurray on August 12 on one of the company's scows, by means of which the furs are transported to Athabaska Landing by tracking, and traveled slowly up the Athabaska, collecting when possible, and reaching Grand Rapid on August 20. Here, the rapids being passed, we obtained a canoe in order to have a better opportunity to collect than was afforded when traveling on scows. The weather was very favorable, and we reached Athabaska Landing

on August 29, two days ahead of the transport, having obtained many interesting specimens on the way. Being obliged to wait for our baggage, we utilized the time collecting in the vicinity. Leaving Athabaska Landing with our baggage and specimens on September 1, we reached Edmonton on the afternoon of September 4, shipped our collections, and as soon as practicable left for Washington, where we arrived on September 15.

CONTINUATION OF INVESTIGATIONS DURING 1903 AND 1904.

In the spring of 1903, the results of our work in 1901 having been elaborated but not published, I was sent to complete our work in the Mackenzie region. This was especially desirable, since on the previous trip we had penetrated only as far as Great Slave Lake. On the second trip, in addition to my brother, I was accompanied by Merritt Cary, an assistant in the Biological Survey. We left Washington May 2, Edmonton May 11, and Athabaska Landing May 16. Collecting when opportunity afforded, but not stopping to do any detailed work, we reached Fort Chipewyan June 2 and Fort Resolution June 19. Here the party was divided, my brother and Cary proceeding to the Mackenzie and working there until obliged to start back with the southward trip of the boats, while I made a trip northward through almost unknown country to the eastern part of Great Bear Lake.

My companions left on June 26, reaching Hay River the following day and remaining there until July 1. Thence they proceeded to Fort Providence, situated on the Mackenzie a few miles below the outlet of the lake, and there remained until July 8. Descending the Mackenzie past Fort Simpson, at the mouth of the Liard, they made their next stop at the mouth of Nahanni River, about 75 miles below the latter place. Here they spent several days, ascending a near-by mountain and obtaining many interesting and valuable specimens. They left this place July 19 and voyaged down the river to Fort Wrigley, where they remained until July 22, when the steamer *Wrigley* arrived on her upward trip, and they were obliged to start on their return. Their journey to Athabaska Landing, where they arrived on September 2, was made by the same conveyances utilized on our previous trip. Many interesting specimens and records were obtained during their return trip, especially along the Athabaska. The time from September 2 to 15 was spent on the river above Athabaska Landing, and good series of the smaller mammals and many desirable birds were obtained.

In the meantime I had crossed Great Slave Lake to Fort Rae, accompanied by James MacKinlay, formerly of the Hudson's Bay Company, and engaging two Fort Rae Indians as guides and canoe-men, had started northward for Great Bear Lake, following a chain of lakes and rivers by way of Lake St. Croix. It had been my intention

to cross by one of the Indian routes to the upper Coppermine and to descend that stream, but various circumstances rendered this impossible and I was obliged to take the shorter, more westerly route.

Leaving Fort Rae on July 30, we traversed the remainder of the Northern Arm and its extension, Lake Marian, and on August 1 began the ascent of Grandin River, first explored and named by Petitot, a missionary who traveled a great deal in this region. Numerous rapids and the consequent portages made progress slow, and the height of land, 80 miles slightly west of north of Fort Rae in a straight line, but much farther by the river, was reached August 6. Up to this time only a few small lakes had been traversed, but beyond our route lay mainly through large and small lakes, between which we sometimes made portages and sometimes followed the streams, now flowing northward toward Great Bear Lake. My guide turned back on August 22, and I reached Great Bear Lake, accompanied by Mr. MacKinlay and one Indian, three days later. Coasting along its semi-barren southern shore, where we were sometimes delayed by northerly storms for days at a time, we reached its western extremity September 17. Ten days were spent near the site of Fort Franklin, the wintering station of Franklin's second northern expedition, and here many desirable specimens were taken. Then we left for the Mackenzie, descending Great Bear River. Its rapid current bore us swiftly on our way, but the spray, freezing thickly on the paddles and gunwales, warned us that navigation would soon be closed. We reached Fort Norman, at the mouth of Bear River, on September 30, and there saw white faces for the first time since leaving Fort Rae two months before.

More than 300 miles of upstream navigation still lay between us and Fort Simpson, where I intended wintering. We remained at Fort Norman, therefore, only long enough to secure provisions, and on October 2 commenced to track up the Mackenzie. During the first few days good progress was made, but snow soon began to fall almost nightly, making tracking slow and difficult. We reached Fort Wrigley on October 11, and left the next morning on the last stage of our journey, still confident of reaching Fort Simpson before navigation closed, although the indications pointed to a much earlier winter than usual. The snow, however, increased in depth, and on October 15, near Nahanni River, the ice began to drift in earnest. Two days were spent in struggling against it. On the morning of October 17 the water had become so thick with ice and slush that further progress was impossible. Accordingly the canoe was pulled up beyond high-water mark and camp was made, and accompanied by the Indian I pushed on to the fort on foot. We were still 50 miles from the post, were obliged to carry blankets and provisions, and, as walking was very difficult, we were nearly three days on the way. As

soon as possible a dog sled was dispatched to our camp, and the lighter and more valuable articles were brought up to the post, while the remainder of the outfit was securely cached to await conditions more favorable for transportation.

From October 20, 1903, to June 1, 1904, I remained at Fort Simpson. A good collection of the winter birds and smaller mammals was made; and being in one place during the entire spring migration, I was able to secure many valuable notes and specimens. I had planned to make a trip down the Mackenzie in the summer and accordingly left Fort Simpson on June 1. Stopping for several days at Fort Norman and Fort Good Hope, and a shorter time at a few other points, I reached Fort McPherson, on the lower Peel, on July 1. Here I remained until the arrival of the steamer *Wrigley* on July 16. and on the following day started on my long homeward journey. Steaming day and night, for there was nearly continuous daylight, I reached Fort Simpson on July 26, Fort Resolution August 1, and Fort Smith August 3. Thence, by the same conveyances before utilized, I journeyed up the Slave and Athabaska, arrived at Athabaska Landing on September 1, and reached Edmonton September 4. From here I shipped my collections and as soon as possible left for Washington.

During the progress of my work in the north I was assisted in many ways by numerous persons, to all of whom my cordial thanks are hereby extended. Acknowledgments are especially due to my field assistants, Alfred E. Preble and Merritt Cary, whose labors added so materially to the results obtained, and to J. W. Mills and H. W. Jones, of Fort Simpson, who in the spring of 1904 procured many specimens and notes, and have since sent me additional information. James MacKinlay also, who accompanied me on my Great Bear Lake trip, assisted by every means in his power. Through the courtesy of C. C. Chipman, commissioner of the Hudson's Bay Company, arrangements were made to secure transportation and supplies at the company's posts throughout the region. I wish to make acknowledgment to all the employees of that company with whom I came in contact. Their number makes it impracticable to mention names. To the other traders, and to the missionaries, I am also under many obligations. I must refer also to Roderick MacFarlane, of Winnipeg, whose name occurs so often in these pages, and whose vast fund of information, the result of many years' experience in the north, has been at my disposal.

During the preparation of this report I have been assisted materially by the officials of the United States National Museum and the Smithsonian Institution, especially by Gerrit S. Miller, jr., and Robert Ridgway, in charge of mammals and birds, respectively, who have given me free access to the collections under their control. I have also received much help and encouragement from various mem-

bers of the Biological Survey. The photographs (except the one of the lynx, on Plate XXII, which was contributed by J. W. Mills) were taken by members of the Biological Survey—some by Merritt Cary, the greater number by myself.

PHYSICAL GEOGRAPHY AND CLIMATOLOGY OF THE MACKENZIE BASIN.

The Mackenzie Basin is here to be understood, in a broad sense, as comprising the area drained by the Mackenzie and its tributaries, and in addition a large section to the north and northeastward of Great Slave and Great Bear lakes, drained by the Coppermine and other smaller rivers tributary to the Arctic Ocean. Thus considered, it comprises a vast region in the northern part of North America, with an area of nearly 700,000 square miles, bounded roughly as follows: On the north by the Arctic Ocean; on the east by the valleys of the Great Fish, Thelon, Telzoa, and Churchill rivers; on the south by the Churchill and Saskatchewan valleys; and on the west by the main range of the Rocky Mountains. (See Frontispiece.)

The principal lakes of this region form a more or less connected system, which is a part of a series extending from Lake Superior to the Arctic Sea. These lakes lie along the junction of the primitive or granitic and the newer limestone formations, usually heading in the primitive belt and outletting in the limestone district. They are of irregular shape, usually sending long arms eastward into the primitive formation and north and south along the junction of the two systems, though in some cases the southern arms have been filled by the sediment-bearing streams which enter them. In addition to the large lakes thousands of smaller ones are scattered over the entire region.

With the exception of a large area at the north, mainly outside the actual drainage basin of the Mackenzie, this region for the most part is covered with woods—the great transcontinental coniferous forest. The principal trees of this forest are the white and black spruces, whose ranges are coextensive with its limits, and the canoe birch, tamarack, aspen and balsam poplars, Banksian pine, and balsam fir, which are common in the southern part of the belt, and which terminate, counting from the north, in about the order given. With these are associated, generally in the form of undergrowth, a variety of shrubs, some of which, also, have a continuous distribution through the forest zone, while others are more or less restricted in range.^a

For convenience of reference this great region may be divided into several areas: The Athabaska Valley; the basin of Athabaska Lake;

^a See list of trees and shrubs, p. 515, for detailed limits of range of the several species.

the Peace River Valley, including the Slave; the basin of Great Slave Lake; the Liard River Valley; the Mackenzie Valley proper; the basin of Great Bear Lake; and the region to the north and east of that body of water, and drained by the Anderson, Coppermine, and smaller rivers which enter the Arctic Ocean. These areas will be considered in the order given.

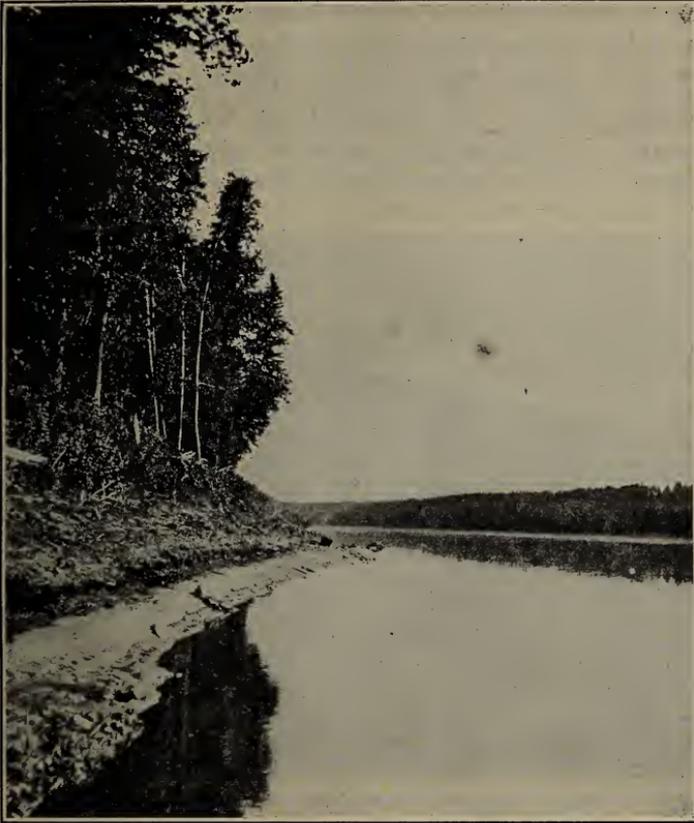


FIG. 1.—Left bank Athabaska River near La Biche River.

THE ATHABASKA VALLEY.

The Athabaska River rises in the Rocky Mountains near Mount Brown, at an altitude of about 5,700 feet, and pursues a northeasterly and northerly course for nearly 600 miles to Athabaska Lake, falling in this distance some 5,000 feet, and being interrupted by several series of rapids. In the first 300 miles of its course it falls about 4,000 feet, and receives in succession Baptiste River from the west, the McLeod and Pembina from the south, and the Lesser Slave, draining the large lake of that name, from the west. Below its confluence with the last-named stream, the Athabaska turns southeastward for some

50 miles and then resumes its northerly course. In the course of the next 150 miles it receives in succession La Biche River from the east (fig. 1); Quito or Calling River from the west; Big Mouth Brook from the east; Pelican River from the west; and House River from the east. Just below the mouth of the last river the Athabaska strikes a range of low hills, and in forcing a passage through them is deflected eastward, and for a distance of about 75 miles contains many rapids, falling in this distance some 400 feet. At the lower end of this stretch it receives the waters of Clearwater River, its principal tributary below Lesser Slave River. The Clearwater rises on the height of land between the Churchill and the Athabaska, and, pursuing a nearly straight easterly course for some 150 miles, mingles its limpid waters with the sediment-laden flood of the latter stream. In

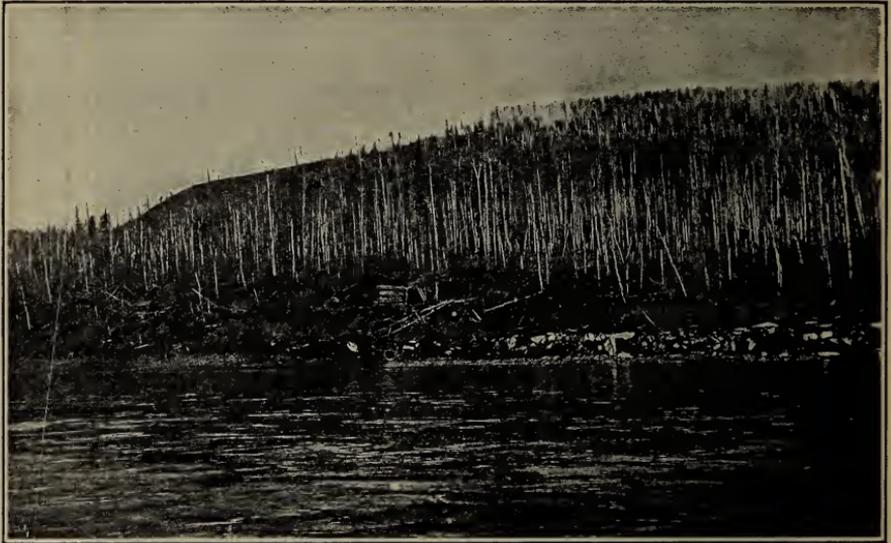


FIG. 2.—A brulé or fire-swept forest, Athabaska River, below Grand Rapid.

the lower part of its course the Clearwater occupies a deep valley and is very rapid. Thirty or forty miles above its mouth it is joined by the Pembina, a stream of about equal volume.

Below the mouth of the Clearwater the Athabaska pursues a nearly direct course northward, receiving Red, Moose, and Tar rivers from the west, and enters Athabaska Lake through a number of channels inclosing alluvial islands. Besides the rivers mentioned, scores of lesser streams enter the Athabaska throughout its course.

The country drained by the Athabaska is mainly a rolling plain, and with the exception of a few areas of semiprairie land is well wooded with a forest composed mainly of spruce, fir, pine, tamarack, poplar, birch, and willow. A large part of its surface is occupied by mossy swamps, called muskegs (Pl. V, fig. 2), and hundreds of ponds

and lakes, of which Lesser Slave, 70 miles in length, is by far the largest, occupy its shallow valleys. Immense areas have been swept by fire (fig. 2), sometimes repeatedly, and in places the original forest covering has been destroyed and small prairies have succeeded.

The country lying between the Athabaska and Peace rivers, and drained in part by the latter stream, may be best characterized by quoting in part the account by McConnell, who examined it in the summer of 1889:

The country between the Peace and Athabasca rivers north of Lesser Slave Lake, comprising an area of about 44,000 square miles, * * * may be described as a gently undulating wooded plain, diversified with numerous shallow lakes, muskegs and marshes. Small prairie patches, manifestly due to forest fires, occur north of the west end of Lesser Slave Lake, at several points along the Loon and Wabiscaw rivers, * * * but their total area is relatively insignificant.

The rolling plains between Peace River and the Athabasca are relieved by several high ridges or plateaus, all of which owe their origin to a differential denudation of the soft rocks on which the plains are based. Of these Marten Mountain is situated north-east of Lesser Slave Lake, above which it rises to the height of about 1,000 feet. The Buffalo Head Hills commence abruptly about fifty miles above the mouth of the Loon River, with an elevation of about 2,500 feet above the Sea, and running in a south-south-westerly direction die away opposite the mouth of Battle River, while Birch Mountain extends for nearly ninety miles along the lower part of the Athabasca, from which it is separated by a plain fifteen to twenty miles wide. Among the smaller elevations are Trout Mountain, which is situated north of the Wabiscaw River, and the Thickwood Hills, which lie south of Birch Mountain. The uplands of the district, like the lowlands, are all wooded, and are dotted everywhere with lakes and marshes.^a

The climatic conditions of the various parts of Athabaska Valley vary considerably, according to location. The more open portions of the upper part of the valley, though lying at a considerable altitude, enjoy the 'chinook' winds, which so temper the climate that it compares favorably with more easterly regions lying much farther south. Lack of detailed data precludes the possibility of comparing absolutely the climatic conditions of the upper and lower Athabaska, but the effects of the 'chinook' winds are felt to some extent throughout the course of the river.

The following table will give a good idea of the climatic conditions at Athabaska Landing:^b

^a Ann. Rept. Geol. Surv. Canada, V (new ser.), pp. 6D, 7D, 1893.

^b The tables of temperatures given in this report, unless otherwise noted, are compiled from the Report of the Meteorological Service of Canada for the year 1900. This seems to have been about an average year, and, by using temperatures taken simultaneously over the whole country, the figures for the different sections are more strictly comparable than they would be if representing different years. All records are in degrees Fahrenheit.

Summaries of temperatures taken at Athabaska Landing, Alberta, during the year 1900.

Month.	Mean daily maximum.	Mean daily minimum.	Extremes.		Monthly mean.
			Maximum.	Minimum.	
January					
February					
March					
April	54.7	27.4	75.0	13.0	41.1
May	68.7	38.5	78.0	28.0	53.6
June	68.9	43.6	85.0	29.0	56.2
July	72.4	42.1	84.0	28.0	57.2
August	67.9	40.3	81.0	27.0	54.1
September	57.9	29.2	78.0	13.0	43.6
October	49.0	22.2	67.0	8.0	35.6
November	22.9	- 2.2	54.0	-37.8	10.3
December	23.3	- 5.9	45.0	-27.6	8.7

In this table the figures for the first three months are not available, but this lack may be atoned for in a measure by presenting the corresponding figures for Edmonton, on the Saskatchewan, about 90 miles almost directly south of Athabaska Landing, though the former locality, being more southern and considerably nearer the mountains, is seen to have a slightly warmer climate.

Summaries of temperatures taken at Edmonton, Alberta, during the year 1900.

Month.	Mean daily maximum.	Mean daily minimum.	Extremes.		Monthly mean.
			Maximum.	Minimum.	
January	27.0	7.2	48.0	-30.0	17.1
February	16.0	- 4.9	40.0	-40.0	5.5
March	30.7	9.1	55.0	-20.0	19.9
April	57.7	35.1	78.0	26.0	46.4
May	68.7	42.6	78.0	32.5	55.7
June	70.7	48.0	86.0	37.0	59.3
July	71.7	47.2	82.0	38.0	59.4
August	67.0	45.2	80.0	33.0	56.1
September	59.7	36.9	76.0	12.0	48.3
October	49.4	31.4	68.0	22.0	40.4
November	29.9	13.6	62.0	-16.0	21.7
December	31.8	14.5	44.0	- 9.5	23.1
Year			86.0	-40.0	37.7

The climate of the lower Athabaska may be fairly represented by the data for Fort Chipewyan, given on a succeeding page.

As intimately connected with the climatology of a region, data regarding the freezing and breaking up of the rivers are of interest. In all northern rivers navigation is interrupted, before the actual closing of the stream, by drift ice. This is mainly ice which has formed in the eddies and which, by a slight rise of water, the usual result of its formation, or from the accumulation of snow upon it, becomes detached and descends the current, continually adding to its own volume. This continues until the increasing cold causes the mass to jam and become solidly cemented. After the breaking up of the rivers in spring the ice, of course, continues to run for a longer or shorter period.

The following table shows the dates of the opening and closing of the Athabaska at Fort McMurray during a series of years: ^a

Table showing condition of Athabaska at Fort McMurray.

Year.	River opened.	Ice drifting.	River closed.	Year.	River opened.	Ice drifting.	River closed.
1878.....	Apr. 18	Oct. 27	-----	1884.....	Apr. 27	Oct. 18	Oct. 28
1879.....	-----	Oct. 26	Nov. 1	1885.....	Apr. 9	Oct. 23	Nov. 13
1880.....	May 2	Nov. 14	-----	1886.....	Apr. 16	Nov. 4	Nov. 14
1881.....	Apr. 21	Oct. 14	Nov. 12	1887.....	Apr. 27	Oct. 22	Oct. 24
1882.....	Apr. 24	Nov. 1	Nov. 8	1888.....	May 4	Nov. 3	Nov. 9
1883.....	Apr. 25	Oct. 30	Nov. 10				

THE BASIN OF ATHABASKA LAKE.

Athabaska Lake is long and narrow and lies in a general easterly and westerly direction. Its greatest length is about 195 miles; greatest width, 35 miles; and area, approximately 2,850 square miles. Its elevation above the sea is about 690 feet.

The principal tributary of Athabaska Lake is the river of the same name, just described. Its capacity for deposition is so great that, assisted by the Peace, it has filled up a large portion of what was originally the western part of Athabaska Lake, and has isolated several good-sized sheets of water, the largest of which, Lake Claire, is some 35 miles in length.

The north shore of Athabaska Lake is mainly rocky and sparsely wooded, and is broken by the mouths of a number of insignificant streams, which help to drain the unexplored country to the northward. On its southern side, whose shores are mainly low and sandy, Athabaska Lake receives the waters of William, Grand Rapid, and several smaller rivers, which drain a large extent of country, also unexplored.

Black River, draining a very large area of rocky, sparsely wooded country, flows into the extreme eastern end of Athabaska Lake. It rises in Wollaston Lake, 1,300 feet above the sea, on the height of land between Athabaska Lake and the Churchill. Black Lake, the principal expansion in its lower portion, receives the waters of Chipman River from the north, and Cree River, draining the large lake of the same name, from the south.

^aThe data given in this report regarding the condition of the rivers have been compiled from various sources, but are based almost entirely on records kept in their daily journals by the employees of the Hudson's Bay Company. It may be well to state that slight discrepancies regarding the time of occurrence of certain events, as recorded by different observers, have been noted. For instance, one may record the date of the first appearance of drifting ice, while another takes the date when the ice appeared in quantity. The total of error in this regard, however, is inconsiderable.

Wollaston Lake has the further distinction of contributing to the waters of Hudson Bay by way of Cochrane River, which flows through Reindeer Lake into the Churchill.

Reindeer Lake, though outside the drainage basin of Athabaska Lake, may be briefly alluded to. It is 135 miles in length from north to south, and the northern half averages 30 miles in width. Its shores are rough and rocky and are mainly sparsely wooded. Its northern end lies within a comparatively short distance of the Barren Grounds, and a trading post at that point is the only one in the Athabaska region which is resorted to by the Eskimo.

The following table, showing the dates of occurrence of certain events during a series of years at Lac du Brochet Post, Reindeer Lake, is condensed from a schedule sent me by R. MacFarlane. It was compiled by Joseph Hourston, for some years manager of this Hudson's Bay Company post, near the north end of Reindeer Lake. Certain items not of general interest have been omitted:

Dates of seasonal events at Lac du Brochet Post, Reindeer Lake.

Year.	First thaw set in.	First crow seen.	First goose seen.	First Barren Ground caribou going northward.	Arrival of Barren Ground caribou from north.	First white partridge (willow ptarmigan) seen.	Last nets set in open water.	First nets set under ice.
1873-----					(a)	Oct. 24	Oct. 20	Oct. 25
1874-----	Apr. 27	Apr. 19	May 5	May 9	Nov. 14	Oct. 11	Nov. 3	Nov. 6
1875-----	May 4	Apr. 28	May 11	Apr. 26	Oct. 27	Oct. 17	Oct. 29	Nov. 9
1876-----	May 2	Apr. 22	May 8	May 17	Oct. 29	Oct. 19	Oct. 28	Oct. 29
1877-----	Apr. 10	Apr. 14	Apr. 27	Apr. 21	Dec. 28	Oct. 23	Oct. 31	Nov. 6
1878-----	Apr. 2	Apr. 10	Apr. 19	Apr. 27	Nov. 12	Oct. 19	Oct. 19	Oct. 28
1879-----	Apr. 11	Apr. 15	Apr. 24	Apr. 24	Nov. 18	Oct. 24	Oct. 26	Oct. 31
1880-----	Apr. 23	Apr. 23	May 5	May 12	Nov. 26	do	Oct. 20	Oct. 28
1881-----	Apr. 18	Apr. 21	May 4	Apr. 22	Oct. 24	Oct. 10	Oct. 14	Oct. 18
1882-----	Apr. 14	Apr. 17	May 3	Apr. 26	Dec. 15	Oct. 8	Nov. 2	Nov. 10
1883-----	Apr. 13	Apr. 16	Apr. 25	do	Nov. 6	Oct. 7	do	Nov. 12
1884-----	Mar. 31	Apr. 15	May 3	May 1	(a)	Oct. 16	Oct. 20	Oct. 27
1885-----	Apr. 2	Apr. 11	Apr. 29	(b)	(a)	Oct. 6	Oct. 15	Oct. 29
1886-----	Apr. 10	Apr. 14	Apr. 23	(b)	(a)	Oct. 17	Oct. 12	Nov. 6
1887-----	Apr. 7	Apr. 11	May 3	(b)	(a)	Oct. 19	Oct. 19	Oct. 24
1888-----	Apr. 8	Apr. 15	May 7	(b)	(a)	Oct. 24	Oct. 29	Nov. 3
1889-----	Mar. 18	Apr. 6	Apr. 17	(b)	Dec. 21	Oct. 8	Oct. 19	Oct. 25
1890-----				Apr. 16				

^a Did not come.

^b None passed.

The climate of Athabaska Lake is not radically different from that of other parts of the Mackenzie region which are practically removed from the influence of the warm Pacific winds. Though it lies at a low altitude, the proximity of the lake to the Barren Grounds, from which winds are frequent, keeps its average temperature rather low. An occasional warm west wind slightly tempers the winter climate. The Peace and Athabaska break up at their mouths about the 1st of May, but the neighboring part of the lake usually does not open until about the middle of May, and the eastern part prob-

ably not before June. The lake usually closes at Fort Chipewyan some time in November.

The following table illustrates the temperature conditions at Fort Chipewyan, Athabaska Lake:

Summaries of temperatures taken at Fort Chipewyan during the year 1900.

Month.	Mean daily maximum.	Mean daily minimum.	Extremes.		Monthly mean.
			Maximum.	Minimum.	
January.....	- 5.4	-18.9	12.5	-36.0	-12.2
February.....	- 7.7	-22.2	7.0	-42.0	-14.9
March.....	13.9	- 5.6	41.0	-39.5	4.2
April.....	49.4	29.6	66.0	8.5	39.5
May.....	61.8	41.9	70.0	25.5	51.8
June.....	68.1	48.5	81.0	35.0	58.3
July.....	70.0	51.0	79.0	38.0	60.5
August.....	68.3	47.7	83.0	31.5	58.0
September.....	55.5	37.6	68.0	24.0	46.6
October.....	43.4	28.0	58.0	15.0	35.7
November.....	16.7	1.7	40.0	-18.0	9.3
December.....	12.8	- 2.7	29.0	-34.0	5.5
Year.....			83.0	-42.0	28.5

The following table has been compiled from records taken at Fort Chipewyan, Athabaska Lake, probably by R. MacFarlane.

Dates of seasonal events at Fort Chipewyan, Athabaska Lake.

Seasonal event.	1883.	1884.	1885.	1886.	1887.
Snow bunting first noted.....			Mar. 22	Mar. 29	Apr. 5
Canada goose first noted.....		Apr. 9	Apr. 13	Apr. 11	Apr. 11
Crow first noted.....		Apr. 16	Apr. 21	Apr. 12	Mar. 25
Frogs first noted.....		May 8	Apr. 30	May 8	May 2
Robin first noted.....		do		Apr. 23	Apr. 26
Snow goose first noted.....			May 4	do	Apr. 23
Snow bunting arrived from north.....	Oct. 12	Oct. 14	Oct. 1	Oct. 9	
Ptarmigan arrived from north.....	Oct. 11	Oct. 18			Oct. 28

THE PEACE RIVER VALLEY.

Peace River is the largest of the affluents of the Athabaska-Mackenzie system, and being in fact much larger than the Athabaska, may be considered the main river. It rises on the western side of the Rocky Mountains and is already a good-sized stream when it breaks through that range. Its principal feeders west of the range are the Finlay and the Parsnip. The former river rises near the headwaters of the Skeena and flows southeasterly. The Parsnip rises close to some of the head feeders of the Fraser, at an altitude of about 2,500 feet, and flows northward, uniting with the Finlay in latitude 56°. Here the river turns eastward through the mountains, the pass being about 1,600 feet above sea level, and the mountains on each side rising some 4,500 feet higher. The tree limit on these mountains occurs at about 4,000 feet.

From the confluence of the Finlay and the Parsnip, the Peace flows in a general easterly direction for some 300 miles to its junction with the Smoky, falling in this distance a little less than 800 feet. The country through which it flows may be considered as a plateau, in which it has excavated a rather deep valley. A number of streams, Pine River from the south being one of the largest, discharge their waters into it. Back from the river the country is mainly level or rolling, and is thinly wooded.

Smoky River is the largest tributary of the Peace. Its principal branches rise on the eastern slope of the Rocky Mountains, and it drains a large extent of thinly wooded and prairie country.

Below the mouth of the Smoky the Peace turns and pursues a winding though general northerly course nearly to Fort Vermilion. It is bordered at first by steep sandstone cliffs, but its valley gradually becomes wider and shallower. Extensive plains, comparatively level and clothed with grass or a sparse growth of poplars, border it on both sides. North of Fort Vermilion this character of country is said to extend to the valleys of Hay and Buffalo rivers. The country between Peace River and Great Slave Lake, however, is very imperfectly known.

Between Fort Vermilion and the Peace-Athabaska Delta the Peace is very broad and contains many wooded islands. Red and Loon rivers, coming from the south, are its principal tributaries. The country drained by them has been alluded to briefly in describing the Athabaska. (See p. 19.) Vermilion Falls, a formidable rapid, interrupts navigation a short distance above the mouth of Red River, and another, usually called the 'Little Rapid,' occurs at some distance below.

The Quatre Fourches, an offshoot of the Peace, connects that stream with Athabaska Lake, and a few miles below, Rocher River also joins the Peace. These streams traverse the Peace-Athabaska Delta, and their currents run to or from Peace River, being dependent on the relative heights of the water in Peace River and Athabaska Lake. (See p. 93.) The delta is a vast marsh, partially wooded with poplars and willows and studded with hundreds of reedy lakes.

Below the delta the combined stream, here called the Slave, turns abruptly northward and flows for a distance of about 70 miles in a general northerly direction to the Smith Rapids. It is a broad, rather deep stream with a moderate current, and its low banks are well wooded with spruce, poplar, and willow. It receives in this stretch no tributaries of importance, but drains many outlying marshes. In latitude 60° it cuts through "a gneissic spur from the Laurentian district to the east," forming the Smith Rapids, some 16 miles in length. Below here it flows in a rather irregular manner for about 175 miles in a general northwesterly direction to Great

Slave Lake. In this stretch it has an average width of about half a mile, and its banks are high at first, but gradually diminish. The country bordering it is level and mainly well wooded, but to the west are extensive tracts of prairie, especially in the region of Salt River, its principal tributary, which enters the Slave from the west 16 miles below the rapids. Slave River enters Great Slave Lake through an extensive delta, in forming which it has silted up an extensive arm of the lake.

The Peace River Valley, as here considered, exhibits the greatest diversity of climatic conditions at the same season of any of the regions now under discussion, excepting possibly the Liard River Valley. Its extreme upper portion, lying at a comparatively low altitude and near the Pacific, has a relatively mild winter climate, while its lower part at the same season is surrounded by almost Arctic conditions. Its middle part, just east of the mountains, seems to be characterized by violent extremes of temperature, judging by the figures for Dunvegan, the only post for which I have been able to obtain a complete record. For the extreme upper and lower portions, exact data being wanting, data for near-by localities may be substituted. Thus the temperatures for Stuart Lake, a locality lying close to and at about the same altitude as the extreme headwaters of the Parsnip, probably represent approximately the conditions in the valley of the upper Peace. In the same way the table for Fort Chipewyan, elsewhere given (see p. 23), may be taken as an index of the climate of the lower Peace River proper, and that for Hay River, Great Slave Lake (see p. 28), as fairly representing the lower Slave.

Summaries of temperatures taken at Stuart Lake, British Columbia, during the year 1900.

Month.	Mean daily maximum.	Mean daily minimum.	Extremes.		Monthly mean.
			Maximum.	Minimum.	
January	18.6	3.4	44.0	-29.7	11.0
February	14.1	- 3.0	33.9	-38.6	5.5
March	23.1	2.3	45.0	-30.2	12.7
April	42.9	21.5	64.0	14.2	32.2
May	52.2	27.5	65.0	20.2	39.9
June	59.4	33.2	77.5	22.2	46.3
July	64.4	38.3	81.0	31.2	51.3
August	59.5	35.3	70.0	18.2	47.4
September	55.0	28.9	68.0	19.2	41.9
October	39.7	22.4	54.0	2.1	31.0
November	27.7	11.3	43.0	-27.4	19.5
December	30.0	15.8	43.0	-15.6	22.9
Year			81.0	-38.6	30.8

The 'chinook' winds exert a powerful, though irregular, influence on the climate of the middle Peace River Valley and, together with a favorable soil, allow a considerable amount of agricultural development.

The following table shows the monthly extremes and means of temperature at Fort Dunvegan "from observations made during 1880-84:"

Summaries of temperatures taken at Fort Dunvegan, Peace River, during 1880-1884.

Month.	Extremes.		Monthly mean.	Month.	Extremes.		Monthly mean.
	Maximum.	Minimum.			Maximum.	Minimum.	
January-----	48	-62	-11.9	August-----	90	31	57.4
February-----	45	-55	2.6	September-----	78	22	45.7
March-----	55	-52	20.3	October-----	72	-4	31.6
April-----	73	-27	35.1	November-----	58	-26	16.5
May-----	79	20	50.1	December-----	46	-30	-4.9
June-----	87	30	55.9				
July-----	87	34	60.5	Year-----	90	-62	29.9

The following table relating to Fort St. John, Peace River, gives the dates of opening and closing of the river, and other phenomena dependent on the climatic conditions, during a series of years:

Dates of occurrence of certain events at Fort St. John, Peace River.

Year.	River opened.	First goose seen.	Potatoes planted.	Potatoes harvested.	Ice drifting.	River closed.
1865-----					Nov. 12	Dec. 10
1866-----	Apr. 19	Apr. 7	Apr. 30	Sept. 25	Nov. 7	Dec. 2
1867-----	Apr. 21				Nov. 8	Dec. 3
1868-----	Apr. 20			Sept. 30	Nov. 7	Nov. 17
1869-----	Apr. 23				Nov. 8	
1870-----	Apr. 26					
1871-----	Apr. 18				Nov. 10	Nov. 15
1872-----	Apr. 19				Nov. 8	Nov. 28
1873-----	Apr. 23		Apr. 26	Sept. 20	Nov. 4	Nov. 30
1874-----	Apr. 19	Apr. 21	May 5	Sept. 22	Oct. 31	
1875-----	Apr. 16	Apr. 15	May 8			
1887-----	Apr. 26					Dec. 3
1888-----	May 1					Nov. 16
1889-----	Mar. 30					Nov. 24
1890-----	Apr. 30					Dec. 21
1891-----	Apr. 17					

THE BASIN OF GREAT SLAVE LAKE.

Great Slave Lake may be briefly described by quoting in part the account of R. G. McConnell:

Great Slave Lake, so far as known, has a superficial area, including islands, of about 10,400 square miles, and ranks fifth among the great lakes of the continent.^a No complete survey of its shores, however, has yet been made, and our knowledge of its geography is still confined to the disconnected explorations of Hearne, Mackenzie, Franklin, Back, and Petitot.^b These give the lake a total length from east to west of about 288 miles. Its width is variable, and in one place exceeds sixty miles. It is situated along the western margin of the Archæan axis, and had originally the form of a great cross with one arm pene-

^a It is exceeded in size by Superior (31,500), Huron (23,800), Michigan (22,300), and Great Bear (11,400). [McConnell.]

^b The less known eastern part of the lake has been carefully examined recently (1899) by Dr. Robert Bell and J. Macintosh Bell, of the Canadian Geological Survey, but, as far as I know, the report on the work has not yet been published.

trating the crystalline schists, while two others stretched north and south along the junction of these with the newer sedimentaries, and the fourth extended over the flat-lying Devonian to the west. The southern arm, as stated before, has been silted up by Slave River.

The eastern or archæan portion of the lake has an irregular outline, and is dotted with rocky islands. It is reported to be much deeper than the western part, and its water is exceedingly clear and limpid.

* * * The northern arm is situated nearly opposite the mouth of Slave River, and is narrow and filled with islands. At its upper end it contracts, and opens out again under the name of Lake Brochet, which communicates in turn by a short river with Marten Lake. Yellow Knife River, at the mouth of which old Fort Providence was situated, and which Franklin ascended on his way to the Coppermine, enters this arm from the east.

The [western] arm of Great Slave Lake rests on the flat-lying Devonian limestones, and is wider, and presents a greater expanse of water, unbroken by islands, than either of the other divisions. Its southern shore has a gently sinuous outline, and is characterized by low banks and gently shelving beaches, which are often thickly strewn with boulders. The banks as pointed out by Richardson are often built up of drift timber. The northern shore is more uneven, and is indented by several deep bays. The water of Great Slave Lake between Slave River and the Mackenzie, is never entirely clear, as a portion of the sediment brought down by the former stream is held in suspension and drifts slowly eastward for a hundred miles. The impurity of the water is especially noticeable along the southern shore, and the shallowness of this part of the lake is undoubtedly caused by the partial settlement of the suspended material.^a

Great Slave Lake lies wholly within the forested region, though some of its eastern affluents drain large areas of treeless country. Its southwestern shores, being watered by rivers coming from the south and southwest, are well wooded, while the northern shores, exposed for most of the year to cold winds from the north and watered by colder streams, are poorly wooded. The soil conditions, also, being more favorable on the southern side of the lake, exert a marked influence on the foresting.

The Eastern Arm of the lake, however, is largely removed from these modifying influences, and the conditions on its northern and southern borders are more nearly uniform. Several streams, whose courses and drainage are practically unknown, enter this arm on the southern side. Hoarfrost River, draining Walmsley Lake, and Lockhart River, carrying the waters of Mackay, Aylmer, Clinton-Colden, and Artillery lakes, which lie almost wholly in the Barren Grounds, fall into this arm near its eastern extremity. The country bordering its northern shore is rocky and sparsely wooded, and contains a great many lakes, but the streams flowing thence into Great Slave Lake are few in number and comparatively insignificant.

The Northern Arm of Great Slave Lake, as before stated, lies along the junction of the primitive and the newer formations. Its eastern shore, therefore, is mainly composed of granite, while its western

^a Ann. Rept. Can. Geol. Surv., IV, p. 65 D et seq., 1891.

border is of limestone. Yellowknife River, a considerable stream which rises near the Coppermine and drains a number of lakes, enters this arm on its eastern side. At the head of the Northern Arm, in an expansion named Lake Marian, or Lac du Brochet, Grandin River discharges its waters. This stream has several branches, the main one being Marten River, which forms the outlet of several large bodies of water, of which Marten Lake is the largest. Grandin River proper descends from a few small lakes near the low height of land to the northward and receives from the northeast, above its junction with Marten River, a small unexplored stream. The country drained by these rivers is mainly rocky and poorly wooded.

To the westward of the Northern Arm and north of the main body of Great Slave Lake lies a low, broad plateau, dotted with many lakes and muskegs. It contains no rivers of consequence and is mainly rather thinly wooded, though a number of large prairies occur in the western part, north of the outlet of Great Slave Lake.

The country to the southward of the main part of Great Slave Lake is mainly flat and swampy. Eagle Mountain, a low, isolated range, lies a short distance south of the extreme western end of the lake. The principal stream is Hay River, which rises close to the height of land between the Nelson and the Peace, far to the southwest. The country drained by it is practically unknown, but is reported to be low and swampy and mainly well wooded, though it contains much grassy prairie, Hay River being said to mark the northern limit of this character of country. To the eastward of Hay River, Buffalo and Little Buffalo rivers enter the lake. So far as known the country drained by them is similar to that bordering Hay River. Slave River, the principal affluent of Great Slave Lake, has already been described.

The main facts in regard to the climate of Great Slave Lake may be gathered by reference to the accompanying table of temperatures taken at Hay River post, at the mouth of the river of that name.

Summaries of temperatures taken at Hay River, Great Slave Lake, during the year 1900.

Month.	Mean daily maximum.	Mean daily minimum.	Extremes.		Monthly mean.
			Maximum.	Minimum.	
January.....	- 9.7	-26.9	5.0	-47.0	-18.3
February.....	- 7.1	-29.5	6.0	-44.0	-18.3
March.....	15.6	-13.5	46.0	-44.0	1.0
April.....	47.8	22.9	68.0	5.0	35.3
May.....	56.4	34.7	72.0	20.0	45.6
June.....	67.3	43.5	79.0	31.0	55.4
July.....	72.1	49.3	85.0	42.0	60.7
August.....	68.8	46.9	83.0	32.0	57.9
September.....	58.5	38.1	76.0	28.0	48.3
October.....	40.3	22.6	61.0	8.0	31.5
November.....	15.2	- 2.5	32.0	-28.0	6.3
December.....	- 2.6	-10.8	24.0	-40.0	- 4.1
Year.....			85.0	-47.0	24.9

These temperatures for Hay River, however, are not strictly representative of Great Slave Lake, since this post is situated at the mouth of a large river which heads far to the southwestward, a fact which probably considerably influences the climate at its mouth. The temperature conditions at other points on the southern shores of the lake probably do not differ materially during an average year from those here recorded. On the Northern and Eastern arms, however, the spring and autumn temperatures are considerably lower. The winters are severe and the conditions recorded at that season by the thermometer are intensified by high winds which sweep over the surface of the lake and in the autumn keep it from freezing until a late date. Ice forms to a considerable thickness and persists until midsummer. I have no exact data regarding the time of the freezing and breaking up of the ice during a series of years, but the dates given by McConnell (*loc. cit.*) probably represent about the average time. He says:

Ice forms in the bays and along the shores of Great Slave Lake between the 20th and the last of October, and the whole lake is usually fast by the middle of November.^a The ice attains a thickness of from six to eight feet. In the spring the disruption of the ice takes place about the 1st of July, but sometimes occurs as early as the 20th of June and as late as the 10th of July.

In the main or western part of the lake the ice breaks up earlier than in the eastern part. At Fort Rae, according to Russell, it disappears earlier than in the main body of the lake. The following table was compiled by him from the journals kept at the Hudson's Bay post:

Dates of breaking up and setting of ice in the Northern Arm at Fort Rae.

Year.	Ice broke up.	Ice set.	Year.	Ice broke up.	Ice set.
1857.....	June 1	Oct. 19	1883.....	June 3	-----
1858.....	June 7	-----	1884.....	June 23	-----
1859.....	May 30	-----	1885.....	June 18	-----
1864.....	-----	Oct. 6	1893.....	-----	Oct. 19
1880.....	-----	Oct. 28			

After the disruption of the ice the floes are tossed back and forth by the winds until finally they become disintegrated. In 1903 a little ice still remained about the western end of the lake until July 1, and a week earlier the *Wrigley*, crossing from the outlet to Fort Resolution, had made its way with difficulty among the drifting floes. In the eastern part of the lake the ice does not entirely disappear in some seasons until late in June.

^a The center of the lake has been known to remain open until the 1st of December (*vide* Richardson).

THE LIARD RIVER VALLEY.

A short account of Liard River may well begin with a brief description by R. G. McConnell, who descended it from Dease Lake in the summer of 1887. He says in part:

The Liard River is one of the three principal tributaries of the Mackenzie, the other two being the Athabasca and the Peace. It has its sources west of the Rocky Mountains, one of its branches reaching to within one hundred and fifty miles of the sea, and drains the eastern part of the broken country lying between that range and the coast mountains. Its branches spread through four degrees of latitude, from 58° N. to 62° N., and interlock with those of the Yukon, Stikine, Skeena, and Peace Rivers. In its upper part it divides at intervals into four nearly equal streams, the Mud or Black River, Dease River, Frances River, and the branch which retains the common name. Of these the latter and Black River are still practically unknown. * * * Rising in the elevated country west of the Rocky Mountains, the Liard falls rapidly toward the east, the difference in altitude between the mouth of the Dease and the Mackenzie amounting to nearly 1,650 feet, and is characterized nearly everywhere by impetuous currents, by dangerous rapids and narrow whirlpool-filled cañons. The descent of the river is greatest and its rapids most numerous, while passing through, and for some distance on either side of the Rocky Mountains. After leaving the foothills it is nearly free from interruptions until near its junction with the Mackenzie, where a series of strong riffles occurs.^a

In its upper portion the Liard bears a strong superficial resemblance to the upper Peace, being formed by large north and south trending branches which unite west of the mountains and, like the Peace, cut eastward through the main range of the Rocky Mountains. The Frances, one of these branches, is formed by several streams which rise close to the headwaters of the Pelly and flow southward, while the Dease takes its waters from Dease Lake, near the source of one of the branches of the Stikine. Below the junction of the Frances and the Dease the united river passes eastward through the mountains, being interrupted by a series of dangerous rapids and receiving several affluents, most of which are very imperfectly known. Fort Nelson River, entering the Liard from the south, is its principal branch east of the mountains. It rises near the headwaters of Pine River (north), and pursues a very tortuous, though general northerly, course to the Liard. Below the junction the Liard flows northerly and then northeasterly, still being bordered on the western side by a spur of the Rocky Mountain range. The country east of the lower Liard is mainly low and swampy in character. It is drained by Black River and many smaller streams. The valley of the lower Liard is heavily wooded, the largest tree being the balsam poplar (*Populus balsamifera*), which here attains perfection of habit, and from which the river is said to take its name. The other forest trees also are those common to the whole region.

^a Ann. Rept. Can. Geol. Surv., IV, p. 33D, 1891.

The climate of the Liard River Valley, like that of the Peace, varies widely in the different sections. The upper part of the river, lying west of the mountains, enjoys a climate much tempered by the warm Pacific winds. The upper Nelson River also, the principal tributary of the Liard east of the mountains, lies far to the southward and sufficiently near the Pacific to come within its modifying influence. Unfortunately no exact data regarding the temperature of the upper Liard or the Nelson are at hand; hence the conditions there can not be compared directly with those on its lower course. The average temperature conditions on the lower Liard may be fairly represented by those taken at Fort Simpson in 1900, given on page 34. The warm westerly winds which reach the valley of the Liard extend their influence as far as its mouth and have been known to cause a pronounced thaw there even in January, the coldest month. This modifying influence is apparent in the character and progress of vegetation, the migration of birds, and in other phenomena. It is especially manifest, however, in its relation to the breaking up of the river and the attendant effect on the conditions along the banks. Furthermore, the disruption of the Liard ice starts that in the Mackenzie also, which thus opens considerably earlier than would be the case were it not affected by its warmer tributary. This, of course, has its natural effect in accelerating the progress of vegetation on the banks of the Mackenzie below the Liard.

The following table shows the dates of the opening and closing of the Nelson at Fort Nelson during a series of years:

Dates of opening and closing of Nelson River at Fort Nelson.

Year.	River opened.	River closed.	Year.	River opened.	River closed.
1887-----		Oct. 23	1890-----	Apr. 30	Nov. 4
1888-----	May 7	Oct. 31	1891-----	Apr. 22	-----
1889-----	Apr. 10	Nov. 10			

The following table shows the dates of the closing of the Liard at Fort Liard during a series of years:

Dates of closing of Liard River at Fort Liard.

Year.	Date of closing.						
1878-----	Oct. 29	1881-----	Nov. 13	1884-----	Oct. 31	1888-----	Nov. 5
1879-----	Nov. 7	1882-----	Nov. 7	1886-----	Nov. 20	1889-----	Nov. 14
1880-----	Nov. 9	1883-----	Nov. 9	1887-----	Nov. 9	1890-----	Do.

The dates of the opening of the Mackenzie at the mouth of the Liard during a series of years appear in a table given on page 36.

At Fort Liard the river is said to break up generally about the 1st of May. The approximate dates for the years given may be ascer-

tained by consulting this table and by assuming that the Liard opened at Fort Liard a few days earlier, since the disruption of the Liard ice is almost invariably the immediate cause of the opening of the Mackenzie below their junction.

An account of the progress of the seasons and attendant phenomena at Fort Simpson, as observed from October, 1903, to June, 1904, appears in the discussion of the Mackenzie Valley. (See p. 37.)

THE MACKENZIE RIVER VALLEY.

The Mackenzie (taken in a restricted sense as comprehending only that part of the river known under this name) has a course of over 900 miles from Great Slave Lake to the Arctic Sea. As its immediate valley is more fully described elsewhere (see p. 100), the present account may be confined to a few general statements and brief descriptions of the country bordering it on either side. It averages over a mile in width and is usually deep, with a current of from 2 to 6 miles an hour. Its general course is to the northwest. It is bordered mainly by sandy or gravelly beaches and occupies a narrow, comparatively shallow valley, through which it flows in a succession of gentle curves. Many low islands, usually well wooded, occur throughout its course. Its rocks are chiefly Devonian.

Issuing from Great Slave Lake, the Mackenzie first follows a general westerly course for nearly 300 miles. The tributaries which it receives in this stretch, with the exception of the Liard, already described, are of minor importance. The Horn Mountains, a long ridge less than a thousand feet in height, lie in an easterly and westerly direction at some distance north of the middle of the stretch. To the southward of the river occur other lower ranges, the principal one being Trout Mountain. These mountains are very imperfectly known. A large part of the country bordering this part of the Mackenzie is of a swampy nature, and it is all well wooded. Nearly all the species of trees of the great subarctic forest are represented. (See p. 16.)

A short distance north of latitude 62° the Mackenzie strikes a spur of the Rocky Mountain system, the Nahanni Mountains, is deflected toward the north, and for some distance flows close to their bases. At the point where the Mackenzie first approaches them the nearest peaks are from 2,000 to 2,500 feet in height and are sparsely wooded to their summits. Farther back they rise much higher, and above an altitude of 2,500 feet are treeless. In early summer these mountains are capped with snow, but this disappears entirely beneath the almost continuous sunlight of midsummer. The North Nahanni River, occupying a deep, narrow valley, issues from the mountains at this point, and joins the Mackenzie by several shallow mouths. (See Pl. XII, fig. 2.) Its course has never been explored.

Continuing northward, the Mackenzie is bordered on the west by a broad expanse of mountain country, mainly unexplored. A few low spurs of the same system cross the river and appear in the form of isolated peaks or disconnected ranges to the eastward of its valley. The principal western tributaries between latitude 62° and 65° are the Red Rock and Gravel rivers. In the same interval the Mackenzie receives several small streams which drain the country east of the river. One of the largest of these is the Blackwater. Mount Clark, which is visible from the river at some distance below the mouth of this stream, has an estimated altitude of 3,500 feet, and is the highest of the mountains east of the Mackenzie. The most conspicuous landmark in the immediate valley is Roche Trempe-l'eau, a limestone mass which rises abruptly from the water's edge a short distance north of latitude 63° . Bear River, the principal eastern tributary of the Mackenzie, joins it just south of latitude 65° . As the outlet of Great Bear Lake, it is described in its proper place (p. 44). Below its mouth, on the north side of the Mackenzie, is Bear Rock, 1,400 feet in height. (See fig. 7, p. 105.) This mount is composed mainly of Devonian limestone.

Below here the Mackenzie resumes its general northwesterly course. Wolverine Rock, 100 miles below Bear Rock, is formed, like that eminence, by an uplift of the Devonian limestone, and is about 1,000 feet in height. Twenty-five miles below here a rocky ridge crosses the river, forming the Sans Sault Rapid. The next important feature in the valley of the Mackenzie is the defile called the 'Ramparts.' (See fig. 8, p. 106.) Here the river contracts from a width of 2 miles to about 500 yards, and flows for about 7 miles between precipitous limestone cliffs, which in places rise to a height of 250 feet.

Below Sans Sault Rapid the Mackenzie recedes from the mountains, and they are not again visible until the delta is reached. Hare-skin River enters the Mackenzie from the east a short distance north of the Ramparts. It drains a large extent of rocky wooded country between Great Bear Lake and the Mackenzie. For a long distance below here the Mackenzie maintains a general northwesterly course. A few fair-sized streams enter it from the east, but from the west it receives no tributaries of importance. In about latitude $67^{\circ} 40'$ it turns rather abruptly at right angles, and for about 50 miles follows a course considerably south of west. It is here bordered, especially on the north, by high clay banks, through which several good-sized streams cut their way. The river then turns northward again and maintains a northwesterly direction to the delta. The defile called the 'Narrows' or 'Lower Ramparts' is encountered near $67^{\circ} 40'$, and at its lower end Arctic Red River, from the south,

discharges its muddy waters. As far as known the country bordering this part of the Mackenzie on both sides is rolling, well watered, and fairly well wooded. A few miles below Arctic Red River the high banks of the Mackenzie gradually become lower and the river spreads out into the delta. Peel River, the largest tributary of the Mackenzie except the Liard, also enters the head of the delta by several mouths.

Peel River is fed by a number of large tributaries, which rise in the mountains some 400 miles to the southward of its mouth. The main river has been ascended to near its head, but the country drained by it is very imperfectly known.

The Mackenzie Delta occupies a triangular area nearly 100 miles in length and 50 miles broad at its widest part. The various branches inclose several large islands and a multitude of smaller ones. At the head of the delta these islands are well wooded with spruce and balsam poplar. Lower down these trees give way to willows, which continue to the sea. To the westward of the delta lies a range of high hills, the northern extremity of the Rocky Mountains. They rise to a height of from 1,200 to 1,500 feet, and their lower slopes only are wooded. The Caribou Mountains, apparently a continuation of the ridge which crosses the Mackenzie at the Lower Ramparts, lie to the eastward of the delta. They rise to a height of 700 to 800 feet and are less rugged than the mountains west of the delta.

The climate of the Mackenzie Valley is fairly indicated by the tables of temperature which follow. They were taken in 1900, which seems to have been a year of about average conditions.

Summaries of temperatures taken at Fort Simpson, Mackenzie, during the year 1900.

Month.	Mean daily maximum.	Mean daily minimum.	Extremes.		Monthly mean.
			Maximum.	Minimum.	
January-----	-16.2	-33.5	5.0	-51.0	-24.8
February-----	- 9.2	-33.5	14.0	-50.5	-21.4
March-----	12.8	-17.4	39.0	-50.0	- 2.3
April-----	41.2	17.8	60.0	5.0	29.5
May-----	52.6	35.2	66.0	27.0	43.9
June-----	69.3	45.3	80.0	27.0	57.3
July-----	69.4	45.7	79.5	31.5	57.6
August-----	65.0	44.1	78.0	27.0	54.5
September-----	56.8	34.7	71.0	23.0	45.7
October-----	29.0	19.2	40.0	3.0	24.1
November-----	5.4	- 8.7	23.0	-29.0	- 1.7
December-----	- 7.3	-20.1	13.0	-48.0	-13.7
Year-----			80.0	-51.0	20.7

The temperatures of the extreme upper Mackenzie are undoubtedly slightly lower than those recorded for Fort Simpson, but comparable data are not at hand.

For purposes of comparison corresponding figures for points in the valley of the lower Mackenzie and for Herschel Island follow.

These figures show that the winter climate of the upper and lower Mackenzie varies but slightly, while the summer climate is considerably cooler to the northward.

Summaries of temperatures taken at Fort Good Hope, Mackenzie, during the year 1900.

Month.	Extremes.		Monthly mean.	Month.	Extremes.		Monthly mean.
	Maximum.	Minimum.			Maximum.	Minimum.	
January	11.0	-62.0	-35.7	August	75.0	23.0	49.2
February	6.0	-46.0	-26.1	September	60.0	12.0	37.9
March	24.0	-47.0	-7.6	October	34.0	-22.0	12.3
April	48.0	-20.0	19.5	November	21.0	-47.0	-15.9
May	56.0	14.0	37.2	December	-6.0	-50.0	-24.3
June	80.0	29.0	56.6				
July	83.0	39.0	59.6	Year	83.0	-62.0	13.6

Summaries of temperatures taken at Fort McPherson, Mackenzie, during the year 1900.

Month.	Mean daily maximum.	Mean daily minimum.	Extremes.		Monthly mean.
			Maximum.	Minimum.	
January	-22.4	-37.6	16.7	-60.6	-30.0
February	-14.8	-31.2	6.0	-47.4	-23.0
March	5.3	-14.6	35.0	-47.2	-4.7
April	24.2	2.6	52.5	-22.0	13.4
May	31.8	20.4	48.9	5.0	26.1
June	60.2	40.8	85.0	26.8	50.5

Summaries of temperatures taken at Herschel Island, Mackenzie, during the year 1900.

Month.	Mean daily maximum.	Mean daily minimum.	Extremes.		Monthly mean.
			Maximum.	Minimum.	
January	-17.1	-28.2	18.9	-49.4	-22.6
February	-12.2	-24.6	11.5	-35.2	-18.4
March	- .1	-15.2	25.4	-39.4	-7.6
April	9.9	-3.5	27.2	-20.4	3.2
May	22.6	11.8	35.3	-1.0	17.2
June	43.2	31.1	55.2	18.7	37.1
July	48.7	36.6	62.3	29.6	42.7
August	43.5	33.4	62.8	23.9	38.4
September	38.3	29.3	55.9	17.3	33.8
October	17.6	9.1	38.7	-10.5	13.4
November	5.4	-9.2	34.2	-27.8	-1.9
December	-11.7	-23.1	-1.5	-42.6	-17.4
Year			62.8	-49.4	9.8

As has been stated, the warm winds from the Pacific sometimes exert a decided though temporary influence on the climate of the Mackenzie, and the Liard, opening early, disrupts the Mackenzie ice below the confluence. The removal of the icy covering of an immense river and the blending with its flood of the waters of a warmer tributary necessarily affect conditions along its banks. The ice in the Liard, having broken its bonds, is forced against that of the Mackenzie, through which it opens a passage, and urged on by the

immense pressure behind it breaks its way seaward, occasionally becoming dammed and raising the level of the water until the increased pressure again clears a channel. At Fort Simpson, near latitude 62°, the ice continues to drift in quantity for some days after its disruption. About ten days, on the average, after the Mackenzie opens at this point, or about the time that the breaking ice has reached latitude 65°, the upper Mackenzie opens and the channel is filled again with floating ice. Sometimes a third consignment of floes, from the 'Little Lake' or from Great Slave Lake, fills its current.

The following table shows the dates of the opening and closing of the Mackenzie at Fort Simpson during a series of years:

Table showing condition of Mackenzie at Fort Simpson.

Year.	Mackenzie opened—		First drift ice.	River closed.	Year.	Mackenzie opened—		First drift ice.	River closed.
	At mouth of Liard.	Above mouth of Liard.				At mouth of Liard.	Above mouth of Liard.		
1876-----	May 14	-----	Nov. 4	Nov. 17	1884-----	May 12	May 14	Oct. 11	Nov. 18
1877-----	May 8	May 19	Nov. 1	Nov. 28	1885-----	May 2	May 7	Oct. 28	Nov. 20
1878-----	do	May 17	Oct. 16	Nov. 26	1886-----	May 3	May 27	Oct. 30	Nov. 25
1879-----	May 3	May 19	Nov. 12	Nov. 20	1903-----	-----	-----	Oct. 14	Nov. 18
1880-----	May 7	do	Nov. 2	Nov. 26	1904-----	Apr. 29	May 13	Nov. 10	-----
1881-----	May 13	do	Oct. 12	Nov. 18	1905-----	May 5	May 11	-----	(^b)
1882-----	May 7	May 20	Nov. 1	Nov. 30	1906-----	May 3	May 10	-----	(^c)
1883-----	May 1	May 5	Oct. 28	Nov. 20	1907-----	-----	-----	Oct. 26	Nov. 25
									do-----

^a From the Liard. The ice from the Mackenzie above the Liard began to run Oct. 18.

^b Had not closed on Nov. 24.

^c Had not begun to drift Nov. 1.

The following table shows the dates of occurrence of certain phenomena at Fort Norman, distant from Fort Simpson about 180 miles by the river. Some of the years being represented in the Fort Simpson table also, the rates of progress of the opening and closing of the river may be noted:

Table showing condition of Mackenzie and date of first snow at Fort Norman, Mackenzie.

Year.	River opened.	First snow.	First ice.	River closed.	Year.	River opened.	First snow.	First ice.	River closed.
1872-----		Sept. 28	Oct. 7	Nov. 8	1881-----		Oct. 2	Oct. 7	Nov. 12
1873-----	May 17	do	Oct. 21	Nov. 12	1882-----	May 14	Oct. 9	Oct. 14	Nov. 14
1874-----	May 25	Oct. 15	Nov. 2	Nov. 18	1883-----	May 11	do	Oct. 24	Nov. 10
1875-----	May 24	Oct. 23	Nov. 9	-----	1884-----	May 28	-----	-----	-----
1876-----	May 19	Oct. 10	do	do	1885-----	-----	-----	-----	-----
1877-----	May 12	Sept. 25	Oct. 18	-----	1886-----	-----	-----	Oct. 18	Nov. 13
1878-----	-----	Sept. 28	Oct. 22	Nov. 7	1887-----	May 24	Sept. 23	Oct. 5	Nov. 8
1879-----	May 9	Oct. 3	Oct. 20	Nov. 2	1888-----	May 19	-----	-----	-----
1880-----	May 22	Oct. 7	Oct. 22	Nov. 12	1904-----	May 21	-----	-----	-----

In the autumn of 1903 the ice in Peel River at Fort McPherson commenced to drift on October 4, and the river set fast on October 12. In the following spring it opened on May 23. The lowest temperature registered there during the same winter was — 60°.

SEASONAL PHENOMENA IN MACKENZIE VALLEY, 1903-4.

As a contribution to the climatology of the Mackenzie Valley, it may be well to present a brief account of the progress of the seasons and attendant phenomena from October 1, 1903, to July, 1904. The first three weeks in October were spent in ascending the Mackenzie from Fort Norman, at the mouth of Bear River, to Fort Simpson, at the mouth of the Liard. The fact that these notes were taken while the party was traveling detracts but little from their value, since the conditions in different parts of this stretch of river were nearly uniform at that time. The period from October 20, 1903, to June 1, 1904, was spent at Fort Simpson, and the month of June in descending the Mackenzie to its delta.

When the Mackenzie was reached, on September 30, 1903, by descending Bear River, a marked contrast was noted between the conditions left behind at Great Bear Lake and those encountered on the Mackenzie. The temperature was considerably higher, and several species of small birds which had practically disappeared from Great Bear Lake were common. The high mountains on the west side of the Mackenzie were covered with snow.

During the first few days of October, as we were ascending the Mackenzie, the weather was mostly fine, with southerly winds part of the time. The nights were frosty and ice formed on still water. The blue flowers of a gentian (apparently *Gentiana acuta*), the latest flowers observed, were seen on October 3. During the night of October 7 (above Blackwater River) a little snow fell, but it disappeared during the following day. On the night of October 12 (above Fort Wrigley) 4 inches of snow fell, and on the night of October 14 another fall of snow occurred. Some ice was seen drifting on the west side of the Mackenzie on October 15 (above mouth Nahanni River).^a On the following day the drifting ice had greatly increased in quantity, and on October 17 our progress by canoe was arrested. At this time the last of the tree sparrows and a few other hardy species left for the South. Snow fell on the nights of October 17 and 18 while we were continuing on foot to Fort Simpson, and the drifting ice continually increased in quantity.

SEASONAL PHENOMENA AT FORT SIMPSON, WINTER 1903-4.

The Liard was partially closed at its mouth on October 21, but broke away once or twice before it finally set fast. The weather from October 21 to 25 was considerably milder than it had been during the pre-

^a It should be noted that the appearance of drifting ice at this early date was almost unprecedented.

vious week, and on the 26th and 27th it became still warmer and the ice practically ceased running. On October 28, however, the weather became colder and the ice again appeared. From this date it continued to run and the snow steadily accumulated. The thermometer did not rise above the freezing point, and consequently there was no thawing, except to a very slight extent in sheltered spots directly exposed to the sun. While the river remained open its expanse of ice-laden water added greatly to the intensity of the cold. From the same cause the trees and shrubs were nightly loaded with ice crystals. On the night of November 7 the minimum temperature recorded was -10° , and on the night of November 15 a temperature of -27° was registered.

During the night of November 18 the river finally set fast. In this process the drifting ice accumulates until it has so filled the river that it jams in some place where it has partially bridged the channel. Against this barrier the oncoming floes, laden with saturated snow, are pushed by the current, and becoming lodged in all possible positions are almost instantly cemented together by the intense cold. This process continues upstream, usually without interruption, until the whole river is closed. As a result the surface of the river becomes extremely rough and is almost impassable until the drifting snow fills the interstices and the projecting points are somewhat rounded off by evaporation. The time of the closing of a river depends greatly on the height of water.

During November and December the cold steadily increased in intensity and the snow gradually accumulated. When no thaw occurs the snow remains so light and powdery that it does not settle appreciably. On the shortest days the sun rose in the southeast about 9.30 o'clock and, after describing a low arc over the tree tops, set about 2.30. Even at midday its heat was scarcely appreciable. After the middle of December the thermometer scarcely ever rose above zero. From January 1 to March 12, 1904, it rose above zero on only eight occasions, as follows: January 6, 3° ; January 7, 1° ; January 28, 2° ; February 24, 2° ; February 25, 5° ; February 27, 4° ; March 4, 4° ; March 5, 4° . The lowest temperature recorded was -54° , on January 20 and 21. During the third week in January the average daily maximum was -30° ; the average daily minimum -45° .

A grave which was dug on February 26, 1904, afforded an opportunity to ascertain the depth to which frost had penetrated. The location was a sandy knoll somewhat sheltered on the north by a thick growth of young trees and open to the south. Snow lay to a depth of about 3 feet. The frost had reached a depth of only 20

inches, but the excavation was not carried to a sufficient depth to reach the permanently frozen substratum.^a

On March 26 the temperature first rose above the freezing point and from that date did not descend below zero. When the spring thaw set in the snow had attained a depth of nearly 4 feet.

^a In this connection it may be well to present some additional data regarding ground ice at Fort Simpson. The information was given me by A. F. Camsell, of that post.

In excavating a cellar on a sandy ridge in the midst of a field on July 21, 1903, frozen ground was reached at a depth of 7 feet. In October, 1903, an excavation made in the yard of the dwelling house revealed frozen ground at 7 feet. Recent frosts had penetrated about 4 inches from the surface. This yard was sheltered by a high, tight fence.

In October, 1901, a pit was sunk beneath an engine house which had contained a fire during two previous winters, and frozen ground was encountered at a depth of 25 feet. A foot of frost was succeeded by a foot of thawed ground, beneath which frozen ground was again reached and was penetrated a short distance. Two years later the hole was deepened 3 feet through ground which had thawed since the pit was originally dug, and frozen ground was again encountered. It is proper to state that this pit was situated only a few feet from the edge of the river bank, where the effect of the summer heat would be greater than in a situation where the soil was not exposed to this lateral influence.

Relating to the same phenomenon at Fort Simpson, Richardson says: "In October 1836, a pit sunk by Mr. M'Pherson, in a heavy mixture of sand and clay, to the depth of 16 feet 10 inches, revealed 10 feet 7 inches of thawed soil on the surface, and 6 feet 3 inches of a permanently frozen layer, beneath which the ground was not frozen." (Arctic Searching Expedition, I, p. 166, 1851.)

Permanently frozen ground occurs in many parts of the north. According to some authorities, its southern limit is the isotherm of 32°. It is unfortunate that more observations regarding this phenomenon, especially as regards the thickness of the frozen substratum, have not been recorded. There is reason to believe that in muskegs and marshes the summer thaw penetrates to a shorter distance than in dry ground. On June 3, 1901, in a marshy pond near Fort Chipewyan, which had been free from ice for about a month, the muddy bottom was still frozen solidly. In the middle of June, 1904, the bottom of a muskeg at Fort Norman flooded with a foot of water was still solid. In such situations it is likely that the covering of cold water prevents the summer heat from penetrating to any considerable depth.

McConnell contributes the following: "Around Great Slave Lake the soil seldom thaws out to a greater depth than eight feet, and in many of the muskegs and marshes ice remains throughout the year at a depth of about two feet. In descending the Mackenzie the frozen soil gradually approaches the surface. At Fort Norman at the end of summer it lies at a depth of about six feet, at Fort Good Hope at about four feet, and at the mouth of Peel River at about two feet. The thickness of the frozen stratum was not ascertained." (Ann. Rept. Can. Geol. Surv., IV, p. 32 D, 1891.)

Richardson states that in the vicinity of Fort Franklin the soil during the greater part of the year "is firmly frozen, the thaw in the two seasons [1825-26] we remained there never penetrating more than twenty-one inches from the surface of the earth." (Franklin's Narr. Second Expedition to Polar Sea, Appendix, p. XI, 1828.)

The progress of the season at Fort Simpson from March to June, 1904, as indicated by the temperatures of successive weeks, is shown in the following table:

Temperatures of successive weeks, spring of 1904, at Fort Simpson, Mackenzie River.

	First week.	Second week.	Third week.	Fourth week. ^a
Average of daily maxima:				
March.....	- 2.8	- 2.7	9.5	30.7
April.....	39.4	42.7	46.4	57.9
May.....	46.0	50.8	59.7	53.2
June.....	62.1	63.1	60.0	70.4
Average of daily minima:				
March.....	-25.4	-26.8	-16.0	3.3
April.....	11.8	23.4	23.4	33.5
May.....	30.6	33.2	38.8	34.5
June.....	39.7	44.4	43.8	48.6

^a The ' fourth week ' includes the last nine or ten days of the month.

On March 19 a flock of white-winged crossbills, evidently migrants, was seen. On March 28 the first hawk owl of the spring was observed, and snow fleas (*Achorutes*) appeared. About the same time several species of small birds, which had been seen rarely during the winter, appeared in larger numbers. On March 30 the buds and catkins on the willows and alders imparted a brown tinge to the hillsides, where these shrubs were common. On the same date snow buntings, which had been absent since the middle of December, reappeared. On April 2 many small grayish moths were seen in the woods. On April 17 a mourning-cloak butterfly (*Euvanessa*)^a was seen. By April 18 the snow had nearly disappeared from the fields. Mosquitoes (*Culex annulatus*) first appeared on April 20, and were biting on April 24, but did not become troublesome until over a month later. The sap of the white birches began to flow freely on April 20. On April 23 a small space of open water was seen near the mouth of the Liard. Frogs were first observed on April 28.

On April 29 Liard River broke up. Its advancing flood first opened a channel nearly straight across the Mackenzie, forcing the ice with irresistible power up on the opposite bank in immense piles. At the same time a mound 60 or 70 feet in height was formed at the mouth of one of the channels of the Liard, several immense cracks opened in the white expanse before the post, and the huge sheets were soon broken up. The stupendous amount of force exerted by the river upon the broad expanse of ice, 5 feet in thickness, as with a grinding roar it folds and crushes the mighty sheets like cardboard, reducing them to powder and forcing them aloft in great mounds, im-

^a A list of the butterflies of the region has been published by Merritt Cary (Proc. U. S. Nat. Mus., XXXI, pp. 425-457, 1906).

presses the beholder, who is likewise occupied in considering the possibility of the river being dammed sufficiently to overflow the ground on which he stands. Such a catastrophe has destroyed more than one post on the Mackenzie in years past. On this occasion the immense volume of ice blocked the channel below the post and did not begin to move in earnest until the night of May 2, when the jam broke and the water, which had risen several feet, again fell.

At this time a few ducks appeared in open places on the river. On May 6 a small quantity of snow fell. The leaves of *Ribes oxycanthoides* began to appear on May 8. By this time the river was nearly clear of ice below the mouth of the Liard, but above its mouth the ice in the Mackenzie was still intact. On May 10 large sheets of the Mackenzie ice broke away and floated down, but the river did not open from above until May 13. The water then rose and became filled with ice, but on the following day was nearly clear again and had fallen. On this date the leaves on aspens and birches were half an inch in length. About the middle of May blue violets (*Viola albertina*) blossomed. The weather continued warm and vegetation advanced steadily. On May 18 *Viburnum pauciflorum* and *Populus balsamifera* put forth their leaves, and mountain cranberry (*Vitis-idea*) was in flower. Birds were now coming fast and additional species were noted daily, but on May 21 the weather turned cold and stormy. This had the effect of retarding the advance of vegetation and the tide of bird migration. On May 22 *Ribes oxycanthoides* and *Calypso bulbosa* were in flower. On May 23 a quantity of ice from the Little Lake, or from Great Slave Lake itself, came down the Mackenzie. The weather remained cold and stormy during the remainder of the month and the conditions of vegetation and of bird migration remained almost at a standstill. On May 29 several inches of snow fell.

SEASONAL PHENOMENA ON MACKENZIE BELOW FORT SIMPSON, SUMMER 1904.

On June 1, 1904, I left Fort Simpson, and spent the remainder of the month descending the Mackenzie. Though stops were made here and there, my general rate of travel kept pace with the advance of spring. The weather during the first few days of June was favorable and vegetation made good progress. On June 2, a few miles below Fort Simpson, the leaves of the tamaracks were just coming out, and they were in the same condition at Fort Norman, 3° farther north, on June 11. All along the river more or less ice still lay on the banks, but a few miles above Fort Norman the quantity was astounding. Many of the stranded cakes were upward of 20 feet in thickness. They had evidently come from the mouth of some tributary which had frozen to the bottom, and whose waters, continually overflowing and freezing, had filled the valley with ice (see fig. 3).

On June 17, below Fort Norman, a small quantity of snow fell. On June 21, at Fort Good Hope, the leaves on most of the trees were about half grown. On the same date the sun was visible at midnight from a low hill near the post, and many birds were in full song at that hour. For the next three weeks, north of this point, the sun was continually above the horizon. Vegetation now advanced rather faster than our rate of travel northward, but was not at its height when we reached the delta of the Mackenzie on June 30.

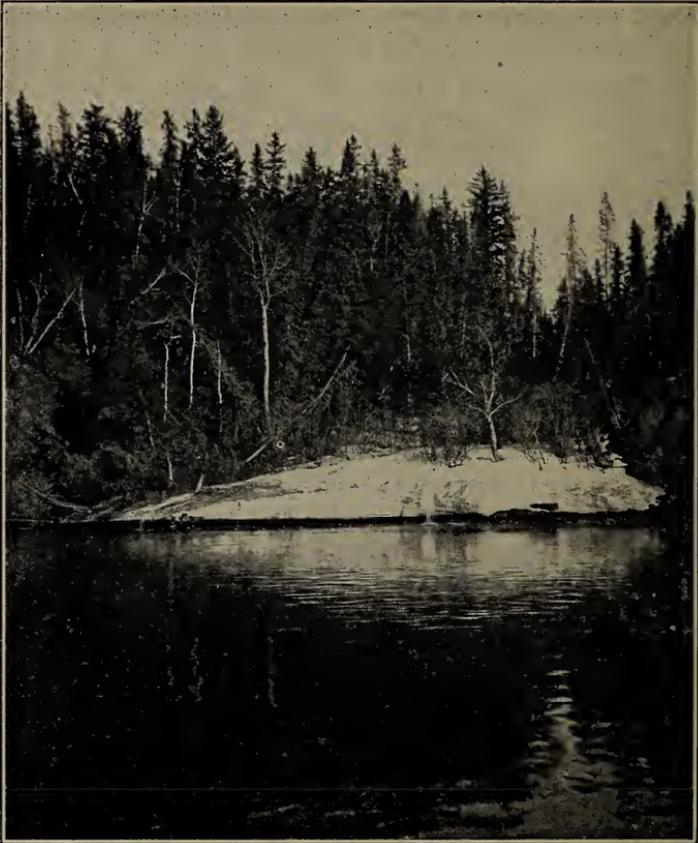


FIG. 3.—Valley of small stream filled with ice which has persisted until late. Athabaska River below Fort MacKay, May 29, 1903.

THE BASIN OF GREAT BEAR LAKE.

A short account of Great Bear Lake may begin with a portion of the description by Richardson, who examined most of its shore line in 1825 and 1826. He says:

Great Bear Lake is an extensive sheet of water, of a very irregular shape, being formed by the union of five arms or bays in a common center. The greatest diameter of the lake, measuring about one hundred and fifty geographical miles, runs from the bottom of Dease Bay, which receives the principal feeding

stream, to the bottom of Keith Bay, from whence the Bear Lake River issues, and has a direction of N.E. to S.W. The transverse diameter has a direction from N.W. by W. to S.E. by E., through Smith and M'Tavish Bays, and is upwards of one hundred and twenty miles in length.^a M'Vicar Bay, the fifth arm of the lake is narrower than the others, and being a little curved at its mouth, appears less connected with the main body of water. The light bluish-coloured water of Great Bear Lake is everywhere transparent, and is particularly clear near some primitive mountains, which exist in M'Tavish Bay. A piece of white rag, let down there, did not disappear until it descended fifteen fathoms. The depth of water, in the center of the lake, was not ascertained; but it is known to be very considerable. Near the shore, in M'Tavish Bay, forty-five fathoms of line did not reach the bottom.^b

Great Bear Lake, according to the Canadian Geological Survey, has an area of approximately 11,400 square miles and lies 391 feet above the level of the sea. Its shores, with the exception of parts of MacTavish Bay, are rather low. Its southern and western shores are well wooded, while its northern and eastern borders are more thinly forested. The immediate shores are mainly of sand or gravel and are usually devoid of trees, but are well clothed with willows and various ericaceous shrubs and herbaceous plants. In most places along the south shore this treeless stretch is only a few hundred yards in width, and in the bays the forest extends to the water's edge. In the vicinity of Leith Point, however, a treeless area stretches from near MacTavish Bay to McVicar Bay, and extends inland for several miles (see Pl. XVI, fig. 3, facing p. 118). On this area the faunal and floral conditions are practically those of the Barren Grounds.

The junction between the primitive or granitic rocks and the limestone formation crosses Great Bear Lake near its eastern extremity. To the eastward of the dividing line the shores are higher, especially around MacTavish Bay, where the mountains approach closely to the shore. The Grizzly Bear Mountain, which occupies the peninsula between Keith and McVicar bays, is upwards of 900^c feet high and several hundred feet of its upper portion are devoid of trees. On the opposite side of the lake, between Smith and Keith bays, a broad peninsula is occupied by the Scented Grass Hills, of about the same height and similar in structure to the Grizzly Bear Mountain. The mountains which border MacTavish Bay are so rocky that it is difficult to trace the limit of timber on their sides.

The northern shores of Great Bear Lake are described as mainly low and thinly wooded, although the country at some distance inland is better wooded.

^a In reality about one hundred and fifty.

^b Narr. Second Exp'd to Polar Sea, Appendix, p. ii, 1828.

^c The altitudes of mountains given in this paper are mainly taken from published narratives, but being largely estimates, can be regarded only as approximate. Thus Grizzly Bear Mountain, stated by Richardson to be 900 feet high (above the lake?), appeared to me to be higher than Mount Charles on Bear River, stated by Bell to be 1,500 feet high.

The tributaries of Great Bear Lake are comparatively few in number. Dease River, which discharges into the northeastern extremity of the lake, is probably the best known of its feeders. It rises on the treeless height of land between Dease Bay and the lower Coppermine. Several important streams enter the lake from the north. Several others draining a very large extent of country to the southward enter MacTavish and McVicar bays. The latter receives also the waters of a chain of large lakes lying north of Marten Lake (which discharges into Great Slave Lake). The country drained by the southern tributaries is very rough and rocky, though fairly well wooded, and is traversed in various directions by ranges of low mountains.

Bear River, which forms the outlet of Great Bear Lake, flows from its western extremity, and after following a general westerly course for about 90 miles, joins the Mackenzie. It is mainly confined between steep banks of sand or clay, is from 150 to 200 yards wide, and has a current of about 6 miles an hour. About midway of its course it passes through a sandstone chasm, forming a rapid nearly 3 miles in length. A ridge of hills, some of whose peaks attain a height of 1,500 feet, crosses the river at this point. From the summit of these hills the surrounding country is seen to consist of a rolling wooded plain dotted with many lakes of various sizes. Below Bear River Rapid the river is wide and the current less impetuous. Bear River is extremely clear, and although it is joined by several muddy streams its waters still present a marked contrast to those of the Mackenzie at their confluence.

The following table shows the summaries of the temperatures recorded during a full year (being for parts of 1825 and 1826), at Fort Franklin, Great Bear Lake, during Franklin's second journey (Narrative Second Expedition to Polar Sea):

Summaries of temperatures taken at Fort Franklin from September, 1825, to August, 1826.

Date.	Mean daily maximum.	Mean daily minimum.	Extremes.		Monthly mean.
			Maximum.	Minimum.	
1825.					
September-----	48.12	38.08	60.5	30.0	42.92
October-----	24.80	14.18	40.3	-18.0	20.28
November-----	8.39	3.72	32.5	-22.0	2.79
December-----	- 8.18	-21.63	27.5	-47.5	-13.96
1826.					
January-----	-16.17	-31.25	11.8	-49.0	-23.78
February-----	- 4.95	-21.71	27.8	-39.0	-12.70
March-----	3.87	-22.01	31.8	-43.0	- 8.26
April-----	24.83	3.99	41.6	-23.0	15.21
May-----	43.89	27.47	61.0	1.0	36.35
June-----					*48.00
July ^b -----	60.24	42.64	80.0	30.0	52.10
August-----	58.21	42.98	74.0	33.5	51.09
Year-----			80.0	-49.0	17.49

^a Assumed. Records for June lost.

^b Temperature for the first eight days of July supplied from observations taken on the Mackenzie.

It is evident that these figures are not comparable with those taken in 1900 at various other points in the region. From its position Fort Franklin should have a mean temperature at least as low as Fort Good Hope, which, although situated a degree farther north, is at a lower altitude and on the banks of a northward flowing river. The temperatures of the three winter months would seem to indicate that the winter of 1825-26 was exceptionally mild, and the temperatures recorded by Richardson as taken elsewhere in the Mackenzie region during the same year seem also to point to the same conclusion.

The following notes regarding the progress of the seasons at Fort Franklin, Great Bear Lake, are taken mainly from Richardson's accounts:

The relative temperatures of December, January, and February differ considerably; either of these months may be the coldest in different years. In some years snow exposed to the sun thaws very slightly during these months; in other winters there is no thaw whatever. The snow attains its greatest depth, about 3 feet, in March. By April 10 the snow begins to thaw decidedly in the sunshine. From the 1st to the 6th of May the earlier waterfowl arrive. The smaller streams break up about the 10th or 12th of May. Between the middle and the end of May most of the small birds arrive. At the end of May or early in June the earlier shrubs and herbaceous plants flower and sprout their leaves. Frogs are heard at the same time. By the last week of May there is bright light at midnight. No snow, excepting the remains of deep drifts, is left. On June 8 (1826), the small lake was clear of ice, having been frozen for two hundred and forty days. By the middle of June summer is fairly established. Great Bear Lake begins to break up about June 20, and drift ice sometimes obstructs navigation until the first or second week in August. By the 25th of July blueberries (*Vaccinium uliginosum*) are ripe. At the beginning of August stars are visible at midnight. By the last of August or first of September snow falls. Severe frosts set in by the last of September. In October, when the soil begins to freeze, the summer thaw has penetrated about 21 inches, beneath which the ground is perpetually frozen. The small lakes are frozen over by the 10th or 12th of October, and the last of the waterfowl depart. The bays of Great Bear Lake are filled with new ice by the end of October or early in November, but the center of the lake does not freeze over until December. The ice attains a thickness of about 8 feet.

Bear River opens at its head early in May, the result (according to Richardson) of its being fed by warm water from the depths of the lake. Probably from the same cause the lake remains open at the

outlet until very late in the autumn, or throughout the winter. At the rapid of Bear River the ice forms from the bottom and sides and finally completely blocks the stream. The resulting overflow continually adds to the volume of ice, which reaches an enormous thickness. The heat of an ordinary summer is insufficient to melt this mass entirely, and great quantities of it usually persist on the south or sheltered bank throughout the season. This vast accumulation of ice probably prevents the lower part of the river from opening as soon as the early disruption of its upper part would seem to justify. Richardson states that the lower part usually opens in June, while Petitot gives the usual time as the last of May. In 1904 it was already open when the Mackenzie broke up at Fort Norman on May 21.

THE BARREN GROUNDS.

Under this heading will be considered the great area lying to the northward and northeastward of Great Bear and Great Slave lakes. It is watered by the Anderson, Coppermine, Great Fish, Thelon or Ark-i-linik, and many smaller rivers. With the exception of Great Fish River all those named are wooded to some extent on their upper portions, but by far the greater part of the area drained by them is treeless. It may be well to trace the northern boundary of the great transcontinental forest from the western shore of Hudson Bay to the mouth of the Mackenzie.

Starting from the mouth of Churchill River, Hudson Bay, the tree line follows the shore closely for a few miles and then curves gently inland (see Pl. II). Thence it extends northwesterly, crossing Nueltin, or Island Lake; Ennadai Lake on Kazan River; and Boyd Lake on the Dubawnt. Just north of 60° on Artillery Lake is the next point where we have a definite dividing line. Between the Dubawnt and Artillery Lake is the valley of the upper Thelon, or Ark-i-linik, along whose banks the forest extends in a narrow line far into the general treeless area. This northward extending tongue of forest will be more fully described beyond.

From Artillery Lake the line extends northwestward to Point Lake, curving toward the southwest in the interval and crossing Lake Mackay south of latitude 64° . From Point Lake, whose shores are practically devoid of trees, nearly to latitude 67° , the banks of the Coppermine are so thinly wooded that the river may be taken as the approximate boundary of the woods. Spruces occur on the Coppermine as far north as the mouth of Kendall River, but are absent from the summit of the divide between there and Great Bear Lake and reappear on lower Dease River. Between Dease River and the

lower Anderson the boundary of the woods is not well known. The north shore of Great Bear Lake is thinly wooded and tongues of timber follow the northward-flowing rivers well into the Barren Grounds, on the Wilmot Horton to latitude 69° . The tree line crosses the Anderson to the northward of the same parallel, and thence extends northwestward to the mouth of the Mackenzie, probably dipping to the southward in the interval, as is usually the case in the areas between rivers. West of the timbered delta of the Mackenzie a considerable area of treeless country occurs.

In describing briefly the region whose southern boundary is thus roughly indicated, a part of MacFarlane's description of the Anderson River region may be quoted. He says:

The belt of timber which at Fort Anderson extends for over thirty miles to the eastward, rapidly narrows and becomes a mere fringe along the Anderson River and disappears to the northward of the 69th parallel of latitude. The country is thickly interspersed with sheets of water varying in size from mere ponds to small and fair-sized lakes. In travelling north-eastward toward Franklin Bay, on the Arctic coast, several dry, swampy, mossy and peaty plains were passed before reaching the Barren Grounds proper. The country thence to the height-of-land between the Anderson and the deep gorge-like valley through which the Wilmot Horton River (MacFarlane River of Petitot's map) flows, as well as from the "crossing" of the latter to the high plateau which forms the western sea-bank of Franklin Bay, consists of vast plains or steppes of a flat or undulating character, diversified by some small lakes and gently sloping eminences, not dissimilar in appearance to portions of the north-west prairies. In the region here spoken of, however, the ridges occasionally assume a mound-like, hilly character, while one or two intersecting affluents of the Wilmot Horton flow through valleys in which a few stunted spruces, birches and willows appear at intervals. On the banks of one of these, near the mouth, we observed a sheltered grove of larger growth, wherein moose and musk-oxen had frequently browsed. * * *

The greater part of the Barren Grounds is every season covered with short grasses, mosses, and small flowering plants, while patches of sedgy or peaty soil occur at longer or shorter distances. On these, as well along the smaller rivulets, river and lake banks, Labrador tea, crow-berries, and a few other kinds of berries, dwarf birch, willows, etc., grow. Large flat spaces had the honey-combed appearance usually presented in early spring by land which has been turned over in the autumn. There were few signs of vegetation on these, while some sandy and many other spots were virtually sterile.^a

This description applies fairly well to the entire region north of Great Bear Lake and west of the Coppermine, as far as it is known. To the eastward of the Coppermine, within the region of the crystalline rocks, the country is much more rugged and rocky. Thousands of lakes dot its surface, and they are often bordered by grassy plains and gentle slopes, on which, during the short summer, the bright

^a Canadian Record of Science, IV, pp. 52, 53, 1890.

flowers of a profusion of shrubby and herbaceous plants lend their beauty to the landscape, and prove the appellation 'Barren Grounds' to be a misnomer, though in many parts, from the nature of the soil, there is little plant life. Alders (*Alnus alnobetula*) occur in a more or less dwarfed condition in favorable places well into the treeless area, and several species of willows, some of which here attain a height of 5 or 6 feet, border some of the streams as far north as Wollaston Land. These are the only trees which occur even in a dwarfed state on the Barren Grounds proper.

The northward extension of the coniferous forest along the banks of northward-flowing rivers has already been referred to. The most remarkable example of this phenomenon is found on the Thelon, or Ark-i-linik, a stream tributary to Hudson Bay. It was first explored by Hanbury in 1899, and by J. W. Tyrrell during the following season. From a point near latitude $62\frac{1}{2}^{\circ}$, which is as far south as the river has been explored, and which is within the main area of the Barren Grounds, a more or less continuous belt of spruce borders the river as far north as latitude $64\frac{1}{2}^{\circ}$, a distance of over 200 miles by the river. A few species of woodland-breeding birds follow these extensions of the forest to their limits.

No tables of temperature taken throughout the year at any point in the Barren Grounds being available, remarks on climatology may be confined to a few general statements and to more or less fragmentary records. The winters are, of course, very long and the summers short, with the intervening seasons practically wanting. Winter sets in soon after the 1st of September and persists until May, with only a short season of spring. During the short summer the progress of vegetation is very rapid, but the seeds and berries are scarcely ripened before winter again asserts its sway.

In the table which follows, an attempt is made to show approximately the conditions of temperature on the Barren Grounds during the summer months. The records were taken by the expedition of J. W. Tyrrell between Artillery Lake and the mouth of Chesterfield Inlet in the summer of 1900. From June 1 to the first week in September the party was traveling within the general limits of the Barren Grounds. Observations were taken every three hours from 6 a. m. to 6 p. m., and the highest and lowest of these temperatures recorded daily have been assumed, with but little probability of error, to represent the maximum and minimum. As no observations were taken during the night the actual minimum would be lower in some cases. As the observations were made in 1900, the figures, so far as they go, are comparable with those taken during the same year in other parts of the Mackenzie region.

Weekly summaries of temperatures, June to September, 1900, between Artillery Lake and Chesterfield Inlet.

	First week.	Second week.	Third week.	Fourth week.
Mean daily maxima:				
June.....	^a 47.0	^a 60.4	^a 65.7	^b 58.8
July.....	^c 67.7	^d 64.2	^e 49.8	^f 56.6
August.....	^g 54.5	^h 54.0	ⁱ 55.2	^j 47.8
September.....	^k 45.0			
Mean daily minima:				
June.....	36.7	46.7	48.5	54.7
July.....	59.4	52.5	44.2	49.8
August.....	47.5	49.1	46.1	36.9
September.....	36.1			

^a Artillery Lake.

^b Kasba Lake to Hanbury River.

^c Hanbury River.

^d Thelon River.

^e Thelon River to Aberdeen Lake.

^f Schultz Lake to mouth Chesterfield Inlet.

^g Chesterfield Inlet.

^h Lower Thelon to Aberdeen Lake.

ⁱ Thelon River.

^j Thelon and Hanbury rivers.

^k Hanbury River to Artillery Lake.

The monthly means were as follows: June, 52.29; July, 55.51; August, 48.96.

Owing to the great thickness of their icy covering, some of the lakes of the Barren Grounds are not clear of ice in backward seasons until July, or even August, when new ice has usually begun to form in still water. They generally break up in late June or early July. The rivers, having the advantage of a current, open earlier than the lakes.

During a residence of about five years at Fort Anderson, on Anderson River, MacFarlane observed the river to set fast on two occasions as early as September 10, though once it remained open until October 10. In 1857 the Anderson broke up at the mouth of the Lockhart on June 12. At Fort Anderson the dates of the opening of the river were as follows: 1861, about May 15; 1862, May 19; 1863, May 30; 1864, May 31; 1865, June 2. During the last days of June, 1864, MacFarlane found nearly all the lakes on the Barren Grounds still covered with ice, though the rivers were open.

In 1821, when Franklin's party started to descend the Coppermine on July 1, the lakes on its upper course were still covered with ice. Apparently the river had opened only a short time before. In 1849 Doctor Rae noted the breaking up of the same river near its mouth on June 28. At this time the leaves of the dwarf birches were out, and the leaf buds of the willows had begun to develop. The lower part of the river remained blocked with ice until July 13.

LIFE ZONES OF THE ATHABASKA-MACKENZIE REGION.

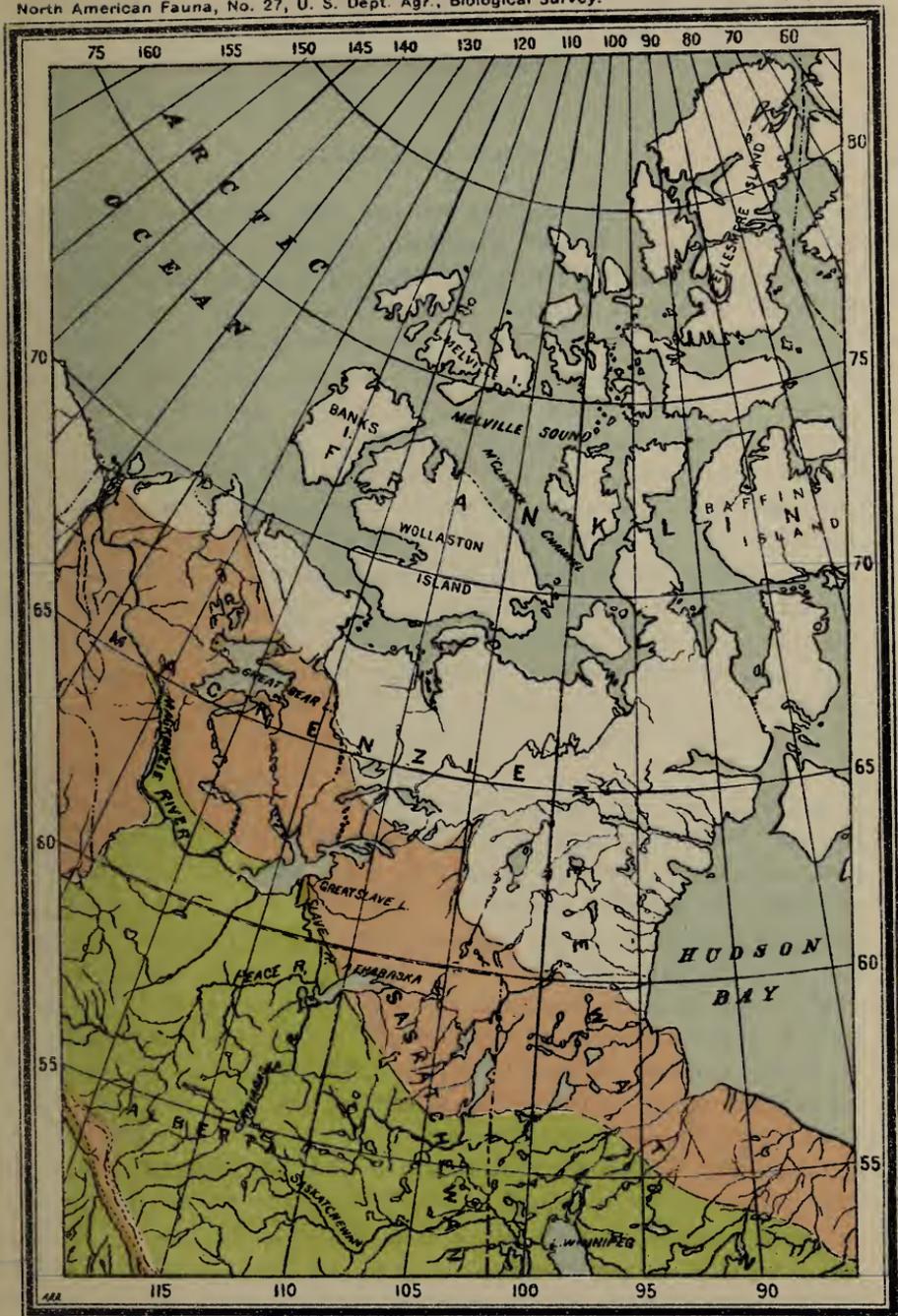
The area treated of lies within the Boreal Region and comprises parts of each of its three subdivisions—the Arctic, Hudsonian, and Canadian zones. The boundaries of these belts are shown on Plate II in as much detail as is possible with our present knowledge.

ARCTIC ZONE.

The Arctic zone comprises the islands of the Polar Sea and the area commonly known as the 'Barren Grounds,' stretching across the northern part of the continent north of the great transcontinental coniferous forest. The physical characteristics of the country comprised in the Arctic zone are given in the description of the Barren Grounds (p. 46). Various shrubby plants are common, among which *Rhododendron lapponicum*, *Cassiope tetragona*, and several dwarf willows are perhaps the most characteristic. Several other less strictly representative plants also are abundant. The zone is further characterized by the presence of certain mammals, as the lemmings of the genera *Lemmus* and *Dicrostonyx*, the Arctic fox, musk-ox, Barren Ground caribou, and polar hare. The birds which characterize this area are migratory, spending only the breeding season within its boundaries. They comprise, among the Anatidæ, the various species of the genus *Chen* and one or two genera of maritime ducks. Among the Limicolæ, the genera *Lobipes*, *Phalaropus*, *Macrorhamphus*, *Tringa* and related genera, *Calidris*, *Tryngites*, *Numenius* (*hudsonicus* and *borealis*), *Squatarola*, *Charadrius*, and *Arenaria*. The Gallinæ are represented by *Lagopus lagopus* and *L. rupestris*, the Raptores by the gyrfalcons, and the Passeres by *Plectrophenax*, *Calcarius lapponicus* and *C. pictus*, and *Anthus*.

The southern extension of the Arctic zone, the Arctic-Alpine, occupies the treeless summits of mountains which lie within the forested area. It comprises in this region the summits of the Rocky Mountain Range. The inconsiderable barren areas that occur on the mountains east of the Mackenzie are near the main Barren Ground area and of course have closer affinities with the true Arctic than with the Alpine summits farther south. Since the mountain area west of the Mackenzie is practically unknown geographically, it is impossible to define the limits of the Arctic-Alpine area with even approximate accuracy. On these mountains timber line occurs, on the sixty-second parallel, at an altitude of about 3,000 feet, and at a diminishing altitude to the northward. As the best information available indicates that extensive areas lie above 5,000 feet, the amount of country to be classed as Arctic-Alpine must be very large. Farther south the zone occupies isolated peaks down to or below latitude 35°.

The Arctic-Alpine zone along the northern Rocky Mountains is characterized by various dwarf willows and several other plants representative of the Arctic. Its mammals are the Dall sheep (*Ovis dalli*), the pika (*Ochotona*), and probably the hoary marmot (*Mar-*



LIFE ZONES OF HUDSON BAY AND MACKENZIE REGIONS.

— CANADIAN.

— HUDSONIAN.

— UNCOLORED—ARCTIC.

(An area of Transition covers part of the Saskatchewan Valley, but is not here shown.)

mota caligata), and lemmings of the genus *Lemmus*. The characteristic birds include the white-tailed ptarmigan (*Lagopus leucurus*), the pipit (*Anthus rubescens*) and probably the rosy finch (*Leucosticte tephrocotis*).

HUDSONIAN ZONE.

South of the Arctic zone lies the Hudsonian, a belt of more or less stunted timber. In the Mackenzie region it has no strictly characteristic mammals, though the range of a red-backed vole (*Evotomys dawsoni*) is practically confined within its limits. Most of the woodland mammals necessarily have their northern limit within this zone. Such comprise the following: *Rangifer caribou*, *Alces*, *Sciuropterus*, *Sciurus*, *Castor*, *Evotomys*, *Fiber*, *Erethizon*, *Lepus americanus*, *Lynx*, *Lutra*, *Lutreola*, *Mustela*, and others. Among birds, the great gray owl (*Scotiaptex nebulosum*), hawk owl (*Surnia ulula caparoch*), pine grosbeak (*Pinicola e. leucura*), and tree sparrow (*Spizella monticola*) breed principally within it. Its trees are those of the Canadian zone, though the Banksian pine (*Pinus divaricata*) and balsam poplar (*Populus balsamifera*) barely enter its borders. Its shrubs are mainly species that overlap from the adjoining zones. Among those which seem to reach their greatest perfection in the Hudsonian may be mentioned *Empetrum nigrum*, *Ledum palustre*, *Vaccinium uliginosum*, *Vitisidæa vitisidæa*, *Oxycoccus oxycoccus*, and *Betula nana*.

The northern limit of the Hudsonian, being the line dividing it from the Arctic, has just been defined; its southern boundary remains to be indicated. On the southwest shores of Hudson Bay the zone occupies a strip about 200 miles in width. Thence its southern boundary extends inland, passing through Athabaska Lake, and then bending northward crosses Great Slave Lake just east of the mouth of Slave River. Practically all of the northern shore of Great Slave Lake lies within its limits. Beyond here its lower boundary is very uncertain. It is bounded by a strip of Canadian country, probably only a few miles in width, extending northward along the Mackenzie. This southern influence ceases to be effective near the mouth of Bear River, and the southern limit of the Hudsonian may be considered to cross the Mackenzie near latitude 65°. Thence it bends again southward, following the western border of the Canadian strip. Here, as on the eastern side, the position of the boundary is unknown, but because of the great altitude of most of the country west of the Mackenzie and north of the Liard the Canadian zone influence can not extend far from the river and the Hudsonian must cover nearly the

entire area, exclusive of the alpine summits of the mountains. The Canadian of the Liard Valley is probably continuous, or nearly so, by way of the valleys of the Frances and Pelly, with the Canadian on the Yukon.

CANADIAN ZONE.

The Canadian zone includes all the country to the southward of the line just defined. It thus comprises the Athabaska and Peace River valleys, the Slave River Valley, and all the country stretching southward from Great Slave Lake, the upper Mackenzie, and the lower Liard. Along the Mackenzie it sends a narrow tongue northward through three degrees of latitude. This strip merely represents the influence exerted on the fauna and flora by the warmer waters and climate of the Liard and by the broad stretch of low country to the southward.

Among the birds limited in their northward range by the upper border of the Canadian zone and which are more or less characteristic of it, are *Picoides arcticus*, *Bonasa u. umbelloides*, *Nuttallornis borealis*, *Empidonax minimus*, *Zonotrichia albicollis*, *Spizella p. arizonæ*, *Melospiza lincolni* and *M. georgiana*, *Lanivireo solitarius*, *Helminthophila celata* and *H. peregrina*, *Dendroica magnolia*, *Hylocichla u. swainsoni*, and *H. g. pallasii*.

The northern border of the Canadian zone in the Mackenzie region limits the successful cultivation of barley, potatoes, and the more hardy root crops, although with special care most of them are raised in certain favored localities in the southern part of the Hudsonian. Even in the Canadian, however, an occasional failure occurs, in the case of the less hardy crops, because of the occurrence of unusually late spring or early autumn frosts. In most parts of the Peace River Valley, and even in the lower Liard Valley, wheat is a successful crop. Peas, potatoes, radishes, turnips, beets, carrots, cabbages, lettuce, and onions are raised with a considerable degree of success as far north as Fort Norman, near latitude 65°, near the northern extremity of the Canadian strip. Nearly or all of these meet with a fair amount of success at Fort Rae and also at Fort Good Hope, in the lower Hudsonian, but at Fort Rae the situation is especially favorable as regards slope exposure, and the permanent frost, which remains near the surface in most parts of the Hudsonian, probably retreats to a much lower depth. At Fort Good Hope the almost continuous sunlight of summer probably compensates in part for its extreme northern position.

The following table shows the mean temperature of the two warmest months (usually June and July), and the mean temperature for the year at various stations in the Athabaska-Mackenzie region:

Table showing mean temperature of two warmest months of year and for entire year at various stations.

Station.	Mean of two warmest months.	Mean for year.	Station.	Mean of two warmest months.	Mean for year.
	^{°F.}	^{°F.}		^{°F.}	^{°F.}
Edmonton (1900)-----	59.3	37.7	Fort Simpson (1900)-----	57.4	20.7
Athabaska Landing (1900)-----	56.7	-----	Fort Good Hope (1900)-----	58.1	13.6
Fort Dunvegan (1880-1884)-----	59.0	30.0	Fort Franklin (1826)-----	^a 50.0	17.5
Fort Chipewyan (1900)-----	59.4	28.5	Fort McPherson (1900)-----	^b 50.5	-----
Hay River (1900)-----	58.0	25.0	Herschel Island (1900)-----	40.0	9.8
Fort Rae (1883)-----	56.3	22.3			

^aApproximate.

^bJune only.

In the case of a few stations it would have been possible to obtain the means of two or more years, but it is believed that the figures for 1900, being more directly comparable, are, on the whole, more satisfactory and represent fairly well the normal conditions. It is manifest that these data are much too scanty to afford assistance in plating life zones or in formulating general laws, but a few significant points may be noted. If these figures are platted on a map, it will be seen that the mean temperature of the two warmest months is very uniform throughout the Canadian zone, the greater amount of sunlight compensating for the higher latitude in the case of the more northern localities, while the mean temperature for the year lowers rapidly toward the northward. Omitting the means for Athabaska Landing, which seem to be lower than the position of the place would warrant, the extremes for the two warmest months for the places within the Canadian zone are 57.4 and 59.4, and the average 58.4° F. Merriam considers that the mean temperature of the six warmest weeks of summer has an important bearing on the distribution of species. Exact data for this period can be obtained for so few localities in the north that the figures would be of little value, but it is believed that the mean temperature of the two warmest months would be found to be only a degree or two lower. Corresponding temperature data for more easterly points in the Canadian zone vary only 2° or 3°, and lead to the conclusion that in that region a mean of approximately 60° F. for the six warmest weeks of summer characterizes the Canadian zone.

Data for the Hudsonian and Arctic zones are less full, but so far as they go indicate that the limiting temperatures for the southern boundaries of the Hudsonian and Arctic zones are approximately 57° F. and 50° F., as stated by Merriam.^a

^a Nat. Geog. Magazine, VI, p. 236, 1894.

PREVIOUS EXPLORATIONS AND COLLECTIONS.

EARLIEST EXPLORERS, HEARNE AND MACKENZIE, 1770-1793.

Samuel Hearne, who made his famous journey of exploration in 1770-71, was the first civilized traveler to penetrate the Great Slave Lake region. Though not a naturalist, he had a general knowledge of the larger birds and mammals, was a good observer, and recorded in his narrative many notes on the fauna.^a

During the eighteenth century the Indians of the unknown region west of Fort Prince of Wales (Churchill) on their occasional trading visits brought to the post specimens of native copper, which they claimed to have discovered near the banks of a large river far to the northwestward. The Hudson's Bay Company, in accordance with its avowed policy of prosecuting discovery, finally decided to send an expedition to discover the source of the metal and at the same time to throw light on the supposed existence of a feasible passage by sea to the westward. Hitherto all the expeditions in search of the Northwest Passage had been by sea, but now the company decided to undertake exploration by land.

For this important mission Samuel Hearne, a factor in the service of the company, who for some years had been stationed at Fort Prince of Wales, was selected. He made three attempts, two of which were unsuccessful. The first failed because of lack of provisions, and the second because Hearne was plundered by his Indian companions and broke his sextant. On these trips he attempted to penetrate to the northwestward through the Barren Grounds; but on the third venture, leaving in December, 1770, he kept more to the westward and, being in the wooded country, was able to provide himself with provisions and to travel with much less discomfort. As he was accompanied by a number of families of Indians as bearers and hunters, his progress was necessarily slow and indirect, on account of the difficulty of crossing lakes and large rivers, and of providing food for so many. His general line of travel was at first a little north of west to Clowey Lake, which was reached May 3, 1771, and thence a little west of north to the eastward of Great Slave Lake, probably passing Artillery Lake, to the stream since called Coppermine River, which was reached probably near Sandstone Rapid. At Bloody Fall, named from the circumstance, the Indians, small parties of whom had joined the company from time to time, fell upon a large party of Eskimos, then their bitter enemies, and, much to Hearne's horror and disgust, massacred the entire company.

^a For full references to publications, see Bibliography, p. 535.

Desiring to satisfy himself that the river emptied into the sea, Hearne proceeded to its mouth, where he arrived July 17. He then turned southward and in a general way retraced his outward course until he reached the vicinity of Point Lake, when he bore slightly westward and crossed Great Slave Lake somewhere to the eastward of the Northern Arm about the last of December, 1771. This lake he called the "Athapuscow," and it has been by some supposed to be identical with the Athabaska, but a careful examination of his narrative and map renders this idea untenable.^a Entering the comparative level country south of the lake, a welcome change from "the jumble of rocks and hills" which he had been traversing, he struck Slave River at a point where its banks were high—that is, at some distance south of the lake—and after following the river for some 40 miles turned off to the eastward, reached his outward track near Clowey Lake, and returned to Fort Prince of Wales over nearly the same route followed on the first part of his outward journey.

The narrative of Hearne's journey, which was published in 1795, contains many notes on natural history, and in his closing chapter the author gives a more or less detailed account of many of the animals with which long residence in the north had made him familiar.

The next traveler to be referred to in the present connection is Alexander Mackenzie, who, in the summer of 1789, descended to its mouth the great river which now bears his name. Since Hearne had penetrated the interior, hitherto unknown to the northward of the Saskatchewan, the fur traders of Canada had gradually extended their field of operations northward, first to the upper Churchill River, then by way of Isle à la Crosse and Methye Portage to Athabaska River, where a post was erected by Peter Pond in 1778, about 40 miles above the mouth of the river. In 1785 trading houses were built on Great Slave Lake to the eastward of the mouth of the river, apparently near Stone Island. In 1787 the various private traders and small companies united under the name of the 'North-West Company,' which was a most formidable rival of the Hudson's Bay Company until their consolidation in 1821. The post established on the Athabaska was removed in 1788 to the south shore of Athabaska Lake, about 8 miles east of the mouth of the river. It was named Fort Chipewyan and for some years was the principal post of the district. From here Alexander Mackenzie started on his famous journeys of exploration.

^a For a brief discussion of this part of Hearne's route, by Doctor Richardson, see Back's Narrative Arctic Land Expedition to Mouth of Great Fish River, pp. 150-155, 1836.

He left on June 3, 1789, and, descending Slave River, reached Great Slave Lake June 9. Ice delayed him until June 15, when he worked slowly across as wind and ice permitted, reaching Yellowknife Bay on June 23. Crossing the Northern Arm, he coasted the north shore of the lake and reached its outlet June 29. Then, entering the great river, he traveled with such expedition that he reached the mouth of Great Bear River July 6, and the mouth of the Mackenzie about the middle of the month. After a short examination of the vicinity he commenced his return against the stream. Great Bear River was passed on August 2, Liard River on August 13, and Great Slave Lake was reached on August 22. Retracing his course around the northern border of the lake, he reached the mouth of Slave River on September 3, the Slave [Smith] Rapids on September 8, and Fort Chipewyan on September 12.

Three years later Mackenzie undertook another voyage of discovery and penetrated the unknown country lying beyond the most distant post on Peace, or Unjigah, River, as it was known to the natives. He left Fort Chipewyan on October 10, 1792, and passing through the smaller lakes to the westward of Athabaska Lake entered the Peace and ascended it to a point 6 miles above its junction with Smoky River, or the 'Forks.' To this place men had been sent earlier in the season to prepare materials for the erection of a trading post. His map and narrative show that up to that time three posts had been established on Peace River—the 'Old Establishment,' then abandoned, a short distance from Vermilion Falls; the 'New Establishment,' evidently near the present site of Fort Vermilion, and a post called on his map 'McLoed's Fort,' about 33 miles below the mouth of Smoky River. The site of the proposed post, called Fork Fort, was reached November 1, and here buildings were erected and the winter of 1792-93 was passed in trading with the Indians. On May 9, 1793, his westward journey was resumed. Peace River and its tributary, the Parsnip, were ascended to a point near the source of the latter, and a traverse made to the Fraser River, supposed by Mackenzie to be the Columbia, and this was descended for some distance. Thence, by a journey on foot westward through the valley of 'West Road' River (evidently the Blackwater), and by descending 'Salmon' River (the Bella Coola), Mackenzie reached the Pacific late in July near King Island, a short distance north of Vancouver Island, thus being the first traveler to cross the continent north of Mexico.

After examining a few miles of the coast and observing for latitude and longitude, Mackenzie retraced his course to the mountains and, after great exertions and much suffering from famine, reached Peace River and, descending it, arrived at Fort Chipewyan in Sep-

tember, 1793. The narratives of these voyages, published in 1801, contain many interesting notes on the natural history of the region traversed.

FRANKLIN, 1819, TO SIMPSON, 1839.

The first journey of Captain (afterwards Sir John) Franklin to the Polar Sea was the beginning of a series of explorations which resulted in the accumulation of a vast amount of information relating to the fauna of the region. The party, including Franklin, John Richardson, George Back, Robert Hood, and John Hepburn, an English seaman, left York Factory on September 9, 1819, and traveling by way of Oxford House and Norway House, arrived on October 22 at Cumberland House, where they went into winter quarters. In order to arrange in advance for the further progress of the expedition, Franklin, accompanied by Back, left Cumberland House on January 18, 1820, and traveling by way of Carlton House, Isle à la Crosse, and Methye Portage, arrived at Fort Chipewyan, their objective point, on March 26. With the opening of navigation the remainder of the party pursued practically the same route and joined Franklin at Fort Chipewyan on July 13, and the entire party leaving five days later, reached Great Slave Lake on July 24. Starting from Moose Deer (now Mission) Island three days later, the party crossed Great Slave Lake to Fort Providence on the Northern Arm, where Indian guides and hunters for the descent of the Coppermine were engaged. The party left Fort Providence on August 2, ascended Yellowknife River, and traversing a series of lakes, established winter quarters on Winter River, after making a preliminary trip as far as the banks of the Coppermine. After passing the winter of 1820-21 here they resumed their travels on June 14, 1821, dragging their boats and baggage on the ice. On July 1, at Red Rock Lake, they commenced the descent of the Coppermine, and on July 18 reached its mouth, the Indians turning back from this point. Leaving here July 21, the party, now numbering twenty persons, explored the coast to the eastward as far as Point Turnagain, which was reached August 16. Further progress in that direction being impossible, the return journey was commenced on August 22. Retracing their way along the coast to the mouth of Hood River, the party attempted to ascend that stream with the large canoes, but this being found impossible, the journey toward Fort Enterprise was undertaken on foot, two small canoes, made from the material of the large ones, being carried for the purpose of crossing the rivers encountered. Owing mainly to the abandoning of their canoes by those deputed to carry them, the party experienced intense suffering from starvation and exposure. Several of the voyagers wandered and died, and Hood was murdered by one of the party, an Iroquois. The survivors assembled

at Fort Enterprise about the last of October. Here two more of the voyagers died, and the whole party must have perished from starvation but for the Indians under the chief Agiatcho, who supplied them with food. The explorers were shortly afterward conveyed to Fort Providence, and thence to the trading post on Moose Deer Island (near Fort Resolution). In the spring of 1822, the party left Great Slave Lake, and proceeding by the same route followed when entering the country, returned to England.

The fauna of Melville Island was made known by the first expedition of William Edward Parry, in the *Hecla* and the *Griper*. This navigator, entering Barrow Strait for the first time, passed through it to the westward and discovered Melville Island about the last of August, 1819. Coasting along its southern shore, the expedition was stopped by the ice on September 24, and went into winter quarters in Winter Harbor, where it remained until the following August. In June, 1820, the ships being still fast in the ice, an exploring party sent out to the northward crossed the island and discovered and named Liddon Gulf and Hecla and Griper Bay, and other parties made shorter trips in the same direction. On August 1 the ships were freed from the ice, and working slowly westward reached Cape Dundas a few days later. From this point, land (Banks Land) was discerned to the southwestward, but being unable to reach it on account of the ice, or to penetrate farther to the westward, Parry retraced his course through Barrow Strait and returned to England. Many notes on the natural history of the region appear in Parry's narrative of the voyage, and an account of the mammals and birds observed and collected was prepared by Edward Sabine, naturalist to the expedition, and published as a supplement to the narrative. The narrative of Alexander Fisher, surgeon to the expedition, also contains a great many notes on natural history.

In May, 1824, Parry left England in the *Hecla* and *Fury* on his third voyage to the Arctic; his second voyage, in 1821 and 1822, penetrated only as far westward as Melville Peninsula, and need not be noticed in detail. He reached Lancaster Sound on September 10, 1824, and Port Bowen, on the east side of Prince Regent Inlet, about the last of the month. Nearly a year was spent in the vicinity, and the expedition then returned to England. Reports on the natural history were published by J. C. Ross.

Franklin's second expedition to the Polar Sea was sent out to explore the coast line to the westward of the mouth of the Mackenzie and eastward to the Coppermine. The principal members were John Franklin; George Back, second in command; John Richardson, surgeon and naturalist; Thomas Drummond, assistant naturalist; E. N. Kendall, and P. W. Dease, who was afterwards associated with Thomas Simpson in explorations west of the Mackenzie and east of

the Coppermine. The first five named entered the country by way of New York and the Great Lakes, and Franklin, Richardson, and Drummond, traveling a little in advance of the others, reached Cumberland House on June 15, 1825. Here Drummond remained, with the intention of making collections on the Saskatchewan and among the Rocky Mountains to the westward. Franklin and Richardson left the following day, and on June 29, at Methye Portage, overtook the boats which had left Cumberland House a short time previously with the heavier supplies. The party then descended the Clearwater and Athabaska to Fort Chipewyan, where Franklin remained until the arrival of Back's party, Richardson keeping on with the boats. On the arrival of Back's detachment, Franklin descended the Slave and Mackenzie to the mouth of Great Bear River. Here Franklin and Back separated, the former, accompanied by Kendall, to descend the Mackenzie to its mouth, while Back was to proceed to Great Bear Lake to the winter residence, Richardson having already preceded him there for the purpose of exploring the shores of the lake. Franklin, after making a preliminary survey of the Mackenzie to its mouth, returned to the prospective winter quarters, established near the head of Great Bear River by Dease, who had passed the previous winter at Great Slave Lake and had arrived here late in July. At this establishment, which had been named Fort Franklin, the entire party assembled on September 5, and passed the winter of 1825-26 in comparative comfort. On the breaking up of Bear River in the following summer, they descended it and the Mackenzie, dividing into two parties on July 4 at Point Separation. Richardson and Kendall surveyed the Arctic coast eastward to the mouth of the Coppermine, and, traveling overland to the northeastern part of Great Bear Lake, crossed it to Fort Franklin, where they arrived on September 1. Richardson left at once for Great Slave Lake and Cumberland House, for the purpose of meeting Drummond and making spring collections on the Saskatchewan.^a In the meantime Franklin and Back had explored the Arctic coast to the westward of the Mackenzie for 374 miles, and returned to Fort Franklin, reaching there September 21. Franklin remained here until February, 1827, when, leaving Back to follow in the spring, he left for Cumberland House, where he joined Richardson on June 18, 1827. Richardson, after leaving Fort Franklin, had proceeded to Great Slave Lake, where he passed a part of the winter collecting, and then proceeded on the snow to Carlton House, where he was joined by Drummond on April 5, 1827. The two spent some

^a In an old journal at Fort Simpson I found the record of Doctor Richardson's arrival at that post on September 14, 1826, and of his departure for Great Slave Lake two days later. He is stated to have left Great Bear Lake on September 3.

weeks here in making collections, until Richardson left for Cumberland House, where he was joined by Franklin, as before indicated. Franklin and Richardson left almost immediately, and, voyaging by way of Lake Winnipeg and the Great Lakes, returned to England by nearly the same route which they had followed when entering the country. Drummond remained in the neighborhood of Carlton House for the purpose of making further collections, since Back's detachment, which he was to accompany to England, would not arrive at Cumberland House from the interior for about two months. When Back arrived he was joined by Drummond, and the party, accompanied by David Douglas, who was returning from a collecting trip of three years to northern California and the banks of the Columbia, and had crossed the Rocky Mountains by the Columbia portage road (Jasper Pass), returned to England by way of Oxford Lake and York Factory.

In order to complete the account of this important expedition it is necessary to refer briefly to the itinerary of Thomas Drummond from the time of the departure of the main expedition from Cumberland House in the summer of 1825 to the time when he joined Richardson at Carlton House. He remained at Cumberland House until about August 1, when he accompanied the Hudson's Bay Company's brigade to Carlton House, and leaving there September 1, reached Edmonton September 20. After two days' delay here he accompanied the brigade overland to Fort Assiniboine, on the Athabaska, near the mouth of the McLeod. Leaving here October 2, the party reached the mountains October 14. Drummond traveled mainly on foot and, as snow fell on the third day after they started, found this portion of the journey very disagreeable. After proceeding about 50 miles on the Columbia portage road he left the brigade, in company with a hunter who had been engaged to supply him with food during the winter, intending to pass that season on the 'Smoking' River, so called from the burning beds of coal on its banks. The snow became so deep, however, that they had to give up the attempt to reach their proposed destination, and leaving the mountains, went into winter quarters on Baptiste River, a tributary of the Athabaska. Here Drummond passed the winter mainly alone, his only shelter being a hut built of branches. About April 10, 1826, he left this place for the Columbia portage road, where he remained until August 10, when, in company with another hunter, he traveled along the mountains to the northward, reaching 'Smoking' River on September 10 and the "headwaters of the Peace"^a on September 24. He then set out on his return, and desiring to cross the portage to Columbia River, he commenced drying provisions for the journey. Soon after reaching the portage, on October 9, however, he received instructions from Cap-

^a Referring, probably, to one of the southern tributaries of the upper Peace.

tain Franklin to rejoin the expedition in the spring of 1827. He therefore proceeded only to the west end of the portage, and returning, commenced his journey down the Athabaska, floating down the river until it set fast and finishing the journey to Fort Assiniboine on foot. Then procuring horses, he proceeded to Edmonton, where he remained until March 17, when he left for Carlton House, arriving there April 5, when the welcome of Doctor Richardson caused him to forget his previous hardships.

The natural history material and notes accumulated on this expedition were so extensive that it was decided that they should be published separately, instead of as an appendix to the narrative. The result was the series of magnificent volumes, the *Fauna and Flora Boreali-Americana*, in which, in addition to the material collected on the Franklin expeditions, appeared the results obtained on the earlier voyages of Ross and Parry. This publication, the several volumes of which treated of the mammals, birds, fishes, insects, and plants, was for many years the chief source of information regarding the natural history of northern North America, and continues to be a standard work.

During the early part of the last century Mr. Leadbeater, a London collector and dealer in natural history specimens, obtained from time to time many birds from the country controlled by the Hudson's Bay Company, evidently securing them from employees of that company. Probably only a few of these specimens were ever made known to science, but here and there are found references to interesting species obtained from this source. Bonaparte, in his 'American Ornithology' and in other articles published about the same time, records four species of birds ostensibly from "Athabasca Lake," or "near the Rocky Mountains," which he found in Leadbeater's collection. A careful consideration of the evidence seems to show that most of these specimens (and probably all of them) were really taken near the sources of Athabaska River. As the species are important it may be well to present the evidence in detail. In the *Zoological Journal* Bonaparte recorded two specimens of '*Fringilla vespertina*' "shot early in the spring on the Athapescow Lake near the Rocky Mts."^a In 'American Ornithology' he figures in colors one of the same individuals, "shot early in the spring on the Athabasca Lake, near the Rocky Mountains,"^b and gives a minute description of a specimen, evidently the one figured.^c

A specimen of the Bohemian waxwing also is referred to by Bonaparte with the remark, "inhabits near the Rocky Mountains."^d In

^a *Zool. Journ.*, III, p. 49, 1828.

^b *Am. Orn.*, II, Pl. XV, fig. 1, 1828.

^c *Ibid.*, II, pp. 76-78, 1828.

^d *Zool. Journ.*, III, p. 51, 1828.

'American Ornithology' he figures this specimen,^a a female, stating that it was shot on the 20th of March, 1825 (probably a mistake for 1826) "on the Athabasca River near the Rocky Mountains." Regarding the same species Richardson says:

This elegant bird has only lately been detected in America, having been discovered, in the spring of 1826, near the sources of the Athabasca, or Elk River, by Mr. Drummond, * * * and by myself the same season at Great Bear Lake, in latitude 65°. Specimens procured at the former place, and transmitted to England by the servants of the Hudson's Bay Company, were communicated, by Mr. Leadbeater, to the Prince of Musignano, who has introduced the species into his great work on the birds of the United States.^b

Bonaparte refers also to a specimen of '*Cinclus pallasi?*' in Leadbeater's collection, stating that the species inhabits "near the Rocky Mountains, on the Athapescow Lake."^c In 'American Ornithology' he gives the locality as "Athabasca Lake."^d Richardson, after speaking of specimens procured by Drummond near the sources of the Athabaska, says:

Several specimens, obtained at the same locality and at the same time with Mr. Drummond's, came into Mr. Leadbeater's hands through the Hudson's Bay Company, one of which has been figured and described by the Prince of Musignano in his splendid American Ornithology.^e

Rallus noveboracensis also is recorded by Bonaparte from "the Athapescow Lake near the Rocky Mountains," from a pair in Leadbeater's collection.^f In 'American Ornithology' he figures a New York specimen, but in the text states that he has "information of its inhabiting near the most north-western lakes, such as the Athabasca."^g

Of these four species, the first three are known to be more or less abundant near the sources of the Athabaska, and two of these, the evening grosbeak and the water ousel, have not been found near Athabaska Lake. Furthermore, we have Richardson's positive statement that in the case of two of these species, the Bohemian waxwing and the water ousel, Leadbeater's specimens were taken near the source of the Athabaska. The remaining species, the yellow rail, is nearly as likely to occur there as at Athabaska Lake. It seems reasonably certain, therefore, that all these specimens were taken near the sources of the Athabaska.

John Ross sailed in the *Victory* from England in May, 1829, in search of the Northwest Passage. He reached Lancaster Sound in

^a Am. Orn., III, Pl. XVI, fig. 2, 1828.

^b Fauna Boreali-Americana, II, p. 237, 1831.

^c Zool. Journ., III, p. 51, 1828.

^d Am. Orn., III, Pl. XVI, fig. 1, 1828.

^e Fauna Boreali-Americana, II, p. 173, 1831.

^f Zool. Journ., III, p. 50, 1828.

^g Am. Orn., IV, p. 142, 1833.

early August, and Felix Harbor, Boothia, on September 30. Three years were spent in this vicinity, and overland journeys were made for about a hundred miles to the westward. The summer of 1832 was spent along the east coast of Boothia and North Somerset, between latitude 70° and 73° , and the next winter at Somerset House, in latitude $72^{\circ} 40'$, after which Ross returned to England. The natural history of the region was reported on by James Clark Ross, a nephew of the commander.

The expedition of Back to the mouth of Great Fish River (since generally called Back River) was sent out to explore that stream, and, if possible, to render aid to the members of the expedition under Sir John Ross, whose prolonged absence had caused much apprehension. Richard King, surgeon and naturalist to the expedition, was second in command. Traveling by way of Montreal, the Great Lakes, the Saskatchewan, and Methye Portage, the party reached Fort Chipewyan on July 29, 1833. Descending the Athabaska and Slave rivers, they reached Great Slave Lake on August 8, and their prospective wintering place, at the eastern end of the lake, August 18. During the autumn a preliminary survey to the head of Great Fish River was made, and the winter was passed at their establishment, which was named Fort Reliance. The party left here May 7, 1834, reached the head of Great Fish River, after great exertions, on June 28, and descending it, reached the mouth about August 1.

Prevented by ice from exploring the coast to the eastward, the party, after being detained in the vicinity of Montreal Island for some days, began the ascent of the river on August 22, reached Fort Reliance on September 27, and again wintered there. Back left on March 20, 1835, and returned to England, leaving King in charge of the expedition. King left with the remainder of the party on April 14, and after spending several days at the fishery near the narrow part of the lake, reached Fort Resolution on April 26. Here he remained until about June 10, when he turned southward, reaching Fort Chipewyan June 22, and Isle à la Crosse July 19, and returned to England by way of Lake Winnipeg and Hudson Bay.

Captain Back did little to encourage the acquisition of natural history specimens, and as King's regular duties took up most of his time, the latter could devote but little time to collecting. Most of the specimens were taken at Fort Reliance, but many observations were made at Fort Resolution and at various other points on the route. Two narratives of the expedition were published. Back gives a few notes on natural history, and a zoological appendix by Richardson contains lists of the birds and mammals collected, the localities being in some cases indicated, and a few species being more extensively annotated. King's narrative is replete with notes on natural history, and much light is thrown on many species which are merely listed in Back's narrative.

The next journey of exploration in this region was that of Thomas Simpson and Peter Warren Dease, officers of the Hudson's Bay Company. While the object of their expedition was to further geographic knowledge, they made many notes on the fauna of the country, as nearly all Arctic travelers do, and secured a considerable collection of plants.

Simpson left Fort Garry, the site of the present city of Winnipeg, on December 1, 1836, and, traveling on snowshoes, arrived at Fort Chipewyan, where he joined Dease, on February 1, 1837. They left Fort Chipewyan on June 1, and, descending the Slave and Mackenzie rivers, explored the Arctic coast westward to Point Barrow. They then returned to the Mackenzie, ascended it and Great Bear River, and, crossing Great Bear Lake, built a post near the mouth of Dease River, naming it Fort Confidence, and there spent the winter of 1837-38. They left here June 6, 1838, and, after ascending Dease River as far as was practicable, portaged to the Coppermine. They then descended that river to the sea and explored the coast to the eastward as far as Point Turnagain, the farthest point reached by Franklin in 1821. Being unable to proceed farther, they returned to Fort Confidence, where they arrived on September 14, and again wintered there. During the summer of 1839, favored by an early spring, an unusually open sea, and their previous knowledge, they again followed the coast to the eastward, reaching the mouth of the stream named by them Castor and Pollux River, to the eastward of Back River. They then returned to Fort Confidence, which they abandoned, crossed Great Bear Lake, and reached Fort Simpson by water. Here Dease remained, while the ill-fated Simpson (for he met an untimely death soon afterwards) resumed his journey as soon as winter set in and traveled over the snow to Red River.

THE FRANKLIN SEARCH EXPEDITIONS, 1845-1855.

An expedition which was to mark the beginning of a most notable epoch in the exploration of Arctic America sailed from England in 1845. Sir John Franklin, with two ships, the *Erebus* and *Terror*, and a crew numbering 129 persons, left England May 26, to complete the survey of the north coast of America and to accomplish the Northwest Passage. "The *Erebus* and *Terror* were last seen by a whaling captain, Dannett, July 26, 1845, moored to an iceberg, 74° 40' N., 66° 13' W., waiting for an opening in the middle ice so as to cross to Lancaster Sound. Thus Franklin and his expedition vanished forever from the sight of civilized man." (Greely.)

In 1848 and 1849 a party under the command of Dr. John Richardson, John Rae, of the Hudson's Bay Company, being second in command, made a journey down the Mackenzie and along the Arctic coast,

the primary object being to search for the party under Sir John Franklin, who had not been heard from since the summer of 1845. They traveled by way of New York, Montreal, the Great Lakes, and Lake Winnipeg, and reached Methye Portage, where for present purposes their journey may be said to have commenced, on June 28, 1848. Here they joined another detachment of the expedition in charge of John Bell, a chief trader of the Hudson's Bay Company. This party had ascended the rivers from York Factory during the previous autumn and had wintered at Cedar Lake, on the Saskatchewan. Crossing Methye Portage, the party descended the Clearwater, Athabaska, Slave, and Mackenzie rivers. The two detachments having separated at the rapids of Slave River, Richardson and Rae pushed on with all possible speed, leaving the heavier boats to follow with the winter supplies, and skirted the Arctic coast eastward to the mouth of Coppermine River. Thence they traveled overland to the mouth of Dease River, Great Bear Lake. Near this point, on the site of Fort Confidence, established by Dease and Simpson, Bell, whose detachment had ascended Great Bear River and crossed Great Bear Lake for this purpose, had erected houses, and here the entire party passed the winter of 1848-49. As early in the spring of 1849 as the season allowed the party divided, since but one boat was available for further exploration on the Arctic Sea, and Richardson returned to England, while Rae made an attempt to reach Wollaston Land. Failing in this, he returned to Fort Confidence and ascended the Mackenzie to Fort Simpson. Doctor Richardson's narrative of the journey, which was published in 1851, is replete with information regarding the natural history, geology, botany, and physiography of the region.

In the summer of 1851, under the auspices of the Hudson's Bay Company, Rae made a journey of exploration along the southern coasts of Wollaston and Victoria lands, still searching for the Franklin expedition. He left Fort Confidence on April 25 and traveled overland to Kendall River. Proceeding northward from here with dog sleds, with only two companions, he reached the Arctic coast near Point Lockyer, and crossing to Wollaston Land, now first visited by a white man, he traced its coast eastward to near Byron Bay and northwestward to Cape Baring, after which he returned to Kendall River. Meeting here his boat party from Fort Confidence, he descended the Coppermine as soon as it opened sufficiently, and traveling eastward through Dease Strait to Cape Alexander, crossed to Victoria Land and explored its coast eastward, partly by boat and partly on foot, to Point Pelly, near its eastern extremity. Unable to cross Victoria Strait, he returned westward and reached the mouth of the Coppermine on August 29. His reports on the sledge journey and

boat voyage, addressed to the Hudson's Bay Company, were published by the Royal Geographical Society, and contain many notes on the fauna of the coast explored.

The boat expedition of Lieutenant Pullen and Capt. W. H. Hooper, dispatched from the *Plover* (under the command of Captain Moore), reached the vicinity of Point Barrow early in August, 1849, and Fort McPherson September 5. From here Pullen, with seven men, proceeded up the Mackenzie to Fort Simpson, where he passed the winter. Hooper, unable for lack of provisions to remain at Fort McPherson, left there September 19 and ascended the Mackenzie to Fort Norman, then situated on the left bank some distance above its present site, where he arrived on October 6. On November 11 the party left for Great Bear Lake, traveling across country with dog sleds and reaching there November 19. Here the winter of 1849-50 was passed, the party occupying a small log house near the site of Fort Franklin. During the winter Hooper passed back and forth between Great Bear Lake and Fort Norman, spending much time at the latter place, where the remainder of the party joined him on May 8, 1850, and later in the month proceeded up the Mackenzie and joined Pullen on June 1. Thence the united party ascended the Mackenzie to Great Slave Lake, intending to return to England, but met dispatches ordering further prosecution of the search on the seacoast. Accordingly they returned down the Mackenzie, reaching Point Separation July 17. Thence they voyaged eastward along the coast to Cape Bathurst, where they were forced to abandon the search on account of ice. They commenced their return about the middle of August and ascended the Mackenzie to Fort Simpson, where they passed the winter of 1850-51, and returned to England the following summer.

About this time and during the next few years many other expeditions in search of the Franklin party traversed the devious and ice-beset waterways of the Arctic north of the American continent, and, mainly by means of sledge journeys, explored nearly the entire extent of coast line of the Parry Archipelago and the other great islands in that quarter. Prominent among these were the following, of which brief itineraries are given:

The ships *Lady Franklin* and *Sophia* left England on April 13, 1850, and arrived at Beechey Island on August 27, and Assistance Bay, at the southern extremity of Cornwallis Island, on September 12. There the winter of 1850-51 was passed. Sledging parties examined Wellington Channel and portions of the shores of North Devon, Albert Land, Cornwallis Island, Baillie Hamilton Island, and Baring Island. In the narrative of the voyage, by P. C. Sutherland, many notes on natural history are given.

The *Prince Albert* reached Batty Bay, Prince Regent Inlet, on September 10, 1851, and wintered there. During the following spring

William Kennedy and Lieutenant Bellot journeyed by sledges around North Somerset, crossing Prince of Wales Land on the way. The ship returned to England in the autumn of 1852. The narrative of the voyage, written by Kennedy, gives many natural history notes.

The *Assistance*, one of Edward Belcher's squadron, reached Northumberland Sound in August, 1852, and wintered near latitude 77°, longitude 97°. During the autumn, and in the spring of 1853, the adjacent coasts of Cornwallis, Bathurst, and Melville islands were examined. The second winter was spent near the southern end of Wellington Channel, where the ship was abandoned in the summer of 1854. In Belcher's narrative are given a few notes on natural history. Doctor McCormick, surgeon on one of the ships of the squadron, made a boat journey along the west coast of North Devon in the autumn of 1852. During this trip he made a great many natural history notes, which appeared in the narrative of his travels, published many years later.

The *Fox*, Capt. L. M'Clintock, reached Port Kennedy, Prince Regent Inlet, in August, 1858, and went into winter quarters. Here a year was passed, during which the adjacent coasts of Prince of Wales Land, Boothia Felix, and King William Land were examined. In the course of these explorations the main object of the voyage was achieved—the ascertaining of the fate of the Franklin party. M'Clintock's parties found records deposited by the ill-fated expedition showing that the *Erebus* and *Terror* had passed the winter of 1845–46 at Beechey Island, and during the following summer had sailed southward into Peel Sound, where the ships had been caught in the ice-pack and had there passed the winter of 1846–47. Sir John Franklin died on June 11, 1847, and by the following April the total number of deaths had reached 24. On April 22, 1848, Crozier, then in command, left the ships with 105 officers and men for Back River, by way of which they hoped to reach the trading posts. Here the written records ended, but M'Clintock by his explorations ascertained that, weakened by disease and starvation, they “died as they walked” along the west coast of King William Land, and not one succeeded in reaching the river. In M'Clintock's narrative many natural history notes are given, mainly referring to Bellot Strait.

It is desirable to refer more particularly to the itineraries of a few other expeditions which have to do with the larger Arctic islands nearest to the Mackenzie Basin, and whose narratives are especially rich in natural history notes. The expeditions selected are as follows:

Those of Collinson and M'Clure, in the *Enterprise* and *Investigator*, for Banks, Baring, Prince Albert, Wollaston, and Victoria lands; and of Kellett, in the *Resolute*, for Prince Patrick Island;

the fauna of Melville Island had been made known partially by Parry's first voyage, already mentioned.

M'Clure, in the *Investigator*, which sailed in company with the *Enterprise*, but became separated from it, reached the vicinity of the Mackenzie by way of the Strait of Magellan, Sandwich Islands, and Bering Sea, about the middle of August, 1850. Following the coast eastward to Cape Parry, the *Investigator* turned northward and entered Prince of Wales Strait, where it was frozen in near Princess Royal Islands, and wintered. The ship was freed from the ice in July, 1851, but being unable to penetrate to Parry Sound through the strait, M'Clure turned southward and skirting the southern, western, and northern shores of Banks Land, entered Mercy Bay, where the ship was imprisoned on September 23, 1851. Here the party, with the exception of some who left on April 15, 1853, for Dealy Island, remained until June 3, 1853, when the ship was abandoned, and the party taken by sledges to Dealy Island, where the *Intrepid* and *Resolute* had wintered, and whence Captain Kellett had sent Lieutenant Pim to the rescue. Another winter was passed in the ice, and the survivors finally reached England on the *North Star*, the first party to accomplish the Northwest Passage.^a Several narratives of this voyage were published. That of Alexander Armstrong, surgeon on the *Investigator*, which has been consulted in the present connection, has very full notes on natural history.

Collinson in the *Enterprise*, becoming separated from the *Investigator* and not being aware that that vessel, a slow sailer, had entered the Arctic Ocean, did not push on during the summer of 1850 (the two ships having orders to keep together), and withdrawing from the Arctic to winter, did not reach Mackenzie Bay until August, 1851, a year behind the *Investigator*. Sailing eastward and northward, Collinson entered Prince of Wales Strait but a few days after M'Clure left it, and attempted to pass through it, but was stopped by the ice. He then turned back and coasted Banks Land to Point Meek,

^a W. E. Parry in 1820 failed to accomplish the Northwest Passage by only a few miles, and since then many other failures have been scored. Recently the feat has been achieved by Capt. Roald Amundsen in the *Gjøa*. This vessel, a sloop 73 feet long and registering 46 tons, sailed from Christiania, Norway, on the night of June 16, 1903, with a crew of seven men, all told. The party reached Beechey Island on August 22, and sailed southward through Peel Sound to Petterson Bay, on the southeastern coast of King William Land. They wintered there and spent the spring and summer of 1904 in making scientific observations in that region. Another winter was passed at the same place, and in the spring and early summer of 1905 the eastern coast of Victoria Land was charted north to latitude 72° 10'. The *Gjøa* left Petterson Bay on August 13, penetrated through Simpson, Dease, and Dolphin and Union straits, and wintered near Cape Sabine, east of Herschel Island. The westward voyage was resumed in the summer of 1906, and the *Gjøa* reached San Francisco in the early autumn.

on its western shore, but not knowing that M'Clure had followed this course, he turned back and wintered in Walker Bay, Prince Albert Land. Sledging parties were sent out in various directions during the winter and early summer, and after the ice broke up in August, 1852, Prince Albert Sound was surveyed. Collinson then sailed eastward between Wollaston and Victoria lands and the mainland to Cambridge Bay, where he was obliged again to seek winter quarters late in September. During the winter of 1852-53 sledging parties examined the southeastern coast of Victoria Land. The ship was liberated in August, 1853, and Collinson retraced his way westward, but was stopped by ice in Camden Bay, east of Point Barrow, and forced to spend another winter in the Arctic, after which he returned to England. In his journal, which was published in 1889, Collinson gives many notes on natural history, mainly referring to the wintering stations.

The *Resolute*, Captain Kellett, and the *Intrepid*, Captain M'Clintock, two of the fleet of five vessels which the British Government sent out in 1852 to search for the Franklin expedition, wintered at Dealy Island, off the southern coast of Melville Island. During the spring of 1853 sledging parties under Mecham, M'Clintock, and others, examined nearly the entire coast line of Prince Patrick Island, and other portions of the adjacent region, one party under Lieutenant Pim reaching and rescuing the crew of the *Investigator*, as before mentioned. The *Resolute* and *Intrepid* were drawn out of winter quarters in August, 1853, but soon afterwards were caught in the ice, and after drifting during the following winter, were abandoned May 15, 1854, in Melville Sound, north of Prince of Wales Island. Two others of the fleet, the *Assistance* and *Pioneer*, being also abandoned, the crews of the four vessels, as well as that of the *Investigator*, were taken home on the *North Star*. The abandoned *Resolute* escaped from the ice, and after drifting a thousand miles through Lancaster Sound, Barrow Strait, and Baffin Bay, was recovered in Davis Strait north of Cape Dyer by Captain Buddington, an American whaler, was purchased by the United States Government, and presented to Great Britain. M'Dougall's narrative of the voyage of the *Resolute* has been examined in the present connection and many notes on the fauna of Prince Patrick Island and the adjacent region have been obtained from it.

In 1855 James Anderson and James G. Stewart, of the Hudson's Bay Company, descended Back River to search for traces of the Franklin expedition. They left Fort Resolution June 22 and proceeded to the eastern end of Great Slave Lake and thence by the lakes and rivers, encountering great difficulties, to the head of Back River, where they arrived about July 13. Back River was then descended to its mouth, and Montreal Island and portions of the shore of the

adjacent mainland were examined. The party then retraced its way, reaching the head of Back River August 31, and Fort Resolution September 16. The official report contains a few notes on the natural history of the region.

KENNICOTT'S EXPEDITION, 1859, AND ITS RESULTS.

The year 1859 marked the beginning of a period of nearly ten years, during which more light was thrown on the natural history of the Mackenzie River region than during any equal period before or since. This resulted from the visit of Robert Kennicott, an enthusiastic young naturalist sent to that region by Prof. S. F. Baird in the interests of the Smithsonian Institution. In the words of one of his northern friends: "During his three years' sojourn in that quarter he managed to infuse into one and all with whom he had any intercourse more or less of his own ardent, zealous, and indefatigable spirit as a collector." Reaching the Canadian border by way of Chicago and Lake Superior, Kennicott left Fort William, on the north shore of Lake Superior at the mouth of Kaministiquoi River, on May 19, 1859, and traveled by way of Rainy Lake, Lake of the Woods, and Lake Winnipeg to Norway House. From here he proceeded up the Saskatchewan and by the well-known Methye Portage route to the Athabaska, where he arrived August 3, and, traveling rapidly down the rivers, reached Fort Simpson on August 15. Here he passed the autumn of 1859, except while making a trip to Fort Liard, which occupied three weeks. Early in January, 1860, he made another trip to Fort Liard, where he remained until the last of February, and then returned to Fort Simpson, arriving on March 8. On March 25 he joined a party going to Big Island, a trading post on the north shore and near the outlet of Great Slave Lake and near the island of that name. He arrived there on April 1 and remained until April 5, when he left for Fort Rae, arriving April 10. Here also he made but a short stay, leaving on April 16 for Fort Resolution, where he arrived April 18. He remained at that place until some time in August, collecting assiduously and making many interesting observations. In August he descended the Mackenzie to Peel River (Fort McPherson), where he remained a short time and then crossed the mountains to La Pierre House, arriving on September 18. After a stop of one day he descended the Porcupine to Fort Yukon. Here he remained until August, 1861, when he returned to Peel River, remaining there until late in December, and then went back to La Pierre House. He remained there until January 31, 1862, when he again set out for Peel River, where he arrived about three days later. In the spring he proceeded up the Mackenzie to Fort Simpson. He had intended to spend the coming summer at Fort Anderson, the newly established post on Anderson River, but

at Fort Simpson received news which necessitated his return to the United States. He arrived in Chicago on October 17. Of his life, mainly spent in scientific research, between that date and March, 1865, when he left the United States for Alaska to take charge of a party of surveyors in connection with the overland telegraph expedition, and of his untimely death at Nulato on May 13, 1866, it is unnecessary now to speak. It is desirable, however, to refer briefly to the labors of a number of gentlemen, mainly employees of the Hudson's Bay Company, who, during the visit of Kennicott to the Mackenzie and for several years afterwards, collected and forwarded to the Smithsonian Institution thousands of valuable specimens. Among them may be mentioned Roderick MacFarlane, B. R. Ross, James Lockhart, Lawrence Clarke, W. L. Hardisty, James McDougall, John Reid, C. P. Gaudet, Strachan Jones, J. S. Camsell, Murdo McLeod, James Sibbiston, A. McKenzie, Andrew and James Flett, R. MacDonald, W. J. McLean, William Brass, Nicholas Taylor, and W. C. King.

Of these Roderick MacFarlane, an officer of the Hudson's Bay Company, made by far the most extensive collections, mainly in the Anderson River region. A brief account of the circumstances under which these collections were formed may begin with a few notes regarding his first trip to this region, which never before had been visited by a white man. He left Fort Good Hope on June 4, 1857, and pursued a general northeasterly course on foot to a large lake, which he called Canoe Lake. A party of Indians had canoes in readiness on this lake, and its outlet, called by him the Iroquois, was descended to a larger stream called the Lockhart, which was reached on June 11 after much difficult navigation and several long portages. The Lockhart at the point where they reached it was found to be a stream about 50 yards wide, easily navigable for canoes, and bordered by high, well-wooded banks. MacFarlane descended this river to its junction with a larger one, named by him the Anderson, a stream varying in width from 500 to 1,500 yards and supposed to be identical with the 'Beghula' of Richardson. This river was reached June 13, and was found to be still full of floating ice, having broken up only on the previous day. On June 14 he commenced the descent of Anderson River, having a party of ten persons in two canoes. It was his intention to follow it to its mouth, but when within about a day's journey of the sea he was forced by a large party of unfriendly Eskimo to abandon the canoes and the heavier portions of the baggage. Leaving here June 16, the members of the party retraced their way on foot and reached the mouth of the Lockhart on June 24. Obtaining a small canoe here, MacFarlane explored a considerable portion of the upper Anderson

and returned to Fort Good Hope by an overland march to Hareskin River and by descending that stream.

In the summer of 1860, the Hudson's Bay Company having decided to establish a post on the Anderson, MacFarlane made another trip to that river for the purpose of setting a party to work preparing lumber for the construction of the buildings. On this occasion he followed a new route, leaving the Mackenzie a few miles below the site of old Fort Good Hope and pursuing a general easterly course through several lakes connected by portages of varying lengths to a stream (named by him the Onion River), a tributary of the Lockhart. Descending the Lockhart to the Anderson, he found suitable timber on the Anderson River 10 miles above this junction. A temporary establishment was erected at this place, called by him 'Shantyville,'

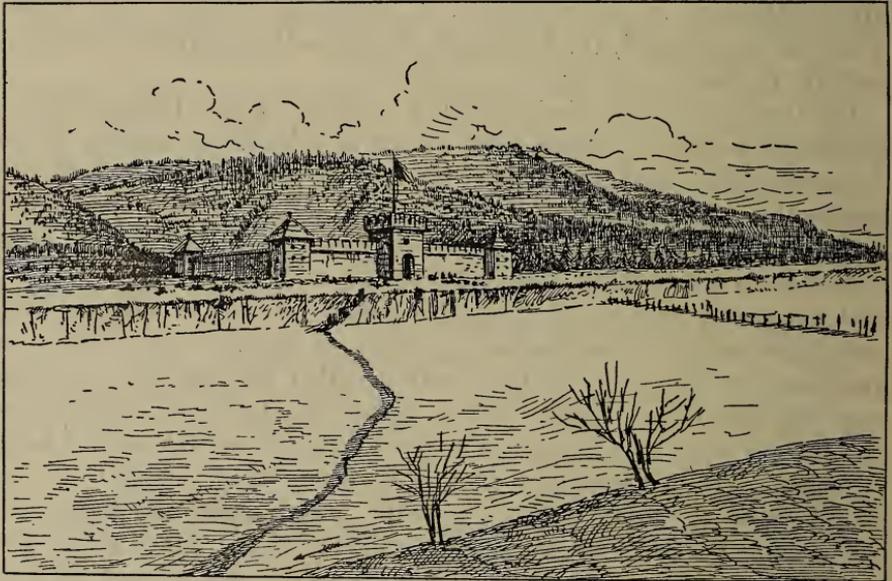


FIG. 4.—Fort Anderson, Anderson River (from sketch by Emile Petitot, March, 1865).

and several men were left to prepare lumber, while MacFarlane returned to Fort Good Hope by practically the same route followed on his outward trip. Subsequently this new route was abandoned in favor of the earlier one, explored in 1857.

In May, 1861, MacFarlane returned to the Anderson, and on the breaking up of the ice rafted the lumber down to the proposed site, on the right bank of the Anderson, approximately in latitude $68^{\circ} 35'$, where the post was built during the summer (fig. 4). No natural history work was done that season, but in the succeeding summer collecting was begun in earnest, and was continued, mainly during the summer seasons, until the post was abandoned in the summer of 1866. In addition to MacFarlane's personal collections many speci-

mens were brought in by the Eskimo, mainly from Liverpool Bay, and by the local Indians. Each summer from 1862 to 1865, inclusive, when the trading season was over, MacFarlane made an overland trip to Franklin Bay, mainly in search of the eggs of water birds, and the breeding habits and eggs of many species were first made known through his efforts. In 1862 he left Fort Anderson, accompanied by five Indians, on June 19, and pursued an easterly course for about 40 miles to the limit of the timbered country. On reaching the Barren Grounds he turned to the northeastward past Rendezvous Lake. No more timber was met with until he reached Wilmot Horton River at a point a little to the northward of latitude 69° . This river flows through a deep valley, and its immediate banks are fairly well wooded. Thence to the coast his course lay through the Barren Grounds. He reached Franklin Bay on June 25, and after a stay of about four days, during which the neighborhood was ransacked for specimens, retraced his course to Fort Anderson.

In 1863 he made a similar trip to Franklin Bay. Leaving Fort Anderson on June 20, he pursued practically the same route, but having a larger party, he divided it, instructing three of his men to follow a parallel course to the northward of his route, while another party pursued a similar course to the southward. At Rendezvous Lake, on the borders of the wooded country, the three parties met by appointment, the lake being named from this circumstance. From this point the party continued on to Franklin Bay, reaching it on June 29 at a point a few miles to the northward of the place visited in 1862. The coast for some distance in either direction was examined for eggs, and a small party of Eskimo visited a neighboring large island, on which many water birds were found nesting. That season he spent nine days on the coast and then returned to Fort Anderson, where he arrived on July 11.

In 1864 a third collecting trip to the coast was made. This time five parties left Fort Anderson on June 18 and pursued parallel courses to Rendezvous Lake, where they assembled on June 24. Here several days were spent arranging and packing the collections, which were then sent back to the post, as was customary, while the main party proceeded to Franklin Bay, reaching it on June 30. Three families of Anderson River Eskimo joined MacFarlane here and assisted in collecting. Three days were spent on the mainland, and a large island 3 miles off shore was visited in an 'oomiak' on July 4, and ransacked for three days. On account of drifting ice and foggy weather the main shore was regained with difficulty after thirty hours' continual effort. In 1865 a similar trip to Franklin Bay was made, but further investigations in that quarter were prevented by the abandonment of Fort Anderson in the summer of 1866.

The immense amount of labor involved in these trips may be imagined when it is considered that all the baggage, in addition to the collections, had to be carried on the backs of the party through woods and swamps, across streams and around lakes, over hills and mossy plains, regardless of the vicissitudes of an Arctic climate. A short account of his first visit to Anderson River, containing a few notes on the fauna and flora, was published by MacFarlane in 1890. He published also, about the same time, an annotated list of the birds and eggs obtained in the Anderson River region, and more recently a similar paper on the mammals of the north.

B. R. Ross, at that time in charge of the Mackenzie district, also made large collections, mainly at Fort Simpson and Fort Liard, and published a number of articles on the natural history of the region. Of the others, Lockhart collected mainly on the Yukon and about Great Slave Lake; Clarke at Fort Rae; Hardisty about Great Slave Lake; Reid at Big Island; Gaudet at Peel River; Jones on the Yukon and at Lesser Slave Lake; Sibbiston at La Pierre House; Mackenzie about Great Slave Lake; and Brass at Fort Halkett.

The extensive collections thus brought together were unfortunately never published as a whole, though they contributed material for many general works and were distributed among several museums.

LATER EXPEDITIONS, 1862-1907.

Between 1862 and 1883 Émile Petitot, a French missionary, was stationed in various parts of the Mackenzie region and visited many districts which were previously unknown except to the natives. Some of his journeys were made by canoe, but most of his trips were made in winter on snowshoes. Immense areas north of Great Bear Lake and the lower Mackenzie, and between Great Bear and Great Slave lakes, were first explored by him and are still mainly known from his labors. In 1875 he published a treatise on the geography of the Athabaska-Mackenzie region. Between 1883 and 1893, after his return to France, he published five books, which contained the narratives of his many journeys. In addition he wrote many shorter articles on geography and anthropology. His books of travel, in particular, contain a great many notes on the fauna of the regions traversed.

In 1875 Dr. A. R. C. Selwyn, of the Canadian Geological Survey, examined the upper part of Peace River as far down as the mouth of the Smoky. Thence he returned westward, while John Macoun, botanist to the expedition, descended the Peace to Athabaska Lake, and, ascending the Athabaska and Clearwater, reached Winnipeg by the Saskatchewan Plains. The report of the expedition comprises a detailed geological and physiological account of the routes

traversed, with numerous detailed notes on the flora and a few on the fauna.

In the summer of 1879 Dr. G. M. Dawson, of the Canadian Geological Survey, en route from Port Simpson, on the Pacific coast, explored some of the upper branches of Peace River and reached Edmonton by way of the upper Athabaska. In his report references are made to the fauna and flora of the region.

In 1879 and 1880 Frederick Schwatka made a journey overland from near Chesterfield Inlet to King William Land, and back, the final search for traces of the Franklin expedition. The summer of 1879 was spent on King William Land. The party left here about November 1 and ascended Back River for some distance on the return journey. Many notes on the game animals of the region, especially of King William Land, appear in the narrative of the trip.

In the summer of 1882 Dr. Robert Bell, of the Canadian Geological Survey, explored La Biche River and made an examination of the Athabaska from the mouth of La Biche River to Athabaska Lake. He then ascended the Athabaska to the Clearwater, and that stream to Methye Portage.

During the seasons of 1887 and 1888 R. G. McConnell, of the Canadian Geological Survey, made a detailed geological examination of portions of the Mackenzie region. Leaving the junction of the Dease and Liard rivers on June 25, 1887, he descended the Liard to Fort Simpson, where he arrived August 5. He then ascended the Mackenzie and Slave to Fort Smith, and spent the remainder of the season of open water in examining Slave River, Salt River, Hay River, and the southwestern shores of Great Slave Lake, reaching Fort Providence about October 1. The winter was passed at this post, from which trips were made to Fort Rae and other points. About May 1, 1888, he descended the Mackenzie on the ice to Fort Simpson, and, leaving there May 28, proceeded by boat to Fort McPherson on the Peel. From here he crossed the mountains by way of La Pierre House to the Porcupine, and descending it reached the Pacific coast by way of the Yukon and the Chilkoot Pass.

In the summer of 1888 William Ogilvie, of the Canadian Department of the Interior, after spending the winter on the Yukon at the boundary between Alaska and Canada, crossed the mountains and ascended the Mackenzie. He left his winter quarters early in March and descended the Yukon to the mouth of the Tat-on-duc. He then ascended this river on the ice, and from its head crossed to the head of the Porcupine. Here he encamped until the river opened, late in May, and then descended it in canoes to the mouth of Bell River, an easterly tributary. This was ascended to its head and a portage made by McDougall Pass to the head of Trout River, a branch of the

Peel. On the lower Peel, on June 23, he met R. G. McConnell, who had just descended the Mackenzie. From here he ascended the Mackenzie and Slave rivers to Athabaska Lake, where he arrived late in October. In his narrative he gives many notes on the more conspicuous birds and mammals, especially of the region traversed between the Yukon and the Mackenzie.

In the summer of 1888 James M. Macoun accompanied Thomas Fawcett, of the Dominion Lands Survey, on an exploration of the Athabaska from the mouth of Lesser Slave River to the junction of the Clearwater, up that stream, and thence to the Churchill. The party left Athabaska Landing on May 25, and ascended the Athabaska to the mouth of Lesser Slave River, which was reached June 5. From this point the expedition turned back and descended the river to Fort McMurray, reaching there late in June. The ascent of the Clearwater was commenced June 26, and the height of land to the waters of the Churchill was crossed by the Methye Portage. Thence, by way of La Loche or Methye, Buffalo, and Isle à la Crosse lakes, the party reached the Churchill, where explorations were continued. On this trip J. M. Macoun took many notes on the birds, thus making the first detailed observations on the ornithology of that region and greatly extending the known ranges of many species. Unfortunately these notes remained unpublished for several years. They were first put on record by John Macoun in his Catalogue of Canadian Birds, recently published.

In the summer of 1889 R. G. McConnell, of the Canadian Geological Survey, explored a considerable portion of the country lying between Peace and Athabaska rivers to the north of Lesser Slave Lake, following several canoe routes and trails between the two rivers.

In 1889 and 1890 Warburton Pike made a hunting and exploring trip into the interior of Mackenzie. From Fort Resolution, which he reached in the summer of 1889 by the usual route down the Athabaska and Slave rivers, he went to Fort Fond du Lac, on the north shore of the eastern part of Great Slave Lake. Thence he made an early autumn trip northward to Lake Mackay and Lac de Gras, first explored and named by him, near the upper part of the Coppermine. In November and December he made another trip into the same region and well toward the Arctic Sea, and then returned to Fort Resolution. Late in the following spring, in company with James MacKinlay, he made another trip to Lake Mackay, and when navigation opened descended Lockhart River to Aylmer Lake, and, portaging to the headwaters of Back River, descended it as far as Beechey Lake. They then returned by way of Clinton-Colden and Artillery lakes to Fort Resolution. Thence Pike ascended the Slave and Peace rivers in an attempt to cross the mountains to the Pacific, but was obliged, after suffering great hardship from cold and famine, to relinquish the

attempt. He then descended the Peace to Dunvegan, and left the country by way of Lesser Slave Lake and Edmonton. His narrative of the explorations is replete with notes on natural history.

In the summer of 1891 William Ogilvie, of the Canadian Department of the Interior, made an exploring trip through the region between the Liard and Peace rivers. He started from Athabaska Landing on July 14 and descended the rivers to Fort Simpson. Leaving here on August 28, he ascended the Liard and the Nelson to a point on Sicannie Chief River, where canoe navigation became impracticable, and then pursued a southerly course on foot to Fort St. John, on Peace River, where he arrived on October 21. From here he descended the Peace to Peace River Landing, and proceeded overland to Lesser Slave Lake and Edmonton. In his narrative of the trip, published a year or two later, he gives a great deal of information regarding the natural resources of the country, including many notes on its fauna, the most important relating to the wood bison and the musk-ox.

In 1892 Miss Elizabeth Taylor made a summer trip by means of the regular conveyances of the Hudson's Bay Company on the Athabaska, Slave, and Mackenzie rivers to Fort McPherson and return. Being interested in natural history, she made collections of birds, mammals, fishes, insects, and plants. These collections, though not extensive, have already formed the basis of at least two papers—on the fishes and the Lepidoptera. A few of the birds which found their way into the collection of the United States National Museum are recorded in the present report.

In the summer of 1892 J. B. Tyrrell, of the Canadian Geological Survey, assisted by D. B. Dowling, explored a portion of the shore of Athabaska Lake and a large extent of country lying between that lake and Churchill River. His report contains many notes on the fauna of the region.

In the summer of 1893 J. B. Tyrrell, accompanied by his brother, J. W. Tyrrell, made a journey through the Athabaska region for the purpose of geographical and geological research. Leaving Athabaska Landing May 31, they descended the Athabaska to Fort Chipewyan. From this point they followed the north shore of Athabaska Lake eastward to its extremity, and then traveled by a series of rivers and lakes hitherto unexplored northeastward to the head of Chesterfield Inlet. This was traversed to Hudson Bay, and thence the coast of the bay was followed to Fort Churchill, the lateness of the season causing much hardship. From Fort Churchill the party traveled on the snow, by way of York Factory and Norway House, to Winnipeg. The official report, by J. B. Tyrrell, comprises a very full geological and general description of the region, and many notes on its fauna and flora, while a popular account of the journey, by J. W. Tyrrell,

also contains much information on the natural history of the country explored.

During the summer of 1894 J. B. Tyrrell, accompanied by R. Munro-Ferguson, explored a canoe route northward through the Barren Grounds to the eastward of the route followed during the previous summer. They ascended the Saskatchewan to Cumberland House, and from that point reached Churchill River by the well-known route. Then descending Churchill River to the mouth of Reindeer River they ascended that stream to Reindeer Lake. This lake was followed to its northern extremity, where the Hudson's Bay post Lac du Brochet is situated. From here the party ascended Cochrane or Icy River and pursued a northerly course never before explored through Theitaga, Kasba, and Ennadai lakes, and Kazan River to Yath-Kyed Lake. From here the general course was easterly, to the head of Ferguson River, and down that stream to Hudson Bay, which was reached on September 18. From this point the party reached Fort Churchill by water, and waiting there until the season was sufficiently advanced for winter travel, proceeded by snowshoe and dog sled to Winnipeg.

The period between August, 1892, and September, 1894, was spent by Frank Russell, working under the auspices of the University of Iowa, in collecting ethnological and natural history specimens in central Canada. The time from August, 1892, to April, 1893, was spent mainly at Grand Rapids, near the outlet of the Saskatchewan, and need not be particularly noticed in the present connection. He left Edmonton on April 26, 1893, and Athabaska Landing May 3, and descending the Athabaska reached Fort Chipewyan about the middle of the month. Here he remained until June 20, most of the time collecting birds in the Athabaska-Peace delta. He then proceeded down the Slave and across Great Slave Lake to Fort Rae, arriving there on July 6. A trip up Yellowknife River nearly to the Barren Grounds was made during the latter half of July and the first week in August, and another to Fort Resolution during September. Later in the fall he made several trips to the northward of Fort Rae and collected a series of caribou skins. During the early part of December he traveled to Fort Resolution by way of Fort Providence, and in January, 1894, made a trip of about 50 miles to the southward of Fort Resolution in search of wood bison, but without success. After this he returned to Fort Rae, and during March and April accompanied a party of Indians into the Barren Grounds to the northeast of that post after musk-oxen, securing a fine series of specimens. In May he traveled around the north shore of Great Slave Lake, and descended the Mackenzie to Fort Providence. With the opening of navigation, he descended the Mackenzie by steamer to Fort Good Hope and then voyaged to Herschel Island by canoe. After collecting for several

weeks in that vicinity he proceeded to San Francisco on the whaling steamer *Jeannette*. His report was published by the University of Iowa.

During the latter part of the winter of 1894-95, Caspar Whitney made a journey to the Barren Grounds north of Great Slave Lake to hunt musk-oxen. He left Edmonton about the last of December, 1894, and traveled by sleigh to Lac La Biche and from there by snowshoe and dog sled to Fort Smith. From here he made an unsuccessful trip to the westward after wood bison. On his return he went on to Fort Resolution and accompanied a party of Indians to their camp in the woods to the eastward of Fort Rae. From this place they traveled into the Barren Grounds to the northward of Point Lake, finding musk-oxen at several points. On his return he reached Fort Resolution on the snow, but was obliged to complete his journey by canoe. Leaving Great Slave Lake early in May, he ascended Little Buffalo River, made a portage to Salt River, and thence following the usual route, reached Edmonton about the middle of June.

During the seasons of 1894, 1895, and 1896, J. Alden Loring, of the Biological Survey, spent in the aggregate about nine months in field work in central and western Alberta. Though considerable work was done on birds, the time was devoted mainly to mammals. Large series were collected and many observations regarding their habits were made. He spent most of the month of September, 1894, at Edmonton. His immediate field of operations was on the south side of the Saskatchewan about South Edmonton, now Strathcona. For convenience this locality has been referred to as Edmonton, the difference in position not being essential.

During the seasons of 1895 and 1896 he made two trips to the mountains in the Jasper and Henry House region, working much of the ground covered by Drummond, and obtaining specimens from the type region of most of the species described, mainly by Richardson, from Drummond's collection. From Edmonton he traveled over the old Government trail, which follows in a general way the course laid out in 1876 as a possible route for the Canadian Pacific Railway. Following the road northwestward to St. Albert, the trail takes a general westerly direction for about 200 miles, making allowance for its irregular course, to Athabaska River. Beyond here the trail has a southwesterly direction to Jasper House and then follows the Athabaska to Henry House, about 15 miles distant in a direct line, but much farther by the river and trail. From here, running southward and then westward, it passes through the celebrated Yellow Head Pass, which leads to the headwaters of the Fraser.

On his first trip Loring left Edmonton August 10, 1895, and traveling with a pack train, followed the trail westward to Jasper House. During the first 100 miles of this course the country is described

by him as very uniform in character, being gently rolling and mainly well wooded with poplar. Small lakes and muskegs occur frequently, making travel difficult. About 20 miles east of the 'Crossing' of McLeod River coniferous trees are first met with, and from here become more common as the mountains are approached. Jasper House (abandoned) is situated in Jasper Valley, which is surrounded by high, rugged mountains. Some collecting was done in this vicinity, and he then proceeded to the site of Henry House, and from there made a trip into the high mountains about 25 miles to the westward, but was prevented by the lateness of the season from doing much detailed work. He therefore retraced his course to Edmonton, where he arrived early in November.

In the summer of 1896 Loring made another trip to the same region, this time starting earlier in the season and making more extended explorations. Leaving Edmonton on May 25, he proceeded to Jasper House by the same route followed the previous year. He then visited the high mountains about 15 miles south of Henry House, where he collected July 3 to 21, securing many interesting specimens and notes. After a delay of about a month, caused by a serious accident, he made a trip northward to Smoky River. Following the east bank of Stony River, a small stream coming from the northward and entering the Athabaska near Jasper House, he crossed the mountains to Smoky Valley, 50 miles north of Jasper House. The trail was but little used and was so filled with fallen timber, the result of forest fires, that often it was inexpedient to follow it. Smoky Valley is long and narrow, mainly grown up to willows, and is evidently situated near the headwaters of Little Smoky River. After leaving this valley he crossed a low divide and descended one of the tributaries of Grand Cache, or Simonette River, which flows northward into Smoky River. Sulphur Prairie, an open portion of the valley, is about 70 miles north of Jasper House. After following the valley for a short distance north of this point the party turned to the eastward and then northward past Fishing Lake, a body of water evidently east of and tributary to Grand Cache River, and a day or two later again entered the valley of the Simonette at Grand Cache Valley, about 120 miles north of Jasper House. Up to the time Fishing Lake was reached the course had been mainly through high rugged mountains clothed mainly with poplars and pines, and having a distinct timber line. The valleys were often so occupied by muskegs that the mountain sides were preferable for traveling, but there also progress was very slow. Beyond the region of Fishing Lake the high mountains give place to foothills and rolling country. Grand Cache Valley is comparatively open and contains many lakes, some of which are of considerable extent. The principal trees are poplars, and the luxuriant grass and tempered climate make the

locality a suitable place for wintering horses. Beyond here a trail lying to the eastward of Smoky River was followed for about 50 miles in a general northerly course to a point near the mouth of Muskeg Creek, a tributary of Smoky River, and here some collecting was done. He left here about the last of September, and turning southward and following a route to the eastward of his northerly course he returned to Jasper House by way of Baptiste River, striking the main Edmonton-Jasper trail some distance to the northeastward of Jasper House, and arriving there about October 8. From here he went into the high mountains to the westward, collecting in Caribou Basin, 15 miles west of Henry House, and in another valley 10 miles farther west, visited by him during the previous autumn, and named by him Rodent Valley, on account of the abundance of small rodents. He left here about October 18 and returned by the trail to Edmonton, where he arrived early in November. Some of the results of Loring's work in Alberta have already appeared in various reports, mainly published by the Biological Survey, but the greater part of the material collected by him is treated of for the first time in the present report.

During the summer of 1897 and the winter following, C. J. Jones, better known as 'Buffalo Jones,' made a trip to the Barren Grounds for the purpose of securing living musk-oxen. Reaching Great Slave Lake by way of the Athabaska and Slave rivers, he proceeded to the eastern end of the lake, accompanied by John Rea, a fur trader. Here, on the site of Fort Reliance, they built a log house and remained during the early part of the winter, making occasional short hunting trips. Late in February, 1898, they started on a longer trip, accompanied by an Indian guide, who soon deserted them. After this Jones and Rea traveled over a large extent of country about upper Back River and eastward toward Chesterfield Inlet. They returned to their cabin on April 10. Here they remained until the ice broke up, when they traveled by boat to Fort Resolution, reaching there about the middle of July. After a short stay here they descended the Mackenzie to its mouth. Thence they ascended the Peel to Fort McPherson, and crossing the mountains to the Porcupine, descended it and the Yukon to the sea. The narrative of this trip, incorporated in 'Forty Years of Adventure,' compiled from the journals of Mr. Jones by Henry Inman, contains much information regarding the larger mammals of the region.

In the summer of 1898 James McEvoy, of the Canadian Geological Survey, made a geological examination of the country between Edmonton and Tête Jaune Cache, in British Columbia, following the trail between the two points and examining large areas of country. Many notes on the fauna of the region are incorporated in his report.

He was accompanied by William Spreadborough, who, working under the auspices of the Survey, devoted his time to ornithological field work, this being the tenth summer spent by him in similar work in various parts of Canada. His ornithological observations, together with many notes secured by members of the Canadian Geological Survey during various surveying trips, are incorporated in the 'Catalogue of Canadian Birds,' by John Macoun, the first part of which was published in 1900, and which was completed in 1904.

During the years 1896 to 1899 A. J. Stone, working under the auspices of the American Museum of Natural History, traversed a considerable portion of northwestern North America, mainly engaged in collecting the larger mammals and securing information regarding their habits and ranges. For present purposes his itinerary from the time he left Hell Gate Canyon, on the Liard, about 150 miles above Fort Liard, with the breaking up of the ice in May, 1898, may be briefly considered. From here he descended the river alone to Fort Liard, where he secured help, and, proceeding about 100 miles farther down, made a trip into the Nahanni Mountains, studying the range of *Ovis dalli*. Returning to the river, he descended it to its mouth, reaching Fort Simpson about the middle of June. He then descended the Mackenzie to Fort Norman, and with a party of Indians traveled westward into the Rocky Mountain range, where he secured a fine series of *Ovis dalli*. Returning to Fort Norman, he continued on down the Mackenzie and ascended the Peel to Fort McPherson. In October he made a trip with dog sleds into the Rocky Mountains to the westward. Returning to Fort McPherson, he traversed the Mackenzie delta and the Arctic coast to Herschel Island in November, returning to Fort McPherson in December. In March, April, and May, 1899, he traveled eastward along the Arctic coast to Cape Lyon and back, sledging a thousand miles and securing much information regarding the larger mammals and geography of the region. In July he crossed the Rocky Mountains to the Porcupine, and descended it to the Yukon.

In the summer of 1899 Dr. Robert Bell, of the Canadian Geological Survey, assisted by his nephew, J. Macintosh Bell, who was in charge of a separate party, explored the shore lines of the eastern part and the Northern Arm of Great Slave Lake. Work was begun late in July and completed in September. Doctor Bell left Fort Resolution on September 13, leaving J. M. Bell to pass the winter there and to make further explorations during the following season.

In 1900 J. M. Bell left Fort Resolution, where he had passed the winter, on April 11, and crossed Great Slave Lake on the ice to Fort Providence. On the breaking up of the Mackenzie he descended the river by steamer and canoe to Fort Norman. He left here about the middle of June, accompanied by Charles Camsell, Charles Bunn, and

two canoemen, and ascended Bear River to Great Bear Lake, where he arrived on June 23, finding the ice on the lake still intact. On July 4 the ice had broken up sufficiently to permit him to start along the north shore, which was followed to Richardson Bay. From here a portage route was followed across the base of the Scented Grass Hills Peninsula, and the traverse across Smith Bay, by way of Treeless Island, was safely accomplished. Coasting along the north shore of the lake, the party reached Fort Confidence, near the mouth of Dease River, on July 30. From this point a foot trip was made across the Barren Grounds to the lower Coppermine. After accomplishing this trip the party left Fort Confidence on August 13 and coasted the eastern shore of Great Bear Lake, never before explored, to the southern part of MacTavish Bay. From here the party struck off to the southward, ascending the stream called the Camsell, and following a series of lakes and connecting channels. Being without a guide, they experienced much difficulty in finding their way, but finally encountered a party of Indians and under their guidance reached Fort Rae on September 20, and Fort Resolution on September 29. Thence the homeward journey was continued by canoe to Fort Chipewyan, and by snowshoe to Edmonton. Of the explorations about Great Slave Lake a short preliminary report only has been published, while J. M. Bell has published several short accounts, in which many references to the fauna are made, of his journey of 1900.

David T. Hanbury, the well-known traveler and explorer, has contributed much toward our knowledge of the geography and natural history of the treeless regions of Keewatin and Mackenzie. On his first journey in this region he left Fort Churchill May 12, 1899, reaching Marble Island June 5, and the head of Chesterfield Inlet June 21. Canoe navigation commenced on Baker Lake early in July, and he reached its head July 19. Voyaging westward through Schultz and Aberdeen lakes, he reached the mouth of the Thelon, or Ark-i-linik, River on August 3. This unknown river, which was found to be fringed with spruces from a point 50 miles above its junction with the Dubawnt, and its western branch, now known as Hanbury River, were ascended, and the height of land crossed to Artillery Lake. While descending Lockhart River, its outlet, his canoe was overturned, resulting in the loss of his geological and botanical specimens. He reached Fort Resolution September 25 and Edmonton in the early winter.

In 1901, having decided to make further explorations in the north, Hanbury proceeded to Fort Resolution, Great Slave Lake, which he anticipated making his starting point. Accompanied by Hubert Darrell, of Manitoba, he left here July 13, and reached the eastern end of Great Slave Lake July 20, Artillery Lake July 23, and the headwaters of the Hanbury July 27. Descending this stream and the

Thelon, or Ark-i-linik, River, he reached its junction with the Dubawnt late in August and the foot of Baker Lake September 3. Having obtained provisions and an outfit from a whaler, who had been engaged to bring them in, and who was wintering at Depot Island, he passed the winter with the Eskimo at the foot of Baker Lake. He left here March 12, 1902, accompanied by a party of Eskimo, and carrying canoes and provisions on dog sleds, reached Ti-bi-elik Lake, an expansion of the Ark-i-linik a short distance above its junction with the Dubawnt. Leaving here April 5, he struck off nearly due northward for the Arctic coast. Pelly Lake, on Back River, was crossed April 14, and the Arctic coast near Ogden Bay was reached May 14. From this point they proceeded westward along the coast, still traveling with sleds. Canoe navigation was not possible until July 12, when the party had reached a point 60 miles east of the Coppermine, which they reached July 18. Ascending the Coppermine and Kendall rivers, the height of land to the head of Dease River was crossed and Great Bear Lake was reached August 19. Proceeding along the north shore of Great Bear Lake, the party descended Bear River and reached Fort Norman August 30. A detailed account of these journeys, published in 1904, contains many notes on the fauna of this little-known region.

In 1900 J. W. Tyrrell, of the Dominion Lands Survey, accompanied by C. C. Fairchild and Archdeacon Lofthouse, made a journey of exploration between Great Slave Lake and Chesterfield Inlet. Reaching Fort Resolution April 1, by way of the winter trail from Edmonton, they transported their supplies over the ice by means of sleds to the eastern end of the lake, where they arrived May 9. Thence they proceeded by way of 'Pike's Portage,' a succession of small lakes and portages, to Artillery Lake. The head of this lake was reached June 21, and from the southern extremity of Clinton-Colden Lake, a short distance to the northward, they made a succession of portages through a chain of lakes over the height of land to Hanbury River, a tributary of the Ark-i-linik, or Thelon. This was descended to the junction of the two rivers, where they arrived July 7. Then they descended the Thelon, finding it fairly well wooded from a short distance below the confluence for about 170 miles, this isolated wooded area occurring well within the general confines of the Barren Grounds. A short distance above the confluence of the Thelon and Dubawnt the party divided, Fairchild and Lofthouse proceeding to Hudson Bay by way of Aberdeen and Baker lakes and Chesterfield Inlet, while Tyrrell retraced his course up the Thelon and explored a considerable part of the course of that stream above the mouth of the Hanbury, and a route across country to Artillery Lake. The latter portion of the journey was performed alone on foot by Tyrrell, while his voyagers returned

to Artillery Lake by way of the route followed on the outward journey and met him there late in August. Here they were joined by Fairchild early in September, and the reunited party reached Great Slave Lake on September 13 and Fort Resolution September 23.

In the summer of 1907, Ernest Thompson Seton, accompanied by Edward A. Preble, made a canoe trip to the Barren Grounds about Aylmer Lake. The party left Athabaska Landing about the middle of May, and voyaged down the Athabaska and Slave to Smith Landing, arriving early in June. Seton remained in this vicinity about a month, making three trips into the country to the westward, in cooperation with Inspector A. M. Jarvis, of the Royal Northwest mounted police, for the purpose of investigating the condition of the herds of wood bison. After completing these investigations, Seton left Fort Resolution about the middle of July, and voyaging to the eastern extremity of Great Slave Lake, followed the Pike's Portage route northeastward to Artillery Lake, and spent a few weeks on the Barren Grounds about Clinton-Colden and Aylmer lakes. The return trip by canoe commenced about September 1, and Athabaska Landing was reached about November 1.

No complete account of this journey has appeared, but a list of the birds observed about Great Slave Lake and northward, published by Seton in the 'Auk,' adds to the previously recorded ranges of many species.

GENERAL ACCOUNT OF ROUTES TRAVERSED BY BIOLOGICAL SURVEY PARTIES.

ROUTE BETWEEN EDMONTON, ALBERTA, AND MOUTH OF MACKENZIE.

For about 20 miles north of Edmonton the face of the country is quite flat. The slight depressions, particularly in spring, are occupied by sloughs or swamps, which support an occasional bunch of spruces, but are mainly covered or fringed with willows. The drier parts of the country are mainly devoted to agriculture, though here and there a grove of poplars still remains. The road, which follows a general northerly course, is usually bordered by fenced fields and frequently turns at right angles to accommodate their square outlines. The soil is a dark, stiff clay. In the spring, when this is thoroughly saturated, the roads are well-nigh impassable.

As the road approaches Sturgeon River, a tributary of the Saskatchewan, it turns northeastward and, following the edge of the valley for about 5 miles, it descends and crosses the river. Then turning northward again, it follows the valley of the Sturgeon and a northern tributary to Lily Lake, a distance of 9 miles, passing first along the gentle slopes of the Sturgeon Valley, then over a succession of rocky ridges sparingly clothed with poplars (*Populus*

tremuloides). A short stretch of rolling prairie is passed before Deep Creek, 41 miles from Edmonton, is reached, and a mile beyond the road crosses Vermilion, or Red Water, Creek, a branch of the Sturgeon. Several miles of prairie and a forest of Banksian pines are now traversed to Two Lakes, 50 miles from Edmonton, the road crossing a small channel connecting these lakes, the last water tributary to the Saskatchewan. The road then passes for 8 miles over a succession of high, rocky, and sandy ridges, clothed with pines and poplars, to Stony Creek. Fourteen miles beyond, after more gravelly ridges are crossed, Sandy Creek is reached. A short distance beyond the road forks, one branch following the ridges to the eastward and the other, the one usually traveled, traversing a sandy tract through a fine forest of pines and crossing the Towattinow, a fair-sized stream. Beyond here the road enters another tract of pines and then follows the western slope of the valley a few miles to the foot of the 'Big Hill,' 11 miles from Athabaska Landing. Ascending this hill, the road passes a lake on the left and then follows the summit of the stony ridge until it descends into the valley of the Athabaska at Athabaska Landing.

Athabaska Landing (see Pl. IV, fig. 3) is a small village and trading post situated on the south bank of the Athabaska at a point where the river, after making a long sweep to the southward, resumes its general northeasterly course. It is principally important as being the gateway to the Athabaska, Peace, and Mackenzie rivers. The ridges to the southward are nearly devoid of timber, probably as the result of successive burnings. The banks of the Athabaska in the vicinity are covered with a fair growth of black and white spruce (*Picea mariana* and *canadensis*), Banksian pine (*Pinus divaricata*), balsam fir (*Abies balsamea*), tamarack (*Larix laricina*), balsam poplar (*Populus balsamifera*), aspen poplar (*Populus tremuloides*), and canoe birch (*Betula papyrifera*). Of these species the Banksian pine and the tamarack are the least abundant, the former growing only on certain elevated points and the latter being mainly a tree of the muskegs and seldom appearing on the immediate banks of the river. Various shrubs are abundant, either forming an undergrowth in the forests of larger species or occupying exclusively restricted areas. Among these may be mentioned *Juniperus nana* and *sabina*, various species of willows (*Salix*), alders (*Alnus incana* and *alnobetula*), several species of *Ribes* and *Rubus*, wild roses (*Rosa*), the serviceberry (*Amelanchier alnifolia*), buffaloberry (*Lepargyrea canadensis*), silverberry (*Elwagnus argentea*), cornels (*Cornus canadensis* and *stolonifera*), blueberry (*Vaccinium*), viburnums (*Viburnum pauciflorum* and *opulus*), and several species of the genera *Symphoricarpos* and *Lonicera*. As this character of vegetation prevails all along the Athabaska, it will be necessary to

refer only incidentally to the foresting in the description which follows.

Six miles below Athabaska Landing a long, low, spruce-covered island is passed on the left, and about 24 miles below this, La Biche River, the outlet of the lake of that name, enters the Athabaska from the east. In this part of its course the Athabaska has cut down through the formation called the La Biche shales, which consequently compose its banks.^a Ten miles below, Quito, or Calling, River, also an inconsiderable stream, comes in from the west. Near its mouth is a small store, the property of one of the smaller trading companies. Swift Current Rapid is 55 miles below Athabaska Landing. It is merely an acceleration of the current caused by the water flowing over a gravel bar, which forms an island in the center of the river. On the left of this point are high, steep mud banks, where an extensive landslip has occurred. In this case the face of the mass of displaced soil has been sharply cut off by the swift current; in other similar places the slide, with its accumulation of broken and uprooted trees, slopes gently to the water, the tangled mass often remaining for years and forming a serious impediment to upstream navigation, which is effected mainly by tracking. (See Pl. V, fig. 1.) Where the sides of the valley are high, they usually consist of a series of terraces, caused by successive slippings of the banks as the river has excavated its bed. (See Pl. V, fig. 3.) Big Mouth Brook, the next conspicuous feature, enters the Athabaska from the east 10 miles below Swift Current.

At a distance of 100 miles from Athabaska Landing Pelican Portage is reached. From this point a portage road leads to the navigable part of Pelican River, whose lower course, in common with all of the tributaries of the Athabaska above the Clearwater, is rapid and unnavigable. This results from the abrupt descent of the streams from the level of the bordering plateau into the deep valley of the receiving river. On the left bank of the Athabaska, about 150 yards above the small group of log houses which marks the beginning of Pelican Portage, is a gas well. Here, in 1897, a shaft was sunk to a depth of 820 feet in the hope of finding petroleum. At this depth a heavy flow of gas was encountered, which so clogged the pipes and drills with maltha and sand that operations had to be suspended. The gas is still escaping, and having been lighted rises in a fiery column to a height of 15 or 20 feet. Under favorable conditions its roar can be heard for a distance of a mile or more, and the heat has destroyed all vegetation within a radius of 10 or 15

^a The geological notes appearing in this paper are mainly taken from the various reports of the Canadian Geological Survey, principally by McConnell, Ogilvie, Tyrrell, and Bell.

yards, beyond which for a few yards the grasses and shrubs put forth their leaves two or three weeks earlier than the same species elsewhere, and remain green later in the fall.

Two or three miles below here Pelican River, at its mouth a broad, shallow stream, joins from the west. This stream takes its name from the white pelicans, a small flock of which usually congregates near its mouth during the summer. A short distance below are the Pelican Rapids, where several rapids occur within a mile or two. They are not formidable and may easily be run by canoes not too heavily loaded, the right side of the river being preferred for small craft.

At the mouth of Pelican River a sandstone formation, called by McConnell the Pelican Sandstone, makes its appearance, and, rising gradually as the river descends, exposes the underlying stratum, the Pelican shale. These formations now form a conspicuous element in the river banks. Some 30 miles below Pelican River, a small rapid sometimes called 'Rapide du Joli Fou' is passed, and near it another sandstone formation, the Grand Rapids sandstone, appears, and is conspicuous for many miles. About 40 miles below Pelican River, or 143 from Athabaska Landing, House River enters from the east. It is a fair-sized stream and takes its name from several log houses near its mouth. In many places along this part of the river the banks are closely paved with rounded boulders, which have been deposited evenly and firmly by the action of the ice in the spring. (Fig. 5.)

Ten miles beyond we come to Grand Rapid, the most formidable on the river (Pl. III, fig. 1). Here the river plunges for half a mile down a steep incline over a mass of boulders, falling 50 or 60 feet in this distance. Scattered through the lower part of the sandstone formation are found concretions or nodules, more or less spherical and varying in diameter from 2 to 15 feet. As the stream has cut through this stratum they have been liberated and now pave the bed of the river. On the left side of the valley at this point the cliffs are nearly vertical and are upward of 300 feet in height. (Pl. III, fig. 2.) Of this, about 200 feet consists of the Grand Rapid sandstone; the remaining portion comprises the Pelican shale and sandstone. The Grand Rapid sandstone at this point is overlain by a seam of lignite about 4 feet in thickness, which, according to the testimony of several who claim to have used it, burns freely. Trunks of fossil trees, many of considerable size and in some cases embedded in the concretions, are frequent at this point.

For about a mile and a half below the Grand Rapid the river is very rough, and this stretch is generally referred to as the Little Grand. The immediate banks are much lower here than at Grand Rapid, and consist mainly of that sandstone. Beyond this rough stretch the river is smooth for about 15 miles. Seven miles below Grand Rapid we pass Point La Biche, or the Great Bend, where the



FIG. 1.—GRAND RAPID, ATHABASKA RIVER, SHOWING ISLAND AND LEFT OR MAIN CHANNEL.



FIG. 2.—LEFT BANK OF ATHABASKA FROM ISLAND, GRAND RAPID, SHOWING EXPOSURE OF GRAND RAPID SANDSTONE.



FIG. 1.—FORT CHIPEWYAN, ATHABASKA LAKE, 1903.



FIG. 2.—SHORE OF ATHABASKA RIVER NEAR FORT McMURRAY.
[Here the steamer *Grahame* discharges its cargo.]



FIG. 3.—ATHABASKA LANDING, ALBERTA. SEPTEMBER, 1903.

river, which until now has been running in a general northerly direction, turns sharply toward the east, being deflected by a range of low hills. At this point the full thickness of the Grand Rapid sandstone—about 300 feet—is exposed, and it is found to be underlain by a new formation, the Clearwater shale. About 8 miles below here Little Buffalo River flows into the Athabaska from the west. Opposite its mouth is Point Brulé, rising abruptly over 400 feet and showing a section similar to that of Point La Biche, except that the underlying shale is much increased in thickness. Near the mouth of Little Buffalo River a quantity of gas escapes from the bed of the Atha-

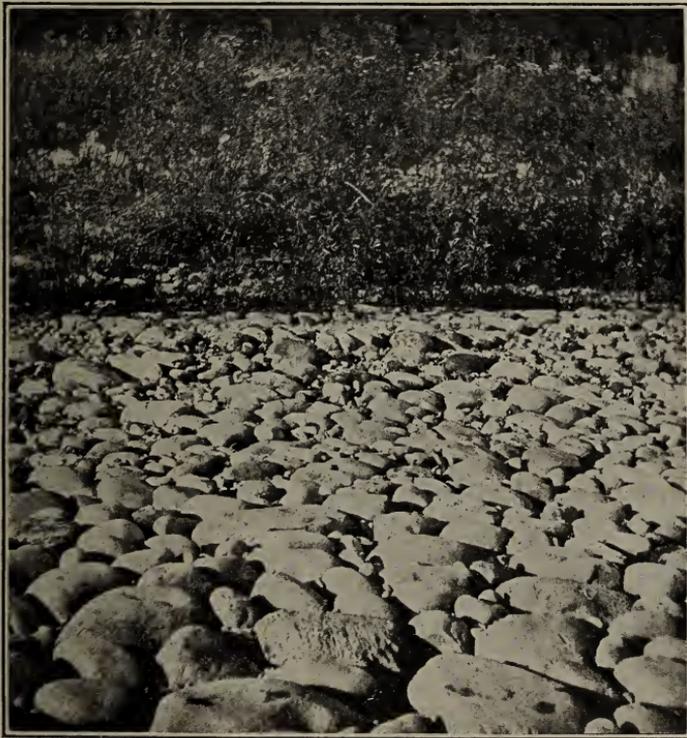


FIG. 5.—Boulder-paved shore, Athabaska River.

baska. Six miles below is a considerable rapid known as the Brulé. Large boats are run in the middle or toward the right bank, but the canoe track closely follows the left bank. The Boiler Rapid occurs 19 miles below, and here also canoes are usually run on the left side.^a

^a This part of the Athabaska seems to have been used first as a transportation route in 1882, when the heavy machinery for the first northern steamer (the first *Graham*) was successfully taken through the rapids in scows, the portable pieces coming by the old route via Methye Portage. In 1885 the machinery for the first Mackenzie River steamer (the first *Wrigley*) was brought in by way of the Athabaska, but one scow containing the boiler was sunk in a rapid, which has since borne the name Boiler Rapid.

Near this point the tar sands begin to show beneath the Clearwater shale, and for the remainder of the way to below the Clearwater form a conspicuous element of the banks. Two miles below the Boiler, Middle Rapid, similar to the last, and 5 miles lower down, the Long Rapid, both usually run on the right side, occur. At the Crooked Rapid, 6 miles below, the river makes a sharp bend to the right. This rapid is run on either side. The river is here bordered on the right side by a band of Devonian limestone, about 15 feet in thickness and highly fossiliferous. The remainder of the bank is mainly composed of the tar sands. Near this point a low anticline occurs, and the strata begin to dip slightly toward the north. As this dip is about equal to the fall of the river, the character of the banks varies but little for many miles.

All along the river between Athabaska Landing and the mouth of the Clearwater, and especially among the rapids, much of the country is partially or wholly denuded of timber, the result of successive forest fires (see fig. 2, p. 18). This circumstance is largely responsible for the numerous landslips. In the spring these deadenings with their immense stretches of fallen timber are very unsightly, but in early fall these same areas are solid masses of color from the purple flowers of the fireweed (*Chamaenerion*.)

Two miles below Crooked Rapid occurs Rock or Stony Rapid. Here large boats are usually run on the left side, but canoes toward the right bank. Five miles below, the Little and Big Cascades occur within a mile. These are caused by ledges of limestone which cross the river somewhat diagonally. The Little Cascade is run by large boats close to the right bank, and the Big Cascade toward the middle of the river, but in both cases canoes keep close to the left bank. These rapids cause much trouble at times of low water. About 7 miles below the Big Cascade another limestone ledge obstructs navigation, forming the Mountain Rapid. This contains heavy swells, but may be run by lightly loaded canoes. The rapid is usually entered near the left bank. A stretch of comparatively quiet water near the middle of the rapid affords an opportunity to cross to near the right bank, where the water is smoother. Six miles below a slight rapid, called the Moberly, is passed, and 3 miles beyond, Fort McMurray, at the mouth of the Clearwater, is reached. (See Pl. IV, fig. 2.)

Fort McMurray is a former post of the Hudson's Bay Company,^a situated on the right bank of the Athabaska a short distance above

^aA trading post was established at this point in 1870, and for some years was known simply as 'The Forks,' but was later named Fort McMurray. It was removed in 1899 to the mouth of Little Red River and named Fort MacKay. The name Fort McMurray is still used to indicate the original site, but it is now occupied mainly by private traders and more or less irregularly by the Hudson's Bay Company. Here the *Grahame* receives its northward-bound cargo from the scows.

the mouth of the Clearwater. At this point the Athabaska divides to inclose a large poplar-covered island, and behind this the Clearwater enters the smaller or easterly channel. The buildings are situated on a broad flat backed by high steep hills. In the days when the Clearwater formed the principal highway to the north, before the construction of the Canadian Pacific Railway and the consequent utilization of the Athabaska, Fort McMurray, or 'The Forks,' was an important post. Large fields were cultivated near the site of the present post and also on the large island, but these fertile fields are now abandoned and have grown up to bushes. The forest is similar to that along the upper river, and the undergrowth is composed of much the same shrubs, with the addition of the ostrich fern (*Matteuccia struthiopteris*), spreading dogbane (*Apocynum androsaemifolium*), and a few other herbaceous plants which apparently are absent from the upper Athabaska, and probably are derived from the country to the southward by way of the Clearwater Valley.

At the mouth of the Clearwater the Athabaska again changes its direction, and throughout the rest of its course runs nearly due north. The valley also changes its character, broadening and soon becoming shallower. For some miles the right bank is formed of Devonian limestone, overlaid by the tar sands and Clearwater shale. In some places these form steep banks several hundred feet high and nearly devoid of vegetation, but the lower and less steep parts are prettily clothed with birches and poplars, whose white trunks present a pleasing contrast to the somber evergreens. Many mineral springs occur on the right bank about 15 miles below Fort McMurray and have formed extensive incrustations.^a

At a distance of 23 miles from Fort McMurray, Steepbank River, a small stream, enters the Athabaska from the east. A few miles below here mineral springs occur near the edge of the valley half a mile east of the river. Their waters are strongly impregnated with salt, and the locality is usually referred to as 'La Saline.' Another small stream, one of the many Muskeg rivers, flows into the Athabaska a short distance farther down, and just below, on the west side and 35 miles below the mouth of the Clearwater, Red River, a fair-sized stream, comes in. Near its mouth is the small trading post Little

^a Richardson, from an analysis made by Doctor Fife, states that the incrustation "was composed principally of sulphate of lime, with a slight admixture of sulphate of magnesia and muriate of soda, and with sulphur and iron." (Arctic Searching Expedition, I, p. 123, 1851.)

Red River, or Fort MacKay, before referred to.^a The valley here is much reduced in depth. About 50 miles below Fort McMurray, on a high bank on the right, is the site of an early post called Pierre au Calumet, so named because the natives procured pipestone in the vicinity. Only the cellars and ruined chimneys now remain to mark the site.^b As the river is descended the banks gradually become lower and the mixed woods give way to poplar and willows, and lower down to willows alone. At Poplar Point, 90 miles below Fort McMurray, the banks are still fairly high and the prevailing character of forest is indicated by the name. At present a small trading establishment is maintained here during a part of the winter. The banks now lower rapidly, and at a point about 40 miles above the lake we pass the site of the first post established in this region.^c Its

^a In the early part of the nineteenth century at least two trading posts existed for longer or shorter periods near this point. Beren's House, a post of the Hudson's Bay Company, was in existence in 1825, apparently on the right bank of the Athabaska a few miles above Red River. (Franklin's Narr. Second Journey, p. 5, 1828.) Apparently this post had been established subsequent to 1820, and it was still in existence in 1848. Another trading post, probably of the Northwest Company and then known as "La vieux Fort de la Rivière Rouge," is mentioned by Richardson in 1848 as long abandoned. (Arctic Searching Expedition, I, p. 125, 1851.)

^b Pierre au Calumet, a Northwest post, was in existence as early at least as 1814, as W. F. Wentzel speaks of it in a letter written during that year. (Masson, Les Bourgeois, I, p. 115, 1889.) It was still occupied in March, 1820, but a Hudson's Bay post on the opposite bank was said to have been abandoned during the previous December. Subsequent narratives mention these posts as abandoned, and I can find no evidence that their sites were ever reoccupied.

^c This post, which seems never to have had a distinctive name, being known in later years merely as the "Old Establishment," was built on the right bank of the river about 40 miles above the lake, by Peter Pond, a partner in the Northwest Company, in 1778-79. In 1789 it was removed by Roderick McKenzie to Athabaska Lake, and there established on a point about 8 miles east of the mouth of the Athabaska, and was named Fort Chipewyan. It was removed not many years later to its present site, and early in the nineteenth century the X Y Company, which was merged into the Northwest Company in 1804, is said to have had a post near the same place. The Hudson's Bay Company later built a small post on Coal Island, near Fort Chipewyan, and named it Fort Wedderburne. Franklin in 1820 speaks of it as having been built about five years before. The present site of Fort Chipewyan appears to have been occupied continuously since 1821, when the Northwest and Hudson's Bay companies united.

Fort Fond du Lac, near the eastern extremity of Athabaska Lake, also has been occupied many years. J. B. Tyrrell gives the following: "In 1892 it was in charge of José Mercredi, a venerable old French half-breed seventy-five years of age, who had lived there continuously for the past forty-seven years. In the immediate vicinity is a Roman Catholic mission church, where a priest lives during the winter. Mr. Mercredi informed me that in the early part of the century the Hudson's Bay Company had a trading post on a point on the



FIG. 1.—TANGLED MASS OF UPROOTED TREES, RESULT OF LANDSLIP, ATHABASKA RIVER.



FIG. 2.—MUSKEG, A TYPE OF SWAMP CHARACTERISTIC OF THE ATHABASKA-MACKENZIE REGION.

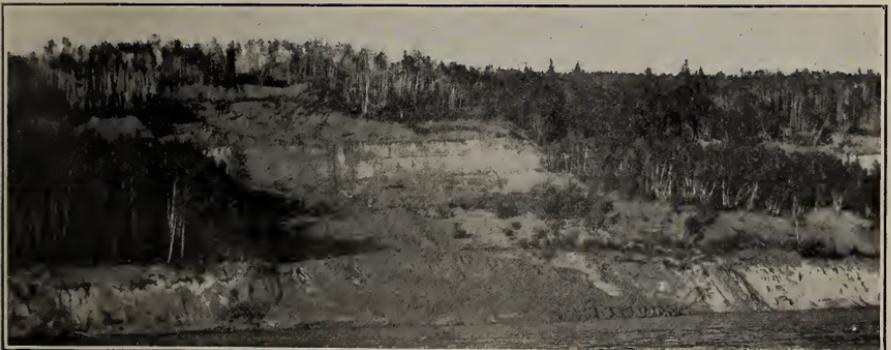


FIG. 3.—BANK OF ATHABASKA ABOVE HOUSE RIVER, SHOWING SLIDE TERRACES.



FIG. 1.—THE ROAD ON SMITH PORTAGE, NEAR SMITH LANDING, ALBERTA.



FIG. 2.—GROVE OF ASPEN POPLARS (*POPULUS TREMULOIDES*). ATHABASKA RIVER AT MOUTH OF CLEARWATER.

exact site is not known, and has probably disappeared as a result of successive cavings of the river bank. The Athabaska enters the lake through several mouths, one of which is called the Embarras, from having its channel choked by driftwood, a common circumstance in these deltas. Emerging from the river the traveler sees several rocky islands to the northwest, and behind them, stretching out along the rocky shore, the whitewashed buildings of Fort Chipewyan meet the eye.

Fort Chipewyan (Pl. IV, fig. 1) is built on the borders of a rounded shallow bay near the outlet of Athabaska Lake. It is the largest establishment in the region north of Athabaska Landing, and has a more or less permanent population of between 200 and 300. The buildings are arranged in a broken line about a mile in length near the shore. Sandy beaches form the margin of the bay in places, but usually mossy Archæan rocks compose the immediate shores. On the highest point, at the eastern end of the line, stands the stockaded group of buildings of the Hudson's Bay Company, and beyond, stretching in single file to the westward, is a line of dwelling houses and the English church. Farther still are the church, school and other buildings of the Catholic Mission, and the establishments of several private traders. Back of the village, rocky, rounded hills, sparsely wooded, rise to a height of a few hundred feet, with mossy swamps in their valleys. The shore of the lake to the northwestward is mainly higher, and within a few miles high precipitous cliffs rise directly from the water. In late May the turf slopes are bright with the flowers of the purple anemone (*Pulsatilla*), serviceberry (*Amelanchier*), *Potentilla nivea*, *Ribes*, *Antennaria*, violets, and many others, the number of species increasing rapidly as the season advances. The population is supported largely by the excellent fisheries in the vicinity, but considerable gardening is done in the village, and large crops of potatoes are raised on one of the large islands near by.

This part of the lake originally covered a much greater area, extending for many miles to the westward of its present confines, though its shape has not changed to any great extent during historic times. Within the bounds of its ancient basin, Lakes Claire and Mammawee, the former upward of 35 miles in length, still exist, their marshy margins slowly contracting and threatening to terminate

south side of the lake, lying in a direction S. 20° W., and that the three inhabitants were killed by Chippewyan Indians. At the same time the Northwest Company had a post on a point on the north shore a short distance farther east, but after the murder of the Hudson's Bay Company's men, they moved across to the point on the south shore. The place was afterwards abandoned until 1845, when Mercredi arrived and built the present post." (Ann. Rept. Can. Geol. Surv., VIII, p. 62D, 1896.)

their existence. The soil-laden waters of the Peace and Athabaska, meeting at this point, are responsible for the change. Gradually the sediment and the immense quantities of driftwood carried by these streams have filled in the lake at their mouths, until now their waters flow in channels carved from the muddy plain of their own making, and finally enter the lake many miles below their original place of outlet. This applies more strictly to the Athabaska, since the bulk of the water of the Peace flows on northward without touching the lake. A part of its water, however, regularly enters Athabaska Lake by way of the Quatre Fourches River, and during certain stages of flood the water of Peace River, meeting that of Rocher River, the outlet of Athabaska Lake, reverses for a time the current of that stream, and raises the level of the lake until its water again asserts itself and the original conditions are restored.

Proceeding northward from Athabaska Lake we enter Rocher River, before referred to. The course of this stream is at first northerly, then northeasterly. It varies from 20 to 50 yards in width and is mostly bordered by low willow-covered shores, flanked by extensive marshes. Here and there outcrops of gneiss occur, and on these slight elevations a few Banksian pines are seen; otherwise the trees on its banks are deciduous. Thirty-two miles from Fort Chipewyan it unites with the main channel of Peace River, here upward of half a mile in width, and the resulting stream is called Slave River. (See Pl. VII, fig. 1.) Here the willows and poplars which border the stream alternate with stretches of fine white spruces (*Picea canadensis*), some of which attain a diameter of 3 feet and rear their summits to a height of 150 feet.

A few miles below the main mouth of the Peace a high gravelly knoll on the right, on the slopes of which are one or two lobsticks,^a is a conspicuous landmark. On the opposite bank there is a low cliff of limestone, and at this point there is a slight quickening of the current. The banks are mainly low, and many outlying marshes are observed. Continuing, the banks of the river become higher, with more rock exposures, and several rocky islands are passed. A few miles below, on the left bank of the river, Smith Landing, 100 miles from Fort Chipewyan, is reached.

Smith Landing is an inconsiderable post of the Hudson's Bay Company, and owes its existence to the fact that this point is at the head of the formidable Smith Rapids, which form the only obstacle to steamboat navigation between Fort McMurray and the Arctic Ocean, a distance of 1,600 miles, and here the *Grahame* discharges

^a A lobstick is a sort of memorial usually dedicated to some traveler or official. It consists of a tree, usually a large spruce occupying a conspicuous position, which has been trimmed in a more or less fanciful manner, by being stripped of its limbs with the exception of the top and a few lateral branches.

its cargo. The rapids begin a short distance below Smith Landing, and afford some magnificent scenery. Before the construction of the portage road all the freight for the north was transported through these rapids, several portages being necessary, and even now many of the private traders follow this route. A large colony of white pelicans occupies a wooded island among the rapids, which thus constitutes one of the most northerly breeding stations of this interesting species. Though much persecuted by the voyagers, this colony has persisted apparently since the river was first descended, over a century ago, since Mackenzie calls one of the portages after these birds.

Smith Portage (see Pl. VI, fig. 1) consists of a wagon road about 16 miles in length, over which most of the freight for the north, and the returning fur, is carried by means of carts. Its course is generally straight and lies a short distance from the bank of the river. Leaving Smith Landing, it passes for a little distance over a low rocky ridge, traverses a level, scantily wooded tract, and then crosses two morasses, where in ordinary seasons the water reaches the body of the cart. Halfway to Fort Smith the road ascends a sandy ridge and passes for several miles through a sandy undulating tract clothed with Banksian pines and aspen poplars. Latterly, for a few miles, it follows a poplar-clothed ridge, passing on the left a series of marshy ponds, and emerges into the brushy 'prairie' where Fort Smith is situated.

Fort Smith, established by R. MacFarlane, of the Hudson's Bay Company, in 1874, stands on the brink of the high sandy bank of Slave River (see Pl. VIII, fig. 1). From this point one overlooks the lower part of the rapids and the river, here a mile in width. An immense eddy washing for ages against the bank has carved here a deep bay, on whose shores stand the warehouses of the traders. At this point the steamers plying on the lower Slave and the Mackenzie discharge their outward cargoes and take on the supplies to be distributed over the immense country to the north.

Below Fort Smith the Slave flows between rather high banks of sand and clay, which gradually diminish in height as the river is descended. About 7 miles below Fort Smith, Bell Rock, a cliff of limestone, forms a part of the left bank, and is noteworthy as being the only rock exposure between Smith Rapid and Great Slave Lake. Two miles below, on the right, is Pointe de Gravois, where several cabins have been built by the natives. The next point of interest is Salt River, which enters the Slave from the west, 16 miles below Fort Smith. This stream drains the Salt Plains, formerly a favorite resort of the wood bison. On these plains, about 20 miles from the mouth of Salt River, occur the salt springs, about which the mineral may be gathered in a comparatively pure state. Most

of the salt used throughout the north is procured here. Near the mouth of the stream stand several houses, some of which are occupied by members of the celebrated Beaulieu family.^a About 3 miles below Salt River we reach the Grand Detour, where the river turns sharply to the left, then bends again to the right and almost regains the place where its course was deflected. Around this bend the river follows a course of about 16 miles, which can be avoided by a portage across the base of the peninsula which is thus formed. About 14 miles below, Point Brulé is passed, and about 30 miles beyond, Point Ennuyeux, where the river again doubles on itself as at the Grand Detour. Along this part of the river the banks are rather low, and many low, sandy islands occur. These islands, because of changes in the currents, are continually altering their shape, and some are traveling slowly downstream, being worn away at the upper end, and added to below by the sediment-laden waters. The higher islands are well wooded with spruces, poplars, and willows, the several species usually being disposed in belts, with the evergreens on the higher part of the island. (See Pl. VII, fig. 3.)

About 6 miles below Point Ennuyeux a low broad point showing scattered fragments of limestone is passed on the right, and just below, Six Mile Island—low, narrow, and wooded—is separated from the eastern bank by a narrow channel. Gradually the banks become lower, and some 25 miles beyond the McConnell Islands are passed. A few miles below them we reach the head of the delta, where Rivière au Jean, one of the main outlets, turns toward the eastward, while the larger branch follows a general northerly course to Great Slave Lake, inclosing many low islands. The alluvial banks on the lower Slave are constantly being cut away and the uprooted trees precipitated into the stream. (Pl. VII, fig. 2.) Two or three miles above the lake, below a moderately high cut bank on the left, a narrow channel, locally called a 'schney,' with a fairly strong current, turns abruptly to the westward and affords the easiest course to Fort Resolution. After following its winding course for 3 or 4 miles, we enter a shallow bay, separated from the main lake by several wooded islands, and passing through a short narrow channel between Mission Island and the mainland, reach the lake within sight of Fort Resolution.

^a Petitot states that the half-breed family Beaulieu had already settled at Salt River when Peter Pond penetrated to Great Slave Lake in 1780 and that one of them, Jacques, acted as his interpreter. Ever since that time some members of the Beaulieu family seem to have continuously occupied that station. Francois Beaulieu, a nephew of Jacques, was a guide and hunter to Franklin's expedition about Great Bear Lake in 1825-26. Mr. MacFarlane informs me that from 1857 until his death in 1872, Francois Beaulieu traded fur and gathered salt for the Hudson's Bay Company at Salt River. After his death, his son Joseph continued trading until 1874, when Fort Smith was established.



FIG. 1.—SLAVE RIVER NEAR SMITH LANDING, SHOWING GENERAL CHARACTER OF FORESTING.



FIG. 2.—ALLUVIAL BANK BEING WORN AWAY BY THE CURRENT, LOWER SLAVE RIVER.



FIG. 3.—CHARACTERISTIC FORESTING ON ISLAND IN LOWER SLAVE RIVER, SHOWING THREE ZONES OF GROWTH.



FIG. 1.—FORT SMITH, SLAVE RIVER, LOOKING NORTH, JUNE, 1903.



FIG. 2.—FORT RESOLUTION, GREAT SLAVE LAKE, JUNE, 1903.



FIG. 3.—HAY RIVER POST, GREAT SLAVE LAKE, JUNE, 1903.

Fort Resolution is situated on the south shore of the lake a short distance west of the mouth of Slave River (Pl. VIII, fig. 2). It comprises the establishments of the Hudson's Bay and several private trading companies, and of the Roman Catholic mission. The shore in the vicinity is low and swampy and is covered with a mixed growth of spruces and willows of small size, the descendants of the original forest, long since removed for fuel. The soil is mainly a sandy loam. Potatoes, turnips, beets, and other hardy vegetables are raised with a considerable amount of success. Mission Island, formerly called Moose Deer Island, and the site of early posts of the Hudson's Bay and Northwest companies, lies half a mile northwest of the post.^a This island is moderately high and is well wooded, mainly with spruce, and is one of a group which are arranged along the shore to the eastward of the Slave River Delta, in a general northeast and southwest direction.

The narrow channels through which Slave River enters the lake are disposed along a distance of over 20 miles of its coast line. Many of these channels are so shallow in times of low water as to be almost unnavigable even for canoes, and even in the main channel the 6 feet of water necessary for the passage of the *Wrigley* is sometimes found with difficulty. The alluvial islands which are inclosed by these channels are low, and are mainly covered with grasses and willows. Toward the head of the delta the islands are older and higher, and have become clothed with willows, poplars, and spruces, in varying degrees of combination, according to the age of the island.

In July, 1901, and again in July, 1903, I crossed from Fort Resolution to Fort Rae by the canoe route, which may be briefly described. From Fort Resolution various channels are traversed to Stone Island, near the extreme eastern part of the delta. This island, which supports a few shrubs, rises abruptly from the water and marks on this shore the western limit of the granitic rocks. On the shore of the lake near-by stand several small log houses, probably near the site of the first trading post built on Great Slave Lake. (See p. 55.)

^a Though several trading visits had been made to Great Slave Lake previously, the first houses were erected on the south shore of the lake a short distance east of the mouth of the Slave in 1785, by the Northwest Company. Their post on Moose Deer Island was established not many years later. Still later the Hudson's Bay Company also built a post on the same island, where both remained until 1821, at which time the latter company had no post north of this point. After the union of the two companies, in 1821, their posts on Moose Deer Island were abandoned, and Fort Resolution was built (probably in 1822) on its present site. The first Catholic mission was built on Mission Island in 1856. Besides these, an early trading post was built on Slave River about 15 miles from the lake, but I have no definite data concerning it.

From Stone Island, if the weather be fair, a traverse of about 14 miles may be made nearly directly northward to the nearest islands of the extensive Simpson group. They may be barely discerned from the summit of the island, but are invisible from the water level. The more exposed of these islands are much wind swept and their vegetable covering reminds one of the extreme edge of the timber. The spruce and tamarack trees are more or less stunted, and various heathy shrubs, with cinquefoils, saxifrages, and various grasses, form the principal flora (see Pl. IX, fig. 1). They constitute breeding stations for several species of gulls, terns, loons, and the parasitic jaeger. Another shorter traverse leads to other islands, whence the Gros Cape, on the eastern side of the mouth of the Northern Arm, is attained, and the crossing, always attended with some difficulty, is accomplished. A safer but longer crossing is made by following the southern shore of the lake several miles to the eastward of Stone Island and then making a traverse of about 8 miles to the nearest islands. Thence the canoe track winds through an intricate maze of beautiful channels to the Gros Cape.

On these islands are found many small ponds and swamps, in which, as well as about the low shores of the Northern Arm, grow many interesting plants. Conspicuous among these may be noted the bog-bean (*Menyanthes trifoliata*), parnassia (*Parnassia palustris*), water arum (*Calla palustris*), and many sedges and grasses. In a small pond on one of the Simpson Islands I found a colony of the small white water lily (*Castalia tetragona*), which has been detected at but few stations in America. On the drier parts of many of these islands occur numerous other species, the genera *Potentilla* and *Saxifraga* being represented by several species. *Cryptogramma acrostichoides* and *Dryopteris fragrans* are abundant ferns.

From the Gros Cape the eastern shore of the Northern Arm is followed northward. The shores and islands are very rocky, and at first are high, often precipitous, but soon lower to the northward.

About 40 miles above the mouth of the Northern Arm, Yellowknife River empties into a bay about 4 miles broad and several miles long. On the eastern shore, just south of this bay, stand several log houses. Not far from here is the site of old Fort Providence, a northwest post in 1820, when Franklin ascended Yellowknife River on his way to the Coppermine.^a

^a In 1789, when Alexander Mackenzie was on his way to the Arctic Ocean, Mr. Le Roux, his assistant, met a party of Yellowknife Indians near this point, where also he had traded with them during the previous season. While Mackenzie was exploring the great river, Le Roux made a trip to Great Marten Lake, where not long afterwards the Northwest Company established a post. Fort Providence evidently was built soon after this time. I have been unable to ascertain when it was abandoned.

North of Yellowknife Bay the canoe route passes through a network of low rocky islands, following closely the eastern shore. Grassy inlets occur in many places, and the stretch is a favorite breeding place for several species of ducks. Near the extremity of the Northern Arm, about 50 miles northwestward from Yellowknife Bay, stands Fort Rae (Pl. IX, fig. 3).

Fort Rae is situated on the western extremity of a projecting point, which was at one time an island, but which is now connected by a marsh with the eastern shore of the Northern Arm.^a Back of the post the land rises rather abruptly and extends easterly in an elevated ridge for several miles. Its southern face is capped by a limestone cliff, below which a steep talus slope extends to the water. Most of the timber, originally of good size, has been removed for fuel, and the 'Island Hill' now presents a comparatively barren aspect, though it is well covered with shrubby and herbaceous plants (Pl. IX, fig. 2). It is remarkable as presenting the only exposure of limestone which occurs on the eastern shore of the Northern Arm. To the westward extends the broad arm of the lake, dotted with a few wooded islands, and bordered on the west side by an elevated limestone escarpment.

Since Great Slave Lake has already been described (p. 26), I will refer briefly to Hay River, where a small collection was made in 1903, and proceed with an account of the Mackenzie. The trading post of Hay River (see Pl. VIII, fig. 3) is situated at the mouth of the stream of that name, which enters Great Slave Lake about 60 miles southwesterly from Fort Resolution. Here are located both Church of England and Catholic missions. The shores of this part of the lake are low and marshy, with grassy plains bordering some of the streams. Westward from Hay River the low shore continues to the vicinity of the Desmarais Islands, Point de Roche, a long boulder-strewn spit, being passed about 14 miles from Hay River. Eagle Mountain, a long limestone ridge rising from the flat country to the southwest, is a conspicuous landmark. Near the Desmarais Islands the current of the outlet begins to be apparent. Big Island, about 10 miles in length, with many smaller adjacent isles, lies in the

^a Fort Rae was established on its present site in 1852, mainly as a provision post. An abandoned post near the present site is thus referred to by Russell: "Two hundred yards from the big house, on the shore of a little cove called Sandy Bay, a few crumbling ruins of clay and stone chimneys mark the site of an 'old fort,' abandoned so long ago that nothing is known by the present inhabitants concerning it. Another fort once stood near the Big Point, twenty-five miles south." (Expl. in Far North, p. 69, 1898.)

A letter written by W. F. Wentzel from "Mountain Island, Great Slave Lake," dated May 23, 1820 (Masson, *Les Bourgeois*, I, p. 125, 1889), would seem to indicate an establishment near the present site of Fort Rae at that early date. Possibly this refers to the abandoned site referred to by Russell.

center of the contracted outlet—the head of the Mackenzie. The channel south of Big Island carries most of the water. On the north shore of the lake, opposite Big Island, stood the former trading post of that name. It is said to have been established in 1847, and abandoned in 1868. This is a famous place for the fall fishery, and upward of 50,000 whitefish are taken in the vicinity and frozen for use at Forts Providence and Simpson. At the outlet of the lake the Mackenzie has a width of 7 or 8 miles, with many low, rocky islands and a moderate current. A little beyond, the river contracts and the current increases in force. Some 40 miles from the lower end of Big Island several islands block the channel and cause an acceleration of the current, usually called 'The Providence Rapids.' On the north shore of the river at this point is situated Fort Providence. (See Pl. X, fig. 2.)

The country about the fort is level and is mainly grown up to poplars (*Populus tremuloides*). Back from the river are many muskegs, with their characteristic tamarack and spruce forests. The first settlement at this point seems to have been made by the Roman Catholics in 1862, and their establishment is now one of the largest in the north. The Hudson's Bay Company post was established here in 1868, when the post at Big Island was abandoned. Both establishments cultivate large fields of potatoes and the various root crops.

Below Fort Providence the Mackenzie passes through an expansion called the 'Little Lake,' and then follows a general west-northwesterly course to its junction with the Liard. Its banks are composed mainly of shale and gravel, and its valley, at first rather shallow, gradually increases in depth. Its principal affluents are the Horn (or Willow), Trout, Spence, and Rabbitskin rivers. The first of these streams enters the Little Lake on its north side. Between this point and Trout River, a distance of 70 miles, the Mackenzie flows with a sluggish current, receiving from the south the waters of Yellowknife River, 50 miles from Willow River. Below the mouth of Trout River, a large affluent from the south, the current of the Mackenzie becomes swifter, and this point is called the 'Head of the Line,' as the slacker current above permits travelers when ascending the river to discard the tracking line, and to use oars or paddles to advantage.^a

Between this point and Spence River, a distance of 35 miles, the course of the Mackenzie is west-northwesterly. It then flows toward the northward for 15 miles to Rabbitskin River, and then westward

^a On the map accompanying Franklin's narrative of his second expedition the site of the first post on the Mackenzie is placed on the north bank of the river a short distance below this point. This post was built in 1796 by Duncan Livingston (or Levingston) of the Northwest Company. In the summer of 1799 Mr. Livingston made a voyage of discovery to the mouth of the river, and with four companions was murdered by the Eskimo, only one of the party escaping.



FIG. 1.—SEMIBARREN SUMMIT OF LOON ISLAND, GREAT SLAVE LAKE.

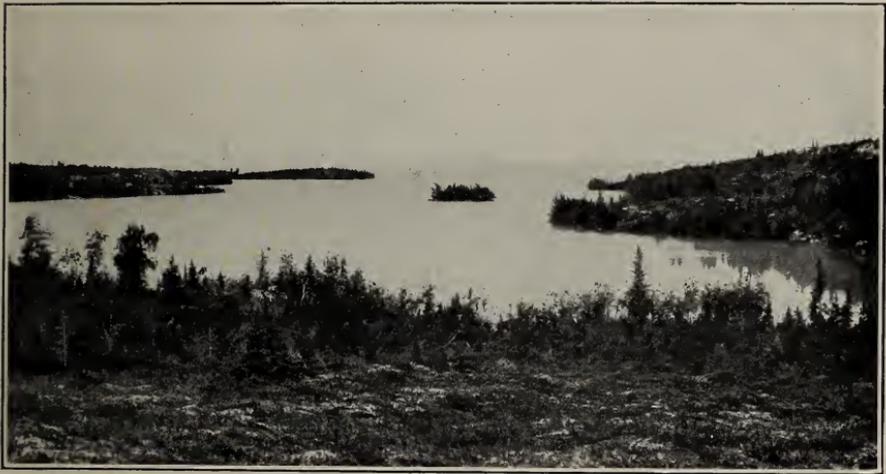


FIG. 2.—BAY NEAR FORT RAE, GREAT SLAVE LAKE, SHOWING GENERAL CHARACTER OF COUNTRY IN THIS VICINITY.



FIG. 3.—FORT RAE, NORTHERN ARM GREAT SLAVE LAKE, JULY, 1901.



FIG. 1.—FORT SIMPSON, MACKENZIE RIVER, SPRING, 1904.



FIG. 2.—FORT PROVIDENCE, UPPER MACKENZIE, JULY, 1903.



FIG. 3.—CAMP OF SLAVEY INDIANS NEAR FORT PROVIDENCE.

20 miles to join the Liard, its largest tributary. Two miles below the junction, on a large island near the left bank, stands Fort Simpson. (Pl. X, fig. 1.)

Fort Simpson is an important post of the Hudson's Bay Company, and its site, under various names, has been occupied for about a century.^a The island on which Fort Simpson is built is about 2 miles in length, and is the upper and larger of two which lie close to the western bank, being separated from it only by a narrow, shallow channel. It is apparently of alluvial origin, but if so was formed when the bed of the Mackenzie occupied a much higher level than at present. It has been heavily wooded, but most of the original forest has been removed. Its highest parts stand 40 or 50 feet above the ordinary level of the water. The width of the main channel of the Mackenzie at this point is 1 mile, and that of the island and the western channel about half a mile. The river is bordered on the west by a rolling, wooded plain, where mossy muskegs, alternating with poplar or pine covered ridges, extend back to a range of low hills. The country bordering the river to the eastward is similar, but is less rolling. Bluefish Creek, which enters the Mackenzie opposite the post, has cut its way from the swampy plateau down to the level of the main river. Its lower course is a succession of rapids, bordered in places by high cut banks of shale. It is the only tributary stream of any note in the vicinity.

Fort Simpson is the head post of its district,^b and, like many other trading posts, was in former days a much more pretentious establishment. Before the days of steam navigation all the goods for the district were distributed from this point, but since the lower posts have been supplied direct it has lost much of its former importance. Its great warehouses were formerly disposed in the form of a square, open toward the river, but the recent removal of one of the buildings has broken up this regularity. In the center of the square stands a

^a Fort Simpson was established as a Northwest Company post very early in the nineteenth century—at least previous to 1807. Local tradition places the original site on the same island a few hundred yards north of the present location. At first it had no distinctive name, being known simply as "The Forks." It was established as a Hudson's Bay Company post soon after the coalition of the two companies, most likely in 1823, and probably received its name at that time.

Fort Liard, on Liard River about 150 miles southwest of Fort Simpson, is said to have been established in 1806, at or near its present site.

Fort Nelson, on Nelson River, was built only a little later. In the winter of 1812-13 the fort was destroyed and its inmates killed by the Indians. (Masson, *Les Bourgeois*, II, p. 125, 1890.) It was again in use in 1825, but was subsequently abandoned, and was reestablished in 1865.

^b Since my visit to the Mackenzie, Fort Smith, on account of its greater accessibility, has been made the head post of Mackenzie River district. The transfer took place in 1907.

sundial, across whose leaden face have fallen the shadows of many a yearly cycle. Surrounding the post on three sides are the fields, where in former years large crops of potatoes, barley, and other staples were raised, and where a considerable amount of farming is yet carried on. A small herd of cattle is kept for draft purposes. In one of the little-used stores is the museum, containing mounted specimens of many of the native birds, some mammals, and remnants of collections of eggs and fossils. The library, once extensive, but now much reduced, is kept in one of the rooms of the main dwelling house. The most striking modern improvement is the electric light plant, whose dynamo is run by the engine from the steam launch of a disappointed Klondiker.

Between Fort Simpson and Nahanni River, a distance of 75 miles, the Mackenzie follows a nearly direct west-northwest course. Its banks are high and well wooded, and gravelly or bowldery beaches are exposed at the ordinary stage of water. Several groups of long, low islands, well wooded with spruce, balsam poplar, willows, and the usual undergrowth, are encountered in this stretch. The only tributary large enough to bear a name is Martin River, which comes in from the southwest 8 miles below Fort Simpson.

Near latitude $62^{\circ} 15'$ the Mackenzie approaches the mountains, and, making a sharp turn, runs for a long distance nearly due north, at a short distance from their base.^a At the 'Great Bend' the Nahanni, emerging from a deep, narrow valley, mingles its waters with those of the main river. The apex between the Nahanni and the Mackenzie is occupied by a mountain called by some of the natives *Tha-on'-tha*, i. e., 'standing alone' (Pl. XI, fig. 2). It rises abruptly from the swampy plain to a height of about 2,500 feet. Its northern face is steep—in places precipitous—and is formed of several superimposed terraces. It is as well wooded as the nature of its soil will allow. The white spruce (*Picea canadensis*), tamarack (*Larix laricina*), Banksian pine (*Pinus divaricata*), and aspen poplar (*Populus tremuloides*), with their attendant shrubs, ascend the slopes to an altitude of about 2,000 feet, occurring at their upper limit as depauperate shrubs. Willows (*Salix myrtilifolia* and *alaxensis*) occur in a

^a On the right bank of the Mackenzie, near where the river bends northward, stood formerly a Northwest Company's post. On the map accompanying Franklin's narrative of his second journey (1828) its site is placed opposite the mouth of the Nahanni. Concerning this post, Masson says: "In 1800, Mr. John Thomson, a clerk in the Northwest Company, * * * established a trading post on the Mackenzie River 'in full view of the Rocky Mountains at whose smallness I was greatly surprised' and called it Rocky Mountain Fort. It was soon after abandoned and in 1805, Mr. Alexander MacKenzie, the Partner in charge of the Great Bear Lake Department, already calls it 'Old Rocky Mountain House.' It was then going to ruin." (Les Bourgeois, II, p. 27, 1890.)

dwarfed state on the extreme summit. Other plants of interest are mountain avens (*Dryas integrifolia* and *drummondii*), *Pedicularis euphrasioides*, *Pinguicula vulgaris*, and *Anemone richardsoni*.

From the summit of Mount Tha-on'-tha (see Pl. XII), which I ascended on June 4, 1904, an interesting prospect presented itself. Ten or 15 miles to the westward Mount Camsell (Pl. XI, fig. 1), on whose barren summit much snow yet remained, loomed up to a height of about 4,000 feet, or over a thousand feet higher than the peak on which I stood, and beyond other still higher peaks could be seen. To the north and northwest extended lofty rugged mountains, the highest capped with snow. Farther back it is impossible to see whether or not the mountains are arranged in definite series, but the most easterly ranges are very well marked and lie parallel to the Mackenzie. To the eastward, beyond the broad river, stretches a vast rolling plain, well forested and dotted here and there with lakes. To the south is a low, level, wooded plain, with thousands of small lakes, bordered on the west by the Nahanni Mountains and the low foothills back of Fort Simpson. Between the Mount Camsell range and the mountains to the northward lies the deep valley of the North Nahanni River, with its broad, muddy flood plain, through which the river, spread out in numerous channels, pursues its meandering course.

Below the mouth of the Nahanni River (Pl. XII, fig. 2) the Mackenzie makes its abrupt turn above referred to, and for some miles parallels closely the Nahanni Mountains. A number of long, narrow islands, closely wooded with spruces, lie close to the western bank. The largest of these is about 20 miles long. Root River enters the Mackenzie from the west 16 miles below the Nahanni, and 4 miles below, opposite the lower part of Twentymile Island, Willow Lake River comes in from the east, both being small streams. Here the high mountains have receded from view, and the sides of the valley are only moderately elevated. Twenty-five miles below a slight rapid occurs, inclosing an island, and here on the right bank, at the time of our visit, stood Fort Wrigley.^a (See Pl. XIII, fig. 2.) It is a small and unimportant post and may be passed by without further comment. Below here the Mackenzie pursues a general northerly course, with rather high banks on the right. Twenty-five miles below the Little Rapid the 'Rock by the Riverside,' or Roche Trempe-l'eau (fig. 6), as it is generally called, forms a part of the right bank. It is an uplift of Devonian limestone, rising directly from the water to a height of 1,500 feet. Below this point the left bank becomes higher

^a Fort Wrigley was established in 1877, and was at first known as 'The Little Rapid.' Its site proved to be unhealthy and lately (autumn, 1904) it has been abandoned and the post reestablished 25 miles lower down, on the left bank opposite Roche Trempe-l'eau.

and the right rather low. No feature of particular interest occurs until Blackwater River, 28 miles below the Rock, is reached. This stream at its mouth spreads out over a broad gravelly flat. Below here the river makes a sharp bend and for several miles pursues a westerly course, being bordered on the north by banks of gravel and clay upward of 400 feet high. A few miles below where the river turns northward again, or 10 miles below the Blackwater, Red Rock River comes in from the west through a broad valley. At its mouth is a broad stretch of willow-covered country. Salt River, 22 miles below, is an insignificant stream on the right. The next feature of interest is Birch Island, a large wooded island occupying a dilatation of the river. Gravel River, 8 miles below, is the next tributary of

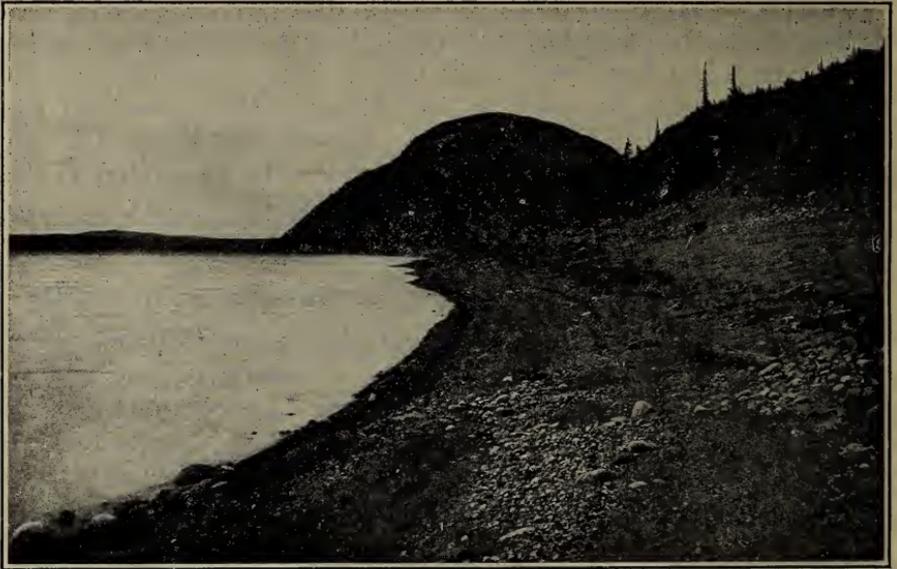


FIG. 6.—Roche Trempe-l'eau, or Rock by the Riverside, Mackenzie River, near Fort Wrigley.

importance.^a It is a clear-watered stream which forms one of the principal highways for the Indians of the mountains, who descend it in large boats. It approaches the Mackenzie through a broad gravelly flat, and has a swift current. Below here the river is broad and incloses many wooded islands. At the lower end of this stretch of islands a high bank on the left, with a thick layer of peat on its top, is passed, below which the river is bordered on the left by low banks. The right bank now becomes the higher and continues so nearly all the way to the mouth of Bear River. In one stretch the sandy banks are very high and some stupendous landslips have occurred. The beautiful *Hedysarum americanum*, the roots of which

^a The name Dahadinne has been applied by authors to both the Red Rock and Gravel rivers, but is not here used.



FIG. 1.—MOUNT CAMSELL, FROM SLOPES OF MOUNT THA-ON'-THA; VALLEY OF NAHANNI RIVER ON RIGHT.



FIG. 2.—MOUNT THA-ON'-THA, FROM NEAR MOUTH NAHANNI RIVER.



FIG. 1.—SUMMIT OF MOUNT THA-ON'-THA, SHOWING STUNTED VEGETATION AND CORAL-BEARING ROCKS.



FIG. 2.—JUNCTION OF NAHANNI RIVER WITH MACKENZIE, FROM SUMMIT OF MOUNT THA-ON'-THA.

are eaten extensively by the natives in spring, abounds all along the Mackenzie, and here early in June its violet-purple flowers were beginning to appear. Below here the 'boucanes'—beds of lignite which have been on fire at least since the river was first descended in 1789—are passed. A short distance below, Fort Norman stands on the right bank a few hundred yards above where Bear River mingles its clear waters with the discolored flood of the Mackenzie.

Fort Norman occupies a commanding position on the high bank. It has been built successively at several points, but the present site has been occupied for a number of years. Back of the post extend the inevitable muskegs with their shrubby growth of *Chamædaphne*, *Andromeda polifolia*, the two species of *Ledum*, *Vaccinium uligi-*

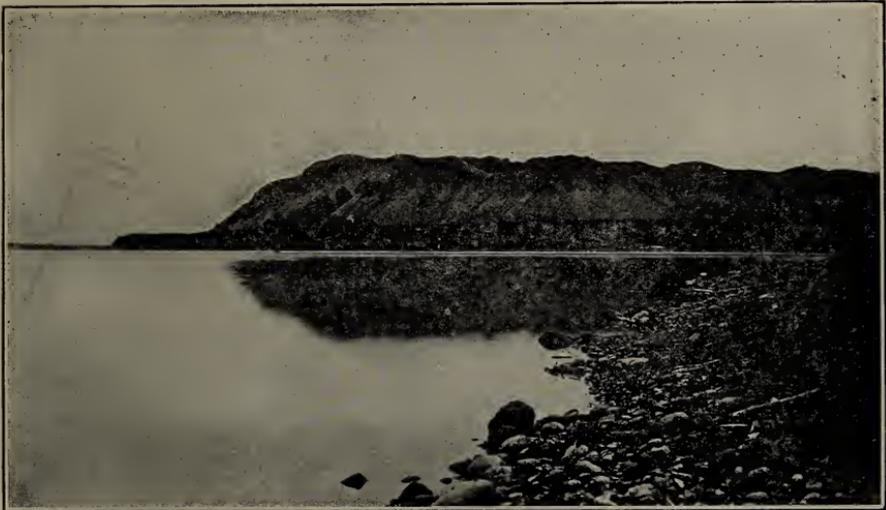


FIG. 7.—Bear Rock, at junction of Bear River with the Mackenzie.

nosum, etc., while a strip along the crest of the bank is comparatively dry and is wooded with poplars and willows. To the north, across Bear River, rise the rugged peaks of Bear Rock (see fig. 7). Along its southern base, at the time of my visit in June, 1904, a mass of ice at least half a mile in length and of unknown thickness was visible from the post. To the west across the broad Mackenzie the ranges of the Rocky Mountains, snow clad during most of the year, stretch away into the distance.

Below the mouth of Bear River, whose clear blue water flows distinct for several miles before losing its individuality, the Mackenzie follows a general west-northwest course for about 125 miles to the Sans Sault Rapid. The face of Bear Rock is nearly devoid of trees, and from the river presents an aspect similar to that of Roche Trempe-l'eau. Below here a low limestone cliff borders the river on the right for some miles. The banks are generally low and shelving

and when we descended the river late in June were well lined with immense blocks of ice. On the right bank 100 miles below Fort Norman stands Wolverine Rock, or Roche Carcajou. It is about a thousand feet high and presents sheer cliffs rising several hundred feet directly from the water. On its precipitous face nest innumerable cliff swallows, besides duck hawks, ravens, and other cliff-loving species. A weathered knob, whose summit from some points resembles the figure of a wolverene, gives its name to the mount. Twenty-five miles below a range of low mountains is encountered. On either side of the river stand low peaks called the East and West Mountains of the Rapid, and the river falling over a rocky barrier forms the Sans Sault Rapid, a rather formidable one in low water. By following the left bank, however, it may be run easily and safely in canoes, as the



FIG. 8.—Entrance to Ramparts, Mackenzie River, near latitude 66°.

descent, though swift, is gradual. Here the river turns northward again, and it presents no features of especial interest until the Ramparts, 60 miles below Sans Sault Rapid, are reached. Beaver River, 36 miles below the rapid, and a larger unnamed river 12 miles lower down, come in from the west, while a mile or two above the latter, on the eastern side, is the mouth of a small stream called locally Bluefish Creek. The Rampart Rapid, just below, is formidable in low water, especially in the middle and toward the western bank, but in ordinary stages of water is scarcely discernible near the eastern bank. Just below it the Mackenzie enters the defile called the Ramparts. (See figs. 8 and 9.)

Here the river, which has expanded to a width of several miles, contracts to about 500 yards and flows with a steady current between perpendicular walls of limestone upward of 250 feet in height. The

length of the more contracted part of the canyon is 5 miles and for 2 miles more the channel is but slightly expanded. Then it widens out and incloses the Manitou Islands.

Fort Good Hope (Pl. XIII, fig. 1) is built on the right bank of the Mackenzie, about 2 miles below the Ramparts, only a few miles south of the Arctic Circle. It consists of the establishments of the Hudson's Bay Company and one or two private traders, and that of the Roman Catholic mission, whose church, a highly ornamented structure, is the



FIG. 9.—Right bank of Mackenzie, near lower end of Ramparts, near latitude 66°.

largest in the region north of Fort Resolution. The post has occupied its present site since 1837.^a A low limestone ridge, the continuation

^a Fort Good Hope probably existed in effect as a Northwest post early in the nineteenth century, but accounts differ as to its precise location, both Sans Sault Rapid and the foot of the Ramparts being given as the earliest site. A temporary post was built in the summer of 1805 at 'Bluefish River,' about 60 miles below the mouth of Bear Lake River. (Masson, *Les Bourgeois*, II, p. 104, 1890.) It was established as a Hudson's Bay post on the west bank of the Mackenzie, about 120 miles below the Ramparts, about 1823, after the union of the rival companies, being spoken of by Franklin in 1825 as "but recently established." It was removed about 1835 to Manitou Island, below the Ramparts, where its site may still be seen on the eastern shore of the island nearly opposite the present establishment. It was destroyed in June, 1836, by a flood caused by an ice jam in the Ramparts and was rebuilt on its present site in 1837.

of the eastern bank of the defile, lies back of the post beyond the valley of a small stream in whose bed, as late as midsummer day, large masses of ice still remained. To the north stand several rounded hills 100 or 200 feet high; otherwise the country is rolling and rather swampy. At the time of my visit the open areas were bright with the beautiful flowers of *Rhododendron lapponicum*, *Dryas integrifolia* (see Pl. XXV, fig. 1), *Lupinus arcticus*, and many less showy plants, about which flitted several species of Arctic butterflies.

Below Fort Good Hope the Mackenzie again resumes its general northwesterly course and is bordered mainly by high clay banks. Three miles down, Hareskin River, at its mouth a broad, dark-watered stream, is passed, and in the next 17 miles Lower Manitou and several other large islands are passed. At the end of this stretch Loon River, a good-sized stream which drains several large lakes, is passed on the right. For the next 100 miles the river follows the same general course, is very broad, and contains many islands. A range of low mountains is seen to the westward midway of this stretch.

In about latitude $67^{\circ} 30'$ the Mackenzie turns at right angles to the course it has been following, and for about 60 miles flows a little south of west. It is here bordered on the north by high banks of yellowish clay, much furrowed by rivulets. On these banks ground squirrels first became common, having appeared about 60 miles below Fort Good Hope. The site of old Fort Good Hope, before referred to, is on the left or southern bank just below where the river changes its course. When we traveled this stretch late in June the sun of course was continually above the horizon, though sometimes it was hid from sight for several hours by the high northern banks, and we traveled as inclination or the weather prompted us.

At the end of this westward-trending stretch the river resumes its northwesterly course. It here averages narrower than in the few hundred miles preceding, and its valley continues deep. Half-way to the delta it makes an oxbow turn through a rock-bordered defile called the 'Lower Ramparts.' Its walls are less precipitous than those of the upper Ramparts and the channel is less contracted. On emerging from this canyon, the post of Arctic Red River, at the mouth of the stream of that name, is seen on the left.

Arctic Red River is a small post of the Hudson's Bay Company, and is also the seat of a Roman Catholic mission which was established thirty or forty years ago, being first located on the opposite bank of the Mackenzie a few miles below. The trading post has been established only a few years.

From the mouth of Arctic Red River the Mackenzie flows northward for 20 miles to the head of the delta. The banks rapidly lower and are soon composed entirely of alluvium. Exposed sec-



FIG. 1.—FORT GOOD HOPE, MACKENZIE RIVER, JUNE, 1904.



FIG. 2.—FORT WRIGLEY AND MACKENZIE RIVER, JULY, 1903.



FIG. 3.—MAIN BUILDINGS AT FORT MCPHERSON. INDIANS ARRIVING FROM LA PIERRE HOUSE WITH PACK DOGS, JULY, 1904.

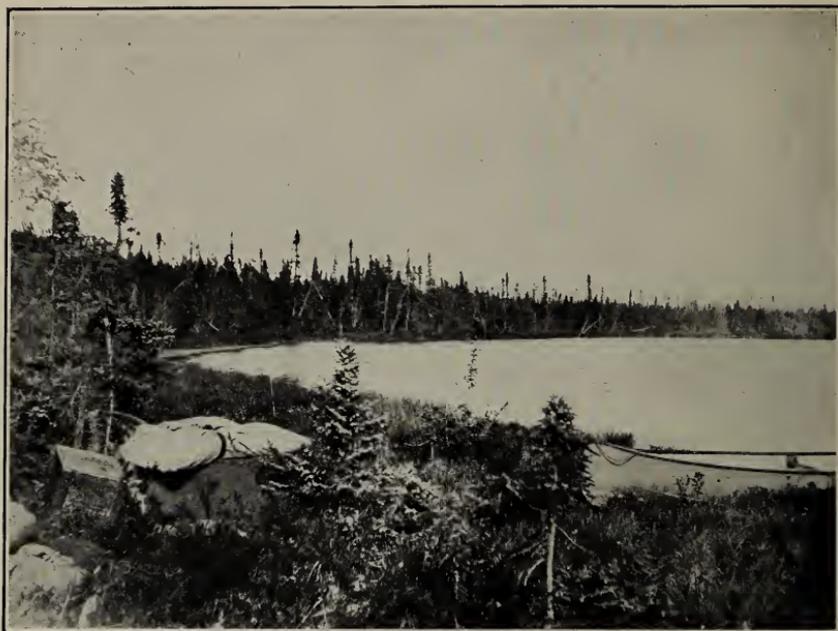


FIG. 1.--MUSKEG POND ON HEIGHT OF LAND, HEAD OF GRANDIN RIVER, BETWEEN GREAT SLAVE AND GREAT BEAR LAKES.



FIG. 2.--LAKE AND MOUNTAIN COUNTRY NEAR LAKE ST. CROIX, BETWEEN GREAT SLAVE AND GREAT BEAR LAKES, AUGUST, 1903.

tions often disclose beds of willows or large trunks of trees many feet below the present summit of the banks. Keeping to the left we pass several large islands and enter the easternmost channel of Peel River. From this point to Fort McPherson, the terminus of our trip, is reckoned 32 miles. The channel is winding, and the part first entered is rather narrow, and usually is bordered by overhanging clay banks on the concave side of the bends, and low shelving shores on the opposite points. A portion of this channel has been formed within the memory of men now living, by the river cutting across a sharp bend. A little over halfway to Fort McPherson we come to the main channel of Peel River, where it is nearly half a mile in width. From here we follow a nearly straight southerly course up the Peel to the post.

Fort McPherson (see Pl. XIII, fig. 3) occupies a commanding site on the right bank of Peel River, 32 miles above its junction with the Mackenzie.^a It comprises the establishments of the Hudson's Bay Company, and of a Church of England mission, which has been presided over for many years by the Rev. Robert MacDonald. To the westward an uninterrupted view is afforded of the wooded valley of the Peel, beyond which stretches a gently ascending heathery slope several miles in width, with the barren summits of the northern Rockies on the horizon. The portage trail to La Pierre House leads directly westward across this range. Nearly due north of the post, just west of the Mackenzie delta, stands a spur peak of the Rockies called locally Black Mountain. It is a dark, barren, rocky mass upward of 2,000 feet in height. To the eastward of the post is spread a low, rolling, wooded plain, evidently of alluvial origin, and containing thousands of lakes. A winter trail extending eastward from Fort McPherson to its outpost, Arctic Red River, is said to cross 31 small lakes. The timber about the post, except along the river, is noticeably stunted, and in some places conditions similar to those of the Barren Grounds prevail.

TABLES OF DISTANCES.

The following tables, showing the approximate distances along the principal rivers traversed, have been compiled from the reports and maps of track surveys made by the Canadian Geological Survey and Department of the Interior. In cases where the estimates by different surveyors vary, unless there is reason to believe that one or the other of the figures is more nearly correct, an average has been adopted.

^a Fort McPherson was first built 3 miles above its present situation, in 1838. Its necessity arose from the fact that the removal of Fort Good Hope from its former site to the Ramparts left the lower Mackenzie without a trading post which was accessible to the Loucheux.

Approximate distances along the principal rivers traveled.

ATHABASKA RIVER.

Station.	Distance from Athabaska Landing.	Distance between points.	Station.	Distance from Athabaska Landing.	Distance between points.
	<i>Miles.</i>	<i>Miles.</i>		<i>Miles.</i>	<i>Miles.</i>
Athabaska Landing (altitude 1,650 feet).....	0	0	Long Rapid.....	198	5
La Biche River.....	30	30	Crooked Rapid.....	204	6
Quito River.....	45	15	Stony Rapid.....	206	2
Swift Current Rapid.....	55	10	Little Cascade Rapid.....	211	5
Big Mouth Brook.....	65	10	Big Cascade Rapid.....	212	1
Pelican Portage.....	100	35	Mountain Rapid.....	219	7
Pelican River.....	102	2	Moberly Rapid.....	225	6
House River.....	143	41	Clearwater River (Fort Murray, altitude 840 feet).....	228	3
Grand Rapid (altitude 1,200 feet).....	153	10	Upper Steep Bank River.....	251	23
Point La Biche.....	159	6	Red River (Fort MacKay).....	263	12
Little Buffalo River.....	166	7	Pierre au Calumet.....	278	15
Brulé Rapid.....	172	6	Poplar Point.....	318	40
Boiler Rapid.....	191	19	Athabaska Lake (mouth Athabaska River).....	388	70
Middle Rapid.....	193	2			

SLAVE RIVER.

Station.	Distance from Athabaska Lake.	Distance between points.	Station.	Distance from Athabaska Lake.	Distance between points.
	<i>Miles.</i>	<i>Miles.</i>		<i>Miles.</i>	<i>Miles.</i>
Fort Chipewyan (Athabaska Lake, altitude 690 feet).....	0	0	Point Brulé.....	181	14
Peace River.....	32	32	Point Ennuyeux.....	213	32
Smith Landing.....	100	68	Limestone Point.....	219	6
Fort Smith.....	116	16	McConnell Islands.....	243	24
Salt River.....	132	16	Great Slave Lake (mouth Slave River).....	290	47
Grand Detour.....	151	19			
Around Grand Detour.....	167	16			

MACKENZIE RIVER.

Station.	Distance from head of Mackenzie.	Distance between points.	Station.	Distance from head of Mackenzie.	Distance between points.
	<i>Miles.</i>	<i>Miles.</i>		<i>Miles.</i>	<i>Miles.</i>
Big Island (head Mackenzie River, altitude 520 feet).....	0	0	Gravel River.....	440	8
Fort Providence.....	48	48	Old Fort Norman (site 1844).....	454	14
Willow or Horn River.....	68	20	Fort Norman.....	484	30
Head of the Line.....	138	70	Wolverene Rock.....	584	100
Spence River.....	173	35	San Sault Rapid.....	609	25
Rabbitkin River.....	188	15	Beavertail Point.....	623	14
Liard River (Fort Simpson).....	209	21	Beaver River.....	645	22
Martin River.....	217	8	Ramparts.....	662	17
Two Islands.....	241	24	Fort Good Hope.....	670	8
Nahanni River.....	285	44	Loon River.....	690	20
Root River.....	301	16	Grand View.....	730	40
Willow Lake River.....	321	20	Old Fort Good Hope (site).....	790	60
Fort Wrigley (site 1904).....	341	20	Trading River.....	802	12
Roche Trempe-l'eau.....	366	25	Lower Ramparts.....	867	65
Blackwater River.....	394	28	Arctic Red River (post).....	875	8
Red Rock River.....	404	10	Mackenzie Delta (head).....	907	32
Salt River.....	426	22	Arctic Ocean (mouth Mackenzie).....	995	88
Birch Island.....	432	6			

ROUTE BETWEEN GREAT SLAVE AND GREAT BEAR LAKES.

To complete the account of the routes traversed by the parties of the Biological Survey, it remains to describe the canoe route followed by the writer northward from the Northern Arm of Great Slave Lake to MacTavish Bay, Great Bear Lake, and thence to the Mackenzie.

The first part of this route, which follows a chain of lakes, has been previously traversed by so few travelers that brief mention may be made of the earlier explorations.

In May, 1864, Émile Petitot, a Catholic missionary, accompanied a party of Dogrib Indians from Fort Rae northward toward Great Bear Lake. They traveled on snowshoes and penetrated a short distance north of a lake which he named Lac St. Croix. On this lake he remained a short time, and on a prominent point erected a large wooden cross. His return journey was made in June, mainly by canoe. A brief account of his journey, with a map, was published in 1875, and other fuller accounts later. The principal streams and lakes were named by him, and until 1900 his accounts and maps constituted the only sources of information in regard to the tract in question.

In the winter of 1866 the Rev. W. C. Bompas, an Episcopal missionary, and W. C. King, a Hudson's Bay officer, traveled with dogs along Petitot's route and northwestward to Fort Franklin on Great Bear Lake. I have seen no published account of this journey.

In 1900 J. Macintosh Bell, of the Canadian Geological Survey, traversed the region from MacTavish Bay southward to Great Slave Lake. On entering the territory first explored by Petitot he attempted to apply his names, but owing to discrepancies between the positions of the lakes as located by his own observations, and the location of those described by Petitot, who traveled by dead reckoning, he was unable to correlate his own and the latter's discoveries, and consequently applied Petitot's names incorrectly to some lakes and renamed others.

When I made this traverse in 1903 I chanced to discover Petitot's cross, now fallen and disjointed, but readily identified by its position and the remains of the date, inscribed by him in Roman letters on the crosspiece. This fortunate circumstance positively identifies this lake as his Lac St. Croix, and also aids in identifying the other lakes to the north and south. In view of the positive nature of the evidence it seems best in the interests of accuracy to use the names applied by Petitot to the various lakes on this route.

Accompanied by James MacKinlay and two Indians I left Fort Rae late in the afternoon of July 30, 1903, and encamped on the eastern shore a few miles to the northward. On July 31 we traversed the remaining part of the Northern Arm and passed through the short narrow channel which connects with Lake Marian.^a

Lake Marian is about 20 miles in length and nearly 10 miles broad in its widest part, and contains a multitude of rocky islands. Its shores are rocky, and altogether it is exactly similar to the Northern

^a This lake is sometimes called Lake Brochet, but this name is applied to so many that the name Lake Marian, used by Bell, seems preferable.

Arm, of which it is a continuation. Several limestone hills stand on its western shore. The trading post of Hislop and Nagle, built on its eastern shore, is much resorted to by the Dogribs, who hunt the extensive country to the northward. On July 31, being delayed at the trading post, we did not reach the end of the lake, but early the following day we entered Grandin River, which flows into its northern extremity.

Grandin River at its mouth is about 50 yards wide, and has a rather strong current. The first rapid, where a portage of a few dozen yards is made over a rock, is reached within a mile. About 2 miles above another fall is encountered, where also a portage was made. Above here we continued to work our way slowly against the current, having to propel the canoes entirely by the paddles, as the shores are unfit for tracking. In the afternoon we paddled through a small, marshy lake and passed the mouth of Marten River shortly before camping. The next day we paddled through several marshy lakes, above which we ascended a small rapid with the aid of the line and soon afterwards reached a fork of the river. The right-hand branch is followed by the Dogribs on their way to the Coppermine. Our route lay up the left fork. The shores here are low and the channels narrow, winding, and much obstructed by fallen trees. Above here we paddled through several small, marshy ponds and portaged past a small fall. We then passed through a rocky defile, above which we made four portages, and ascended several small riffles with the paddles or with the help of the line.

On August 3 we avoided eight falls or rapids by making portages and ascended several others with the line. At the last rapid, where we encamped, the river rushes for a hundred yards through a rocky gorge (see Pl. XV, fig. 2). The spruce woods about here have escaped the fires which have devastated most of this section. Some of the small ponds and channels passed through were bordered by banks of clay, clothed mainly with white birch.

Continuing, on August 4 we ascended a small rapid with the line and soon came to Hislop Lake, a fair-sized body of water with irregular shores. A conspicuous, well-wooded ridge bordered its northwest shore. We crossed the lake diagonally and passed up its principal feeder, a small, willow-bordered stream, very deep in some places and in others much obstructed by bowlders. In the afternoon we made two short portages and ascended several small riffles. Toward evening we made a portage about half a mile long over a rocky ridge to the right, cutting off a bend of the river which was evidently full of rapids. The upper end of the portage passed over a rocky hill and ended with an abrupt descent to the water's edge.

The next day, August 5, we soon reached a rapid, which we avoided by a short portage on the left, embarking again on a small, rock-

bordered lake. A rapid falling into this lake was next portaged and we soon entered another small lake. Leaving this on the north side we made a portage of a mile and a half over a wooded ridge, avoiding a circuitous stretch of rapid water. This portage, the longest on the route, led through small muskegs, where tracks of bears and moose were numerous.

On August 6 we paddled through a small, irregular lake, out of which we made a short portage, avoiding a rapid, and almost immediately entered another small expansion of the channel. From this lakelet a small stream with alternating depths and shallows led us to Lake Mazenod (Nagle Lake of Bell), which is practically the head of the stream we had been ascending. Closely wooded regular ridges border Lake Mazenod to the south, and irregular rocky hills to the north. Its greatest length (about 8 miles) is from east to west. We paddled among its rocky islands to its western extremity and made a series of four short portages between three small muskeg ponds to the shores of a larger body of water, Sarahk Lake. A notable feature of the small ponds was the difference in color of their muddy bottoms. The first is yellow, the second a brick red, and the third of the usual dark muddy tinge. The waters of all are clear. (See Pl. XIV, fig. 1.)

Sarahk Lake, about 7 miles in length, was explored and named by J. M. Bell in 1900. Its water is beautifully clear, and it is bordered on the south and west by long, wooded ridges. We camped on its rocky eastern shore, and the next morning paddled to its foot. Its outlet, which issues from its northeastern bay, flows toward Great Bear Lake, so henceforth the current was with us. As its outlet is a succession of rapids, we did not enter its northeast bay, but took another northern bay, and going nearly to its head made a portage of a few hundred yards over a rocky ridge on the right, entering the river below the rough water. Passing down this stream we soon entered a large lake with many rocky islands. A hill nearly a thousand feet high stands on its southwest shore and others on its eastern shore. A heavy smoke, the result of forest fires to the westward, shut off our view in that direction. This lake was visited by Petitot in 1864 and named by him Lac Faber. Bell, in 1900, passing southward through the chain, explored its eastern shore and renamed it Dawaso-necka Lake. We passed northward close to its eastern shore. In one place the lake is contracted to a narrow channel, on the eastern shore of which, apparently on the mainland, we passed a small collection of log houses, the only buildings seen on the route. Apparently they had been built only a few years. A short distance beyond here we camped on a low rocky island grown up to *Ribes* and *Rubus strigosus*.

On August 8 we continued northward among islands, passing close to a peak about a thousand feet high on the eastern shore. This mountain was very steep and rugged, but was wooded to the summit. A short distance north of here we reached the extremity of the lake. From here a portage of about half a mile leads through muskegs and over several rocky ridges to a good-sized muskeg pond. The latter part of this trail passes along the bare summit of a ridge of rock where the path is plainly marked by the moccasined feet of past generations of natives. From this pond we made a portage of less than a quarter of a mile mainly through muskegs to another similar lake, and then another carry of about three-eighths of a mile to Lake Rae—the Lake Rosamond of Bell. Like most of the lakes of this region it is irregular and full of islands. A rocky promontory on its southwest side is spoken of by Petitot as a favorite rendezvous of the Indians, and it is still much resorted to. Here they gather in spring to make canoes and prepare for the summer trip to the Barren Grounds. On a large high island near by many bundles of caribou-skin clothing, dog harness, and other winter paraphernalia were suspended from tripods, thus cached securely from the depredations of wolverenes or stray dogs. Here in 1900 Bell, journeying southward from Great Bear Lake, first met with Indians, who guided him to Fort Rae.

On August 9 we made only a short journey. We passed northward among the islands to the northeastern end of the lake, and made a portage of a quarter of a mile over low ground to the next body of water, Lake St. Croix, where we camped on a rocky promontory. Here we were detained by high winds and storms until August 13.

The river between lakes Rae and St. Croix leaves the former a short distance west of the portage and falls into a small bay of Lake St. Croix near the point where we camped. The ground was mainly high, but the depressions among the rocks held small swampy spots where leatherleaf (*Chamædaphne*), sweet gale (*Myrica gale*), Labrador tea (*Ledum*), and various willows were the most conspicuous shrubs. On the muddy shores a tiny crowfoot (*Ranunculus reptans*) was common, along with species of *Potentilla* and *Polygonum*.

On the highest part of the rocky point overlooking the main area of the lake we found the large cross which was erected in 1864 by Père Petitot, as before referred to. It was formed of pieces of squared spruce about 7 inches in thickness, the upright being some 15 feet long, and the crosspiece 6 or 7. Of the date, 1864, which Petitot inscribed in Roman characters, only an occasional letter could be traced. Thus far we had been following in a general way the route traveled by J. M. Bell in 1900, but we now

left his route and pursued a northward course to the eastward of his track.

On August 13 we crossed Lake St. Croix diagonally, and from near its northeast corner made a portage of a quarter of a mile over a low, rocky ridge to a lake about 2 miles long east and west, by 1 mile wide. Its shores are mainly high, and near its center stands a small rocky island, high and well wooded. We passed to the eastward of this island and crossed among some large low ones to the northeast extremity. This lake is evidently the one referred to by Petitot in his narrative (*Autour du Grand Lac des Esclaves*, p. 247) as *Lac Seguin*.^a From it we made a portage of 175 paces over another rocky ridge to a smaller lake and encamped on its southern shore, near the western extremity. To the eastward stood several high, rocky hills, the highest of which showed a summit of very light grayish rock, in striking contrast to the surrounding hills. To the south, between us and Lake St. Croix, ran a rocky ridge. This is a part of the ridge called by Petitot *Mount Vandenburghe*, and on some maps the *Barrier Mountains*. To the westward a ridge of mountains with a general north and south trend loomed blue in the distance. From the summit of the ridge near camp an extended view of characteristic scenery—irregular rock-bound lakes and rugged ridges—could be seen (see Pl. XIV, fig. 2). The two common ferns, *C. acrostichoides* and *D. fragrans*, grew abundantly on the moss-covered rocks, and about the margins of the lakes the water arum (*Calla palustris*) was still in flower.

On August 14, the weather being unfit for traveling, we remained in camp at this place, but on August 15 we struck camp, and, crossing the end of the small lake, made a portage of 175 paces to another lake of irregular shape, about 1½ miles long east and west and less than a mile wide. We crossed it, and from its northern shore made a portage of about 1 mile over a rocky ridge and through several muskegs to another lake, which proved to be large. On the eastern shore of the part which we entered rose a rocky mount, about 800 feet high. Its northwest side is long and very precipitous; its other slopes are more gradual. Westward the lake is seen to be quite extensive. This is the *Lac Seguin* of Petitot (1875), and the *Lake Fabre* of Bell (1901). Going northward, we passed through channels between islands to another expansion, which is nearly circular and contains only a few small islands. This part we crossed in a northern direction and paddled through a narrow, winding channel, running a small rapid, to a small narrow lake, and out of this into another large one containing many rocky islands. Some of these islands and parts of the shores

^a But on his map of 1875 this name is given to the larger lake to the northward.

are high and have many large angular bowlders scattered over them. Other lower islands held mossy swamps on their summits, from which the water trickled down their sloping sides and glittered brightly in the sun. This is the Lake Hardisty of Petitot (1875) and of most maps, and the Lake Rey of Bell (1901).

In reaching these lakes we had again struck Bell's route, which we had left at Lake St. Croix. He entered the latter lake by a westerly route, while we had crossed north from Lake St. Croix by the better known Indian track, leading directly northward.

From Lake Hardisty northward to Great Bear Lake we followed, partially under the guidance of the Indians, a route never before followed by a white man, as far as I have been able to ascertain, and reached MacTavish Bay through an unmapped inlet to the eastward of where Bell started south.

After proceeding a few miles along the eastern shore of Lake Hardisty we entered a channel having a very perceptible current northward and encamped on a large, low, rocky island on its western shore. Here we remained during the following day. On August 17 we struck camp and proceeded northward down the channel, soon emerging into a small rounded expansion of the lake. A good-sized stream, said by the Indians to head near the Coppermine, and forming part of one of their hunting routes, enters this bay near its northeast corner. To the northward stands a range of rugged hills, one of which is cut by a deep narrow ravine. We here turned sharply to the west to avoid a westerly promontory which partly incloses the bay, and then turned northward again and after going a short distance encamped in a small, deep bay.

On August 18 we were detained until noon and then paddled northward along the comparatively even easterly shores for about 15 miles and encamped near the northern extremity of the lake. The principal feature worthy of record was a shallow bay, on whose shores were low ridges and fields of drifting sand. At our night camp the timber was of better growth than we had seen for some time. We were still on the large lake, which I can do no better than call Lake Hardisty. It is of much greater extent than hitherto has been supposed. Bell took it to be Petitot's Lac St. Croix, and, as he did not thoroughly examine it, was unaware of its great extent to the northward.

On August 19, when apparently near the end of the lake, we crossed diagonally toward the northwest and entered its outlet, a rather broad channel running northwestward with a moderate current. This stream soon expanded into a rounded lake, which we left by a strait on its northeastern side. Beyond the point where we left it it extended toward the northwest, but was probably not extensive. Its outlet soon expanded into a rounded lake some 3 miles in diameter, on whose

northeastern shores stands a range of hills upward of 800 feet high, rounded, rocky, and sparsely forested. Leaving this lake we descended several slight riffles and paddled through a wide channel with a scarcely perceptible current. Its shores at first were swampy, but farther on its southern shore became higher and was well wooded. A long, narrow lake succeeded, at whose foot we had to portage everything about half a mile on the west side of the stream past a rapid. The trail, which was fairly well marked, passed over several low, rocky ridges and through some fine groves of white spruce and Banksian pine. The trail mostly avoided the river, but the part of the river we saw consisted of a succession of foaming cascades. We encamped at the lower end of the rapid, on the shores of a small rock-bound lake.

On August 20 we paddled through the lake, which proved to be about a mile long. At its outlet another half-mile series of rapids was encountered and another portage made on the left side of the river. It led over ground which was similar to that passed on the previous portage. From here we passed through a small lake and then for a mile or two followed a narrow stream, here and there expanded into a broad channel with little current, until it fell into a large lake. The part where we entered was about 4 miles in length and was much broken up by islands. We then passed through a narrow part with a considerable current into the main part of the lake, which proved to be of large extent. We encamped on its eastern shore after going a few miles.

On August 21 we started with a fair wind and, turning toward the northwest and rounding a point, sailed northward up the lake. During the forenoon we passed on our left a large island several miles in length, on which was a mountain apparently about 800 feet high. From here we sailed until the middle of the afternoon on a general northerly course. The shores of the lake were mainly low and swampy, but had many gneissic outcrops. In the afternoon we encountered a point or large island extending east and west across our path. It was occupied by three rugged, sparsely wooded peaks 700 or 800 feet high, the most easterly being the highest. The range apparently formed a part of the eastern shore. A broad channel lying south of and parallel to the range was divided by a long, high, and narrow island. We entered the narrower, southern arm of this channel and followed it for 3 or 4 miles, then turned southward through a narrow strait and entered a rounded expansion a mile or so in extent. This we crossed in a westerly direction and from a small bay made a portage of about 100 yards into another bay at the same level. This was the first time we had been out of sight of direct water connection since reaching Lake Seguin on August 14, and the Indians assured us that in this case the portage merely connected

two bays of the same lake. After making the portage we pursued a winding, but generally westerly course for 2 or 3 miles and encamped at a narrow strait, an excellent fishing place, between two slight expansions of the channel. The rocky margins were sparsely clothed with the usual trees and shrubs.

On August 22 our guide declined to conduct us farther, apparently not having a personal knowledge of the route. He gave some directions to the other Indian, but after the first half day we were unable to follow them and had to find our way as best we could.

We went on at once, the guide accompanying us for a couple of miles from camp, and leading us westward into a broad expansion of lake. After parting with him we turned northward among some islands and soon entered a channel leading toward the northeast. It was narrow at first, but soon attained a width of nearly a mile. After following this channel about 8 miles we passed a high crag on the right, the extremity of a rocky hill. On the sloping side, as we advanced toward it, could be seen the profile of a face. At the point where this crag dipped to the water the width of the channel was reduced to 50 yards and there was a perceptible current. About 3 miles beyond here we came to a mountainous island or point extending across our path. We passed westward and traveled for 3 or 4 miles through a broad channel bordered on the north by a high, rocky ridge whose sparsely wooded sides, strewn with angular blocks of stone, sloped steeply to the water. From this we emerged into a large lake apparently nearly filled with large islands, and encamped on the eastern shore.

During the forenoon of August 23 we remained in camp finishing necessary work, and we spent most of the afternoon attempting to follow out the instructions given us by the guide; but becoming involved in a mass of low islands, and not being able to recognize any landmark referred to by him, we came back to our camping place and started northward up a broad channel which lay between the hilly eastern shore and a number of large, low islands. We encamped on one of these after proceeding a few miles.

On August 24 we pursued our way northward through an expanded part of the channel and during the forenoon passed through a narrow place where a fair current flowed northward. This convinced us that we were approaching the looked-for outlet, but a range of high hills which bordered the lake to the northward showed no indication of a river valley. After exploring several deep bays, however, we found where the river left by a formidable rapid about 300 yards in length. (See Pl. XV, fig. 1.) The portage track led over rocky ground on the left bank. Favorable spots at the rapid supported a good growth of spruce, with a luxuriant undergrowth of *Viburnum pauciflorum*, *Rosa acicularis*, *Rubus strigosus*, and *Vaccinium uliginosum*. Since



FIG. 1.—RAPID ON STREAM ENTERING MAC TAVISH BAY, GREAT BEAR LAKE, SHOWING LUXURIANT FOREST GROWTH, IN LATITUDE 65°.



FIG. 2.—RAPID ON LOWER GRANDIN RIVER, SHOWING GENERAL CHARACTER OF COUNTRY NORTH OF FORT RAE.



FIG. 1.—SANDY BAY ON WIND-SWEPT SHORE, GREAT BEAR LAKE NEAR LEITH POINT, SEPTEMBER 1, 1903.



FIG. 2.—CHARACTERISTIC BIT OF SHORE ON GREAT BEAR LAKE WEST OF MCVICAR BAY, SHOWING TONGUE OF FOREST APPROACHING SHORE.



FIG. 3.—SEMIBARREN SHORE NEAR LEITH POINT, GREAT BEAR LAKE.

leaving Lake Hardisty I had observed an increased luxuriance in the forest growth, evidently the result of a more favorable soil and the slightly decreased altitude. Paddling down this river, which was a broad, deep channel winding in a circuitous manner between high, sparsely wooded banks, we descended a short riffle a few hundred yards below the large rapid, and another a quarter of a mile beyond. Within a quarter of a mile below the second riffle we came to a rapid about a quarter of a mile long and quite formidable. We were obliged to portage everything on the left side of the river over a rocky ridge and diagonally down a mossy hillside. At the lower end of the rapid, which fell into a small, rock-bordered pond, we encamped. Currants (*Ribes rubrum* and *prostratum*) were abundant and ripe.

On August 25 we crossed the small pond and ran a small rapid which fell into the narrow arm of another lake. We paddled to the extremity of three bays before finding the outlet, which flowed from the westernmost bay. To the left of this stream, which starts from the lake with a moderate current, rises a high, rounded rock with a few trees growing on its sides. A few hundred yards below we came to a short rapid, where we made a portage of about 75 yards through thick spruce woods. The extremities of this portage were marked by blazed trees. This rapid fell into what apparently was a small lake, but which proved to be an inlet of Klarondesh Bay, which connects with MacTavish Bay. Searching for the outlet, we explored the first northerly bay, but had to retrace our way, and then took the western bay, where we encamped after going a short distance. The shores here are low and well wooded to the water's edge.

The next day, August 26, we pursued our way northward up the inlet. After proceeding about 2 miles we came to an easterly inlet, which we explored, but finding no outlet had to retrace our way. A mile or two beyond we passed another narrow easterly bay. A range of high, rocky hills now appeared ahead. The channel then widened out and a long, high, and narrow gravelly island, nearly devoid of trees, a favorite camping ground for the natives, was passed on the right. From this we crossed diagonally westward to a high, rocky point, where we encamped. From the summit this point was seen to lie between two diverging arms of the lake, the one we had traversed being the narrower. To the westward lay the range of granite hills, and northward stretched a maze of high, rocky islands.

On August 27 we started before sunrise and pursued our way northward and then eastward among islands, passing to the left of several large ones, and finally entering a channel about a quarter of a mile wide, bordered on either side by high, rocky, sparsely wooded hills. We followed this channel for about 4 miles, and encamped in a sandy bay, where a low level spot at the base of a high gravelly point

supported a scattering grove of white spruces. A dense smoke coming from extensive fires to the eastward obscured our view, but during the afternoon it gradually cleared away. While hunting about the hills we found that we were within a short distance of the main body of MacTavish Bay. The high, rocky land bordering to the northward the channel on which we were encamped was Ndu-tcho, or Richardson Island. Back of our camp, on the southern side of the inlet, rose a range of rough, rocky hills, whose steep slope was a succession of thinly wooded rock-slides. Eastward toward the main body of the lake rose a succession of sloping terraces, thinly wooded and with a number of small ponds in shallow basins. Leading by the easiest routes along the rocky slopes were the well-worn paths of the Barren Ground caribou, whose migrating bands pass along this shore in their semiannual movements. Exploring in that direction I reached the extremity of a rocky headland which extended between two inlets close to the lake, from which its rocky sides rose precipitously for several hundred feet. A very deep lakelet on the summit of the promontory, with no connection with Great Bear Lake save its tiny outlet, which fell over the precipice at its margin, was inhabited by at least one species of fish. From the summit of this headland I overlooked the apparently boundless expanse of Great Bear Lake—unbroken except by a few rocky islets near the shore. Toward evening we broke camp and paddling around the point encamped near the base of the promontory, where a favorable fishing place was found. From camp back to the base of the steep rocks stretched a sloping boulder-covered area on which small birches and willows, whose foliage was already turning yellow, were the principal trees.

On August 28 we left camp and started westward along the shore. The smoke, which had again gathered, allowed no prospect, and we had to feel our way cautiously around the bays. Occasionally it cleared enough for us to see that the shore was very rocky, with irregular ranges of granite mountains rising higher and higher in the background. Many ravines which cut their sides were filled with slide rock and devoid of vegetation. In the afternoon we passed the mouths of two deep bays bordered by high rocky hills. What appeared to be an island turned out to be the extremity of a point about 5 miles in length, and we had to paddle around it. This point was apparently about 2 miles broad at its base, where it was low and fairly well wooded. The main part, however, was in places nearly a hundred feet high, was composed of loose, angular rocks, and was entirely devoid of vegetation, with the exception of a few willows which grew near the shore. It was terminated by a precipitous rock, perhaps 50 feet in height. Rounding the point we paddled back along its dreary and monotonous shore. Our view was still obscured by smoke, and we nearly reached its base before we discovered that a

similar but broader point stretched out into the lake ahead of us. We rounded this and encamped in a sandy bay just beyond. (See Pl. XVI, fig. 1.)

At our camp (see Pl. XVII, fig. 1) the country was fairly level and was sparsely wooded with spruce, which was much dwarfed and twisted on the wind-swept shores, but farther back attained a diameter of 2 feet and a height of 50 feet. Large areas were nearly barren from the nature of the soil, but usually a carpet of *Dryas integrifolia* and various mosses, or dense masses of crowberry (*Empetrum nigrum*), covered the ground. Willows (*Salix alaxensis* and *S. reticulata*) grew in favorable places along the shore and on the banks of the small streams. Several small muddy ponds (see Pl. XVI, fig. 3), about which were lingering a few of the latest sandpipers, lay near the shore of the bay.

We remained at this camp until the morning of September 8, detained during the first few days by high winds, and latterly by having to dry and bring to camp the flesh of a moose which the Indian fortunately killed. On September 8 we loaded our canoe and started westward along the coast, which was rocky and nearly barren. About noon we were forced by wind to run ashore, and took refuge in a small bay behind a low wooded island. This was the first place we had seen since leaving our camp in the morning where the spruce and tamarack woods approach close to the shore.

The next day, September 9, we sailed all the forenoon westward along the coast, passing half a dozen barren rocky points inclosing sandy bays, the heads of which were well wooded. In the afternoon we passed Leith Point and turning southwestward crossed a deep bay, passing inside a series of low rocky islands, and entered McVicar Bay shortly before sunset. Grizzly Bear Mountain, across the bay, was capped with a light snow.

On September 10 we crossed a deep bay and reached the extremity of a low point or island from which we were to cross the mouth of McVicar Bay. The wind, however, was unfavorable for attempting the dangerous traverse, and we landed near by to wait for a calm. About 4 o'clock in the afternoon the wind had nearly died down, and we struck out for the low rocky island which lies midway of the passage. We paddled steadily and reached it in fifty minutes, the distance thus being about 4 miles. From the island we covered the remaining stretch, about 4 miles northwestward, to the low, barren rocky point which terminates the immense peninsula of Grizzly Bear Mountain. Beyond we passed several small rocky points and encamped in a bay where the spruce woods approach close to the shore. The beaches here are of sand and gravel and rise quite steeply from the water. Back of our camp a level park-like area, with a sandy soil which supported a fair growth of white spruces, stretched

back to the base of Grizzly Bear Mountain. The altitude of this mountain has been estimated at 900 feet, and several hundred feet of its upper portion is devoid of timber. Extensive areas on the wooded slopes, appearing gray in the distance, showed the destructive effects of forest fires.

On September 11 we voyaged westward along a low, rocky shore. Some spurs of the mountain, which gradually become lower to the westward, approach nearly to the shore. A nearer view showed that the fire-swept areas were covered with willows and other shrubs whose magnificently tinted autumn foliage, with its endless variety of yellow, red, and green, combined to form a beautiful effect. During the forenoon we passed some high clay banks, and in the afternoon paddled along the borders of a broad, shallow bay whose shores were formed partly by high sandy banks holding in places a seam of what appeared to be lignite. We encamped in a small sandy bay where the foothills approach within a mile or two of the shore. During the following day, on account of high winds, we advanced only a few miles, and encamped on the borders of a shallow bay just west of a long, low rocky point. The shores here are mainly composed of limestone, the first we had seen since leaving the vicinity of Fort Rae.

On September 13 we paddled along a rather low coast, passing a number of shallow bays, and at noon rounded a long westerly point and entered a bay which makes in toward the east. It is bounded on the south by sandy shores and a low, narrow, finely wooded flat (see Pl. XVII, fig. 2), behind which rises a low ridge thickly clothed with shrubs. Beyond here we passed several small bays. On one of these bays was the camp of a family of Indians, the first humans we had seen since leaving lower Grandin River, six weeks before. We encamped that night in a broad bay with low shores.

On September 14 we continued southwestward along the coast, but were delayed several hours in the middle of the day by high winds. We passed several large and small bays with low sandy shores, and a long, bare, gravelly point covered with quantities of small bowlders pushed up by the ice. The forest was composed largely of tamarack, whose foliage, now turned yellow, made quite an impress on the scenery. About midafternoon the Manito Islands appeared in sight.

The next day, September 15, we passed one or two points and reached the deep bay at the base of the Grizzly Bear Mountain peninsula. We paddled across the mouth of this bay, about 4 miles, in a dead calm. Midway of the traverse we passed a bar where the water was only 12 or 15 feet deep and could see numbers of large lake trout idly swimming about near the gravelly bottom. A few miles beyond, about the middle of the day, we passed the Manito Islands, which lie farther to the east than is represented on most maps. They



FIG. 1.—CAMP OF BIOLOGICAL SURVEY PARTY NEAR LEITH POINT, GREAT BEAR LAKE, SEPTEMBER, 1903.



FIG. 2.—SHORE OF SANDY BAY WEST OF MCVICAR BAY, GREAT BEAR LAKE.
[The forest here is more luxuriant than farther east.]



FIG. 1.—BANK OF UPPER BEAR RIVER, AND OUR INDIAN ESCORT.



FIG. 2.—TRAPPER'S CABIN NEAR SITE OF FORT FRANKLIN, GREAT BEAR LAKE.



FIG. 3.—MOUNT CHARLES, AT RAPID OF BEAR RIVER.

are three in number, rather high and rocky, and are devoid of trees, though apparently well covered with low shrubs. Their constantly changing appearance, as one travels along the coast past them, causes them to be held in some veneration by the natives and probably has given rise to the name. Rising from the clear waters of the lake without a tree to serve as a standard for comparison, they present a weird appearance, and we found it impossible to estimate their distance from any point. Where we passed them they were apparently only a mile or two offshore, but the real distance is probably much greater. They remained in sight nearly all the afternoon, and had a different appearance every time we turned to view them. In the afternoon we paddled nearly 20 miles along a rather low, gravelly shore.

The next day, September 16, we kept on most of the day, though the wind forced us to lie by for several hours. The immediate coast here is low and treeless, but the spruce forest parallels the shore at a distance of a mile or so. We persisted until dark, hoping to find a favorable place to camp, but were finally driven ashore by a thick fog which suddenly swept over us. The next morning when the fog lifted we found that we were near the outlet of Great Bear Lake, but we could not start until noon, when the wind went down, though huge rollers sweeping in from the main body of the lake still testified to the violence of the storm. We paddled eastward a short distance and then struck across toward the site of Fort Franklin, where we could see the cabins and tents of a party of Hare Indians. It was late in the afternoon before we had our camp established on the shores of Gray Goose Lake, a body of water about a mile in length, which receives a small stream and is connected with Keith Bay by a narrow channel. As I intended to remain here about ten days I pitched camp in a favorable place for working the surrounding country. Fort Franklin is interesting from a zoological standpoint on account of being the type locality of several species of mammals, birds, fishes, and other vertebrates.^a

^a The first establishment on Great Bear Lake, according to the testimony of François Beaulieu, who was one of the principal guides and hunters of Franklin's expedition about Great Bear Lake in 1825, was built by a Northwest Company officer named Mackenzie, probably Mr. Alexander Mackenzie (not Sir Alexander), in 1799. During one year, a post of the rival X Y Company also was maintained there, but these companies united in 1804. The post was kept up at least until the autumn of 1812. In the summer of 1825 Fort Franklin was built by Franklin's party on "the site of an old fort belonging to the Northwest Company"—plainly the original site. This was abandoned two years later when the expedition left the country, and the buildings were gradually destroyed by the fishermen who were sent there each autumn by the Hudson's Bay Company. Richardson in June, 1849, found nothing remaining of the buildings but portions of the chimneys, and occupied the fishermen's

The country about Fort Franklin is slightly undulating and, except for certain semibarren points near the shores of the lake, is well wooded with spruce, tamarack, willow, and the usual subarctic vegetation. (See Pl. XVIII, fig. 2.) Much of the ground is covered with lichens of the genus *Gyrophora* and various mosses. At the time of our visit the leaves of the tamaracks, willows, and other deciduous trees were falling. The site of the post itself is the summit of a rather steep bank elevated about 50 feet above the shores of the lake. The buildings have long since been destroyed, and only the débris of the stone chimneys and the faint outlines of the sills of the principal houses now remain to mark the spot. The original clearing is partially grown up to willows, but much of the ground supports only a growth of grasses and herbaceous plants. The site overlooks to the southward the broad expanse of Keith Bay, at the extremity of which, at a distance of 4 or 5 miles, Bear River has its efflux. To the westward the ground slopes rather abruptly. A marsh lies between the small lake and Keith Bay, and beyond stretches a broad, low, barren area, flanked by interminable wooded muskegs. To the southwest, at a distance of 60 miles, the summit of Roche Clark, snow clad at the time of my visit, is visible under favorable conditions of the atmosphere. The region about the outlet of the lake, on account of the excellent fisheries, has long been a favorite resort for the natives; consequently large game and fur-bearing animals are scarce.

I remained at Fort Franklin until September 28, securing a valuable collection. The weather during my stay was usually cold and rainy and it was evident that the autumn was drawing to a close. On the day of our departure an autumnal gale delayed us until afternoon, and we descended Bear River only a few miles before being forced by darkness to encamp.

Bear River issues from the lake by a broad, shallow channel with a swift current, which it maintains throughout its course. The water is beautifully clear, and as the stream is descended the bottom can be plainly seen, and seems to rush by with lightning speed. When the water is low, as at the time of our visit, a zigzag course must be pur-

cabin, where also Lieut. Hulme Hooper, of the boat expedition dispatched from the *Plover*, passed a part of the following winter.

In 1863, at the request of the natives, the Hudson's Bay Company established a trading post on the western side of the little inlet which connects Gray Goose Lake with Keith Bay. A Catholic mission was established by Petitot at the same point in 1866, and continued until 1878. When the trading post was discontinued I have not been able to ascertain.

Fort Confidence, on the northeast shore of Great Bear Lake, was built in the autumn of 1837 by Thomas Simpson. These buildings were mostly destroyed by fire after their abandonment. Richardson, in the autumn of 1848, reoccupied the site, erecting several buildings, and these were found by J. M. Bell, in 1900, to be in a fair state of preservation.

sued, both to take advantage of the current and to avoid the numerous bars, and this greatly increases the distance. The banks at the head of the river are low (see Pl. XVIII, fig. 1), but rapidly increase in height. The bordering country is mainly swampy and is well wooded. The more gently sloping banks are grassy or wooded, and a dwarf willow (*Salix reticulata*) is a conspicuous shrub for some distance below the lake. Snow fell during the first night, and the next day, September 29, we kept on down the river. We soon descended the rapid, keeping close to the right bank, and accomplishing the passage in safety. At the lower end of the rapid great quantities of ice still remained on the southern bank of the river. Mount Charles (Pl. XVIII, fig. 3), just below the rapids, presents a rather steep, sparsely wooded slope to the river. It is said to be upward of 1,500 feet high and is mainly composed of limestone. Below here the river broadens out, inclosing several low islands, and has a less impetuous current. We encamped on the left bank only a few miles from the mouth and the next forenoon reached Fort Norman; thence we ascended the Mackenzie to Fort Simpson. This part of our journey is elsewhere (p. 37) described in sufficient detail, and need not be alluded to further.

NOTE ON BOUNDARIES OF REGION TREATED.

The present report relates to the natural history, especially to the higher vertebrates, of the northern parts of the provinces of Alberta and Saskatchewan (north of latitude 55°), the unorganized territory of Mackenzie, and the islands of the Arctic Sea to the northward of the latter division.^a In addition the northern part of the old province of Alberta (south to about latitude 53°) has been included, both because it was traversed by our parties and because it seems desirable to record the results of field work previously done by the Biological Survey in that region.

The literature of the Athabaska-Mackenzie region has been searched thoroughly for notes on natural history. Of the thousands of notes thus secured, many of which are buried in narratives of travel or official reports, and thus practically hidden from the natural history student, only those have been utilized which have

^a Since the greater part of this paper was prepared the territories of Athabaska and Assiniboia have been abolished, and their area is now mainly included in the present provinces of Alberta and Saskatchewan, whose boundaries have been extended and otherwise changed. It was therefore deemed advisable to make the wording of the report conform to these new boundaries. The provinces of Alberta, Saskatchewan, and Mackenzie, therefore, are to be considered as understood since 1905. The map (see frontispiece) accompanying this report shows the new boundaries. The parallel of 55° marked the southern boundary of the old territory of Athabaska.

special value from the standpoint of geographic distribution, breeding, migration, or some other phase of life-history. Occasionally, when deemed advisable, notes from outside these geographic boundaries have been utilized.

The present report may be considered as complementary to the previous report on the Hudson Bay region.^a

MAMMALS OF THE ATHABASKA-MACKENZIE REGION.

The following list is intended to include all the species of mammals which are known to occur in the region now under review. Most of the species came under our observations, and many were added to the list of those previously known. Owing to the uniformity of climatic and physiographic conditions in the north many species range over large areas without differentiation into races; consequently few new forms have been detected. It has been necessary to describe only one, a northern form of *Evotomys gapperi*; in the case of one or two other forms, old names have been revived. All measurements, unless otherwise stated, are in millimeters.

***Balæna mysticetus* Linn.** Greenland Whale.

This species is of regular occurrence in the Arctic Ocean north of the Mackenzie region, and has been recorded a number of times. It is probably most abundant in the open ocean north of the mouth of the Mackenzie, and it is there that most of the whaling is carried on. The animal occurs also in the straits among the large islands to the eastward, and I find a few records showing that occasionally it enters the comparatively narrow inlets between Wollaston Land and the mainland. Its numbers, however, are now everywhere very much diminished.

During Parry's first voyage, whales were observed near Melville Island in August, 1820;^b and other individuals, as well as remains, were seen in that region on several other occasions. J. C. Ross stated that the species was found in considerable numbers in Prince Regent Inlet, and that one was killed at Port Bowen in June, 1825.^c He later recorded it as occurring in the inlet down to latitude 71° on the west shore, and stated that a few were noted about the Isthmus of Boothia.^d Richardson mentions that whales have sometimes drifted to the vicinity of the mouth of Coppermine River.^e During Franklin's and Richardson's journeys along the Arctic coast in the summers of 1826 and 1827, black whales were noted at the mouth of the

^a A Biological Investigation of the Hudson Bay Region, by Edward A. Preble. North American Fauna, No. 22, October, 1902.

^b Fisher, Journal Voyage of Discovery, p. 249, 1821.

^c Appendix to Parry's Third Voyage, p. 94, 1826.

^d Appendix to Ross's Second Voyage, p. xxiii, 1835.

^e Appendix Parry's Second Voyage, p. 338, 1827.

Mackenzie, at Cape Bathurst, and in Franklin Bay.^a The Arctic Ocean north of the Mackenzie is still visited by many whaling vessels, some of which winter at Baillie Island and Langton Bay, though Herschel Island is a more general resort. While at the latter point in the summer of 1894, Russell recorded that the whaling fleet left on August 11 for the whaling grounds between Richards Island and Cape Bathurst, where, during the preceding summer, they had made the greatest catch in the history of Arctic whaling, the *Narwhal* having taken 64 bowhead whales, the *Balaena* 62, and the others from 9 to 40 each.^b

From a letter received from Sergt. F. J. Fitzgerald, of the Northwest Mounted Police, dated at Herschel Island in the autumn of 1904, I glean the following facts relative to the whaling industry. In the winter of 1896-97 fifteen vessels wintered at Herschel Island, and since then from one to six annually have wintered at that place or at Baillie Island. Four vessels were then (1904) supposed to be in winter quarters at Langton Bay, and two steamers were then wintering at Herschel Island. The largest catch was made about 1897, when one vessel took 69 whales, and two others of the fleet over 60 each. The steamer *Narwhal* left Herschel Island in the autumn of 1904 with the product of 18 whales, taken during the three preceding seasons. The largest number taken by one vessel in 1904 was 9, by the steamer *Jeannette*. Two whales are said to pay for a season's work, and three for the wintering of a vessel.

MacFarlane states that each season the Eskimo who frequented Fort Anderson usually succeeded in killing one large whale, though seldom more. On two occasions he heard the spouting of whales in Franklin Bay, and he also observed their bones in several places.^c Hanbury reports that the Eskimo find the bones of whales along the coast near Ogden Bay.^d

Monodon monoceros Linn. Narwhal.

The narwhal is of regular occurrence in the more extensive inlets among the Arctic Islands.

During the summer of 1826, on Franklin's second expedition to the Arctic Sea, Richardson saw at Point Toker, east of the mouth of the Mackenzie, spearheads and ice chisels made from the horns of this species, and the animal was stated by the Eskimo to frequent the vicinity.^e Fisher recorded one which was killed August 11, 1819, in Prince Regent Inlet (near Port Bowen). Its weight was estimated at

^a Narrative Second Expedition to Polar Sea, pp. 35, 229, 239, 1828.

^b Expl. in Far North, p. 148, 1898.

^c Proc. U. S. Nat. Mus., XXVIII, p. 730, 1905.

^d Sport and Travel in Northland of Canada, p. 139, 1904.

^e Narrative Second Expedition to Polar Sea, p. 209, 1828.

2 tons.^a J. C. Ross later reported the narwhal as abundant in Prince Regent Inlet.^b Armstrong records one seen in the summer of 1850 near Cape Bathurst.^c Sutherland states that Penny found the animals numerous about the middle of June, 1851, in Wellington Channel near Point Decision.^d

Delphinapterus catodon (Linn.). White Whale.

This wide-ranging species occurs all along the northern coast, and in the larger inlets among the islands nearly as far north as man has penetrated. It is partially migratory, withdrawing from the more northern part of its range by the first of September, but the extent of its migration is unknown.

Mackenzie noted it at the mouth of the river since named for him, when he first descended it.^e Franklin, during his second expedition to the Arctic Sea, noted it near the same place in the summer of 1825.^f In the summer of 1848 Richardson observed the species near Cape Bathurst and in Franklin Bay.^g J. C. Ross recorded the beluga as abundant in Prince Regent Inlet.^h M'Clintock later states that one was shot in August, 1859, at Port Kennedy.ⁱ Fisher observed great numbers on August 6, 1819, in Barrow Straits near Prince Regent Inlet.^j Osborn observed the species on September 5, 1850, in Wellington Channel near Cape Spencer. The animals were numerous and were moving southward, accompanied by their young.^k

Joseph Hodgson, of the Hudson Bay Company, informed me that some years ago, while stationed at Fort McPherson, he saw two individuals which had ascended Peel River to that point.

Odocoileus virginianus macrourus (Rafinesque). Plains White-tailed Deer.

I was informed by J. S. Edmonton, an old hunter in the Athabaska region, that within a few years a number of white-tailed deer have been killed near Edmonton.

Odocoileus hemionus (Rafinesque). Mule Deer.

In the summer of 1895 J. Alden Loring reported seeing a doe of this species at Jasper House; he observed also many tracks in the vicinity of Henry House. In 1896 he saw fresh tracks along a stream in the

^a Voyage of Discovery to Arctic Regions, p. 83, 1821.

^b Appendix to Ross's Second Voyage, p. xxii, 1835.

^c Narrative Discovery Northwest Passage, p. 201, 1857.

^d Journ. Voy. Baffin Bay, II, p. 150, 1852.

^e Voyages to Frozen and Pacific Oceans, p. 64, 1801.

^f Narrative Second Expedition to Polar Sea, p. 35, 1828.

^g Arctic Searching Expedition, II, pp. 269, 271, 1851.

^h Appendix to Ross's Second Voyage, p. xxii, 1835.

ⁱ Voyage of Fox, p. 302, 1860.

^j Voyage of Discovery to Arctic Regions, p. 74, 1821.

^k Arctic Journal, p. 122, 1852.

valley 15 miles south of Henry House in July; reported the species rare between Jasper House and Smoky River, but saw tracks on Grand Cache River and on the north bank of Smoky River, in the early autumn; and saw the tracks of two bands in the mountains west of Henry House about the middle of October.

J. S. Edmonton assured me that during the fall of 1897 a few black-tailed deer frequented the vicinity of Stony Rapid, on the Athabaska, about 200 miles (by the river) below Athabaska Landing.

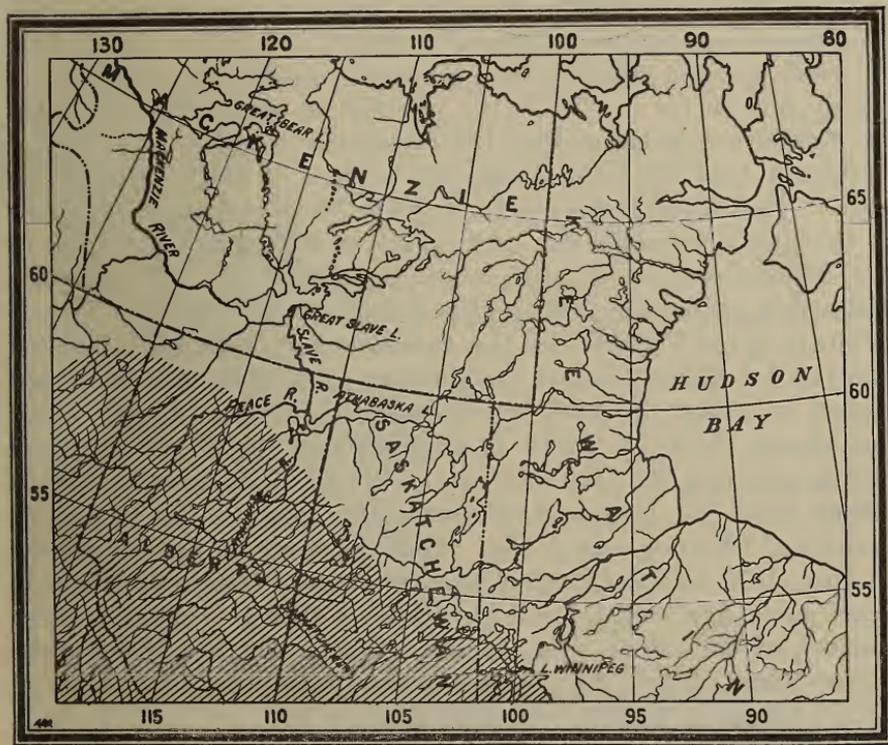


FIG. 10.—Former distribution of elk (*Cervus canadensis*) in central Canada. This species is now reduced in this region to a few herds in the Saskatchewan Valley.

Cervus canadensis Erxleben. Canadian Wapiti.

Formerly ranging north over the plains of Peace River, this animal has now apparently become extinct over this part of its range, but still occurs in small numbers in central Alberta. (Fig. 10.)

I was informed by J. S. Edmonton that during the autumn of 1897, while trapping near Stony Rapid, on the Athabaska, he noted the occurrence of four or five individuals of this species on the south side of the river near that point; he further stated that a few still remain in the neighborhood of Fort Saskatchewan, near Edmonton. W. E.

Whiteley, living on Sandy Creek, 20 miles south of Athabaska Landing, tells me that the animal occasionally occurs there.

During Alexander Mackenzie's exploration of Peace River, he several times met with this species, and states that it abounded on the plains on both sides of Peace River near the trading post which he established near the mouth of Smoky River in the autumn of 1792,^a and on several occasions he noted it farther up the river. Harmon, the next traveler to give a detailed account of this river, frequently observed the wapiti, and refers to its general abundance in that region as follows: "Throughout the whole course, from this fall [Vermilion] nearly to the Rocky Mountains, at a little distance from the river, on each side, there are plains of considerable extent, which afford pasture for * * * the red deer or elk."^b He states that the species was killed at Fort Dunvegan, and was seen between that place and Fort St. John, during the autumn of 1810.^c Richardson says: "The *wapiti* is not known on Slave River or Lake, but further to the west it ranges as far north as the east branch of the River of the Mountains near the fifty-ninth parallel, where Mr. Murdoch M'Pherson informs me that he has partaken of its flesh."^d Caspar Whitney gives Victoria, on the Saskatchewan, between Edmonton and Lac La Biche, as about the northern limit of the species in that region in 1894.^e In 1896, while exploring between Jasper House and Smoky River, J. Alden Loring reported that a few were said still to exist near the head of Pembina River, where, however, during recent years the Indians had nearly exterminated the species by 'crusting.' Petitot relates that while traveling on the Athabaska in June, 1879, he met two Cree hunters who had lately killed, among other game, five wapiti;^f and he writes me that in August, 1876, he partook of elk's flesh in an Indian camp on the Athabaska above House River.

***Alces americanus* Jardine. Eastern Moose.**

The moose occurs throughout the Athabaska and Mackenzie region north to the limit of trees. (Fig. 11.) It is often seen by parties descending the rivers, but we did not observe any during our first trip in 1901. At the cabin of a trapper near the Boiler Rapid, Athabaska River, we saw a number of heads which had been taken in the vicinity during the previous winter. One of these was a partial albino, a large

^a Voyages to Frozen and Pacific Oceans, p. 130, 1801.

^b Journal of Voyages and Travels, p. 174, 1820.

^c Ibid., pp. 185, 187, 1820.

^d Arctic Searching Expedition, I, p. 128, 1851. By the east branch of the "River of the Mountains" (Liard), Richardson meant Fort Nelson River. (See note, p. 198, under *Ochotona princeps*.)

^e On Snowshoes to Barren Grounds, p. 21, 1896.

^f Proc. Roy. Geog. Soc., 1883, p. 640.

patch on the face being of a dark creamy color. During the first half of June we saw many tracks at our camp on Slave River 10 miles below the mouth of the Peace, and on the islands in the river between there and Smith Landing. A party of Indians whose camp we passed on the lower Athabaska early in August had just killed a moose, and

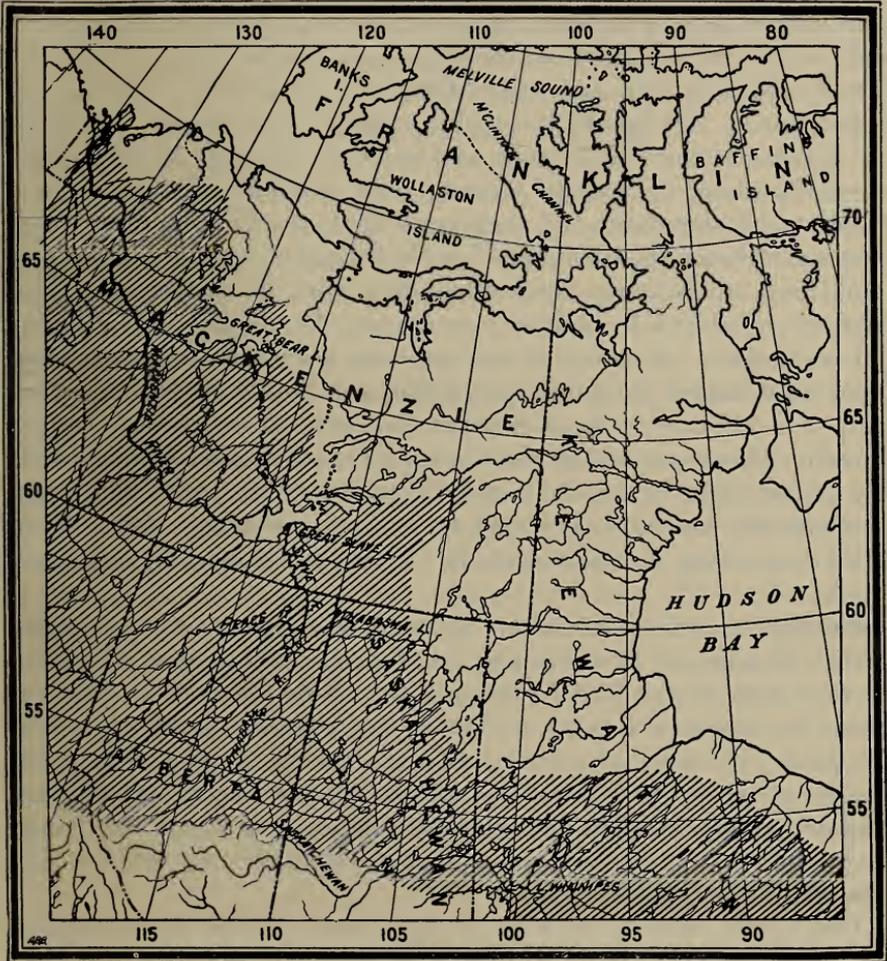


FIG. 11.—Distribution of moose (*Alces americanus*) in central Canada. The moose seems to be extending its range northward in the region of Hudson Bay.

during our ascent of the river a female was killed by the voyagers on August 18 near Brulé Rapid.

In the spring of 1903, while descending the Athabaska and Slave rivers to Great Slave Lake, we saw tracks of moose occasionally, but observed none of the animals. During their return trip in the fall, however, my brother and Cary saw a young one on the Athabaska above Athabaska Landing. In the lake country between Fort Rae

and Great Bear Lake, during my northward trip in the same autumn, the moose was found to be rather common, and became more abundant as we approached Great Bear Lake, owing to the country being better suited to its needs. Tracks were often seen on the portages and a large bull was observed on an inlet of MacTavish Bay on August 25. Along the southern shore of Great Bear Lake we found it a common and in some places an abundant species. Even in the exposed and semibarren country in the region of Leith Point a few are found, and a female was killed there by my Indian canoeman on September 1. Owing to the rocky nature of its haunts, the hoofs of this animal were much worn and blunted. West of McVicar Bay, especially along the base of Grizzly Bear Mountain, the species was found to be abundant, and numerous fresh tracks were seen wherever we landed. Its abundance here is partially explained by the fact that there are immense areas abounding with its proper food, and sparsely inhabited by natives; moreover, the inhabitants are poor moose hunters. A party of natives seen near Manito Islands had repeatedly started moose without killing one, while my Dogrib canoe-man, in a far more difficult country, had secured the only animal he hunted. Moose are seldom found about Fort Franklin, owing doubtless to the place having been a favorite resort of natives since time immemorial, but they are said to be common along Bear River. While ascending the Mackenzie in October we frequently saw fresh tracks.

During the winter of 1903-4 upward of forty moose were killed within 25 miles of Fort Simpson, and moose meat comprised an important item of our food. During a trip down the river in January I saw the tracks of a band of four or five about 30 miles below Fort Simpson. An area of considerable size on the sloping side of the valley, grown up to willows, had afforded a fine feeding ground, and was well trampled. The animals had wandered out on the snowy surface of the river also, and had trotted about apparently with no particular aim, perhaps in play.

During the night of May 23, 1904, a female moose wandered upon the island on which Fort Simpson is situated. During the next forenoon the animal was roused from its bed by a dog and driven into the shallow channel between the island and the western bank of the river, where it was shot by an Indian, and the skin obtained for a specimen. While fleeing from the dog the moose continually uttered a loud grunting protest. Another was killed near the same place in June. While descending the Mackenzie during June tracks of moose were frequently seen along the banks, and several of the animals were observed. A female, apparently pursued by wolves, took to the water near our camp a few miles below Fort Simpson, on the morning of June 2, and was killed for food. Tracks of moose were common

along the lower Nahanni, and two of the animals were started in the vicinity early in June. Though tracks were often observed, no more of the animals were seen until we reached the lower Mackenzie. During the evening of June 28, while paddling down the Mackenzie, a few miles below the site of old Fort Good Hope, we saw three moose. Early in the evening a cow and her young calf were seen to take to the water at some distance below us, and start across the river. We let them get well into the stream and then paddled swiftly after them. When they discovered us they first made several undecided moves and then attempted to regain the shore they had just quitted. The mother accommodated her speed to that of her calf, and did not leave it until we had approached within 30 yards. She then started for the shore, and on reaching it trotted away into the forest after a momentary survey of the situation. The little one was by this time nearly exhausted. We gently forced it ashore and held it until it had somewhat recovered its strength and breath, then heading it back along the river bank, we left it to rejoin its mother. When we last saw it the little creature was trotting up the shore, occasionally uttering a querulous cry to attract her attention.

A few miles below here a large bull moose was seen on a sandbar at the lower end of a willow-covered island. He shortly entered the willows without perceiving us, and hoping to get a close view of him, I landed and ran toward the place. He soon came into sight again, when I took to the brush and easily approached within 200 yards. As he started up the shore in my direction I crouched behind a willow sapling and awaited his approach. I was really in plain sight, but he was totally unaware of my presence and I had a good chance to observe his movements. He approached at a slow trot, occasionally snipping off the tender tip of a willow, and was passing within 50 feet when I stood up and attracted his attention. He instantly whirled about and plunging into the water swam across the narrow channel to the main shore. Here he made several attempts to climb the high bank, but failing, again took to the water, and disappeared around a point.

Moose are fairly common in the vicinity of Fort McPherson, where one hunter was said to have killed ten during the preceding winter. The natives of this section generally run down the animals on snowshoes when the snow is deep.

While we were ascending the Mackenzie by steamer, a band of three moose was observed on the right bank of the Mackenzie 50 miles below Fort Simpson. Another individual was seen on the Athabaska below Poplar Point on August 8.

In the mountains west of the Mackenzie, where the snow becomes very deep during some seasons, moose are said to form yards, but they do not seem to have this habit in other parts of the region.

Hearne was the first to record moose from the Mackenzie region, finding them "very plentiful" on the south side of Great Slave Lake east of the mouth of Slave River during the winter of 1771-72, while on his way back to Fort Churchill during his famous journey of exploration.^a Harmon noted their occurrence on the plains of Peace River in 1808.^b During Franklin's first northern journey a moose was killed near Fort Enterprise in the spring of 1821.^c During his second expedition moose were killed on Ellice Island, near the mouth of the Mackenzie, in the summer of 1825; and near Fort Franklin in September of the same year, and in February, 1826.^d During the spring of 1834, while Back's expedition was wintering at Fort Reliance, a moose was killed on 'Fish River' (in all probability the Thelon, or Ark-i-linik) several days' travel east of Great Slave Lake.^e Simpson reports that tracks of moose were seen on MacTavish Bay, Great Bear Lake, during the winter of 1837-38.^f Ross recorded specimens taken at Fort Good Hope,^g and Fort Simpson.^h Lockhart, writing in 1865 on the habits of moose, states that they were rarely killed in the vicinity of Fort Rae, though they were quite numerous at Big Island and along the south shore of Great Slave Lake; and that the moose of Peel River and the Yukon are much larger than those in the Great Slave Lake region.ⁱ While exploring in the country between Athabaska Lake and Churchill River in the summer of 1892, J. B. Tyrrell found that the moose occurred throughout the more thickly wooded parts of the country as far north as Stone River, near the eastern end of Athabaska Lake.^j Russell states that a moose was killed near the mouth of Yellowknife River, Great Slave Lake, in August, 1893.^k A. J. Stone records the moose from several points in the lower Mackenzie Valley, giving evidence as to the large size of the animals found there, and from the headwaters of the Nahanni River, where they abound.^l

During the early autumn of 1895 a moose was killed by a member of Loring's party near the headwaters of McLeod River; in the autumn of 1896, fresh tracks were seen almost daily along the trail between Smoky River and Jasper House.

^a Journey to Northern Ocean, p. 250, 1795.

^b Journal of Voyages and Travels, p. 174, 1820.

^c Narrative of Journey to Polar Sea, p. 299, 1823.

^d Narrative of Second Expedition to Polar Sea, pp. 34, 57, 71, 1828.

^e King, Narrative of Journey to Arctic Ocean, I, p. 192, 1836.

^f Narrative Discoveries on North Coast of America, p. 216, 1843.

^g Can. Nat. and Geol., VI, p. 442, 1861.

^h Nat. Hist. Rev., II (second ser.), p. 275, 1862.

ⁱ Proc. U. S. Nat. Mus., XIII, pp. 305, 307, 1891.

^j Ann. Rept. Can. Geol. Surv., VIII (new ser.), p. 13D, 1896.

^k Expl. in Far North, p. 80, 1898.

^l Bull. Am. Mus. Nat. Hist., XIII, p. 49, 1900.

J. W. Tyrrell states that while exploring on the upper Thelon in the summer of 1900, "on two occasions moose antlers were found embedded in the sand of the river bank."^a Hanbury states that moose are found in the main Ark-i-linik, or Thelon, River [below its junction with the Hanbury], and mentions seeing numerous fresh tracks and places where the animals had browsed on the willows.^b In August, 1902, while descending Dease River, northeast of Great Bear Lake, he found tracks along its banks.^c

MacFarlane states that previous to the establishment of Fort Anderson, in 1861, moose were frequently seen feeding on the high banks of Anderson River, but that they diminished in numbers after that date, though found to the very edge of the wooded country. He observed traces of this animal (evidences of browsing) in the thickets along Wilmot Horton River, near latitude 69°, within the limits of the Barren Grounds.^d

Rangifer caribou (Gmel.). Eastern Woodland Caribou.

Our knowledge regarding the forms of caribou inhabiting the interior of British America is very meager, and the following notes relating to woodland caribou are only provisionally included under this name.

No woodland caribou were seen on either of our trips, but they were ascertained to occur sparingly throughout most of the region. Mr. Brabant, of Fort Smith, informed me that they were unusually common in that vicinity during the winter of 1902-3. Captain Mills, of the steamer *Wrigley*, told me that he saw one on Slave River near McConnell Island on July 5, 1903. The Dogribs say that a few are found in the country between Fort Rae and Great Bear Lake. Along the lower Liard the animals are occasionally detected in small bands and are often killed. Caribou meat was several times brought in to Fort Simpson during my residence there, but all my efforts to secure a specimen failed. The natives about there distinguish between the wood caribou of the lowlands and of the mountains, and say that the former is smaller and lighter in color than the mountain animal. Woodland caribou still occur along the Saskatchewan near Edmonton, and W. E. Whiteley, who lives on Sandy Creek, 20 miles south of Athabaska Landing, Alberta, stated that he had seen a few in that vicinity.

The presence of the woodland caribou in this region was first noted by Hearne, who refers to the species as 'Indian deer.' During his journey southward from Coppermine River he saw many in the

^a Ann. Rept. Dept. Interior (Canada) for 1900-1901, p. 122, 1902.

^b Sport and Travel in Northland of Canada, p. 40, 1904.

^c Ibid., p. 239, 1904.

^d Proc. U. S. Nat. Mus., XXVIII, p. 677, 1905. See also Can. Rec. Science, IV, pp. 43, 45, 53, 1890.

sparsely wooded country north of the eastern part of Great Slave Lake in December, 1771. While crossing the lake on the ice he found the wooded islands "well stocked" with the same species.^a Deer (i. e., caribou) are enumerated by Richardson among the animals said to inhabit Birch Mountain, west of the lower Athabaska River.^b While exploring in the region between Athabaska Lake and Churchill River in the summer of 1892, J. B. Tyrrell ascertained that the woodland caribou was reported "to occur in the more southern portion of the district, near Churchill River, but none were seen."^c In January, 1894, Russell frequently came across their trails in the small prairies south of Fort Resolution. The animals were said not to occur to the eastward of the Northern Arm of Great Slave Lake, but he crossed several of their trails on the traverse between Fort Rae and Fort Providence. He states that they also "occur in the wooded portions of this region south of the Great Bear Lake."^d

R. MacFarlane, in a letter to the Biological Survey, written in January, 1902, states that the woodland caribou inhabits the country between Lake Winnipeg and Athabaska Lake, and though nowhere in large numbers is more abundant on the southern than on the northern shores of this lake. Between Athabaska and Great Slave lakes he states that the animal is met with chiefly on the west side of Slave River, and through all the country lying between Peace River and Great Slave Lake.

It also inhabits certain sections on both sides of the Mackenzie River and its principal tributaries almost if not quite up to (abandoned) Fort Anderson, Anderson River, in about latitude 68° north. It is not, I believe, numerous anywhere, except perhaps fairly so in the neighborhood of the Rocky Mountain range, and of its spur mountains, the 'Caribou' on the Peace, the 'Nahanni' on the Liard, and the 'Horn,' 'Clark,' and other spurs of the Rockies in the valley of the Mackenzie.

He met with tracks of this species on the lower Onion River, near its junction with the Lockhart, in the summer of 1860. In his recent paper on northern mammals he states that herds of this species seldom exceed 30 or 40 individuals, except in autumn, when larger numbers sometimes congregate. The species occurred in the well-forested country a short distance south of Fort Anderson. During his residence at Forts Good Hope and Simpson the skins and meat of wood caribou were often brought in by the natives.^e

Rangifer caribou montanus Seton-Thompson. Mountain Caribou.

The following notes on woodland caribou in the mountains of western Alberta I refer to this form.

^a Journey to the Northern Ocean, p. 223, 1795.

^b Arctic Searching Expedition, I, p. 127, 1851.

^c Ann. Report Can. Geol. Surv., VIII (new ser.), p. 13D, 1896.

^d Expl. in Far North, pp. 224, 225, 1898.

^e Proc. U. S. Nat. Mus., XXVIII, p. 680, 1905.

J. Alden Loring reports that in the autumn of 1895 three caribou, two of which were killed, were seen by members of his party in the Jasper House region, in mountain parks near timber line. In 1896 tracks were seen in a valley 15 miles south of Henry House in July, and in the early autumn its presence was noted both in the high mountains and in the valleys on the route between Jasper House and Smoky River. About the middle of October tracks were frequently seen in Rodent Valley, about 25 miles west of Henry House.

This form is believed by A. J. Stone to inhabit the Rocky Mountains in northeastern British Columbia for a considerable distance north and south of the latitude of the Cassiar Mountains (about latitude 59°), where he took specimens in September, 1897.^a

The caribou of the Liard River mountains, which the Indians distinguish from the lowland form, is probably referable to this race. It is said to be fairly common in the Nahanni and other mountain ranges of the lower Liard.

Rangifer arcticus (Richardson). Barren Ground Caribou.

This famous animal, usually in the north called 'deer,' and often mentioned in the narratives of Arctic travel, occurs more or less abundantly on the Barren Grounds of the region treated of, and on the large islands to the northward. (See Pl. XIX.) It is the caribou, more than any other animal, which renders human residence in this desolate region possible.

Within this great area it is probable that there are two or more races, or perhaps distinct species, since the animals are separated by the physiographic conditions of the country into different herds, or aggregations of herds, which never associate with each other at any time of the year, and which have somewhat different habits. A series of skins and skulls will be necessary to a decision as to the number of recognizable forms. For the present, however, all the caribou of this region, excepting the woodland species, may without violence be considered as one species, for which the name *arcticus*, applied by Richardson to the animal inhabiting the main area of the Barren Grounds between Great Bear Lake and Hudson Bay, may be used. It is reasonably certain that within this latter area but one species is represented.

During my first visit to the Great Slave Lake region, in the summer of 1901, this species was not observed. I learned, however, that during the previous winter the caribou approached within a short distance of Slave River, half a day's journey east of Fort Smith, for the first time in many years. In the country south of Athabaska Lake the natives assert that long ago the animals extended their migrations to the neighborhood of Fort McMurray. I was after-

^a Bull. Am. Mus. Nat. Hist., XIII, p. 52, 1900.

wards informed by Mr. Thomas Anderson that during the winter of 1902-3 they reached the southern end of Cree Lake, Saskatchewan.

During my trip northward between Great Slave and Great Bear lakes, in August, 1903, I learned from the natives that large numbers of the Barren Ground caribou cross this route at several points, usually arriving about the time of the first heavy snows. Points on Lake Faber and Lake Rae were said to be especially good 'passes.' Tracks made during the previous spring before the animals had left on their return journey to the Barren Grounds were often seen in the muddy or sandy margins of the lakes and streams. While ascending Grandin River we were passed by several families of Dogribs, then on their way to the region of the Coppermine to live on the caribou.

Along the southern shore of Great Bear Lake, especially at the point where we reached it on MacTavish Bay, numerous well-worn trails testify to the great numbers of caribou that pass back and forth in spring and fall. They arrive from the Barren Grounds about the time of the first deep snows, usually by the middle of October, and sometimes extend their migration west to the outlet of the lake, though they are not common in that vicinity. In the spring the greater number return, though a few remain through the summer on the semibarren areas near Leith Point, and westward to the vicinity of McVicar Bay. We saw fresh tracks of a number near our camp east of Leith Point during the early days of September.

The Hare Indians living about the southern and western shores of Great Bear Lake repair to its eastern end about the end of July, usually coasting the southern shore, and spend a month or two among the caribou on the treeless country between the eastern end of the lake and the lower Coppermine, returning to their winter hunting grounds early in October.

During the winter of 1903-4 caribou reached the Northern Arm and the eastern part of Great Slave Lake in great numbers, and some were killed within a short distance of the buildings at Fort Rae for the first time in several years.

Mr. John Firth, of the Hudson's Bay Company, for many years stationed at Fort McPherson and on Porcupine River, informed me that the herds of caribou west of the Mackenzie have a semiannual movement to and from the seacoast. In their journeys they head toward the prevailing winds, and consequently occasionally pass to the eastward of the mountains, though usually to the westward. The southward movement commences in August, and extends only about 400 miles. They start to return in March. Though the bulk of the animals then proceed to the coast, a few remain throughout the summer in the elevated and semibarren country between the Peel and the Porcupine. The Indians from La Pierre House, who arrived



DISTRIBUTION OF BARREN GROUND CARIBOU (*RANGIFER ARCTICUS*) AND RELATED FORMS IN CENTRAL CANADA.

[Distribution:  winter;  summer;  winter and summer, approximate.]

at Fort McPherson during my stay there early in July, 1904, having crossed the mountains on foot, had killed a few of these animals on the way.

As winter approaches, the caribou which have summered on the Barren Grounds move southward in herds, many of which enter the wooded country. Their movements are more or less irregular, but the following account, by Warburton Pike, seems to be approximately correct as applying to the animals to the eastward of the Coppermine:

From what I could gather from the Yellow Knife Indians at the east end of the Great Slave Lake, and from my own personal experience, it was late in October, immediately after the rutting season, that the great bands of caribou, commonly known at La Foule, mass up on the edge of the woods, and start for food and shelter afforded by the stronger growth of pines farther southward. A month afterwards the males and females separate, the latter beginning to work their way north again as early as the end of February; they reach the edge of the woods in April, and drop their young far out toward the seacoast in June, by which time the snow is melting rapidly and the ground showing in patches. The males stay in the woods till May and never reach the coast, but meet the females on their way inland at the end of July; from this time they stay together till the rutting season is over and it is time to seek the woods once more.^a

While the above account of the movements of the caribou is substantially correct, Hanbury has shown that many do not migrate in the true sense of the word, but merely wander, and that the course taken by the moving bands can never be predicted.^b

The following notes, gleaned from various sources, show the general distribution of the Barren Ground caribou in the region under review, as well as other points in its history. Sabine says: "Inhabits the North Georgia Islands in the summer in considerable numbers, arriving toward the middle of May, and retiring to the south before the first week in October. In the course of the season 24 were killed."^c During Franklin's first northern journey, this species was first met with on the upper part of the Yellowknife River about the middle of August, 1820; toward the end of September it had become common about Fort Enterprise; on October 10 an estimated number of 2,000 were seen during a short walk in the vicinity; by October 26 they had departed southward; but about the middle of November, on account of warmer weather, they returned to the neighborhood.^d During the following summer, while the party was exploring the Arctic coast to the eastward of Coppermine

^a Barren Ground of Northern Canada, p. 45, 1892. In regard to habits of this animal, see also various writings of Richardson; Russell, *Expl. in the Far North*, p. 225, 1898; Stone, *Bull. Am. Mus. Nat. Hist.*, XIII, p. 49, 1900; etc.

^b *Sport and Travel in Northland of Canada*, pp. 120-122, 1904.

^c *Suppl. to Appendix Parry's First Voyage*, p. cxc, 1824.

^d *Narrative Journey to Polar Sea*, pp. 218-248, 1823.

River, caribou were found to be rather common at the mouth of Hood River,^a and were noted also on Parry Bay and at Point Turnagain.^b During Franklin's second journey, reindeer were killed near Fort Franklin, Great Bear Lake.^c J. C. Ross states that great numbers were seen about the Isthmus of Boothia.^d

During Richardson's journey along the Arctic coast east of the Mackenzie, in the summer of 1848, he observed the species near Liverpool Bay in August;^e and on Darnley Bay later in the same month;^f and saw many at Bloody Fall, on the lower Coppermine, on September 5.^g The skeleton of a Barren Ground caribou from Fort Confidence, probably taken during the same trip, is described by Richardson.^h Doctor Rae saw many caribou on Victoria Land near Admiralty Island about the middle of August, 1851.ⁱ During the voyage of the *Investigator* Armstrong records that tracks of reindeer were seen near Nelson Head, the southern extremity of Baring Land [Banks Land], September 7, 1850; three of the animals were seen on Prince of Wales Strait, near Princess Royal Islands, January 6, 1851. Some were seen on Banks Land, near Prince Alfred Cape, August 19, 1851; and 50 or 60 near Mercy Bay, Banks Land, October 7, 1851; at the latter harbor 112 of the animals were killed between the autumn of 1851 and the summer of 1853.^j At the winter quarters of the *Enterprise* in Cambridge Bay, Victoria Land, Collinson states that large herds had gathered by October 9, 1852, and were waiting for the ice to form a bridge for their passage to the continent; by November 24 all had left, and during the spring of 1853 the species was first seen April 6, when 4 individuals were observed at Finlayson Islands, near Cambridge Bay, crossing the strait from the mainland northward.^k The presence of caribou on Prince Patrick Island is recorded by M'Dougall, who states that some were killed by Meham near Cape Hay.^l He also records the animal from near Cape Russell, Melville Island; and from Byam Martin, Moore, and Baker islands.^m Sutherland records the presence of the animals during the summer of 1851 on the north shore of Cornwallis Land; and near Point Decision; Disappointment Bay;

^a Narrative Journey to Polar Sea, p. 374, 1823.

^b *Ibid.*, pp. 383, 387, 1823.

^c Narrative Second Expedition to Polar Sea, p. 60, 1828.

^d Appendix to Ross's Second Voyage, p. xvii, 1835.

^e Arctic Searching Expedition, I, p. 251, 1851.

^f *Ibid.*, p. 281, 1851.

^g *Ibid.*, p. 318, 1851.

^h Zool. of Herald, Fossil Mammals, p. 115, 1854.

ⁱ Journ. Roy. Geog. Soc., XXII, p. 91, 1852.

^j Narrative Discovery Northwest Passage, pp. 210, 297, 391, 473, 477, 1857.

^k Journ. H. M. S. *Enterprise*, pp. 244-253, 1889.

^l Voyage of *Resolute* to Arctic Regions, p. 291, 1857.

^m *Ibid.*, pp. 266, 267, 295, 1857.

and other points on the same island.^a The same author states that traces of reindeer were observed near Cape Riley and Cape Grinnell.^b McCormick observed tracks on Baring Bay, North Devon, in August, 1852.^c The presence of caribou on Russell Island is recorded by Osborn, who observed tracks near Cape Walker in the spring of 1851.^d M'Clintock noted the species at Port Kennedy and Brentford Bay.^e Kennedy mentions seeing many tracks near Cape Garry, North Somerset.^f During Anderson and Stewart's journey down Back River in the summer of 1855 caribou were found to be numerous about Clinton-Colden and Aylmer lakes; and the species was observed on Adelaide Peninsula.^g In the summer and fall of 1879 the party of Frederick Schwatka, searching for relics of Sir John Franklin, found large numbers of caribou on King William Island and on the lower part of Back River.^h During Warburton Pike's journey northward into the Barren Grounds from the eastern part of Great Slave Lake in the autumn of 1889, caribou were first met with on Lake Camsell, about 70 miles north of Great Slave Lake, on September 15. The animals were then on their way south, and many were seen during the remainder of September as the party traveled northward.ⁱ In notes on the fauna of the country lying between the eastern part of Athabaska Lake and Churchill River, explored in the summer of 1892, J. B. Tyrrell says:

The Barren Ground caribou * * * comes south in winter to the south end of Reindeer Lake and the upper portion of Mudjatick and Foster rivers. It travels north in spring to the Barren Grounds, but a very few animals are occasionally left behind, one having been shot in July near the north end of Cree Lake.^j

Fort Fond du Lac is stated by him to be "on one of the principal lines of travel of the Barren Ground caribou, in their regular migrations north and south."^k During the summer of 1893, while traveling northward between Athabaska Lake and Chesterfield Inlet, the Tyrrell brothers first saw Barren Ground caribou on July 28 on Barlow Lake; on the next day, on the shores of Carey Lake, a few miles below and in about latitude 62° 15', they saw a herd estimated to contain from 100,000 to 200,000 individuals.^l In 1894, during

^a Journ. Voyage to Baffin Bay, II, pp. 106, 147, 151, 1852.

^b Ibid., I, p. 310, II, p. XII, 1852.

^c McCormick's Voyages, II, p. 131, 1884.

^d Arctic Journal, p. 220, 1852.

^e Voyage of the *Fox*, p. 167, 1860.

^f Narrative Second Voyage *Prince Albert*, p. 129, 1853.

^g Journ. Roy. Geog. Soc., XXVI, p. 25, 1856.

^h Schwatka's Search, p. 196 and elsewhere, 1881.

ⁱ Barren Ground of Northern Canada, p. 41, et seq., 1892.

^j Ann. Rept. Can. Geol. Surv., VIII (new ser.), p. 13D, 1896.

^k Ibid., p. 63D, 1896.

^l Ann. Rept. Can. Geol. Surv., IX (new ser.), p. 165F, 1898.

their trip northward from Reindeer Lake, the animals were first seen, near Ennadai Lake, on August 14, and were then moving southward in large numbers.^a

Frank Russell, who passed the winter of 1893-94 at Fort Rae, says, concerning the Barren Ground caribou:

A few years ago * * * they were often killed from the buildings, and throughout the winter might be found near the post. In 1877 an unbroken line of caribou crossed the frozen lake near the fort. They were fourteen days in passing and in such a mass that, in the words of an eyewitness, "daylight could not be seen" through the column. They are now seldom seen within several miles of Rae."^b

During the winter he spent there only one small band crossed the lake toward the west.^c Concerning their abundance about the mouth of the Mackenzie, he says:

West of the Mackenzie they are still abundant along the barren coast and in the mountains south of it. They migrate southward in autumn, but how far is not known. Rampart House was a "deer post," being situated in a pass traversed semiannually by the caribou.

The whalers reported that the caribou were abundant among the islands between the mouth of the Mackenzie and Cape Bathurst in July, 1894.^d

W. J. McLean states that in 1899 the caribou arrived in the neighborhood of old Fort Reliance, Great Slave Lake, on August 12.^e

A. J. Stone, who studied the caribou of northern Mackenzie in 1898-99, says:

The mighty Mackenzie seems to form, throughout its entire length, a well-defined dividing line between eastern and western herds; in fact, we find that at most points this dividing line is a broad belt of country, in places more than one hundred miles wide. The herds that reach the coast in the spring, to the west and east of the Mackenzie Delta, never approach each other nearer than 75 miles, and rarely so near as this.

He was informed that the caribou to the east of the Mackenzie are considerably larger than those to the westward.^f On May 12, 1899, he saw a herd of about twenty-five female caribou near Franklin Bay; "they were travelling northward at a fair pace and were among the advance guard to reach the coast."^g He considers that the animals are fast being exterminated in that quarter, principally on account of the demand for meat at the trading posts, and at the wintering places of the whalers along the Arctic coast.^h

^a Ann. Rept. Can. Geol. Surv., IX (new ser.), p. 19F, 1898.

^b Expl. in Far North, p. 88, 1898.

^c Ibid., p. 226, 1898.

^d Ibid., pp. 226, 227, 1898.

^e Hist. and Sci. Soc. of Manitoba, Trans. 58, p. [5], Feb., 1901.

^f Bull. Am. Mus. Nat. Hist., XIII, p. 51, 1900.

^g Ibid., p. 53, 1900.

^h Ibid., pp. 56, 57, 1900.

J. W. Tyrrell, while descending Hanbury River, to the eastward of Great Slave Lake, during the early part of July, 1900, reported only an occasional straggling caribou.^a On July 23, however, on the upper Thelon, he observed a large band moving southward.^b Hanbury found large bands, comprising adults of both sexes and young, proceeding southward along Hanbury River about the last of July, 1901.^c He was later informed by the Eskimo of Ogden Bay that the animals are found on Kent Peninsula, at Cape Barrow, and near the coast of Victoria Land, throughout the winter, but that none remained during that season between Cape Barrow and the Coppermine, or near Ogden Bay.^d J. M. Bell informs me that on his trip eastward along the north shore of Great Bear Lake in 1900, he first met with caribou 60 miles west of Fort Confidence late in July, and later found them fairly numerous between Fort Confidence and the lower Coppermine.

MacFarlane states that during his residence in the Anderson River region large numbers were killed by the Eskimo of the lower Anderson, mainly during the spring and fall migrations. A few remained during winter close to the Arctic coast, though the bulk of the herds moved southward. He gives in tabular form the dates of the arrival of caribou from the north in the autumn, and their return thereto in the spring, as observed at Lac du Brochet Post, at the north end of Reindeer Lake,^e the neighborhood of which is a wintering ground for great numbers. These dates may be found in a table of occurrences given on page 22 of the present report.

Bison bison athabascæ Rhoads. Wood Bison.

This animal formerly ranged over immense areas north to Great Slave Lake and Liard River, but is now restricted to a few small herds inhabiting the region north of Peace River. (Fig. 12.)

The bison was first recorded from this region by Samuel Hearne, the first traveler to penetrate its unknown wilds. After crossing Great Slave Lake (his 'Athapuscow Lake') from the north, in January, 1772, he entered the level country to the eastward of Slave River, and there found buffaloes "very plentiful."^f He traveled southward for some days and then left Slave River and proceeded to the eastward, still finding the animals abundant until he reached a point near the longitude of the eastern end of Great Slave Lake.^g During

^a Ann. Rept. Dept. Int. (Canada), 1900-1901, p. 120, 1902.

^b Ibid., p. 126, 1902.

^c Sport and Travel in Northland of Canada, p. 34, 1904.

^d Ibid., p. 139, 1904.

^e Proc. U. S. Nat. Mus., XXVIII, pp. 682-684, 1905.

^f Journey to the Northern Ocean, p. 250, 1795.

^g Ibid., p. 272, 1795.

Mackenzie's descent of the river which now bears his name, he was informed by the Indians that buffaloes abounded on the plains bordering the stream which entered from the north the expansion of the river now known as the Little Lake.^a On the return journey, his party killed a buffalo near the same place.^b During his exploration of Peace River he noted numerous herds of buffaloes on the plains near Ver-



FIG. 12.—Former distribution of American bison (*Bison bison*) and its northern subspecies (*B. b. athabasca*) in central Canada. A few small herds still exist in the area indicated by cross lines.

million Falls; ^c and he mentions also that the animal was common at the mouth of 'Sinew' River, a stream entering Peace River from the south a short distance east of the mountains.^d Harmon, in 1808, found the animals abundant on the plains on either side of Peace River from Vermilion Falls nearly to the Rocky Mountains; ^e and in 1810 saw some on the Peace between Forts Dunvegan and St. John.^f

^a Voyages to Frozen and Pacific Oceans, pp. 24, 25, 1801. (This must refer to the stream now known as Horn or Willow River.)

^b *Ibid.*, p. 109, 1801.

^c *Ibid.*, p. 125, 1801.

^d *Ibid.*, p. 163, 1801.

^e Journal of Voyages and Travels, p. 174, 1820.

^f *Ibid.*, p. 187, 1820.

During Franklin's first northern journey the detachment under Hood, while descending the Athabaska a short distance above the lake, "observed the traces of herds of buffaloes, where they had crossed the river, the trees being trodden down and strewed, as if by a whirlwind."^a One was killed by the party on Salt River, between the Salt Plains and Slave River, during a short side excursion.^b Richardson, in 1829, speaks thus of the range of the animal:

They still exist, however, in vast numbers in Louisiana, roaming in countless herds over the prairies that are watered by the Arkansa, Platte, Missouri, and upper branches of the Saskatchewan and Peace rivers. Great Slave Lake, in latitude 60°, was at one time the northern boundary of their range; but of late years, according to the testimony of the natives, they have taken possession of the flat limestone district of Slave Point, on the north side of that lake, and have wandered to the vicinity of Great Marten Lake, in latitude 63° or 64°. As far as I have been able to ascertain, the limestone and sandstone formations lying between the great Rocky Mountain range and the lower eastern chain of primitive rocks are the only districts in the fur countries that are frequented by the bison. * * * They do not frequent any of the districts formed of primitive rocks, and the limits of their range to the eastward within the Hudson Bay Company's territories may be nearly correctly marked on the map by a line commencing in longitude 97° on the Red River which flows into the south end of Lake Winipeg, crossing the Saskatchewan to the westward of Basquiau hill, and running from thence by the Athapescow to the east end of Great Slave Lake.^c

Since Mackenzie had found them on the north side of the Mackenzie River near the Horn Mountains many years before this, it is probable the animals reached Slave Point and Marten Lake from that direction.

King, in his narrative of Back's expedition, mentions the occurrence of the bison on the plains bordering Slave River;^d and Simpson saw many tracks and a few individuals on Clearwater River, near the mouth of the Pembina, in June, 1837.^e In the summer of 1848 Richardson was informed that bison frequented the Birch Mountains, west of the lower Athabaska, in great numbers.^f

In 1877 Dr. J. A. Allen published a letter from E. W. Nelson, which contained information concerning the bison, obtained from two men who had reached the Yukon through British America. An extract follows:

These gentlemen descended the Peace River and at about the one hundred and eighteenth degree of longitude made a portage to Hay River, directly north. On the portage they saw thousands of buffalo skulls and old trails, in some instances two or three feet deep, leading east and west. They wintered on Hay

^a Narrative Journey to Polar Sea, p. 192, 1823.

^b *Ibid.*, p. 197, 1823.

^c Fauna Boreali-Americana, I, p. 279, 1829.

^d Narrative Journey to Arctic Ocean, I, p. 115, 1836.

^e Narrative Discoveries on North Coast of America, pp. 60, 61, 1843.

^f Arctic Searching Expedition, I, p. 127, 1851.

River, near its entrance into Great Slave Lake, and there found the buffalo still common, occupying a restricted territory along the southern border of the lake. This was in 1871. They made inquiry concerning the large number of skulls seen by them on the portage, and learned that about fifty years before snow fell to the estimated depth of fourteen feet, and so enveloped the animals that they perished by thousands. It is asserted that these animals are larger than those of the plains.^a

In the summer of 1879 Dr. G. M. Dawson, while exploring on 'Grande Prairie,' north of the headwaters of Smoky River, saw many wallows and scattered bones of the bison, and was told by the Indians that the animals had been exterminated by an excessively severe winter many years before. During the same summer the Beaver Indians reported seeing six bison, of which they killed one, on the Pouce Coupée Prairie, in the same region.^b In 1888 J. B. Tyrrell stated, on the authority of Mr. King, a Hudson's Bay Company officer, that "One band of about five hundred lives on what is locally known as the 'Salt Plain' which is a prairie * * * stretching for five hundred miles south-westward from the vicinity of Fort Smith on the Slave River to the foot of the Rocky Mountains."^c Warburton Pike found a herd of eight about 50 miles south-west of Fort Resolution in February, 1890;^d and in the autumn of the same year, while ascending Peace River, was told by the Indians at Fort St. John that they occasionally found small bands to the northward of that post, toward Liard River.^e

William Ogilvie, from information obtained in 1888, writes:

The wood buffalo, which formerly roamed around all the upper waters, is now nearly a thing of the past. A few still remain scattered over a wide district. Could some means be devised to protect them for several years, they would probably soon multiply and become a source of food supply and revenue to the natives. Mr. McDougall, who has for some years past been gathering information concerning the number of these animals and their locality, has kindly given me the following notes: In the winter of 1887-88, on the headwaters of Hay River, which flows into Great Slave Lake, and west of Battle River, a tributary of the Peace, the Indians saw three bands containing 17, 10, and 4, respectively; they killed 5, but Mr. McDougall did not ascertain whether these were in addition to the above numbers. The same winter three bands were seen between Salt River and Peace Point, on Peace River, numbering 50, 25, and about 25, respectively. None of these are reported to have been killed. During the winter of 1886-87, between the north end of Birch and the south end of Thickwood Mountains, distant about one day or 30 miles from Fort McMurray, on Athabasca River, one band of about 13 was seen. Since then 5 of this band have been killed. Below Red River, a tributary of the Atha-

^a Am. Nat., XI, p. 624, 1877.

^b Rept. Prog. Can. Geol. Surv., 1879-80, p. 54B, 1881.

^c The Mammalia of Canada, p. 8. (Read before Canadian Institute Apr. 7, 1888, and published separately.)

^d Barren Ground of Northern Canada, p. 145, 1892.

^e *Ibid.*, p. 230, 1892.

basca, and between Birch Mountains and Athabasca River, and ranging down to Poplar Point, on the Athabasca, another band said to contain about 20 was seen. Altogether we have only about 180 head of wood buffalo in this vast extent of territory. The paucity of their numbers is, to some extent, a protection to them. If they escape epidemics and such a winter as almost exterminated them on the Upper Peace some years ago, they may possibly increase. Whenever the Indians come across a band they try to exterminate them whether they need them for food or not. They try to drive them into a bog, if one be convenient, and, if they succeed in this, their object is soon accomplished, for the poor brutes mire in the bog and are quickly killed.^a

The same explorer, from information obtained in 1891, states:

The haunt of the wood buffalo lies north and west of the Athabasca River, across the Peace to the Liard River, and at Fort Liard it was reported that two of them had crossed the Liard and had been seen in the mountains to the north-west of the fort. Compared with the area of the district they inhabit, their numbers are very small, probably not exceeding 300 in all. This is in striking contrast with their numbers as reported half a century ago, when it was no uncommon thing for a few Indians, in the neighborhood of Dunvegan and St. John, on Peace River, to go out and in a few days to procure sufficient meat to supply their wants for a good part of the winter. * * * The explanation given is that a heavy fall of rain occurred in one of the winter months, about twenty-five years ago, which completely saturated the snow, which was then frozen, and converted into an immense cake of ice, and the buffalo and all animals that graze and do not browse were nearly exterminated.^b

Frank Russell had an unsuccessful hunt for the animals in January, 1894, in the Buffalo River region, southwest of Fort Resolution. He says:

Black Head, an old Yellow Knife chief, living at the mouth of the Rivière au Jean, told me that he had killed 'plenty of buffaloes' in the delta of the Slave River. About fifteen years ago a few were killed near [Fort] Liard, but they are seldom seen in that quarter.^c

In February, 1894, Caspar Whitney found a herd of about a dozen to the westward of Fort Smith, and estimated the total number then living as about 150.

Thomas Johnson gives extracts from the report of Inspector Jarvis, who was sent by the Canadian government, in January, 1897, to report on the condition of the bison and other game animals of the Athabaska region. His report, in part, was as follows:

The range of a scattered herd of about 300 is from Peace Point to Salt River, and from Salt River to within 20 miles of Fort Resolution, on Great Slave Lake. I met a Mr. Handbury, an English sportsman, who * * * had just returned from an unsuccessful buffalo hunt, but he saw the tracks and beds of about 60 buffalo.^d

^a Ann. Rept. Dept. Interior (Canada) for 1889, Part VIII, p. 91, 1890.

^b Ann. Rept. Dept. Interior (Canada) for 1892, Part VII, p. 39, 1893.

^c Expl. in Far North, p. 232, 1898.

^d Forest and Stream, XLIX, p. 323, Oct. 23, 1897.

Rhoads, in 1897, described the northern bison as a subspecies under the name *Bison bison athabascæ*, his type being an adult male in the collection of the Canadian Geological Survey, taken by Indians about 50 miles southwest of Fort Resolution, presumably in March, 1892. This form is said to be larger and darker, with hair more dense and silky, and with the horns slenderer, larger, and more incurved than the typical plains species. Regarding its range and abundance, he publishes a letter from H. I. Moberly, of the Hudson's Bay Company, in which he says, in part:

At present there are not more than two hundred and fifty to three hundred alive, and they are in two bands, one on the lower Peace River, north of it, and run from close to Great Slave Lake at [to] Peace Point, which is some 90 miles below Fort Vermilion. The other is on the upper Hay River, and ranges between Peace River and the Liard River, and run down some 250 miles east of the Rocky Mountains and up to the foot of the Rocky Mountains.^a

One of the latest published items in regard to the northern herds of bison is comprised in the following extract from a letter by J. A. Macrae, Indian commissioner in the Athabaska region in 1900 (when the notes were written), to Otto J. Klotz, and published by him:

At Fort Chipewyan, Fort Smith, and Fort Resolution I made close inquiries into the number of Wood Buffalo remaining, having an opportunity to do this owing to meeting so many Indians fresh from their grounds—such as, I think, no one else has enjoyed. Some of the Indians who came in to meet me at each place had lately been near the buffalo and had counted the different herds, which are, generally speaking, three in number; one ranging from Salt River to Peace Point on Peace River, one from Salt River north to Great Slave Lake, and one from Salt River east and west. They number, I conclude, from 500 to 575 head. * * * Some 8 or 9 were killed last winter, but as I tried and punished those who killed them it is thought * * * that no more depredations will occur. I understand that there has been an increase, since the animals were protected, of perhaps a couple of hundred, and it would appear to be only necessary to continue vigorous protective measures in order to perpetuate the herd.^b

MacFarlane states that during a residence of fifteen years (1870 to 1885), at Fort Chipewyan, the fort hunters seldom failed to kill a few bison each winter, mainly on the north side of lower Peace River. In the winter of 1871-72 an Indian shot an albinistic individual, of a faint yellowish white color, 35 miles northwest of Fort McMurray. In March, 1879, a herd of 20 was discovered near the Birch Mountain, and all were killed. According to Indian report the animal rarely has more than one calf at a birth.^c

^a Proc. Acad. Nat. Sci. Phila., 1897, pp. 497, 498. For additional details regarding the extent of range and numbers of this species during recent years, see Allen, Bull. Am. Mus. Nat. Hist., XIII, pp. 63-67, 1900.

^b Ottawa Nat., XIV, pp. 228, 229, 1901.

^c Proc. U. S. Nat. Mus., XXVIII, p. 691, 1905.

In a journal of the Hudson's Bay Company at Fort Simpson I found mention of two buffalo bulls killed April 29, 1831, near the mouth of Martin River, a small stream which enters the Mackenzie from the west 8 miles below Fort Simpson. The occurrence of the animals at this point was said to be unique in the experience of the natives, and this note probably constitutes the northernmost known record of the occurrence of the recent animal on the Mackenzie.

About thirty years ago, according to testimony received from several independent sources, about 90 buffaloes were drowned in a small lake whose outlet, about 20 miles in length, and apparently the *Petite Rivière Bouffante* of Bell's map, enters the Athabaska near Boiler Rapid from the southward. The animals attempted to cross the lake during the early part of the winter before the ice had formed sufficiently to bear their weight, and were precipitated into the water, from which they were unable to escape. The ice formed about their bodies, and in this natural refrigerator their flesh was preserved, and provided a ready means of subsistence to numbers of the natives who resorted to the place for the winter.

During our visits to the region we were unable to get very definite information as to the present range and number of bison, owing to the fact that press of other work made it impossible for us to visit their haunts. Reports from the natives were unsatisfactory, since much of the country inhabited by the bison is not well stocked with large game of other species, and the hunters do not cover it so thoroughly as formerly.^a All those best qualified to express an opinion were unanimous on one point, that the herds are much harassed by wolves, and that unless something is done to reduce the numbers of these fierce animals, the total extermination of the bison is inevitable. Merritt Cary obtained the following definite note from Mr. Brabant, Hudson's Bay officer at Fort Smith. During the winter of 1902-3 two small bands, aggregating 24 individuals, ranged over the region five or six days' journey (about 125 miles) southwest of Fort Smith. Here a band of 8 was tracked several times in the dense forests, and another of 16 ranged about the southern edge of the Salt Plains, a prairie region of indefinite extent about the upper part of Salt River. The natives reported that these bands contained no yearlings or 2-year-olds, all of the young ones having been killed by wolves, which have been unusually numerous for several years past.

The latest definite information in regard to the wood bison is incorporated in the report of Inspector A. M. Jarvis of the Royal Northwest Mounted Police, who, in cooperation with Ernest Thompson

^a With the exception of one year, the killing of bison has been prohibited in the Northwest Territories since 1893. (The Game Ordinance No. 8 of 1893, sec. 3.)

Seton, visited the region west and southwest of Fort Smith in June and early July, 1907, for the purpose of investigating the present status of the herds.

On the first trip, in the region of upper Salt River, 15 or 20 miles southwest of Fort Smith, a herd of 13 wood bison—2 bulls, one calf of the year, and the rest cows and yearlings—was seen. The next day, June 15, another herd comprising 4 bulls, 8 cows, 3 two-year-olds, 1 yearling, and 4 calves was observed within a few miles of the same place. Two other trips, to the Little Buffalo River region, west and northwest of Fort Smith, were made, but the parties were unable in the time at their disposal to reach the bison, though tracks a few weeks old were seen.

Jarvis concludes that the destruction of the bison is due in part to illegal killing by Indians, and that the amount of damage done by wolves has been exaggerated.

Ovibos moschatus (Zimm.). Musk-ox.

This famous ruminant within historic times ranged over the entire extent of the Barren Grounds, from the mouth of the Mackenzie to Fort Churchill. It has now become extirpated over large areas at the eastern and western extremities of this range, but still exists in great numbers in the less accessible parts of its habitat. (Fig. 13.)

Edward Sabine first reported this animal from Melville Island, where it was observed during Parry's first voyage. He says:

This species * * * inhabits the North Georgia Islands in the summer months, * * *. They arrived in Melville Island in the middle of May, crossing the ice from the southward, and quitted it on their return toward the end of September.^a

During Franklin's first northern journey musk-oxen were first noted near the mouth of Fairy Lake River, a small tributary of the Coppermine, on July 4, 1821, a small herd being seen;^b and later in the season one was killed near the mouth of Hood River, at the head of Bathurst Inlet.^c Richardson states that—

To the westward they are rarely seen in any numbers lower than latitude 67°, although from portions of their skulls and horns, which are occasionally found near the northern borders of Great Slave Lake, it is probable that they ranged at no very distant period over the whole country lying betwixt that great sheet of water and the Polar sea. I have not heard of their having been seen on the banks of Mackenzie's River to the southward of Great Bear Lake, nor do they come to the southwestern end of that lake, although they exist in numbers on its northeastern arm. * * * From Indian information we learn that to the westward of the Rocky Mountains, which skirt the Mackenzie, there is an extensive tract of barren country, which is also inhabited by the musk ox.^d

^a Supplement to Appendix Parry's First Voyage, p. CLXXXIX, 1824.

^b Narrative Journey to Polar Sea, p. 331, 1823.

^c Ibid., p. 377, 1823.

^d Fauna Boreali-Americana, I. p. 275, 1829.

Thomas Simpson found the animals numerous near Dismal Lakes, between Great Bear Lake and the mouth of the Coppermine, about April 1, 1838.^a A. K. Isbister, writing in 1845, says that the musk-ox was said to occur to the westward of Rat River.^b Doctor Rae killed a large male musk-ox near the mouth of Kendall River, a tributary of the lower Coppermine, in June, 1851.^c Since Rae mentions his intention of preserving the skeleton, this in all probability is the one

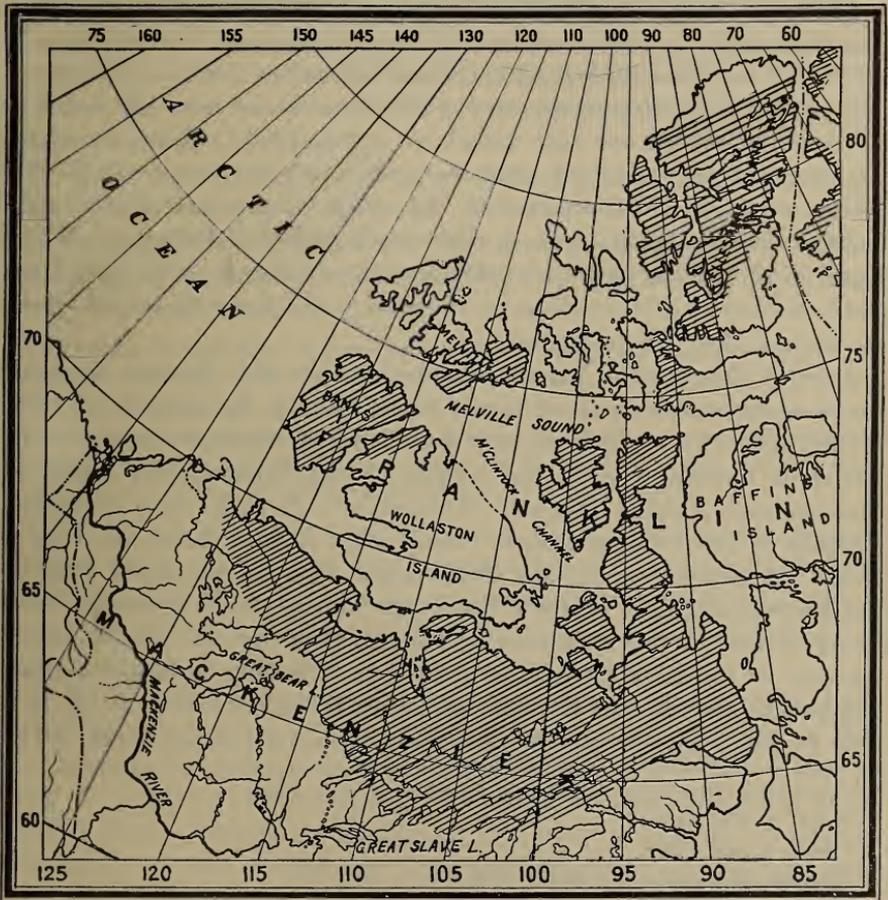


FIG. 13.—Present distribution of musk-ox (*Ovidos moschatus*) and related forms. (Range in Greenland incomplete. Along its southern border the range has been considerably reduced within historic times.)

described by Richardson in his report on the Zoology of the Voyage of the *Herald*, published two years later.

Armstrong, in his narrative of the voyage of the *Investigator*, records that tracks of musk-oxen were seen near Nelson Head, near the

^a Narrative Discoveries on North Coast of America, p. 234, 1843.

^b Journ. Roy. Geog. Soc., XV, p. 343, 1845.

^c Ibid., XXII, p. 80, 1852.

southern extremity of Baring Land, September 7, 1850;^a five were killed October 29, 1850, near the northern extremity of Prince Albert Land;^b others were killed at Mercy Bay, Banks Land, in the summer of 1852.^c M'Dougall, in his narrative of the voyage of the *Resolute*, records that remains were seen on Lowther Island;^d near Hardy Bay the species was observed in great numbers, about 70 being seen at one time;^e a white musk-ox cow was seen June 18, 1853, at Cape Smyth by Lieutenant Meham;^f six individuals were seen at Cape Mudge, Hecla and Griper Bay, Melville Island; and two were killed on Byam Martin Island in the summer of 1853;^g a total of 114 individuals were shot on Melville Island between September, 1852, and September, 1853.^h J. C. Ross states that a few were found near the Isthmus of Boothia, where one was killed in April, 1830.ⁱ Kennedy states that many tracks of musk-oxen were observed in the spring of 1852 on the coast of North Somerset near Cape Garry and southward.^j Osborn records tracks seen on the north shore of Prince of Wales Land in the spring of 1851.^k McCormick in August, 1852, found the skull and horns of a musk-ox on the shores of Clarke Bay, and tracks on Baring Bay, North Devon.^l

During Warburton Pike's explorations in the Barren Grounds north of the eastern part of Great Slave Lake in the autumn of 1889, he first met with the species near Lac de Gras, on September 27;^m he found it numerous near the source of the Coppermine, north of Mackay and Aylmer lakes, in November.ⁿ A large herd composed entirely of cows was seen near Sandy Bay, Aylmer Lake, on July 1, 1890.^o According to James MacKinlay, who accompanied Pike to the Barren Grounds in 1890, the single young one is generally born in April, and he was informed by Indians that the cow usually buries the calf in the snow as soon as it is born, selecting a sheltered place exposed to the rays of the sun, and that three days after birth it is able to run with the dam.^p The species abounds along Back River,

^a Narrative Discovery Northwest Passage, p. 210, 1857.

^b Ibid., p. 275, 1857.

^c Ibid., p. 533, 1857.

^d Voyage of *Resolute* to Arctic Regions, p. 103, 1857.

^e Ibid., p. 288, 1857.

^f Ibid., p. 296, 1857.

^g Ibid., p. 525, 1857.

^h Ibid., p. 529, 1857.

ⁱ Appendix to Ross's Second Voyage, p. xviii, 1835.

^j Narrative Second Voyage *Prince Albert*, p. 129, 1853.

^k Arctic Journal, p. 220, 1852.

^l McCormick's Voyages, II, pp. 113, 132, 1884.

^m Barren Ground of Northern Canada, p. 65, 1892.

ⁿ Ibid., p. 102 et seq., 1892.

^o Ibid., p. 166, 1892.

^p Ogilvie, Ann. Rept. Dept. Interior (Canada) for 1892. Part VII, p. 40, 1893.

and Anderson and Stewart saw Eskimo lodges made entirely of musk-ox skins at Lake Franklin in the summer of 1855.^a Frank Russell, who hunted musk-oxen to the northeast of Fort Rae in April, 1894, in company with Indians, observed the first signs of the animals about three days' journey east of the Coppermine; between there and Bathurst Inlet a number of bands were seen.^b He was informed by the Indians at Fort Rae that five or six years before, the musk-oxen had been found in the sparsely wooded country west of the Coppermine, but that each year the hunters had been obliged to penetrate farther into the Barren Grounds before finding the animals.^c Caspar Whitney, during his trip to the Barren Grounds in March and April, 1895, found musk-oxen at several points east of the Coppermine to the northward of Point Lake.^d

A. J. Stone, in the early spring of 1899, saw many tracks of musk-oxen to the southeast of Cape Lyon, but saw none of the animals, and concluded that they had wintered there and had moved to other feeding grounds, probably to the southward. Concerning their range to the westward, he says:

The result of extensive inquiry among the Indians and Eskimo west of the Mackenzie leads me to believe that the Musk-ox has not inhabited that region for a very long period. Indeed, only a few of the Kookpugmoots east of the Mackenzie have any knowledge of their ever having been seen west of Anderson River, or anywhere between that river and the Mackenzie. Their western limit is now far to the east of Anderson River and Liverpool Bay.^e

Later, in a letter published by Doctor Allen, Stone presents much detailed testimony proving the present absence of the musk-ox from the region west of the Mackenzie, and states that about 80 were killed, mainly on Parry Peninsula, by the hunters and sailors of four whaling vessels which wintered in Langton Bay in 1897-8.^f

J. W. Tyrrell, during his explorations between Great Slave Lake and Chesterfield Inlet in 1900, found a band of 9 musk-oxen on Sifton Lake, a few miles east of the outlet of Clinton-Colden Lake, on June 27. Later in the summer he found the animals numerous along Thelon River, almost invariably on the north shore or on islands. The bands of cows and young were easily startled, but the old bulls were practically fearless.^g

Hanbury, during his exploration of Thelon River in 1899, first found musk-ox tracks numerous 35 miles above its junction with the

^a Journ. Roy. Geog. Soc., XXVII, p. 321, 1857.

^b Expl. in Far North, pp. 112-117, 1898.

^c Ibid., p. 71, 1898.

^d On Snowshoes to Barren Grounds, p. 185 (map), 1896.

^e Bull. Am. Mus. Nat. Hist., XIII, p. 42, 1900.

^f Ibid., XIV, p. 86, 1901.

^g Ann. Rept. Dept. Interior (Canada) for 1900-1901, pp. 118, 121 (pp. 23, 26 of separate), 1902.

Dubawnt. He refers to the animal's habitat in that region as follows:

On the main Ark-i-link River there is a stretch of country about 80 miles in length into which no human being enters. The Eskimo do not hunt so far west, and Yellow Knives and Dog Ribs from Slave Lake do not go so far east. * * * Thus there remains one spot in the Great Barren Northland which is sacred to the musk-ox. Here the animals remain in their primeval state, exhibiting no fear, only curiosity. I approached several herds within 30 yards, photographed them at my leisure, moving them around as I wished, and then retired, leaving them still stupidly staring at me as if in wonder.

A fair-sized full-grown male shot by Hanbury weighed 579 pounds.^a He mentions a solitary bull shot near the north end of Artillery Lake in 1901, and states that, while the animal was common about the lake a few years since, it is now practically exterminated in its vicinity.^b On May 19, 1902, while traveling along the Arctic coast, he ascertained that the Eskimo had seen musk-oxen on the preceding day near White Bear Point, Ogden Bay.^c He reports the animal fairly numerous a short distance inland from Melville Sound;^d and he killed a large bull near the head of Dease River on August 7. The paunch of this animal contained nothing but willows.^e Hubert Darrell, who accompanied Hanbury through this region in 1901-2, informs me by letter that the musk-ox ranges south to latitude 63° in the neighborhood of Dubawnt Lake, thence westerly to Campbell Lake and to Walmsley Lake. He thinks a line drawn from this point to the eastern end of Great Bear Lake would mark in a general way their limit in that quarter.

J. M. Bell, who made explorations in this region in 1900, informs me that when traveling eastward along the north shore of Great Bear Lake he first met with the species about 10 miles east of Fort Confidence.

MacFarlane states that the musk-ox was only fairly common in the Anderson River region, comparatively few being seen during his winter and summer journeys there. During the winter the animals entered the outer section of the forest and frequently were found at a distance of 50 and occasionally 100 miles from the Barren Grounds. As spring advanced they moved northward. He mentions meeting with herds several times near the crossing of Wilmot Horton River. The animal is said to produce usually one and sometimes two at a birth. He states:

The company's posts at which skins are usually traded are Fort McPherson (from the eastern coast Eskimo), Forts Good Hope and Norman (from the

^a Sport and Travel in Northland of Canada, p. 13, 1904.

^b *Ibid.*, p. 31, 1904.

^c *Ibid.*, p. 148, 1904.

^d *Ibid.*, p. 165, 1904.

^e *Ibid.*, p. 225, 1904.

Anderson Eskimo and from post Indians who specially hunt them), Rae and Resolution, on Great Slave Lake (from Indian hunters), Lac du Brochet, Reindeer Lake (from the inland Eskimo), and Fort Churchill (from the Hudson Bay Eskimo).^a

In notes sent to the Smithsonian many years ago he states that a musk-ox calf captured on the Barren Grounds east of Fort Anderson in the summer of 1864 bellowed like a domestic calf, but with a stronger voice, and that in attacking its captors it backed off and butted like a ram.

I was informed by John Firth, for many years stationed at Fort McPherson, that some thirty years ago many skins were brought in to that post by both Indians and Eskimo, who obtained them to the eastward of the Mackenzie. A few from the Anderson River region are still traded at Fort Good Hope, and Fort Norman usually receives a few from Great Bear Lake. During the past few years many hundreds have been brought in to Fort Rae and Fort Resolution, Great Slave Lake. The large number collected, combined with the fact that most of the animals are killed in the spring, when the robes are in poor condition, have conspired to overstock the market. As a result, the Dogribs and Yellowknives were instructed to refrain from hunting them during the winter of 1903-4, and practically none were killed. Happily the range of this animal lies in a region which is very sparsely inhabited and not easily accessible, and there seems to be little danger that the species will be sensibly reduced in numbers for many years.

Ovis canadensis Shaw. Mountain Sheep.

Occurs in the mountains in western Alberta and for an undetermined distance northward. In the early autumn of 1895 J. Alden Loring met with the species in the Jasper House region, and in the summer of 1896, on his second trip to the same region, he again found it common in the higher mountains as far west as Henry House. The Indians claimed that the animal was not found west of this point, and this accorded with his experience. The species was particularly common at his camp 15 miles south of Henry House. It was noted also in Smoky Valley, 50 miles north of Jasper House, and at the head of Grand Cache River, a few miles to the northward, and was said to occur in the higher mountains all along the route between Jasper House and Smoky River.

At his camp south of Henry House, where he had the best opportunity to study their habits, the animals frequented the higher craggy mountains with grassy slopes, descending to the salt licks, usually the cut banks of small streams, daily during the summer and less regularly in the autumn. They were stupidly tame, did not readily scent an enemy, and on being approached retreated leisurely and with

^a Proc. U. S. Nat. Mus., XXVIII, pp. 686-689, 1905.

apparent reluctance. On one occasion the survivors of a band of 9 stood staring at the hunter and at their falling companions until the majority of them had fallen, before they slowly retreated. At this place they had not been hunted since the previous autumn, which accounted for their tameness. Young of different sizes were observed in that region on June 20 and July 6 and 9. At this time the pelage of the old ones was usually very much worn.

An adult female taken by Loring 15 miles south of Henry House, July 5, 1896, has the back, head, neck, breast, sides, and outer aspect of legs wood brown, this color darkest on the legs. A narrow darker stripe extends from base of horns to tail, except where interrupted on the lumbar region; rump patch white, tinged with fawn, and divided by the dark brown central stripe which extends down over the tail; belly, inner aspect of legs, and a small patch beneath chin white, tinged with fawn. A young female killed at the same time is much lighter than the adult, being mainly of a light dingy brown.

Richardson, under the name *Ovis montana*, states that Drummond shot many of these animals in the mountains near the head of the Elk (Athabaska), and his account of the habits shows that they have changed but little, the experience of the two naturalists agreeing very closely in many details.^a

Ovis stonei Allen. Stone Mountain Sheep.

Concerning the range of this species in the Rocky Mountains about the upper Liard River, A. J. Stone, the discoverer of the species, says:

They are found in the Rocky Mountains to the south as far as the headwaters of the Nelson and Peace rivers, in latitude 56°. But I proved conclusively that in the main range of the Rocky Mountains very few of them are found north of the Liard River. Where this river sweeps through the Rocky Mountains to Hells Gate, a few of these animals are found as far north as Beaver River, a tributary of the Liard. None, however, are found north of this, and I am thoroughly convinced that this is the only place where the animals may be found north of the Liard River.^b

Lydekker recently has described a specimen in the British Museum from Liard River under the name *Ovis canadensis liardensis*.^c Bid-dulph^d intimates that this specimen was taken by Doctor Rae. Since the upper part of Liard River is within the range of *Ovis stonei*, and as the figures and descriptions of the two animals agree in most particulars, it is probable that *liardensis* is a synonym of *stonei*. In a later paper Lydekker comes to the same conclusion.^e

^a Fauna Boreali-Americana, I, pp. 272, 273, 1829.

^b Bull. Am. Mus. Nat. Hist., XII, p. 2, 1899.

^c Wild Oxen, Sheep, and Goats of all Lands, p. 215, 1898.

^d Proc. Zool. Soc. London, 1885, p. 679.

^e Great and Small Game of Europe, Asia, and America, p. 13, 1901.

The original of Richardson's figure and description of the female of *Ovis montana*, which was killed on Liard River,^a seems likewise referable to *O. stonei*.

Ovis dalli Nelson. Northern Mountain Sheep.

While in the Mackenzie region I failed to observe these sheep, since this would have necessitated a special trip into their haunts. They occur in the mountains west of the Mackenzie from the vicinity of Fort Liard to near the Arctic coast. According to information obtained at Fort Liard, the animals are still fairly numerous in the Nahanni Mountains. Formerly they occurred on the mountains close to the mouth of the South Nahanni, below Fort Liard, but now are to be found only farther back in the mountains. In winter they are said to frequent the higher parts of the mountains, which are kept clear of snow by the wind, enabling them to find food. Limited numbers of their skins are brought in to the trading posts along the Mackenzie, and are in demand for making winter coats. While ascending the Mackenzie in October, 1903, I obtained fresh meat of this species from some Mountain Indians who had just descended Gravel River on their way to Fort Norman. The animals are killed also in the mountains opposite Forts Norman and Good Hope. While at Fort McPherson I saw several heads and skins which had been obtained on Black Mountain, the extremity of the range west of the Mackenzie delta.

The original of Richardson's description of the male of *Ovis montana*^b was killed "on the mountains which skirt the south branch of the Mackenzie" [Liard], and is apparently referable to this species, and his statement that the Rocky Mountain sheep inhabits that range to its northern termination shows that his account also refers partly to *O. dalli*. Later he describes the skeleton of one "killed on the Rocky Mountains west of the Mackenzie, between the 66th and 67th parallels of latitude," also undoubtedly referable to this form.^c McConnell mentions that one was killed in the mountains west of Peel River while his party was crossing in the summer of 1888.^d

Allen has recorded this species from the Nahanni Mountains, and writes as follows:

Two specimens of this species have been received, taken by Mr. Stone in the Nahanna Mountains, a spur of the Rockies on the eastern slope, about 61° N.

^a Fauna Boreali-Americana, I, p. 274, 1829.

^b Ibid., p. 274, and plate facing p. 271, 1829.

^c Zool. of Herald, Fossil Mammals, p. 87, 1854.

^d Ottawa Naturalist, VI, p. 131, 1892. The first published reference to *Ovis fannini* as a distinct species seems to have been made by McConnell in this article, in which he states: "Another variation in color was reported to me by some miners on the Yukon, who described some sheep shot by them on the upper part of this river as having a brown patch on both sides behind the fore shoulders, and referred to them as the 'saddle-backed sheep.'"

They were killed the latter part of May, 1898, with the old coat about half shed. The two coats thus represented being both white, shows that the species is always white.

As stated above, Mr. Stone first met with the species just north of the Beaver River, and north of the Liard River below its confluence with the Beaver. He adds: "This is their southernmost range, whence it extends north almost to the Arctic coast. I made very careful inquiry of the Indians of the Ettshotas, Takullas, and Spatotimas tribes, who hunt this region, and they were unanimous in their declaration that the Black and White Sheep never mingle together; that the Black are never found north of the Beaver River, and that the White Sheep are never found south of it. This information was substantiated by the testimony of the Histolenas or Mountain Indians and that of the Schotinas of the Liard River."

I subjoin the measurements of six additional adult specimens collected in July and August, 1898, by Mr. Stone, but not yet forwarded. They were taken in the Rocky Mountains, in latitude $65^{\circ} 45'$, near where the Carcajou? River leaves them.^a

A. J. Stone gives the range of this species as follows:

This beautiful inhabitant of Boreal America occupies two separate and distinct ranges, namely (1) the Alaskan Mountains and the Kenai Peninsula; and (2) the entire stretch of the Rocky Mountains north of latitude 60° , to near the Arctic coast west of the Mackenzie, ranging thence west to the headwaters of the Noatak and Kowak rivers, that flow into Kotzebue Sound.

He states that they are in most places much less common than formerly.^b

Oreamnos montanus (Ord). Mountain Goat.

Ross listed this species as having been taken near Fort Simpson.^c Concerning the range of this animal in the Mackenzie Valley, Fannin and Grinnell publish an extract from a letter from MacFarlane, in which he says:

While stationed at Forts Simpson, Norman, and Good Hope, on the Mackenzie, I often partook of the flesh of this species, killed by Indians at a distance, amid the Rocky Mountain spurs. The eastern limits are the mountains which extend on the Liard, or Turnagain, the Peel, and the Mackenzie rivers. They are also to be met with in the Rockies on the upper Peace River, but I have never heard of any being found to the east of the Mackenzie, but they come close to the latter river.^d

In a recent article MacFarlane states that this species ranges north at least to the Arctic Circle:

At Forts Norman and Good Hope the company frequently receives small quantities of the dried meat of this animal from their Indian hunters on the west side of the river and in the mountains.^e

^a Bull. Am. Mus. Nat. Hist., XII, p. 3, 1899.

^b Ibid., XIII, p. 43, 1900.

^c Nat. Hist. Rev., II (second ser.), p. 275, 1862. He had previously (Can. Nat. and Geol., VI, p. 442, 1861) recorded specimens from La Pierre House, but this was probably an error.

^d Forest and Stream, XXXIV, p. 64, Feb. 13, 1890.

^e Proc. U. S. Nat. Mus., XXVIII, p. 685, 1905.

During the autumn of 1895 J. Alden Loring saw a band of 6 on a cliff in the mountains about 25 miles west of Henry House, and was told that the animals were found throughout the mountains in that region. On visiting the same region in 1896 he found that those observed the previous year west of Henry House had been killed by Indians just before his arrival. Several specimens were taken at his camp 15 miles south of Henry House early in July. A few seen a few days later, not being wanted for specimens, were allowed to escape. He describes their gait as ungainly and slower than he expected. When the animals started up the mountain from the salt lick where they had been disturbed he amused himself by chasing them, and succeeded in getting within 20 feet of one, partially cutting off his retreat. The goat lowered his head as though preparing to charge, but started off to one side and finally succeeded in getting past, and then walked leisurely up the mountain, occasionally turning his head to get a good look at his enemy. In this region they were less common than the mountain sheep, but somewhat resembled them in habits, frequently visiting the same licks. Along the route between Jasper House and Smoky River the species was rare, most of the country not being adapted to their wants. At a camp near the head of Grand Cache River he found wool of this species, showing that it occurred there.

According to information obtained at Fort Liard this species is still found in the Nahanni Mountains back from Liard, and used to occur near the river. It is said to occur also in the mountains opposite Fort Norman, but is rare.

Marmota monax canadensis ^a (Erxleben). Canadian Woodchuck.

The woodchuck, usually called 'wenusk' in the north, occurs in suitable places, usually where there are rocks or sandy soil, throughout the region north to Great Slave Lake and the mouth of the Liard. Owing to lack of material from Quebec, the name *canadensis* is used only provisionally for the woodchuck of the Mackenzie Valley.

In June, 1901, I found the burrow of one in poplar woods 10 miles below the mouth of the Peace, and another at Fort Smith. In 1903, at Smith Landing, Cary saw several skins, said to have been taken in the hilly country to the eastward. I was informed that the species occurs commonly on the sandy ridges in the vicinity of Fort Resolu-

^a In 1902 (N. A. Fauna, No. 22, p. 47) I used the name *Arctomys m. empetra* (*Mus empetra*, Pallas, Novæ Species Quad. e Glirium Ordine, p. 75, 1778), which was based mainly on the Quebec Marmot of Pennant, for the Canadian woodchuck. Unfortunately, however, I then overlooked the fact that Erxleben (*Systema Regni Animalis*, p. 363, 1777) had already described the same animal under the name *Glis canadensis*, giving the same citations as Pallas. The name *canadensis* being thus equally pertinent with *empetra*, and having a priority of one year, will stand for the Canadian woodchuck.

tion. Near Fort Simpson it is said to be fairly common, living in high clay banks. I obtained a female from a native on May 23, 1904, and J. W. Mills secured a male on June 20. They measured, respectively: Total length 455, tail vertebræ 112, hind foot 73; and 508, 120, 76. The species is said to abound in the vicinity of the Liard River rapids, about 30 miles above its mouth, and at Fort Liard.

While walking along the bank of the Athabaska at the Cascade Rapid on August 17, 1904, during my homeward trip, I found the skin and head of a well-grown woodchuck which had been captured and eaten by a golden eagle.

Richardson states that this species inhabits the wooded districts of Canada as far north at least as latitude 61°. ^a Ross, under the name *Arctomys monax*, recorded a specimen from Liard River (probably Fort Liard), ^b and also gives the species as having been taken at Fort Simpson. ^c Allen, under the same name, records specimens from Fort Chipewyan and Fort Simpson. ^d MacFarlane mentions that skins of this animal were traded at Fort Simpson, Fort Chipewyan, Isle à la Crosse, Portage la Loche, Green Lake, and Pelican Narrows. ^e J. Alden Loring obtained a specimen at Edmonton, Alberta, September 14, 1894. It was killed in a grain field, and the species was reported to be rare. He took another on June 5, 1896, on McLeod River about 150 miles west of Edmonton. They were both males and measured, respectively: 446, 121, 67; and 510, 129, 75. A skull from Fort Liard taken by B. R. Ross, and probably the one recorded by him (loc. cit.), is in the National Museum. Skins and skulls from the region agree essentially with specimens from the Hudson Bay region.

Marmota caligata (Eschscholtz). Hoary Marmot.

This large woodchuck inhabits the Rocky Mountains and their spurs west of the Mackenzie, north at least to near the Arctic Circle.

Harmon ^f mentions this animal under the name 'whistler' as an inhabitant of the mountains near the upper part of Peace River, and Mackenzie met with it farther to the westward. Richardson, under the name *Arctomys pruinosis*, quotes the description of one which was killed on the south branch of the Mackenzie (Liard). ^g Allen, under the same name, records specimens from Fort Liard and Fort Good Hope. ^h

^a Fauna Boreali-Americana, I, p. 147, 1829.

^b Can. Nat. and Geol., VI, p. 442, 1861.

^c Nat. Hist. Rev., II (second ser.), p. 274, 1862.

^d Monographs N. A. Rodentia, p. 919, 1877.

^e Proc. U. S. Nat. Mus., XXVIII, p. 751, 1905.

^f Journal of Voyages and Travels, p. 427, 1820.

^g Fauna Boreali-Americana, I, p. 151, 1829.

^h Monographs N. A. Rodentia, p. 929, 1877.

On September 28, 1895, during Loring's trip to western Alberta, several were seen in the mountains west of Henry House, and a young specimen was taken. At this time there had been a heavy fall of snow, but most of it had melted. In 1896 Loring found the species common at and above the timber line near his camp 15 miles south of Henry House in July, and observed several about one-quarter grown about the first of the month. In many places the entrances to their holes were in snowdrifts, and the animals could be seen seated there on sunny days. A well-grown female was taken on July 7. It measured: 616, 202, 85. In the late summer and early autumn, he reported the species common at and above timber line in the high mountains between Jasper House and Smoky River. When he visited the mountains 25 miles west of Henry House about the middle of October, the animals had hibernated, but he saw many skulls about an Indian camp, and judged that the species was common there.

John Firth, Hudson's Bay officer in charge of Fort McPherson, who has spent many years in that region, informed me that this species, which he accurately described, occurs in the mountains about the headwaters of the Porcupine. From other sources I learned that it is a well-known inhabitant of the mountains about Fort Liard.

Citellus (Colobotis) parryi (Richardson). Hudson Bay Spermophile.

Ground squirrels inhabit the entire area of the Barren Grounds across the northern part of the region now under review (see Pl. XX), and are usually abundant wherever found. In the absence of specimens it is impossible to draw a definite line between the habitats of *C. parryi* and of *kennicotti*, which is the form found about the mouth of the Mackenzie, and with which *parryi* undoubtedly intergrades. It being desirable, however, to separate the records, I have taken the watershed between the Coppermine and Great Bear Lake as the dividing line, though this boundary is purely arbitrary and subject to correction.

The species was first recorded from the region in Franklin's narrative of his first northern journey, under the name *Arctomys richardsoni*, as occurring near Gordon Bay, Bathurst Inlet.^a Richardson mentions seeing many of the animals on the lower Coppermine in August, 1826; ^b later he states that the species abounded in the vicinity of Fort Enterprise.^c Back mentions the species as occurring near the northern end of Artillery Lake, northeast of Fort Reliance; ^d

^a Narrative Journey to Polar Sea, p. 378, 1823.

^b Narrative Second Expedition to Polar Sea, p. 271, 1828.

^c Fauna Boreali-Americana, I, p. 158, 1829.

^d Narrative Arctic Land Expedition to Great Fish River, p. 128, 1836.

and King noted it on Back River, above Pelly Lake.^a Pike also found it numerous on Back River, above Lake Beechey, in July, 1890.^b

Hubert Darrell, who accompanied Hanbury down the Thelon or Ark-i-link in the summer of 1901, informs me by letter that ground squirrels were very numerous along its banks, and in the summer of 1902 were common also along the Arctic coast between Bathurst Inlet and the Coppermine. Hanbury mentions that one was killed on May 29 of the same year near Melbourne Island, and implies that it was the first observed that season. He states that the animals are easily taken by hand when surprised at some distance from their burrows, and that they form the chief food of the wolverene during the summer months.^c

Citellus (Colobotis) parryi kennicotti (Ross). Mackenzie Spermophile.

Arctomys kennicottii Ross, Canadian Nat. and Geol., VI, p. 434, 1861.

In an article on the animals useful to the Chipewyan Indians, Bernard R. Ross proposed the name *Arctomys kennicottii* for the spermophile of the lower Mackenzie region. The name has heretofore been overlooked or not taken at its full value, from failure to trace it to the place where it was first used, where it is accompanied by a fairly full description.

In order to present the matter clearly the original description is here quoted. Under the head of Marmots (*Arctomys*), Ross says:

There are three, if not four, species of this animal in the Mackenzie's River District, viz, *A. pruinusosus*—inhabiting the northern Rocky Mountains and Nahaunay Hills; *A. Kennicottii*—dwelling in the same localities, with a more northern range, and extending eastward to the Anderson River. * * * As I do not think that the Marmot, which I have named *A. Kennicottii* (after my friend the enterprising Naturalist Mr. Robert Kennicott,) has been yet described, I shall here insert a brief notice concerning it.

It is in size as large as a small muskrat, and in color a silvery gray, interspersed with orange hairs on the back, but changing on the flanks into a decided yellow, palest on the belly; the tail is short. It has cheek pouches, and is decidedly smaller than *A. monax*. In habits, so far as I know, it assimilates closely to the other marmots. It is a social animal and digs its den on the mountain's side, or in the banks of rivers. * * * Very far north there is a variety which is perfectly black, instead of hoary and yellow.

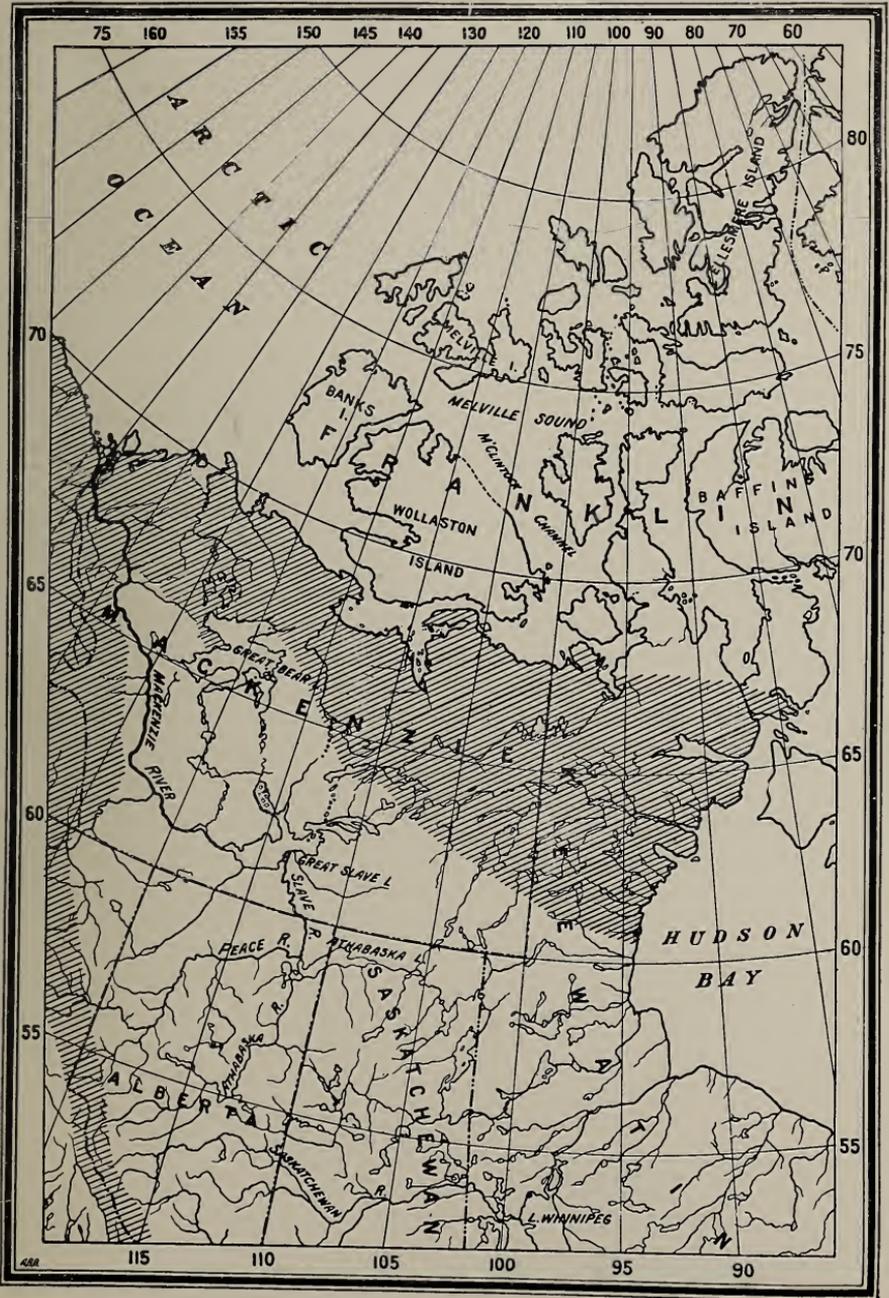
The habitat, as above given, is somewhat indefinite. Fortunately, however, on a succeeding page (p. 442), he lists specimens from [near] Fort Good Hope and Anderson River, which may be considered to fix the name on the animal of the lower Mackenzie region. Since specimens from this region prove identical in characters with topotypes of *Spermophilus barrowensis*, recently described from Point Barrow,^d the latter name becomes a synonym of *kennicotti*.

^a Narrative Journey to Arctic Ocean, I, p. 281, 1836.

^b Barren Ground of Northern Canada, p. 183, 1892.

^c Sport and Travel in Northland of Canada, p. 154, 1904.

^d Merriam, Proc. Wash. Acad. Sci., II, p. 19, March, 1900.



DISTRIBUTION OF PARRY MARMOT (*CITELLUS PARRYI*) AND RELATED FORMS IN CENTRAL CANADA.

While descending the Mackenzie in June, 1904, I was constantly on the lookout for this spermophile. C. P. Gaudet, of Fort Good Hope, informed me that it was not found in the vicinity of that post, but occurred beside the river at some distance below. Descending the river, I saw the first burrows on some sandy hills on the right bank about 60 miles below Fort Good Hope, and was afterwards informed by Père Giroux, who has paid much attention to the animal life of the region, that this point is the uppermost limit of their range on the river. They become common on the right bank 50 miles below, where the river bends sharply to the west, and is bordered by a succession of high clay banks. Well up on these banks, above high flood mark, the animals make their permanent burrows, and are usually seen scampering toward them, or sitting upright at the entrances, to whistle a moment at the intruder before plunging into their depths. Here on June 27 I took a pair of adults and two half-grown young. The adults were shy and difficult to secure, but the young were much less wary. The latter were digging burrows on the sandy shores below high-water mark, evidently merely for temporary occupation. During the following day, while pursuing my voyage down the river, I saw many burrows and occasionally one of the animals, and noted that the Indians had set snares at many of the holes. The animals occur in suitable places along the right bank of the river nearly to the Lower Ramparts, but below this point none were observed. In certain places on Peel River near Fort McPherson, where sandy banks occur, they are numerous, and I obtained two specimens there on July 11. They are said to be common also on the mountains west of the Mackenzie below this point.

A female taken near the site of old Fort Good Hope, June 27, is in worn breeding pelage and has a pale, washed-out appearance. A male taken at the same time is assuming the postbreeding pelage. This is nearly completed in a male taken at Fort McPherson, July 11. These specimens, compared with topotypes of *C. barrowensis* in corresponding pelages, agree very closely. On comparing the full pelaged specimens with a series of *C. parryi* from Hudson Bay in comparable condition, *C. kennicotti* is seen to differ considerably, being much paler throughout. The paler tint of the ochraceous suffusion of the lower parts, sides, and thighs is especially noticeable.

The pair taken near old Fort Good Hope measure as follows: Male: total length, 410; tail vertebrae, 120; hind foot, 60; female: 375, 118, 62. The two males from Fort McPherson measure, respectively, 380, 120, 62, and 380, 110, 64.

The following records in all probability refer to the present form. Richardson states that the species abounded about Fort Enterprise and was plentiful on Cape Parry.^a Simpson noted its occurrence near

^a Fauna Boreali-Americana, I, p. 158, 1829.

Fort Confidence, and its abundance at Marmot Rapid on Dease River.^a Ross mentions specimens from [near] Fort Good Hope and Anderson River (loc. cit.). In addition to skins from Lockhart and Anderson rivers, localities still represented in the collection of the U. S. National Museum, specimens are listed by Allen from Liverpool Bay, Franklin Bay, and Onion River (a tributary of the Lockhart).^b Russell mentions the 'siffleux' as very abundant near Warren Point, between the mouth of the Mackenzie and Herschel Island, and took specimens at the latter locality in the late summer of 1894.^c A. J. Stone says: "I saw Spermophiles sitting on their mounds among the hills to the east of Darnley Bay early in April [1899], during very cold weather."^d

J. M. Bell, who explored the region of Great Bear Lake in the summer of 1900, informs me by letter that he found this animal common along the north shore of the lake; and Peter McCallum, who has lived several years in the same region, told me that it is abundant on the 'Big Point,' a local name for the point separating Smith and Keith bays, and mainly occupied by the Scented Grass Hills. MacFarlane, in manuscript notes sent to me, speaks of these animals as fairly numerous along the banks of the Onion and Lockhart rivers in July, 1860.

Citellus (Colobotis) plesius (Osgood). Lake Bennett Ground Squirrel.

While collecting at Fort Norman in June, 1904, I fortunately obtained from a native a male ground squirrel which he had shot a few miles back from the west bank of the Mackenzie, opposite the post. The species was said to be common in the mountains farther back, but to be rare near the river. It measured: Total length 350; tail vertebræ 108; hind foot 55. On comparison, it agrees precisely with specimens from Lake Bennett, British Columbia, the type locality of *C. plesius*, and thus greatly extends the known range of that well-marked form. *C. plesius* probably inhabits the Nahanni Mountains, and other ranges west of the Mackenzie. A specimen from Fort Liard, which I have recently examined, is unmistakably referable to it.

Citellus (Colobotis) columbianus (Ord). Columbian Ground Squirrel.

Ground squirrels referred to this species inhabit the Canadian Rockies in western Alberta and southern British Columbia, for an undetermined distance northward. The species was redescribed by Richardson under the name *Arctomys parryi* var. *erythrogluteia*,

^a Narrative Discoveries on North Coast of America, pp. 216, 249, 1843.

^b Monographs N. A. Rodentia, pp. 846, 847, 1877.

^c Expl. in Far North, pp. 143, 249, 1898.

^d Bull. Am. Mus. Nat. Hist., XIII, p. 6, 1900.

from specimens taken by Drummond on the Rocky Mountains near the sources of the 'Elk' (Athabaska).^a While in that region in 1896, J. Alden Loring found the animals rather common in Smoky Valley, 50 miles north of Jasper House. They were extremely shy, probably on account of being harassed so much by bears, which, in their attempts to capture the spermophiles, had dug great holes in many places. They seemed to prefer bushy flats to hillsides. Seven specimens were taken on August 27. Later in the summer he found a skull in the mountains about 25 miles west of Henry House.

Most of the specimens taken are young of the year, though some apparently are full-grown. The older ones have the general color of the back yellowish brown, vermiculated with black; upper surface of thighs and hind feet, and face as far back as the eyes, bright brick red; lower parts tinged with ochraceous buff; nape, sides, and rump flecked with gray, evidently the fall pelage coming in; tail fringed with gray. The younger specimens are similar, but lighter in color. These specimens agree closely with skins from various points in Idaho, collected in the type region of the 'burrowing squirrel' of Lewis and Clark, the *Arctomys columbianus* of Ord.^b The largest specimen taken by Loring measures: Total length, 345; tail vertebrae, 93; hind foot, 53.

Citellus (Ictidomys) franklini (Sabine). Franklin Spermophile.

This ground squirrel occurs in the region now under review only in central Alberta. It is abundant along the road from a few miles north of Edmonton, Alberta, to Sturgeon River, and I saw a few individuals to the northward of that point. During the first days of May, 1901, when we passed through this section, the animals were very active and had evidently been out of hibernation some time. They were common in the same region also in 1903. They frequented brushy tracts and the borders of cultivated fields, and were doing considerable damage to the sprouting grain. Many were seen during our return trip through the region in September, but the species was then less conspicuous. A single specimen was taken on each of our spring trips.

J. Alden Loring took a specimen at Edmonton September 19, 1894. It was killed beneath a shock of oats, where it had collected about half a peck of grain. It is an adult male, and measured: Total length 294, tail vertebrae 147, hind foot 55.

The type locality of this species is sometimes given as Cumberland House, probably from Sabine's statement that it was obtained there,^c but the correct locality was evidently Carlton House, since Richard-

^a Fauna Boreali-Americana, I, p. 161, 1829.

^b See Merriam, N. A. Fauna, No. 5, p. 39, 1891.

^c Narrative of Journey to Polar Sea, Appendix, p. 662, 1823.

son, who undoubtedly collected the type specimen, states that the species was found only at that locality, where it made its appearance about three weeks later in the spring than Richardson's ground squirrel.^a

In notes sent to Dr. C. Hart Merriam by John Macoun some years ago he states that this species was observed at Athabaska Landing.

Citellus (Ictidomys) tridecemlineatus (Mitchill). Thirteen-lined Spermophile.

This species is abundant locally along the road from a few miles north of Edmonton, Alberta, to Athabaska Landing. The animals usually frequent open uncultivated fields, but frequently were seen running across the road in the poplar-covered tracts.

Besides a specimen or two taken by us near Sturgeon River on our spring trips through the region the Biological Survey collection contains specimens collected by J. Alden Loring at Edmonton in September, 1894, and others taken by G. F. Dippie at Edmonton and Red Deer, Alberta, in September, 1899. Three adults from Edmonton average: Total length 287, tail vertebræ 101, hind foot 39.

Richardson redescribed this species under the name *Arctomys (Spermophilus) hoodii*, from Carlton House. He gives the northern limit of its habitat as latitude 55°, but assigns no definite locality.^b

Citellus (Callospermophilus) cinerascens (Merriam). Northern Mantled Spermophile.

This species is a rather common inhabitant of the mountains of western Alberta. It was first recorded from there under the name *Arctomys (Spermophilus) lateralis*, by Richardson, who states that Drummond obtained several specimens "on the Rocky Mountains, in latitude 57°," probably in the Jasper House region.^c

In 1895 J. Alden Loring took two specimens at Jasper House on August 27, and thinks that the species hibernated soon afterwards. In 1896 he found the species in the mountains 15 miles south of Henry House in July, taking a number of specimens, and in the early autumn noted it as rather common north of Jasper House, where it inhabited rock slides and grassy slopes. He collected specimens on Grand Cache River at points 60 and 70 miles north of Jasper House

^a Fauna Boreali-Americana, I, p. 168, 1829.

^b Ibid., p. 178, 1829.

^c Ibid., p. 175, 1829. Latitude 57° of Richardson, frequently used by him in connection with specimens collected by Drummond in the Rocky Mountains, is incorrect, and much confusion has resulted from this statement of latitude being taken literally. The most northern point reached by Drummond was probably short of latitude 55°. (See itinerary of Thomas Drummond, p. 60.)

August 31 to September 5. Most of the specimens are changing from summer to fall pelage, a few having the intense chestnut mantle and nearly all showing traces of it.

Eutamias borealis (Allen). Liard River Chipmunk.

Chipmunks referred to this species occur rather commonly in the Athabaska, Slave, and upper Mackenzie valleys. In the original description of *Tamias asiaticus borealis*^a the name "was allowed to cover the Old World *T. asiaticus* as well as the form of the American fur countries."^b In 1890, when Allen restricted the name to the American form, he designated as the type No. 6506, U. S. Nat. Mus., from Fort Liard, remarking that No. 3994 (coll. C. Hart Merriam) was practically identical with it.^c In now using the name *E. borealis* for the chipmunk of the Athabaska and upper Mackenzie region this remark plays an important part, since the type specimen is not now available, and the discovery of the fact that *Eutamias caniceps* inhabits the Nahanni Mountains (which range extends close to Fort Liard), within less than 150 miles of that post, indicates that the Fort Liard animal may possibly be the same form. The specimen mentioned by Allen, however, No. 3994 (coll. C. Hart Merriam), taken at Deadwood, South Dakota, whether or not specifically identical with the Athabaska animal, resembles comparable specimens of it much more closely than it does specimens of *E. caniceps*. At present, therefore, it seems advisable to retain the name *borealis* for the animal which for some years has borne it.

In 1901 we noted several about 200 miles north of Edmonton, and near Sturgeon River, on May 2. One seen near the latter place was feeding on willow buds, which with great dexterity it gathered from the slender branchlets. While we were descending the Athabaska we saw a few individuals at Brulé and Cascade rapids on May 12 and 13. We saw none at Fort Chipewyan, but found them rather common at our camps on the west bank of Slave River 10 and 25 miles below the mouth of the Peace, and collected several on June 9 and 13. The animal was rather common at Smith Landing, but during several days' collecting on the opposite bank of the river we did not see it, and in fact did not note the species anywhere on the eastern bank of Slave River. We observed a number on Smith Portage, and collected several at Fort Smith, June 22 to 28. At Fort Resolution we noted a few and took specimens there on July 5 and 8. On our return trip we collected two at Fort Smith, August 5, and found it common about the rocky hills at Smith Landing on the following day, collecting a number. We noted the species also at Big

^a Monographs N. A. Rodentia, p. 794, 1877.

^b Bull. Am. Mus. Nat. Hist., III, p. 109, 1890.

^c *Ibid.*, p. 109, 1890.

Cascade Rapid, August 14. We saw it at Athabaska Landing, August 30, taking one specimen. Its cheek pouches were filled with seeds of *Rosa*.

In 1903 we saw chipmunks at several points between Edmonton and Fort Chipewyan on our northward journey, and my brother and Cary during their outward trip noted the species at Smith Landing and at several points on the Athabaska, including their camp 30 miles above Athabaska Landing, where they collected one September 8. During the same season I failed to detect it to the northward of Great Slave Lake. At Fort Simpson the animal was reported rare, and this accorded with my experience. A. F. Camsell saw one on the Mackenzie a few miles above the mouth of the Liard about October 25, when 6 inches of snow lay on the ground.

During the spring of 1904 I failed to observe the animal at Fort Simpson, but received a report that one was seen on the hills west of the post about the middle of May. During my outward trip I occasionally observed it along the Athabaska.

In September, 1894, J. Alden Loring found the species rather common about the borders of fields near Edmonton. He took a number of specimens, some of which had their cheek pouches filled with oats, September 19 to 24. During his trip from Edmonton to the mountains, in the early autumn of 1895, he observed it at several places, but nowhere found it common. He took specimens on McLeod River, August 16; at Henry House, September 10 to 12; and at Moose Creek, west of Lake Ste. Anne, October 16. In 1896, on again visiting western Alberta, he found it occurring sparingly throughout the region, and took specimens 15 miles south of Henry House, July 15 to 17; at the head of Muskeg Creek, north of Jasper House, August 29; on Grand Cache River, 60 and 70 miles north of Jasper House, August 31 to September 5; at Fishing Lake, 90 miles north of Jasper House, September 17; at Grand Cache, Smoky River, September 19; and on Muskeg Creek, 15 miles from its mouth, September 25.

Some of the specimens from near Henry House are larger and darker than the rest of the series from western Alberta, and suggest the possibility of intergradation with *Eutamias felix*.

Under the name '*Sciurus (Tamias) quadrivittatus*' Richardson recorded specimens procured by Drummond near the source of Peace River.^a Ross first recorded it from Liard River, under the name *T. quadrivittatus*, stating that it was very abundant there.^b In some notes from Ross, published by Allen, he gives it as ranging north to Fort Good Hope, but as being rare at Fort Simpson and north of Liard River, and states that at Fort Liard and Fort Resolution the

^a Fauna Boreali-Americana, I, p. 184, 1829. (See note on Drummond's itinerary, p. 60.)

^b Can. Nat. and Geol., VII, p. 140, 1862.

animals are very destructive to such garden produce as is raised there.^a Allen records specimens from Salt River, Fort Resolution, Fort Simpson, Fort Rae, and Fort Liard.^b A specimen from Fort Simpson, taken by B. R. Ross, May 8, 1860, agrees very well with specimens from Great Slave Lake and Slave River, and differs markedly from the Nahanni Mountain series of *E. caniceps*.

Tyrrell found chipmunks, probably of this form, in the country southeast of Athabaska Lake in the summer of 1892.^c

***Eutamias borealis caniceps* Osgood. Gray-headed Chipmunk.**

While collecting on Mount Tha-on'-tha, at the junction of the Mackenzie and North Nahanni rivers, about the middle of July, 1903, Alfred E. Preble and Merritt Cary found chipmunks inhabiting the mountain to its summit. They were shy and rather uncommon and were difficult to secure. Four specimens in worn pelage, taken July 14 and 17, agree perfectly with a large series of *E. caniceps* from various points on the upper Yukon. *E. caniceps* differs from *E. borealis* in several particulars, the gray-fringed tail being its most conspicuous character, but the two forms probably intergrade.

During my trip down the Mackenzie in the summer of 1904 I saw a single individual in a 'brulé' near the base of the same mountain on June 4, and one of my canoemen saw one on the right bank of the Mackenzie near Blackwater River on June 9.

***Sciurus hudsonicus* Erxleben. Hudson Bay Red Squirrel.**

This species is abundant nearly throughout the wooded parts of the Athabaska and Mackenzie region. During our trip in 1901 a series of 50 specimens was taken, from the following localities: Athabaska River, 60 miles above Grand Rapid, 1; Fort Chipewyan (including the several camps near by), 30; Slave River (mouth of Peace), 1; Smith Landing, 4; Fort Smith, 7; Fort Resolution, 5; Great Slave Lake (mouth of Northern Arm), 1; Fort Rae, 1. In this series the rufous phase, which characterizes by far the larger part of a series taken in 1900 between Norway House and Hudson Bay, is absent, and the tails with two exceptions are edged with yellowish gray, this character being very conspicuous. Among the large series taken in the vicinity of Fort Chipewyan, May 20 to June 5, 1901, only some half dozen are in the summer pelage, the majority being in transition from winter to summer coats. The species was abundant, especially at our camp near Point La Brie, 12 miles northeast of the post. Here their nests were very numerous in the spruces and

^a Monographs N. A. Rodentia, p. 802, 1877. These notes may refer in part to *Eutamias caniceps*.

^b *Ibid.*, p. 805, 1877.

^c Ann. Rept. Can. Geol. Surv., VIII (new ser.), p. 14D, 1896.

their scolding chatter was often heard. A pair which occupied a nest in a large tree beneath which we pitched our tent were allowed to remain undisturbed until their almost continual scolding at our intrusion rendered their company intolerable. At the other posts where we collected they were much less common, and at Fort Rae they seemed to be rare, only one being seen during my ten days' work, though one or two others were heard. It is probable, however, that they had been killed off by the natives.

A specimen from Fort Resolution, taken by Alfred E. Preble on Mission Island, July 22, is abnormally colored, being very light yellowish-rufous above, very sparingly vermiculated with black; the central area of the tail is light rufous, unmarked. Six specimens from Fort Chipewyan, including both sexes, average: Total length 333, tail vertebrae 138, hind foot 51.

During the season of 1903 we found the red squirrel abundant in the country traversed as far north as Great Slave Lake, and Alfred E. Preble and Merritt Cary took specimens at Hay River, Fort Providence, and Nahanni River. Along my route between Fort Rae and Great Bear Lake it was common, and I took specimens on upper Grandin River and at several other points between there and Mac-Tavish Bay. At my camp east of Leith Point I saw a few tracks early in September, but the forest was too thin to afford the animals a congenial habitat. As we traveled westward, however, and the country became more thickly wooded, as was the case after we passed McVicar Bay, I found the species common. A number were seen and several were collected at Fort Franklin. Adults taken there September 19 and 25 had partially assumed the winter coat, the underparts, however, still retaining the unmarked summer pelage. Along Bear River and the Mackenzie the species was common. Owing probably to their comparative immunity from predatory animals, red squirrels were extremely abundant about Fort Simpson, especially on the island where the post is situated. A large series was collected during the winter of 1903-4. Hundreds of nests, constructed of grass, bark, and moss, were found in the trees on the island, and many of the animals appeared to be living in burrows dug in the piles of cone scales which accumulate under the trees where they feed (see fig. 14). During the winter they lived almost exclusively on the seeds of the white spruce, but about the middle of May they fed largely on the blossoming catkins of the balsam poplar (*Populus balsamifera*). They mated late in March and on May 9 I found a litter of young a week or so old in a nest in a spruce. While descending the Mackenzie in June, I found the species common throughout its course, and took specimens at Forts Norman, Good Hope, and McPherson.

In the early autumn of 1895 J. Alden Loring found red squirrels common throughout the Jasper House region and took specimens at several localities. He observed large piles of spruce cones which the animals had collected for winter use, as well as quantities of mushrooms accumulated on the branches of trees near their nests. In one place about a half bushel of mushrooms were thus deposited near a single nest. In 1896 he found the species common 15 miles south of Henry House, July 3 to 21; along his route between Jasper House and Smoky River, August 20 to October 8; and in the mountains west of Henry House later in October. Specimens taken by Loring in this region, mainly in 1895, were recorded by Allen, under the



FIG. 14.—Pile of scales of cones of white spruce, collected by red squirrel (*Sciurus hudsonicus*). Fort Simpson, March, 1904.

name *S. h. baileyi*, from the following localities: Banff, 2; Edmonton, 1; Jasper House, 6; Cache Picot [Pecotte], 3; Corral (near Jasper House), 1; Henry House, 1; Muskeg Creek, 3.^a They are in the rufous phase of coloration, and apparently are not separable from typical *hudsonicus*.

Ross listed specimens from Big Island and Fort Simpson;^b and Allen specimens from Fort Rae, Fort Simpson, Fort Liard, Fort Good Hope, and Fort Anderson.^c Tyrrell states that the species was

^a Bull. Am. Mus. Nat. Hist., X, p. 262, 1898.

^b Can. Nat. and Geol., VI, p. 441, 1861.

^c Monographs N. A. Rodentia, pp. 691, 692, 1877.

found everywhere in the wooded country between Churchill River and the eastern end of Athabaska Lake, where he explored during the summer of 1892.^a

Sciuropterus sabrinus (Shaw). Hudson Bay Flying Squirrel.

Though flying squirrels occur apparently throughout the wooded portion of the region, they are rare in most localities, and their nocturnal habits and the great number of abandoned woodpecker holes available for hiding places insure almost perfect immunity from detection. On the Athabaska above Grand Rapid, and also on the upper Mackenzie, we secured almost typical specimens of both *S. sabrinus* and *S. alpinus*, showing that these species meet or overlap, or more probably that they intergrade, in these sections. Considering their close affinity, the latter view is the more reasonable.

In the dusk of the evening of May 27, 1903, while encamped at the Cascade Rapid, Athabaska River, I shot a fine specimen in a small grove of poplars, from one of which the animal had been roused. It proved to be an adult female, and measured: Total length, 332; tail vertebræ, 160; hind foot, 41. Compared with skins from Norway House and Hudson Bay, typical *S. sabrinus*, it agrees almost perfectly in color, differing only in the slightly paler tint above. While collecting at Fort Providence early in July, Alfred E. Preble and Merritt Cary obtained another fine adult specimen, a male, which measures 339, 157, 41. It is apparently typical of this form and matches almost perfectly the Cascade Rapid specimen. The under side of the tail shows as much rufous as the most extreme examples of *S. sabrinus*, thus differing markedly from *S. alpinus*. In both of these specimens the upper surfaces of the hind feet are brownish, relieved by a slight amount of white on the toes.

An imperfect specimen in the National Museum from Big Island (No. 6505) agrees closely in color with skins from Hudson Bay and Norway House. Another younger specimen from the same locality (No. $\frac{7069}{37219}$), the skull of which can not be found, also is referable to this form. Specimens from Big Island and Fort Resolution have been recorded under the name *Sciuropterus hudsonius* by Allen,^b and as *S. sabrinus* by Bangs.^c In a recent article MacFarlane, on the authority of Pierre Deschambeault, states that the flying squirrel is not uncommon at Isle à la Crosse and at Lac du Brochet post [Reindeer Lake].^d The skeleton of a flying squirrel, now in fragments, taken by MacFarlane at Fort Anderson, is also provisionally referred to this species, and shows that the animal probably ranges to the limit of the forest.

^a Ann. Rept. Can. Geol. Surv., VIII (new ser.), p. 14D, 1896.

^b Monographs N. A. Rodentia, p. 664, 1877.

^c Proc. Biol. Soc. Wash., X, p. 163, 1896.

^d Proc. U. S. Nat. Mus., XXVIII, p. 749, 1905.

Sciuropterus sabrinus alpinus (Richardson). Mountain Flying Squirrel.

This flying squirrel is mainly an inhabitant of the Rocky Mountain range from the Jasper House region northward at least to Liard River. To the eastward of the mountains it apparently grades into *S. sabrinus*, as before stated.

'*Pteromys sabrinus* var. *alpinus*' was described by Richardson from specimens taken by Drummond near the sources of Elk River [Athabaska].^a Two specimens, male and female, taken by D. E. Noyes at Jasper House, Alberta, December 15, 1896, can thus be considered typical. Compared with winter skins of *S. sabrinus* from Norway House, and skins without date from Oxford House and Hudson Bay, the Jasper House specimens are much less rufous, the general color above being sepia or grayish-bister; the tail is much darker, being dusky-brownish above and but slightly lighter beneath; the upper surfaces of the feet are darker; the lower parts are dull grayish-white, tinged with fawn, not conspicuously different from *S. sabrinus*.

A specimen, not fully adult, taken by us on the Athabaska about 60 miles above Grand Rapid August 25, 1901, agrees closely with the Jasper House specimens. In December, 1903, while at Fort Simpson, I received a flying squirrel from Joseph Hodgson, of Fort Providence, where it was taken about December 7. It is a male, evidently a young one of the previous summer, and measured: Total length 310, tail vertebræ 140, hind foot 39. The molt had been retarded, and the specimen is consequently in poor pelage. The general duskiness of both surfaces of the tail and the lack of brownish suffusion on the back indicate that this specimen should be referred to *S. alpinus*.

Two specimens, both males, taken at Fort Simpson March 14, 1905, have been received recently from J. W. Mills, who writes that they were found in a nest on the branches of a tree, evidently a repaired bird's nest. These specimens evidently are referable to *S. alpinus*, though perhaps slightly inclining toward *sabrinus*. They are slightly more rufous on the back than the topotypes of *alpinus*, but agree in having the tails much suffused with sooty. The upper surfaces of the hind feet also are very dark, as in typical *alpinus*. The measurements, reduced to millimeters, are as follows: Total length 318, tail vertebræ 146, hind foot 39; and 305, 127, 36. The skulls are smaller than the topotypes of *S. alpinus*, due evidently to immaturity, but show no striking peculiarities.

^a Zool. Journ., III, No. XII, p. 519, 1828. (See also Fauna Boreali-Americana, I, p. 195, 1829.)

With the rather limited amount of material available, I am unable to discover tangible cranial differences between *S. sabrinus* and *alpinus*.

In addition to the Elk River specimens, Richardson mentioned having received others from the south branch of the Mackenzie [Liard];^a and Rhoads has recorded two specimens from Fort Liard as *S. alpinus*.^b Ross recorded *Pteromys alpinus* as rather rare in the mountain ranges of Liard River.^c

Peromyscus arcticus (Mearns). Arctic White-footed Mouse.

This familiar species is abundant throughout the region north to the lower part of Grandin River and Fort Norman. During the three seasons spent in the north we collected a very large series, comprising specimens from the following localities: Alberta: 40 miles north of Edmonton; Athabaska River, 5 and 30 miles above Athabaska Landing; Swift Current, and several points between there and Pelican Portage; Pelican River; Grand Rapid; Brulé Rapid; Crooked Rapid; Cascade Rapid; Mountain Rapid; Fort McMurray; Fort Chipewyan; Slave River, 10 and 25 miles below the Peace; Smith Landing. Mackenzie: Fort Smith; Fort Resolution; Trout Rock (25 miles south of Fort Rae); Fort Rae; lower Grandin River; Fort Providence; Willow River (near Fort Providence); Fort Simpson; mountains at mouth North Nahanni River; Fort Wrigley; and Fort Norman. A large series from Fort Simpson, the type locality of *P. arcticus*,^d on comparison with the rest of the series, shows that the species remains remarkably constant over a very large area. The principal variation appears in the series from the upper Athabaska, individuals of which have much longer tails, on the average, than typical specimens from farther north. In some respects these show a tendency toward *Peromyscus oreas*, but the measurement of the hind foot falls far short of the same dimension in typical *oreas*, and the specimens seem properly referable to *arcticus*. Ten adults from Fort Simpson average: Total length 162.2, tail vertebrae 72.2, hind foot 20; five from near mouth of North Nahanni River, 171, 77, 20.5; four from Fort Norman, 165, 75.5, 20; ten from Fort Providence, 175, 69, 20; ten from Fort Rae, 168.7, 71.4, 20; ten from Fort Resolution, 161, 71.8, 20.3; ten from Fort Smith, 173.2, 76.5, 20; ten from Fort Chipewyan, 167.7, 74.8, 20; ten from 30 miles above Athabaska Landing, 173, 83.3, 20. The tendency toward elongation of the tail in the white-footed mice of the upper Athabaska is well shown in this last series.

^a Fauna Boreali-Americana, I, p. 195, 1829.

^b Proc. Acad. Nat. Sci. Phila., 1897, p. 320.

^c Can. Nat. and Geol., VII, p. 140, 1862.

^d Mearns, Bull. Am. Mus. Nat. Hist., II, p. 285, 1890.

White-footed mice inhabit nearly all kinds of ground, from swamps to high, dry situations, though the latter constitute the favorite habitat, especially if ledges of rock occur. They are always common about the buildings at trading posts, especially during the winter season, taking the place of the house mouse of more southern regions, and becoming quite as much of a pest. The traveler while camping often hears them as they search for food about his tent at night, making their presence known in the dry leaves about his bed, or by attempts to climb the walls of the tent.

While on my trip northward from Fort Rae in August, 1903, I took specimens on Grandin River about 50 miles north of Fort Rae, but failed to detect the species to the northward of that point, though considerable trapping was done. It was next seen at Fort Norman, on the Mackenzie, where it is a common species. It is common also along the Mackenzie above Fort Norman, and as we ascended the river during October we frequently saw its characteristic footmarks on the freshly fallen snow. At Fort Simpson I found it abundant and active all winter, and collected many specimens both in the woods and about the buildings. A nest of young was found in one of the houses on April 20, 1904. The Indians say that the animal has three litters during the summer. The number of embryos noted in the Slave River region during June, 1901, varied from four to eight. In 1904 I noted seven small embryos in a specimen taken at Fort Simpson, on April 12, and the same number at Fort Norman, June 15. I did not detect the species on the Mackenzie below Fort Norman.

Richardson refers to the species under the name *Mus leucopus*, and states that it was observed as far north as Great Bear Lake.^a King found it abundant in the winter of 1833-34 at Fort Reliance, Great Slave Lake, where it established itself in the dwelling house a short time after the building was completed.^b Coues records specimens from Fort Resolution, Fort Rae, Big Island, Fort Simpson, and Fort Liard.^c Ross records specimens from several localities, including Fort Good Hope. The species may have been introduced at the last-named post, but it is rather doubtful if it occurs there naturally. Allen has recently recorded specimens taken by Stone at Hell Gate (Liard River), Fort Liard, and Fort Norman.^d

In September, 1894, J. Alden Loring found this mouse common at Edmonton, Alberta, and took a large series. Ten adults average: Total length 163.2, tail vertebræ 75.9, hind foot 20. He took the species also at St. Albert, northwest of Edmonton, in 1895. During

^a Fauna Boreali-Americana, I, p. 142, 1829.

^b Narrative Journey to Arctic Ocean, I, p. 166, 1836.

^c Monographs N. A. Rodentia, p. 84, 1877.

^d Bull. Am. Mus. Nat. Hist., XIX, p. 542, 1903.

the seasons of 1895 and 1896 he found white-footed mice rather common in the mountains of western Alberta, and secured a series of about 50, including specimens from the following localities: Jasper House; 15 miles west of Henry House; 15 miles south of Henry House; Stony River (north of Jasper House); Grand Cache River (70 miles north of Jasper House); and Muskeg Creek. A male from the mountains 15 miles south of Henry House measures: 199, 101, 21. Six specimens from Grand Cache River average: 172, 84, 20. These specimens approach *P. oreas* in several characters, but on the whole are best referred to *arcticus*. The skulls are longer, flatter, and relatively narrower than those of typical *arcticus*, with the lachrymal region more swollen, the zygomata less strongly bowed outward, and the rostrum longer.

***Neotoma drummondi* (Richardson). Drummond Wood-Rat.**

This species was described by Richardson from a specimen taken by Drummond in the Jasper House region.^a Richardson later figured this specimen, at the same time describing it more fully and mentioning several others, all said to have been procured in the same region. He mentions also another skin, "of a larger, and perhaps a specifically distinct kind, procured on the Rocky Mountains in latitude 63°."^b Coues recorded specimens, presumably referable to the same species, from Fort Liard and Fort Halkett.^c A specimen from the former place is still in the United States National Museum. I was informed that at Fort Liard, where the animal is said to be not very common, the Indians call it the 'big mouse.'

In the early autumn of 1895 J. Alden Loring found the species common in the mountains near Jasper House, and collected a series of over twenty at that place. Their nests, built of sticks, leaves, bones, small stones, and other rubbish, the usual materials, were found in the crevices of ledges, some of which seemed to have been occupied for many years. The animals were called by the Indians 'medicine rats,' in allusion to the musk glands.

The series collected is quite uniform in color, the fur of the back, sides, and head being light plumbeous at base, with a subterminal band of yellowish-brown, and with black tips. The black-tipped hairs are most conspicuous on the posterior half of the back, where the black and yellowish-brown contribute about equally to form the general color. On the shoulders and thighs the yellowish-brown forms the conspicuous element of the color, especially in the case of the freshly pelaged individuals. The lower parts and feet are white, slightly tinged with yellowish, the tails are plumbeous above and

^a Zool. Journ., III, p. 516, 1828.

^b Fauna Boreali-Americana, I, pp. 137-140, pl. 8, 1829.

^c Monographs N. A. Rodentia, p. 24, 1877.

yellowish-white below, and in two individuals slightly albinistic at the tip. Ten individuals of both sexes average: Total length 397, tail vertebræ 177, hind foot 46.

Phenacomys mackenzii Preble. Mackenzie *Phenacomys*.

Phenacomys mackenzii Preble, Proc. Biol. Soc. Wash., XV, p. 182. August 6, 1902. (Fort Smith, Mackenzie.)

One of the gratifying results of our work in the Athabaska and Mackenzie country was the detection of *Phenacomys*, represented by a new form, as an inhabitant of the region, the genus thus being for the first time ascertained to occur in the interior north of Alberta.

In 1901 we first trapped this vole at our camp on Slave River 10 miles below the mouth of the Peace, on June 11, taking an adult female in poplar woods. We next took the species at Fort Smith, where, during the last few days of June, a series of 25 specimens was trapped. They were captured in a strip of spruce and poplar woods bordering a marsh, the situation being dry, however, since the ground sloped gently from an adjacent poplar ridge. No runways or burrows were found which could be attributed with certainty to this species, since both *Microtus* and *Evotomys* were abundant and were taken in the same traps. Embryos, varying in number from 4 to 7, were noted in several instances, and a number of half-grown young ones were trapped. Many were taken beneath the clumps of buffaloberry (*Lepargyrea canadensis*) which helped to form a sparse undergrowth. We took a few specimens in similar situations at Fort Resolution early in July, and my brother trapped one on Mission Island near by.

In this series the fur of the upperparts is dark plumbeous at base, tipped with yellowish-brown, black, and gray, the varying proportions of these colors causing some variation in the general color of the different specimens; face from the eyes forward, ochraceous; cheeks and underparts grayish-white, grading insensibly into color of upperparts. Ten adults of both sexes from Fort Smith average: Total length 140.7, tail vertebræ 32.7, hind foot 17.

During my trip northward from Great Slave Lake in 1903 I trapped an adult male near the shores of a small lake a few miles north of Lake St. Croix, 120 miles slightly west of north of Fort Rae. This individual was taken in dry mixed woods of spruce and birch. It measured: Total length 127, tail vertebræ 31, hind foot 18. The skull unfortunately was lost, but the skin can be exactly matched by specimens in the series from Fort Smith, the type locality of *P. mackenzii*, and is certainly referable to this species. In September of the same year Alfred E. Preble and Merritt Cary took two specimens in mossy spruce woods on the Athabaska at points 5 and

30 miles above Athabaska Landing, Alberta. The range of the species in the region is thus ascertained to extend from central Alberta to a point about halfway between Great Slave and Great Bear lakes. It has not been detected on the Mackenzie.

Phenacomys intermedius Merriam. Kamloops Phenacomys.

A female, taken by J. Alden Loring at Fishing Lake, 90 miles north of Jasper House, Alberta, September 17, 1896, has been recorded, under the name *P. orophilus*, by Miller, who calls attention to some of its peculiarities.^a It measured: Total length 133, tail vertebrae 33, hind foot 17. Another adult female (measuring 137, 31, 17), taken near the mouth of Muskeg Creek, a tributary of Smoky River, near latitude 55°, has come to light since Miller's revision of the genus was published. A careful comparison of these specimens with the descriptions of *P. intermedius* (the type and only known specimen not being available) shows several resemblances and no differences which may not be individual. The broad interorbital constriction and ascending branches of the premaxillae ascribed to *intermedius* are probably due to immaturity. In the character of the fur, which is much less soft and woolly than in *orophilus*, the Alberta specimens agree closely with the description of *intermedius*. The teeth also agree closely, except that in the Alberta specimens the outer anterior angle of the anterior lower molar is much less pronounced. Compared with *P. orophilus*, the teeth are narrower. In color the one recorded by Miller (loc. cit.) agrees perfectly with ordinary examples of *P. orophilus*, but the Muskeg Creek specimen is very different, the upper parts, including the head, being very much more reddish. These specimens were taken less than 300 miles from the type locality of *P. intermedius*.

Evotomys gapperi athabascæ subsp. nov. Athabaska Red-backed Mouse.

Type from Fort Smith, Slave River, near the Athabaska-Mackenzie line, Canada. Male adult (skin and skull), No. 109945, U. S. Nat. Mus., Biological Survey collection. Collected June 27, 1901, by Edward A. and Alfred E. Preble. Original number, 4235.

General characters.—About the size of *Evotomys gapperi*, with sides and lower parts lighter and face grayer.

Color.—Dorsal stripe averaging in color about as in specimens of *E. gapperi* from North Bay, Ontario, but ending rather abruptly a short distance in front of the ears; face much clearer gray; sides grayer, with less ochraceous; lower parts white, very rarely tinged with creamy, as is usually the case with *gapperi*.

^a Proc. Biol. Soc. Wash., XI, p. 81, 1897.

Skull.—Only one skull of typical *E. gapperi* (from Emsdale, Ontario) is available for comparison. Compared with this the skulls of *E. g. athabascæ* are longer, with a less rounded braincase and slightly larger bullæ, but of course it is inadvisable to attempt to formulate cranial characters on such scanty material. For an opportunity to compare this form with skins of typical *E. gapperi*, I am indebted to Gerrit S. Miller, jr., who loaned me a series of *Evotomys* collected at North Bay, Lake Nipissing, Ontario. They were taken in August and are therefore in comparable pelage. As would be expected from its more northern habitat, the fur of *E. g. athabascæ* is longer and fuller than that of *E. gapperi*. The skulls of the North Bay series are unfortunately not available.

We found this vole common throughout the region north to Great Slave Lake and secured a very large series, comprising specimens from points on the Athabaska 5 and 30 miles above Athabaska Landing; Calling River; Swift Current; 50 and 100 miles above Pelican Rapid; Pelican Rapid; Cascade Rapid; Mountain Rapid; Fort Chipewyan; Slave River at the mouth of the Peace, and at our camps 10 and 25 miles below that point; Smith Landing; Fort Smith; and Fort Resolution.

In 1901 we found the species very common at our various camps near Fort Chipewyan and easily secured a large series. Here we found the animals living mainly in the spruce woods growing in valleys and ravines, though some were caught in swamps and in mixed woods on higher ground. It seemed to be common also along Slave River between Fort Chipewyan and Fort Smith, and a large series was trapped at the latter place. The species was abundant in a strip of mixed woods bordering a marsh half a mile south of the post, and here most of our specimens were secured. In the hurried work between Fort Smith and Fort Resolution, it was not taken. It was fairly common in the vicinity of the latter post, however, where Alfred E. Preble secured a good series of specimens, mainly on Mission Island, which is better adapted to its habits than the mainland because the woods have not been so much devastated by cutting and by fire. In the autumn of 1903 the species was found to be abundant at various points along the Athabaska by my brother and Cary, and a large series in the normal phase was secured.

Ten adults of both sexes from Fort Chipewyan average: Total length 145.6, tail vertebrae 40.6, hind foot 18; ten from Fort Smith average: 142, 38, 18; ten from Fort Resolution, 142.7, 38.5, 19.

The slaty or gray phase of color, hitherto unrecorded from this region north of south-central Alberta, was taken at the following localities: Slave River, 10 miles below mouth of Peace (1); 25 miles below mouth of Peace (1); Smith Landing (1); and Fort Smith (6). At these places this phase was represented by less than 10 percent of

the specimens taken. Our specimens in this phase are quite uniform in coloration, and differ from those in the red or normal phase mainly in the color of the dorsal stripe, the sides and lower parts being practically normal. The dorsal stripe is slaty brown, in some specimens very slightly tinged with reddish, and one taken 25 miles below the Peace shows considerable red, and may be considered fairly intermediate between the two phases. The series of dark-backed specimens includes but one young one, a quarter grown individual from Fort Smith.

Bailey, under the name *E. gapperi*, records specimens taken by Loring at Edmonton; St. Albert; Muskeg Creek; 15 miles west of Henry House; and 15 miles south of Henry House, Alberta.^a These specimens are not typical *E. g. athabascæ*, but are here provisionally included under this form.

A specimen in the gray phase of color from Red [Deer] River, south-central Alberta, has been recorded by Allen.^b

Evotomys dawsoni Merriam. Dawson Red-backed Mouse.

This fine species ranges throughout the Mackenzie region from Great Slave Lake northward to the limit of trees. During our investigations we collected a large series, comprising specimens from the following localities in Mackenzie: Trout Rock (near Fort Rae); Fort Rae; Grandin River; Lake Faber; Lake St. Croix; north of Lake St. Croix; Lake Hardisty; near Leith Point, Great Bear Lake; Fort Franklin; Fort Providence; Fort Simpson; mouth of Nahanni River; Fort Norman; Fort Good Hope; and Fort McPherson.

This species replaces *E. g. athabascæ* north of Great Slave Lake, and no evidences of intergradation have been found. The difference between the two is so striking that I instantly noted it when I took the first specimen of *E. dawsoni*. In the latter the dorsal stripe is much lighter and brighter and grades insensibly into the ochraceous of the face, cheeks, and sides. In *E. g. athabascæ* from Fort Resolution and southward, the face, cheeks, and sides are grayish, with scarcely a tinge of ochraceous, the face especially being strikingly different in coloration. The skulls of *E. dawsoni* are conspicuously narrower interorbitally, and have smaller bullæ, than those of *E. g. athabascæ*.

Eight adults from near Fort Rae average in measurements: Total length 138, tail vertebræ 33.6, hind foot 18.3; ten from Lake St. Croix, 131.3, 31.8, 18.8; ten from Fort Franklin, 128.4, 31.4, 18.5; ten from Fort Simpson, 129.4, 33.3, 18.5; eight from Fort Norman, 132.7, 34, 18.6; eight from Fort Good Hope, 142, 35, 18.8; eight from Fort McPherson, 133.7, 34.8, 18.6. The number of embryos recorded in several instances varied from 2 to 6.

^a Proc. Biol. Soc. Wash., XI, p. 124, 1897.

^b Bull. Am. Mus. Nat. Hist., XII, p. 9, 1899.

I first collected this vole at Trout Rock, 25 miles south of Fort Rae, early in July, 1901, and a few days later took a small series at Fort Rae. In 1903 I found it common along my route between Great Slave and Great Bear lakes, and took specimens at several places. I took a small series also on the south shore of Great Bear Lake near Leith Point, where I found the animals living among the rocks on the semibarren tracts near the shore and feeding largely on the crowberries (*Empetrum nigrum*). At Fort Franklin the species was very common in spruce woods, and a large series was procured. It was not very common at Fort Simpson, but a fair series in winter pelage was taken. This pelage is characterized, in comparison with the summer coat, by lighter color, and by longer fur, the tail especially being much more heavily clothed. During my trip down the Mackenzie in June, 1904, I took specimens at Forts Norman, Good Hope, and McPherson, as mentioned above.

An adult male taken at Fort Good Hope, June 23, furnishes the only instance of dichromatism in this species that I have seen. It is in the light phase of coloration. The dorsal stripe is yellowish brown, only slightly different from the sides anteriorly, but becoming darker toward the rump. The red element so conspicuous in the color of the dorsal stripe in normal specimens is practically absent. Specimens from Fort Liard and Fort Anderson, in the collection of the National Museum, have been examined and prove referable to this species. Specimens from these localities, as well as from Fort Rae, Fort Norman, Fort Good Hope, and La Pierre House were recorded, under the name *E. rutilus*, by Coues.^a Allen has recently recorded *E. dawsoni* from Hell Gate (Liard River), Fort Liard, and Fort Norman.^b

Lemmus trimucronatus (Richardson). Back Lemming.

This species was described by Richardson from a specimen taken by Captain Back on the shores of Point Lake.^c During Franklin's second expedition additional specimens were taken on Great Bear Lake, and the measurements of one from Fort Franklin are given by Richardson.^d The animal was met with near the head of Back River, during Back's journey down that stream, and is recorded by King.^e Coues, under the name *Myodes obensis*, records specimens from Fort Anderson; Anderson River; 'Arctic coast'; and Peel River, those from the last locality taken by C. P. Gaudet, the others by MacFarlane.^f A few specimens from Fort Anderson are still in the National Museum, but are too imperfect for satisfactory com-

^a Monographs N. A. Rodentia, p. 139, 1877.

^b Bull. Am. Mus. Nat. Hist., XIX, p. 547, 1903.

^c Appendix Parry's Second Voyage, p. 309, 1825. (1827).

^d Fauna Boreali-Americana, I, pp. 130, 131, 1829.

^e Narrative Journey to Arctic Ocean, I, p. 250, 1836.

^f Monographs N. A. Rodentia, p. 243, 1877.

parison. I have, however, already described the species from specimens taken on the Hudson Bay Barren Grounds,^a which are probably fairly typical. Allen has recorded specimens of *Lemmus* from Herschel Island.^b

J. C. Ross states that this species was seen on the coast of Boothia Felix in considerable numbers.^c

***Lemmus helvolus* (Richardson).** Tawny Lemming.

This species is known only from Richardson's descriptions of a specimen taken by Drummond in the Rocky Mountains, ostensibly "in latitude 56°"—but in reality from near the headwaters of one of the southern tributaries of Peace River, or between there and the Jasper House region.^d His descriptions indicate an animal more tawny than *L. trimucronatus*, but it does not appear that a direct comparison was made.

***Dicrostonyx hudsonius alascensis* Stone.** Point Barrow Lemming.

Since specimens from Fort Anderson and the mouth of the Mackenzie agree essentially with topotypes of *D. alascensis*, the following notes are included under this name, though the affinities of the animals inhabiting the islands of the Arctic Sea and the eastern part of the Mackenzie region are unknown.

Sabine recorded '*Lemmus hudsonius*' as abundant on the islands of the Polar Sea;^e M'Dougall relates that lemmings [probably *Dicrostonyx*] were seen in innumerable numbers on Melville Island, in April and June, 1853, by Lieutenant Meham.^f J. C. Ross stated that a few were noted at Port Bowen in the winter of 1824–25;^g he later recorded the animal as common at Felix Harbor, Boothia.^h Back recorded lemmings which were undoubtedly of this genus from the northern shore of Aylmer Lake.ⁱ Sutherland states that tracks of lemmings were frequently observed about the south end of Cornwallis Island in the autumn of 1850.^j McCormick states that young were taken at Beechey Island in August, 1852.^k Armstrong noted

^a N. A. Fauna, No. 22, p. 55, 1902.

^b Bull. Am. Mus. Nat. Hist., XIII, p. 61 (in footnote), 1900.

^c Appendix to Ross's Second Voyage, p. XIV, 1835.

^d Zool. Journ., III, p. 519, 1828. See also Fauna Boreali-Americana, I, p. 129, 1829. (Though specimens referred to *Lemmus helvolus* have recently been recorded from Cassiar Mountains, Telegraph Creek, and other points in northern British Columbia, this region is so far from the actual type locality of *helvolus* that the specific identity of the specimens must at present be considered merely as assumptive.)

^e Suppl. to Appendix Parry's First Voyage, p. CLXXXVIII, 1824.

^f Voyage of *Resolute* to Arctic Regions, p. 298, 1857.

^g Parry's Third Voyage, Appendix, p. 93, 1826.

^h Appendix to Ross's Second Voyage, p. XIII, 1835.

ⁱ Narrative Arctic Land Expedition to Great Fish River, p. 296, 1836.

^j Journ. Voyage to Baffin Bay, I, p. 362, 1852.

^k McCormick's Voyages, II, p. 91, 1884.

the presence of the animal on Prince Albert Land near Princess Royal Islands, October 10, 1850.^a Rae mentions lemmings as migrating northward near the mouth of the Coppermine early in June, 1851.^b In a later paper he refers to the circumstance as follows:

I am not aware if it is generally known that the lemmings (*Myodes hudsonicus*, etc.) of North America migrate much in the same manner as do those of Norway and Sweden. When traveling in June 1851 southward from the Arctic Coast along the west bank of Coppermine River, and north of the Arctic Circle, we met with thousands of these lemmings speeding northward, and as the ice on some of the smaller streams had broken up, it was amusing to see these little creatures running backward and forward along the banks looking for a smooth place with slow current at which to swim across. Having found this, they at once jumped in, swam very fast, and on reaching the opposite side gave themselves a good shake as a dog would, and continued their journey as if nothing had happened.^c

Under the name *Cuniculus torquatus*, Coues records specimens from the Rocky Mountains near Peel River; mouth of Mackenzie River; 'Arctic Coast'; Anderson River; and Fort Anderson.^d Allen has recorded specimens of *Dicrostonyx*, probably of this form, obtained by A. J. Stone on Herschel Island.^e

MacFarlane, referring particularly to the Anderson River region, states that this species was more abundant than *Lemmus trimucronatus*. He mentions specimens from Fort Anderson, lower Anderson River, and shores of Liverpool and Franklin bays. Two females secured in the 'Barrens' on June 26, 1865, each contained 5 embryos.^f

Synaptomys (Mictomys) borealis (Richardson). Northern Lemming Vole.

Arvicola borealis Richardson, Zool. Journ., III, No. 12, p. 517, 1828. Fauna Boreali-Americana, I, p. 127, 1829. (From [Fort Franklin] Great Bear Lake.)

Synaptomys (Mictomys) bullatus Preble, Proc. Biol. Soc. Wash., XV, p. 181, August 6, 1902. (From Trout Rock, near Fort Rae, Mackenzie.)

Our investigations show that this vole inhabits the region from the Athabaska north to the vicinity of Great Bear Lake.

Richardson first described *Arvicola borealis* in 1828, giving a short description of a specimen from Great Bear Lake (loc. cit.). A year later he gave a detailed description of the animal, which he says was found in abundance at Great Bear Lake (loc. cit.). Though Richardson does not particularly mention Fort Franklin, it is reasonably certain that the specimens, which he says were taken in spring

^a Narr. Discovery Northwest Passage, p. 254, 1857.

^b Journ. Roy. Geog. Soc., XXII, p. 81, 1852.

^c Journ. Linn. Soc. London, Zool., XX, p. 143, 1890.

^d Monographs N. A. Rodentia, pp. 250, 251, 1877.

^e Bull. Am. Mus. Nat. Hist., XIII, p. 61 (in footnote), 1900.

^f Proc. U. S. Nat. Mus., XXVIII, p. 736, 1905.

after the snow had melted, came from that place, where he spent the spring of 1826. (See footnote.)

Arvicola borealis has been variously referred by authors to *Arvicola*, *Microtus*, and *Phenacomys*, usually to one of the two first-mentioned genera. A careful study of the very full description in Fauna Boreali-Americana, however, seemed to point so strongly to *Synaptomys* that I felt reasonably sure that it actually referred to that genus. On visiting Fort Franklin in September, 1903, therefore, I made a special effort to ascertain if *Synaptomys* inhabited the region and was rewarded by the capture of 8 specimens, including adults of both sexes and nearly grown young. These specimens accord so well with the later detailed description that there is no doubt of the advisability of applying the name *borealis* to this animal. It may be well to quote the more pertinent portions of Richardson's description:

The body and head are clothed with fur, which is very long in proportion to the size of the animal. The fur on the upper parts is shining blackish-gray, from the roots to the tips, some of which are yellowish or chestnut-brown, some black. The hairs with black tips are the longest, and are equally distributed amongst the others, giving the whole a dark umber or liver-brown color, but producing no spots. There is a rufous mark under the ears. The fur on the back is about ten lines long, that on the crown of the head is three or four. The fur on the under parts (including the chin and lips) has a lead-gray colour, and is shorter than that covering the back and sides. The tail is round, well clothed with short, stiff hairs, which do not permit any scales to be seen. It is clove-brown above, and grayish-white beneath. * * * The thumb of the fore-feet consists merely of a small strap-shaped nail, slightly convex on both sides, and having an obtuse point projecting from the middle of its extremity. (Fauna Boreali Americana, I, p. 127, 1829.)

Among the dimensions given the length of tail (1 inch=26 mm. approximately), and the length of hind foot ($7\frac{1}{2}$ lines=17 mm. approximately), accord well with the measurements of *Synaptomys*.^a

The first specimen of *Synaptomys* taken during the summer of 1901 was trapped on June 12 in a *Microtus* runway, on the border of a small meadow near Slave River, 25 miles below the mouth of the Peace. A few days later we took two in a wet swamp near Smith Landing. We did not detect the species at Fort Smith nor at Fort Resolution. On July 17 I took two specimens at Trout Rock, 25 miles south of Fort Rae, and during the latter part of the month trapped a few about small muskeg ponds at Fort Rae. One taken

^a Since the above account was written all question as to the application of the name *borealis* to this species has been removed by an examination of the type in the British Museum by W. H. Osgood, of the Biological Survey, who has found it to belong to the genus *Synaptomys*. Its label bore the following legend: "*Arvicola borealis*. Mouse A. 42. 10. 7. 10. See p. 12. Note book. Awinnak, Dog-ribs. $4\frac{1}{2}$ inches long exclus. tail. Fort Franklin. Dr. R." (Proc. Biol. Soc. Washington, XX, p. 49, 1907.)

here July 20 contained four embryos. On comparing the specimens of this series with examples of the various recognized species of this boreal genus I found the Mackenzie series to represent an unrecognized form, and not suspecting at that time the possible applicability of Richardson's name, characterized the species under the name *Synaptomys (Mictomys) bullatus*, taking as the type a specimen from near Fort Rae.

In 1903, on again visiting the Mackenzie Valley, we further extended the known range of the genus in this region. Early in July Alfred E. Preble and Merritt Cary took a small series at Fort Providence, and in August, during my trip northward from Great Slave Lake, I took specimens on Sarahk Lake, just north of the height of land, and on Lake St. Croix, midway between Great Slave and Great Bear lakes. Later I found the species fairly common in the marsh bordering Great Bear Lake near the site of Fort Franklin, and took a series, as mentioned above. Two or three of these specimens were trapped in runways of *Microtus*, and the remainder near the border of the marsh about a small bushy ridge which seemed tenanted solely by these lemmings, since my traps set there captured nothing else. Considering the wide area over which many northern species range without appreciable variation (and this is especially true of the Microtinæ), it is not surprising that these topotypes of *Arvicola borealis* should prove identical in characters with the specimens taken in the Great Slave Lake region, thus proving *bullatus* a synonym of *borealis*.

In color this form differs from *S. dalli* of Alaska in being much darker at all seasons, and it has a shorter hind foot. Cranially the two forms do not differ appreciably. Four adults from Fort Franklin average in measurements: Total length 129, tail vertebræ 26.2, hind foot 17.6. Seven adults of both sexes, selected from the series taken in the Great Slave Lake region in 1901, average: 128, 24.8, 17.7.

Synaptomys borealis dalli Merriam. Dall Lemming Vole.

During his trip from Jasper House northward to Smoky River in 1896 J. Alden Loring took two lemming voles on Stony River, 25 miles north of Jasper House, on August 25. About the middle of October of the same year he found the animals rather common in a high valley about 25 miles west of Henry House, where they inhabited the sphagnum swamps, frequenting runways used by *Microtus*. Here about a dozen specimens, including both adults and young, were taken. These specimens are much lighter and redder than typical *borealis* and agree so well with a series of *S. dalli* from various points in Alaska that I refer them to that form. In cranial characters *S. borealis* and *dalli* agree very closely. In the specimens taken by Loring the hind foot averages a little longer than in typical

borealis, in this respect also resembling *dalli*. Six adults of both sexes from the two localities represented average: Total length 128.3, tail vertebræ 24.6, hind foot 18.5.

In the autumn of 1903 Alfred E. Preble and Merritt Cary took a series of *Synaptomys* on the Athabaska 50 miles above Pelican Rapid, at Swift Current, and at points 5 and 30 miles above Athabaska Landing, Alberta. In color these specimens resemble *S. dalli* closely and are here provisionally referred to that form, but apparently they are somewhat intermediate between *borealis* and *dalli*. The series is largely composed of immature examples. Five of the largest average in measurements: Total length 123, tail vertebræ 21.9, hind foot 17.6.

Microtus (Microtus) drummondi (Aud. and Bach.). Drummond Vole.

This is the most abundant small rodent, occurring commonly from the plains of Saskatchewan and Alberta north to the limit of trees. Even north of the area of extensive agriculture it does considerable damage about the trading posts, where it enters the buildings freely.

In the spring of 1901 we saw fresh traces of this vole along our route between Edmonton and Athabaska Landing, and here and there as we descended the Athabaska to Fort Chipewyan, but the animals were not common. We first secured the species at Fort Chipewyan, but obtained only a small series, though we trapped carefully for the animals. The species was rare at our camp on Slave River, 10 miles below the mouth of the Peace, there being little ground in the vicinity suitable for it. Near our next camp, 15 miles below this point, a colony was found in a marsh on the borders of a small pond a short distance back from the bank of Slave River. Here we easily secured a large series, and at Smith Landing and Fort Smith we found the species equally common. At the latter locality we found it occupying the haunts of *Microtus xanthognathus*, and using to some extent its runways. As we did little trapping between this point and Fort Resolution the species was not detected, although it undoubtedly occurs. It was only fairly common at Fort Resolution, and by careful trapping a small series was taken in the clearing about the post. I took a large series at Fort Rae, mainly near the post, although a few were found about some small ponds among the hills to the eastward.

During our trip northward to Great Slave Lake in the spring of 1903 we obtained little additional information respecting this species. While on their trip to the upper Mackenzie my brother and Cary took specimens at Hay River and Fort Providence. On their outward trip they found it very abundant along the Athabaska, and after each rise of the river noted numbers that had been drowned. They took specimens along the Athabaska at Cascade, Stony, Brulé, and Pelican rapids; 50 miles above Pelican Rapid; Swift Current;

Quito or Calling River; and 5 and 30 miles above Athabaska Landing. They noted embryos as follows: Hay River, June 30, nine embryos; Cascade Rapid, August 15, four embryos.

During my trip northward from Fort Rae I found this vole fairly common along Grandin River and about some small ponds near the shores of MacTavish Bay, Great Bear Lake. At my camp near Leith Point, early in September, I took a small series among dwarfed birches and willows bordering a tiny stream. I secured a good series also at Fort Franklin, mainly along a small stream on a partially cleared hillside. At Fort Simpson, where I took a large number during the autumn of 1903 and the following winter and spring, it is common and enters the buildings freely. While descending the Mackenzie in June, 1904, I found it only fairly common at Fort Norman and Fort Good Hope, and collected a few at each place, but failed to secure it below the latter point.

The large series taken is plainly referable to *M. drummondi*, although the more northern specimens are considerably larger than typical examples of this species from the Jasper House region.^a The Fort Rae specimens are especially large, and show an approach in characters toward *M. aphorodemus*, described from the Barren Grounds north of Fort Churchill.^b The heavy, widely spreading zygomata of *aphorodemus*, however, do not appear in the Fort Rae skulls, although some of the larger specimens are nearly or quite as large as that species. It is highly probable that to the northeastward of Fort Rae *M. drummondi* merges into *aphorodemus*.

Five adults of both sexes from Fort Chipewyan average: Total length 151.4, tail vertebræ 41.4, hind foot 19; ten from Slave River, 25 miles below the Peace, average 168.4, 49.1, 19.3; ten from Fort Smith, 162.2, 42.8, 18.6; five from Fort Resolution, 160.8, 42.8, 19.6; ten from Fort Rae, 169.5, 44.6, 19.3; ten from Fort Simpson, 158, 45.4, 19.6; three from Fort Good Hope, 160, 43.3, 19.6.

During his several trips in Alberta, J. Alden Loring found this species common in most localities and took specimens at Edmonton; St. Albert; 15 miles south of Henry House; Smoky Valley, 50 miles north of Jasper House; Fishing Lake, 90 miles north of Jasper House; and Muskeg Creek, a tributary of Smoky River. At Edmonton, where he collected in September, 1894, he found the animals very abundant in the oat fields, where they were domiciled beneath the shocks of grain, and were destroying large quantities of it. Specimens from the localities just mentioned, as well as others from Lesser Slave Lake; Big Island; Fort Rae; Fort Simpson; Fort Good Hope;

^a Concerning the larger size of northern specimens of *M. drummondi*, see Bailey, N. A. Fauna, No. 17, p. 23, 1900.

^b N. A. Fauna, No. 22, p. 52, Oct. 31, 1902.

Fort Anderson; and Fort McPherson, have been referred to *M. drummondii*, and recorded by Bailey.^a

During the autumn of 1900 great numbers of mice, probably mainly of this species, overran central Saskatchewan and central Alberta. They entered the storehouses and committed great havoc wherever grain or other food was stored. Immense numbers, many of which were floating down the rivers, were found dead. Throughout the country between Edmonton and Athabaska Landing we found abundant evidence of their former presence, but fresh runways were only sparingly noted, showing that most of the animals had disappeared. This invasion must have extended over a very large extent of country. I was informed by W. A. Burman, of Winnipeg, that small rodents were so common in Manitoba during the same autumn that fur-bearing animals were trapped with much difficulty, their natural food being so easily obtained.

Microtus (Microtus) xanthognathus (Leach). Chestnut-cheeked Vole.

This large vole occurs locally nearly throughout the wooded region. Although it inhabits the valley of the Athabaska, we did not detect it in the summer of 1901 until we reached Fort Smith, where we found a colony and secured a series of about 20 adults. This colony inhabited a strip of young mixed woods bordering a marsh about half a mile south of the post. The burrows of the animals were in dry ground in the woods or shubbery, and evidently were quite deep, as I saw nearly a bushel of dirt at the entrance of a single burrow. From the burrows their well-trodden runways extended in various directions to a distance of 50 or 75 yards, only rarely reaching wet or even damp ground. As a rule only a pair was taken in one set of runways. The favorite food seemed to be the stems of *Equisetum*, which grew luxuriantly in their haunts. Only old ones were secured, the young evidently not being large enough to run about, though several of the females had recently borne litters. A female taken June 19 contained 11 well-developed embryos. The measurements of 10 adult specimens from this locality average: Total length 212.6, tail vertebræ 52.8, hind foot 24.5. At Fort Resolution my brother took a few specimens during July, but was unable to find any colony. At Trout Rock, 25 miles south of Fort Rae, I found a small community, and took 3 adults and a number of quarter-grown young on July 17 and 18. Contrary to their usual habit, the individuals of this colony had extended their runways into a wet sphagnum swamp. At Fort Rae I was unable to find any evidence of the presence of this mouse, though the Indians informed me that the species inhabited the vicinity.

^a N. A. Fauna, No. 17, p. 23, 1900.

While we were ascending the Athabaska during the autumn we detected the presence of the species at several localities. The unmistakable burrows and runways of a large colony were found in deep mixed woods on the summit of the hills bordering the valley of the Athabaska at Big Cascade Rapid, August 14, and on the following day I caught a half-grown individual at the foot of a limestone cliff at Crooked Rapid. Evidences of a small colony were found also at a cabin near the foot of Boiler Rapid, and an adult female was found dead on the bank of the river 60 miles above Grand Rapid on August 25.

The series from Fort Smith shows little variation in color, some individuals being merely a little more reddish than others. Young ones from Trout Rock are duller and darker than adults, and have the nose patch duller, though always sufficiently bright to distinguish the species from others of the genus without reference to other characters. A half-grown young one taken at Crooked Rapid, August 15, is in fresh pelage, and is darker and more reddish than any other in the series. An adult female taken 60 miles above Grand Rapid, August 25, is very dark, owing to the great number of black hairs in the pelage. A specimen taken at Cache Pécotte, 40 miles east of Jasper House, March 20, 1897, by D. E. Noyes, though in less worn pelage, can be exactly matched in color by specimens in the series from Fort Smith, and the species evidently breeds in the left-over winter pelage.

In 1903, during our hurried trip to Great Slave Lake, we failed to observe this species, and I did not detect it north of Fort Rae or about Great Bear Lake, though I searched carefully in the vicinity of Fort Franklin, having in mind Richardson's allusion to its occurrence there. While ascending the Mackenzie in October I found a colony inhabiting a willow-covered island about 30 miles above Fort Norman, but could not stop to secure specimens. No other traces of the animal were found on the Mackenzie. In August of the same year, while ascending the Athabaska, my brother and Cary found several colonies in poplar woods between Brulé and Grand rapids. Two specimens were taken at the latter place on August 20 and 21.

A year later, while on my outward trip, I found a large colony on the Athabaska 30 miles above Pelican Portage. It must have comprised many thousands of individuals, and occupied a heavily wooded area, at least half a mile square, on the gently sloping sides of the valley. I took a series of eight specimens here on the morning of August 29.

Richardson states that the species was abundant in the immediate vicinity of Fort Franklin.^a Coues lists specimens from Fort Resolu-

^a Fauna Boreali-Americana, I, p. 123, 1829.

tion; Buffalo River; Big Island; Fort Good Hope; Fort McPherson; Fort Anderson; Anderson River; and Liard River.^a The context shows that the specimens in this list had chestnut cheeks, so there seems to be no reason for doubting the identification. More recently, Bailey has recorded specimens (in the collection of the National Museum) from Fort Resolution; 'Great Slave Lake;' Fort Rae; Anderson River; and 'Arctic Coast' [Franklin Bay] east of Fort Anderson; as well as the Cache Pecotte specimens above mentioned.^b

Microtus (*Microtus*) macfarlani Merriam. MacFarlane Vole.

Little is known of the distribution of this species, which was described from specimens taken by MacFarlane at Fort Anderson.^c It is closely related to *M. operarius* of Alaska, but differs in cranial characters. With *M. drummondi* and *xanthognathus*, which occupy the same general region, it has no close affinities, though superficially it closely resembles the former.

In addition to several from the type locality, Bailey has recorded specimens from [lower] Mackenzie River; and 'Arctic Coast' [north or east of Fort Anderson].^d I trapped carefully for it on Great Bear Lake and the lower Mackenzie, but failed to secure specimens.

Microtus (*Microtus*) mordax (Merriam). Long-tailed Mountain Vole.

This is a Rocky Mountain species which ranges northward to the headwaters of the Liard and the Yukon. Specimens taken by Loring at Henry House in September, 1895, and 15 miles south of Henry House, and on the Smoky River trail between Muskeg Creek and Baptiste River, north of Jasper House, in the summer and early autumn of 1896, have been recorded by Bailey.^e At his camp in the mountains 15 miles south of Henry House, Loring found the species living in muskegs near timber line. Bailey records also (loc. cit.) two specimens from Liard River. These were taken by A. J. Stone at Hell Gate, and mouth of 'Black River' [probably the Kachika], and were the types of *M. cautus* and *M. vellerosus*, respectively.^f

Microtus (*Arvicola*) richardsoni (DeKay). Richardson Vole.

This species was discovered by Drummond "near the foot of the Rocky Mountains"—somewhere in the Jasper House region. Richardson first referred to it under the name *Arvicola riparius*, and stated, doubtless on the authority of Drummond, that its habits were similar to those of the common water rat (*Arvicola amphibius*). "It

^a Monographs N. A. Rodentia, pp. 201, 202, 1877.

^b N. A. Fauna, No. 17, p. 58, 1900.

^c Merriam, Proc. Washington Acad. Sci., II, p. 24, 1900.

^d N. A. Fauna, No. 17, p. 40, 1900.

^e N. A. Fauna, No. 17, p. 50, 1900.

^f Allen, Bull. Am. Mus. Nat. Hist., XII, p. 7, 1899.

frequents moist meadows amongst the mountains, and swims and dives well, taking at once to the water when pursued.”^a

DeKay, perceiving the animal to be different from ‘*riparius*,’ redescribed it under the name *A. richardsoni*.^b

Eight specimens taken by J. Alden Loring at points 10 and 25 miles west of Henry House, in October, 1896, have been recorded by Bailey.^c They were found inhabiting wet sphagnum swamps and were trapped with difficulty. None of the specimens were fully adult, but the largest one, a nearly full-grown female, measured: Total length 208, tail vertebræ 61, hind foot 28. These records from the Jasper House region furnish all we know regarding its distribution within the area now under review.

***Microtus (Pedomys) minor* (Merriam).** Least Upland Vole.

Two specimens, taken by J. Alden Loring at Edmonton, in September, 1894, as well as one from Red Deer, Alberta, have been recorded by Bailey.^d The Edmonton specimens were taken beneath oat shocks in a dry upland field, where the animals were found occupying the same locations as *M. drummondii*, but were much less common than that species.

***Fiber zibethicus spatulatus* Osgood.** Northwest Muskrat.

In the spring of 1901 we found muskrats rather uncommon along the Athabaska above Fort McMurray, but observed a number on the lower part of the river May 17. The species was very common in the delta of the Athabaska and Peace, and among the hills near Fort Chipewyan we found it inhabiting the muskeg ponds as well as the small streams which formed their outlets. We often observed the animals along Rocher River, and near the mouth of Peace River found them frequenting the small landlocked ponds in dense spruce woods, where their well-worn trails between the ponds were very conspicuous in the deep mossy carpet which covered the ground. At Fort Smith they were common in the marshes to the south of the post, and on the lower part of Slave River and in its delta they were very abundant. While crossing Great Slave Lake to Fort Rae I found them inhabiting the islands and shore of the Northern Arm wherever marshy inlets occurred, Trout Rock, 25 miles south of Fort Rae, evidently being a favorite locality. In the immediate vicinity of Fort Rae, though the conditions were favorable, I found the animals very rare, doubtless owing to the presence of a large band of Indians then congregated about the post. On our return trip the species was sev-

^a Fauna Boreali-Americana, I, p. 120, 1829.

^b Zool. New York, Part I, Mammalia, p. 91, 1842.

^c N. A. Fauna, No. 17, p. 60, 1900.

^d N. A. Fauna, No. 17, p. 76, 1900.

eral times observed, and was found to abound in the streams and ponds between Athabaska Landing and Edmonton.

During our trip we collected a series of about a dozen, comprising specimens from our several camps near Fort Chipewyan; the mouth of Peace River; Fort Resolution; Great Slave Lake near the mouth of the Northern Arm; and 40 miles north of Edmonton.

During our descent of the Athabaska and Slave rivers in the spring of 1903 we occasionally saw muskrats, though these large rivers, except at their mouths, offer a less congenial habitat than the smaller streams and outlying muskegs. On my trip northward from Fort Rae I found them abundant along Grandin River and in the various lakes northward to the height of land. North of this they became less common, and the last 'house' was seen on a small lake a few miles north of Lake Hardisty. I did not observe the species while traveling along the south shore of Great Bear Lake, but found it rather common in the small lake at the mouth of Gray Goose River, near the site of Fort Franklin, and took a small series during the latter part of September. Here the animals were occupying burrows in the banks and were living mainly on coarse grass, which was abundant on the marshy parts of the shore.

In the spring of 1904 I took two specimens on the Mackenzie at Fort Simpson. In this vicinity the species is common in the muskegs back from the main river, and hundreds of skins are traded annually.

During my voyage down the Mackenzie in the summer I found the species abundant in the numerous ponds in the valley of the Nahanni, but seldom observed the animal elsewhere, though it is common in suitable places throughout the region. At Fort Norman large numbers are traded annually. At Fort Good Hope the species was said to be very common in the numerous ponds on Manito Island, and this particular locality is a favorite hunting ground of the natives and furnishes hundreds of skins annually. On the lower reaches of the Mackenzie and Peel rivers muskrats are excessively abundant. Thousands are annually traded at Fort McPherson. The Eskimo take a great many by means of the bow and arrow, and the throwing dart, in the use of which they are very expert. I obtained a series of adults at this place.

A careful comparison of the series collected in the Athabaska-Mackenzie region with specimens from Alaska, representing *F. z. spatulatus*, and from Keewatin, comprising the type series of *F. z. hudsonius*, leads me to refer the Mackenzie series to *spatulatus*, though a number, especially those from Athabaska and Great Slave lakes, are somewhat intermediate and might without impropriety be referred to *hudsonius*. In general, the midsummer specimens have more reddish in the fur than typical *spatulatus*. The Fort Franklin

specimens, taken late in September, agree very well with *spatulatus* from Alaska in corresponding pelage. The series of adults taken early in July at Fort McPherson are in a very pale, washed-out pelage. It is highly probable that this condition results from some mineral in the sediment-laden water of Peel River. Specimens from the comparatively clear waters of Great Slave Lake, also taken in July, do not exhibit this bleaching to a degree approximating the condition in the Peel River examples.

Five adults from the Athabaska and Great Slave Lake region average in measurements: Total length 546, tail vertebræ 264.4, hind foot 75; five specimens from Fort Franklin average 499, 218.8, 74.6. This series includes several youngish individuals; the largest in the series, an adult male, measures 540, 244, 80. Five adults of both sexes from Fort McPherson average 544, 251, 76.

The muskrat is quite generally distributed throughout the northern region, nearly to the limit of the forest. Richardson mentions that the species extends its range nearly to the mouth of the Mackenzie;^a and Russell speaks of it as abundant near the mouth of Peel River in the summer of 1894.^b Tyrrell speaks of seeing it in all the streams to the southeast of Athabaska Lake during his exploring trip in that region in the summer of 1892.^c

J. Alden Loring reported it common at Edmonton in September, 1894, and along the trail between that point and the mountains in the early autumn of 1895. In 1896 he frequently observed it in the same region during the summer, and noted it in the valleys and foothills between Jasper House and Smoky River in the early autumn. A male, taken at Henry House, September 6, 1895, and another from Edmonton, have been referred to *F. spatulatus* by Osgood.^d

During the first year of Fort Anderson's existence (outfit 1861), 500 muskrat skins were traded; for the next year 1,500 skins figured in the returns.

MacFarlane states that this animal occurs on the lower Anderson to its outlet, though less commonly than on the Mackenzie. He gives data regarding the number traded and sold during different series of years, and the notable reduction in numbers during certain years on account of unusual seasonal conditions or other causes. He states that the animals are subject to a liver disease which kills them by thousands. They are said to have two or three litters during the summer.^e

^a Fauna Boreali-Americana, I, p. 117, 1829.

^b Expl. in Far North, p. 138, 1898.

^c Ann. Rept. Can. Geol. Surv., VIII (new ser.), p. 13D, 1896.

^d N. A. Fauna, No. 19, p. 37, 1900.

^e Proc. U. S. Nat. Mus., XXVIII, pp. 737, 738, 1905.

Castor canadensis Kuhl. Canadian Beaver.

Formerly abundant throughout this region north nearly to the limit of trees, the beaver is now almost exterminated in many parts, and nowhere is common, though skins are received annually by all the posts throughout the region. During the night of May 15, 1901, while encamped near Poplar Point, 90 miles below Fort McMurray, we several times heard the slap of a beaver's tail on the water. 'Cuttings' were seen on the banks of the Athabaska below this point. Among a large number of skins seen at Fort Rae the color varied from light brown to sooty black.

During the season of 1903 we saw numbers of skins at the various posts passed on our way to Great Slave Lake. We learned that a considerable number are traded at Fond du Lac, an outpost of Fort Chipewyan situated near the eastern end of Athabaska Lake. The vast region which stretches from Great Slave Lake to the Rocky Mountains at present seems to be the best beaver country in the north. Many skins are brought from the upper reaches of Hay River by the Beaver Indians, and from Trout Lake by the natives who frequent that locality. The Horn Mountain country also furnishes many skins. Along my route between Great Slave and Great Bear lakes, the beaver has now become scarce, owing to constant hunting, but my guide intimated that in certain localities off the main route which we were following he knew of small colonies of beavers. About Great Bear Lake the best beaver ground seemed to be to the northward of Fort Franklin, and I saw several skins, some quite dark, just brought from the hunting grounds about two days' travel to the northward. While ascending the Mackenzie in October we obtained fresh beaver meat from natives near Roche Trempe-l'eau.

During the winter of 1903-4 several beavers were killed by Indians in the region about Fort Simpson. In the spring the animals often descend the smaller streams to the main river and follow it to the mouth of the next tributary. A young one was shot near the mouth of the Liard in May, and several adults and young ones have been killed in recent years near the mouth of Bluefish Creek, opposite Fort Simpson, as a result of this habit.

While descending the Mackenzie in the summer of 1904 I saw no beavers, but obtained information regarding the traffic in skins. About 700 skins were said to have been traded during the preceding winter at Fort Norman, which receives the fur of a very large extent of country. Many skins are annually traded at Fort Good Hope. Skins from the country toward the Barren Grounds, according to the testimony of C. P. Gaudet, of that place, are smaller and average darker than those from the vicinity of the post. Fort Anderson, according to the fur returns, never received more than five skins annually during the few years of its existence.

We obtained no skins of this species, but procured a series of skulls from various points throughout the region.

At the time of Hearne's exploration the beaver occurred abundantly throughout the wooded part of the country. He found it plentiful to the northward of Great Slave Lake east of the Northern Arm early in December, 1771,^a and also found some occupying the islands in the eastern part of the lake.^b Richardson intimates that the beaver ranged nearly to the mouth of the Mackenzie, and states that the animals were numerous in the country lying immediately to the northward of Fort Franklin.^c MacFarlane noted the animal on Lockhart River, a tributary of the Anderson, in the summer of 1857.^d Petitot found the beaver occupying the small lakes on the terraced slopes of Grizzly Bear Mountain, near its western extremity, while exploring the southern shores of Great Bear Lake in 1868.^e Allen recorded specimens from Fort Simpson, Fort Good Hope, and Fort Anderson.^f In the summer of 1892, while exploring between Athabaska Lake and Churchill River, J. B. Tyrrell found a "considerable colony" near the source of Geikie River, southeast of Athabaska Lake.^g MacFarlane, from Indian information, states that this animal has from 1 or 2 to 9 young at a birth.^h

In the early autumn of 1895, while in the mountains in western Alberta, J. Alden Loring saw a few fresh 'cuttings' and tracks of beavers, but found the species very rare. During his second visit to the region, in 1896, he obtained evidence showing that the animal formerly abounded in suitable localities throughout the region, but had been nearly exterminated. Tracks were seen on a small stream between Jasper House and Smoky River, but no other recent traces of the animals were observed.

Thomomys talpoides (Richardson). Saskatchewan Pocket Gopher.

In certain places along the wagon road leading northward from Edmonton, during our spring and fall journeys, we saw many hills thrown up by this species. The most northerly traces seen were near Vermilion Creek, 40 miles north of Edmonton.

In September and the early part of October, 1894, J. Alden Loring found this species common along the railroad from Calgary north to Edmonton. At the latter place he took seven specimens, September

^a Journey to Northern Ocean, p. 223, 1795.

^b Ibid., p. 248, 1795.

^c Fauna Boreali-Americana, I, p. 108, 1829.

^d Canadian Record of Science, IV, p. 32, 1890.

^e Expl. du Grand Lac des Ours, p. 182, 1893.

^f Monographs N. A. Rodentia, p. 448, 1877.

^g Ann. Rept. Can. Geol. Surv., VIII (new ser.), p. 13D, 1896.

^h Proc. U. S. Nat. Mus., XXVIII, p. 743, 1905.

9 to 23, and later he collected the species at both Red Deer and Calgary. In 1895 he reported it common at St. Albert, a few miles northwest of Edmonton, and took a specimen there on October 30. This was still in the dark, worn summer coat. Several specimens taken by G. F. Dippie near Red Deer in April and May, 1900, are in the Biological Survey collection. Two of these are melanistic, being of a nearly uniform sooty color throughout, only slightly lighter beneath.

The measurements of six specimens from Edmonton average: Total length 214.6, tail vertebræ 63, hind foot 27.8.

Zapus hudsonius (Zimm.). Hudson Bay Jumping Mouse.

During our trip in 1901 we did not detect this species until we reached Fort Smith, where we took several in shrubby woods bordering a marsh. Here one afternoon I watched one for some time hopping about in some willows near the edge of a marsh. He moved quite leisurely, taking jumps of only 2 or 3 feet. Only two were trapped at Fort Resolution, and at Fort Rae, though I trapped carefully for them, I failed to capture any. During our return trip we took two on the Athabaska, 60 miles above Grand Rapid, on August 25.

In 1903 Alfred E. Preble and Merritt Cary took one at Fort Resolution in June, and while working on the Athabaska in the early autumn trapped specimens at Fort McMurray; Brulé Rapid; 25 miles above Pelican Rapid; Swift Current; La Biche River; and 30 miles above Athabaska Landing. An adult male taken at La Biche River on August 29 had assumed the fall pelage, was very fat, and in all probability would have hibernated soon. The species was last taken, above Athabaska Landing, on September 11. The measurements of three adults from Fort Smith average: Total length 210.6, tail vertebræ 129, hind foot 29.3; two from Fort Resolution average 216, 132, 31; four from the Athabaska average 220, 34.5, 30.7. These specimens are not separable from typical *Z. hudsonius* from the Hudson Bay region.

Ross recorded specimens from Portage La Loche;^a later he gave the species as common there, and recorded it also from Fort Simpson.^b I have recently recorded *Z. hudsonius*, on the strength of specimens in the National Museum, from Fort Resolution and Fort Rae.^c

MacFarlane reports this species, on the authority of P. Deschambeault, as occurring at Isle à la Crosse and at Lac du Brochet post (Reindeer Lake).^d

^a Can. Nat. and Geol., VI, p. 442, 1861.

^b Nat. Hist. Rev., II (second ser.), p. 274, 1862.

^c N. A. Fauna, No. 15, p. 17, 1899.

^d Proc. U. S. Nat. Mus., XXVIII, p. 739, 1905.

Zapus princeps Allen. Rocky Mountain Jumping Mouse.

J. Alden Loring took two individuals of this species a few miles west of Henry House, Alberta, September 6, 1895. In 1896 he took several near his camp in the mountains 15 miles south of Henry House. They were trapped in shrubby willows beside a small stream near timber line, and have already been recorded.^a The vicinity of Henry House is the northernmost point from which this Rocky Mountain species is known.

Zapus princeps minor Preble. Saskatchewan Jumping Mouse.

Three specimens taken on Blindman and Red Deer rivers, near Red Deer, Alberta, in June and July, 1900, by G. F. Dippie, and now in the Biological Survey collection, agree perfectly with *Z. p. minor* from the type locality. This form is known only from the Saskatchewan basin.

Erethizon dorsatum (Linn.). Canada Porcupine.

Though originally abounding nearly throughout the forested region, the porcupine has become rare in most parts of the north, mainly owing to its sluggish habits and its desirability as a food animal. The Indians are very fond of its flesh, and as the animals, in a fairly open country, may be left almost indefinitely with a reasonable certainty of being found again when wanted, they have been unable to hold their own in most sections. None were seen during the course of our journeys, and I obtained only a few records of its occurrence. J. S. Edmonton informed me that he had seen a few near Firebag River, a small stream which enters the Athabaska about 75 miles below Fort McMurray. The animal was reported fairly common in the country north of Fort Chipewyan, and in the region about Fond du Lac, at the eastern end of Athabaska Lake. James MacKinlay informed me that he had seen a few about the eastern end of Great Slave Lake.

In the summer of 1892, while exploring in the region between Athabaska Lake and Churchill River, J. B. Tyrrell found the porcupine plentiful about Cree Lake.^b

MacFarlane states that porcupines are but rarely met with in the northern part of the Anderson River region, but are more numerous to the southward of that section, though nowhere very abundant in the far north.^c

Erethizon epixanthum Brandt. Yellow-haired Porcupine.

Data to define the ranges of this and the preceding form in this region are not at hand, but *E. epixanthum* appears to be confined mainly to the region of the Rocky Mountains. Porcupines are occa-

^a N. A. Fauna, No. 15, p. 23, 1899.

^b Ann. Rept. Can. Geol. Surv., VIII (new ser.), p. 13D, 1896.

^c Proc. U. S. Nat. Mus., XXVIII, p. 741, 1905.

sionally killed at Fort Simpson. In some sections of the Liard River country they are still rather common, and most of the quills used in ornamental work in the Mackenzie region are brought from that quarter. The porcupines of the Liard are said to be of the yellow-haired form.

Richardson stated that the porcupine occurred on the banks of the Mackenzie as high as latitude 67° , his note probably referring to this form.^a Ross included Liard River in its range;^b while Allen referred skulls from Peel River to *E. epixanthum*.^c

While collecting in the Jasper House region in 1895 and 1896 J. Alden Loring found this species rather common. In 1895 he took one at Jasper House on September 14, and later in the autumn saw many tracks and several of the animals in 'Rodent Valley' about 25 miles west of Henry House. In 1896 he saw one in the mountains 15 miles south of Henry House in July, found the species common in the high mountains in the early autumn, and saw one in slide rock in 'Rodent Valley' in October. In an article published a few years later he gives many notes on their habits as observed by him in this region.^d

Ochotona princeps (Richardson). Rocky Mountain Pika.

This species was described by Richardson from specimens from the Rocky Mountains,^e undoubtedly the ones taken by Drummond near the sources of Elk (Athabaska) River. Richardson later mentions, in addition to those taken by Drummond, several obtained by Mr. MacPherson from the River of the Mountains (Liard).^f B. R. Ross, thirty years later, listed the species as common among the mountain ranges of Liard River.^g The limits of its range to the northward are unknown.

While in the mountains of western Alberta, the locality of Drummond's specimens, in 1895 and 1896, J. Alden Loring found the species common in the higher ranges, and secured a series of nearly 50 specimens. In 1895 he took a number at Henry House early in September. In 1896 he found it common in the mountains 15 miles

^a Fauna Boreali-Americana, I, p. 214, 1829.

^b Can. Nat. and Geol., VII, p. 141, 1862.

^c Monographs N. A. Rodentia, p. 397, 1877.

^d Forest and Stream, LII, p. 345, 1899.

^e Zool. Journ., III, p. 520, 1828.

^f Fauna Boreali-Americana, I, p. 227, 1829. Richardson's references to reports and specimens from the 'River of the Mountains,' received from Murdoch MacPherson, usually refer to Fort Nelson, on Fort Nelson River, the principal southern tributary of the Liard. He sometimes refers specifically to the "east branch of the River of the Mountains." ("A collection of birds and quadrupeds, of much interest, made at Fort Nelson on the River of the Mountains, a branch of the Mackenzie, was forwarded to us by Mr. MacPherson." F. B. A., I, Introduction, p. XIX, 1829.)

^g Can. Nat. and Geol., VII, p. 141, 1862.

south of Henry House in July and secured a good series. During the early autumn he secured specimens in the mountains at points about 50 and 60 miles north of Jasper House. He took a few also in the mountains 10 and 25 miles west of Henry House, October 17 and 18. The latter specimens are in fresh pelage, and above are yellowish brown flecked with black, which in some cases becomes the predominating color posteriorly; beneath they are white, more or less suffused with ochraceous. Among the skins taken 15 miles south of Henry House in July, 1896, are some in a different pelage, being much more grayish, but most of them are in process of transition from this coat to the fall pelage referred to above.

Ten adults of both sexes taken 15 miles south of Henry House average: Total length 190.4, hind foot 30.

Lepus americanus Erxleben. Hudson Bay Varying Hare. White Rabbit.

The varying hare or rabbit is common and quite generally distributed throughout the Athabaska and Mackenzie regions north to the limit of trees. As is well known, the species is subject to great fluctuations in numbers, gradually becoming more and more common during a period of years, and then becoming scarce again, the periods of greatest abundance occurring every seven years, according to general report, but in reality not recurring with absolute regularity nor at the same time in all sections.

During our first trip to the Athabaska region in 1901 we found that the rabbits had begun to increase after one of their periods of scarcity. We found them rather common at Fort Chipewyan late in May, and secured a number of specimens, some of which still retained a few scattered white hairs of the winter pelage. Between that point and Fort Smith we occasionally noted the animals. At Fort Smith some of the Indians were living principally on rabbits, taking them in snares. Alfred E. Preble secured several specimens at Fort Resolution during July, and I took a small series, comprising adults and young, at Fort Rae during the latter part of the same month.

In 1903, when we again visited the region, we found that the animals had continued to increase during the interval, and were then apparently at the height of abundance. While descending the Athabaska and Slave rivers we saw large numbers. In many places along the banks the dense thickets of willows and other shrubs had been eaten almost down to the ground. On the Smith Portage road their ravages were especially noticeable, the young Banksian pines being here the principal food. The many evidences of winter snaring and the thousands of white rabbit skins which littered the neighborhood of an occasional deserted Indian camp showed that this locality had been a favorite resort for both rabbits and Indians during the pre-

ceding winter. The region about the lower Slave also abounded with rabbits. While paddling a distance of 3 or 4 miles along a narrow channel in the Slave River delta on June 19 we saw nearly 40 on the banks, and shot several with a pistol. A party arriving at Fort Resolution from Hay River in June, having skirted the shore of the lake, reported rabbits extremely abundant, and stated that a large proportion of those shot had accumulations of pus beneath the skin of the neck. Others have reported a similar condition in sick or dead rabbits along the lower Athabaska. During their trip to the upper Mackenzie in July my brother and Cary found the animals abundant and took a number of specimens.

In the country to the northward of Fort Rae the animals were common during August, and contributed largely to our larder. The Dogribs entice them within shot by making a rasping squeak through the nearly closed lips. To insure the proper salivary condition for this vocal performance, they sometimes chew the bitter bark of some shrub, usually *Lepargyrea canadensis*. I easily learned to imitate the sound by a modification of the squeaking in common use for alluring birds, and soon became a proficient rabbit caller. What attraction this sound has for the animals is not clear, but the method is successful only during the summer or breeding season. Adults of both sexes are attracted by the sound, but the young seldom respond to it. As far as I could learn the native tribes of the lower Mackenzie do not practice this method of enticing the animals, though I found that it was equally successful there. Under favorable conditions the animals respond to the sound by a hurried approach, usually along a runway, and do not stop until suddenly arrested by the unexpected sight of the caller, when they usually remain motionless for a few seconds, apparently in wonder, and then bound away. The same animal can seldom be completely deceived a second time, but usually can be made to approach within a certain distance, varying with the nature of the ground, apparently to get a second look at the intruder, and may be heard scurrying about and loudly thumping its displeasure. Sometimes the approaching rabbit makes a grunting noise as it rushes toward the source of the sound. This apparently denotes great eagerness, as in such cases as I observed the animal always came very close, sometimes almost to my feet, before perceiving me.

Along the south shore of Great Bear Lake to the eastward of McVicar Bay, I found rabbits uncommon, but occasionally saw tracks or other evidences of their presence. To the west of McVicar Bay, where the country is better suited to their needs, they were more abundant. At Fort Franklin rabbits were common late in September, and at the rapids on Bear River a party of Indians were snaring the animals by hundreds. They had now commenced to change to

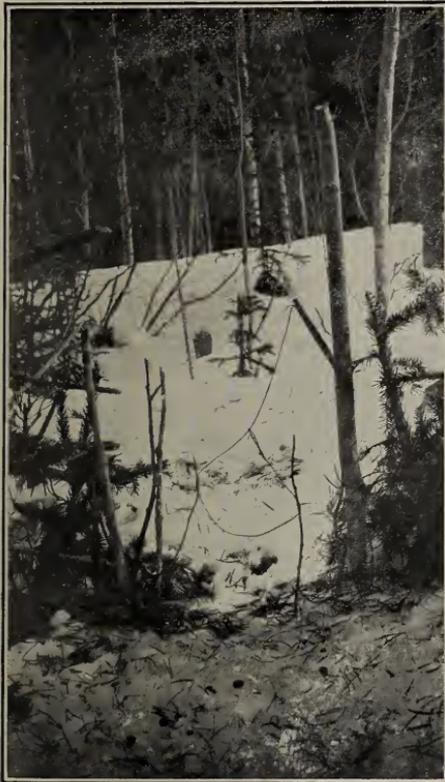


FIG. 1.—SNARE SET FOR RABBIT (*LEPUS AMERICANUS*).



FIG. 2.—RABBIT CAPTURED IN SNARE.



FIG. 3.—FALLEN WHITE SPRUCE DENUED OF LEAVES AND BARK BY RABBITS. FORT SIMPSON, SPRING, 1904.

the white winter pelage. While ascending the Mackenzie in October I saw numbers daily. At Fort Simpson the opinion was unanimous that the animals had not been so abundant for many years.

Each Indian, and some of the white inhabitants, maintained a line of snares, popularly termed a 'rabbit track,' being a trail extending for several miles through a district where the animals were common, with snares set close to the track at frequent intervals. A pole to which the noose is attached is balanced over a convenient limb and tips up when the snare is released, suspending the animal in midair (Pl. XXI, fig. 2). This insures a speedy death and places the quarry out of reach of dogs and other predatory quadrupeds. Rabbits preferably are caught by the neck; when suspended by the leg, as frequently happens, their flesh is less palatable. Usually for a few days previous to the actual setting of the snares, quantities of brush are cut and placed in convenient spots, to attract the animals, and get them into good condition. Hundreds were brought in and sold, the price given in trade being about the equivalent of 5 cents. They freeze in the snares and are kept for weeks and months in this state without deterioration, and figure extensively on the winter bill of fare at the northern trading posts. In summer, when the animals live mainly on herbaceous plants, their flesh is very palatable, though woefully lacking in nourishing qualities, but in winter, when they feed largely on the foliage and bark of resinous trees, the meat acquires a somewhat bitter taste. When Indians are living mainly on rabbits, they call it 'starving,' though they may be eating bounteously of the meat every two or three hours, and it is said that if nothing else is obtainable, they gradually grow weaker on this diet.

Bad as a continuous diet of rabbits is, however, more deplorable still is the condition that ensues when these animals are scarce. Their periodical failure is anticipated by the Indians with grave forebodings. Disinclined to exert themselves to provide for the future, cruel famine is their lot when the short cold days of winter are upon them and the snares yield only a meager supply.

The principal use made by the Indians of the skin of this animal is in the manufacture of robes. For this purpose the skins are cut into strips, which are twisted, and woven on a frame into a robe of the desired size. The mesh is very coarse, and the fingers may be thrust through the finished robe at any point. The loose, soft fur, however, resists the action of the wind, and on account of their lightness and warmth these robes are considered second only to those made of caribou skins, and are preferred by some. To obviate the unpleasant consequences of the shedding of the fur, they are usually inclosed in a cotton case. Capotes, shirts, and mittens made in the same way were formerly in common use, and are still made by some of the remote tribes.

The skins of this species are scarcely ever traded in the Mackenzie region, owing probably to the cost of carriage, but according to MacFarlane, the Hudson's Bay Company annually export many thousands from Hudson Bay.^a

Throughout the upper Mackenzie region during January, and to a less extent during February, 1904, many thousands of rabbits perished from disease. In some cases death overtook them as they sat in their forms at the foot of trees or beneath logs or stumps; in other cases the animals left the shelter of the woods and after wandering a short time on the frozen surface of the river suddenly sprawled in their tracks and died without a struggle. In the spring when the snow went off many were found in all conceivable positions. After February the disease seemed to have run its course, as no sick animals or any which had recently died were found. When affected, the rabbits become excessively thin. On skinning some which had died of this disease I was at once struck by the dry condition of the skin and flesh, which separated with difficulty. The viscera were in an excessively moist condition. The stomach contained a small quantity of comminuted woody food of the consistency of gruel. The throat and lungs were much inflamed.

Despite the thousands which were caught in snares or died from disease the rabbits were fairly abundant when spring arrived. The Indians still lived on them to a large extent, and when the breeding season arrived took note of the number of embryos, since on this depended the relative abundance of the animals during the following winter. The prospect was not encouraging, since in the few instances where I ascertained the number it seldom exceeded two. According to the natives the animals have three litters during the summer. Young the size of red squirrels were seen near the mouth of Nahanni River on June 6.

While descending the Mackenzie in June, 1904, I found the species common along its banks and learned that the area of abundance had extended throughout the length of the Mackenzie. The animals were especially common on the lower Mackenzie and Peel rivers. When I ascended the Athabaska in August of the same year, I found them common there also.

Through the kindness of correspondents I have been able to trace the decline in numbers of the rabbits since my return from the Mackenzie in 1904. They were still abundant during the winter of 1904-5 about Fort Simpson, though less so than in 1903-4. By December, 1905, they had become much scarcer, and in December, 1906, they

^a Proc. U. S. Nat. Mus., XXVIII, p. 741, 1905. See also Poland's List, for numbers of American hare skins collected by the Hudson's Bay Company annually (with some exceptions) between 1788 and 1890. Poland's Fur-Bearing Animals, Introduction, p. xxvii, 1892.

were very scarce, both at Fort Simpson and Hay River. The latest report is from Fort Simpson, where A. F. Camsell, writing December 4, 1907, stated that there were practically no rabbits to be found.

A letter received from Maj. A. E. Snyder, of the Royal Northwest Mounted Police, dated at Whitehorse, Yukon, March 8, 1907, indicates that the rabbits were abundant there at nearly the same time that they were at their maximum in the Mackenzie Valley. They had been very abundant two years before the date mentioned, but had been practically exterminated by an epidemic. He says:

The disease has evidently spent itself and only the healthy rabbits are left. In a journey, recently, of twenty days' duration, I only saw two rabbits; in other words, where there were thousands two years ago, they are in ones and twos now.

During the fall, winter, and spring I had a good chance to observe the seasonal changes of pelage in this species, and collected about 35 specimens, comprising a nearly complete series. Specimens taken at Fort Franklin, Great Bear Lake, on September 19 and 21, 1903, are perhaps properly referable to the form *L. a. macfarlani*, but this distinction may be ignored for the present purpose. They had scarcely begun to assume the winter pelage, the ears, feet, and legs alone being white. One seen, but not secured, about the same time, was slightly flecked with white on the rump. Others seen near the rapid on Bear River the last of September were in about the same condition. During the first three weeks in October, while we were ascending the Mackenzie, none were collected, and there is a slight break in the series in consequence. Adults taken near Fort Simpson, October 20 and 24, were in nearly complete winter pelage, but still retained brown on the head; the ears were largely white. A young one of the year, taken October 24, was white beneath and on the feet. A little white also appeared on the sides of the head and about the bases of the ears, but most of the head and back was still in the immature summer coat. Another taken three days later was similar in color, but the white extended higher on the thighs, and the back was flecked with the same color. The young, however, acquire the white winter pelage earlier than the adults, which were then almost entirely white. Specimens taken November 27 and 28 were entirely white, except that the edges of the ears showed a dark line, and the under fur was of a fawn color. This is the normal winter condition.

On April 11, 1904, the rabbits began to show traces of the change to the summer pelage, first made evident by the tawny under fur showing on the head and ears, owing to the white hair having been shed. In a specimen taken April 20 the fawn formed the predominating color above. In others collected about the same time the fawn and white were about equally divided, the head, however, being

mostly dark. One taken May 1 was still further advanced in the molt. By May 4 the animals were mainly fawn colored above, a few white hairs being still retained, and the long summer fur beginning to show in patches. This condition was still further advanced in specimens taken May 7 and 11, and one taken on May 16 was in nearly complete summer dress. Rabbits noted near the mouth of Nahanni River early in June still retained scattering white hairs on the back, and a few of these sometimes persist until late in the season.

A careful study of the series collected, together with a series of skulls in the National Museum from various points in the region, and specimens from Oxford House, Keewatin, the latter representing typical *L. americanus*, convinces me that the varying hares of the interior of British America east of the Rocky Mountains, due allowance being made for individual variation, are very uniform in characters. There is a slight increase in size northward, culminating in the form named *macfarlani* from Fort Anderson, which seems to occupy the upper Hudsonian zone. Only two adult skulls of typical *L. americanus* from the Hudson Bay region (Oxford House) are available for comparison. These are rather small, but can be matched in size by some adult specimens from the upper Mackenzie region. It is probable that they do not fairly represent *americanus*, and that a larger series would be found to agree approximately in size with specimens from Athabaska and the upper Mackenzie. In color the Oxford House skins can be matched by specimens from Fort Chipewyan and various points about Great Slave Lake, but the larger series naturally shows much individual variation.

Two specimens from Fort Chipewyan average in measurements: Total length 460, tail vertebrae 39, hind foot 133; one from Fort Resolution measures 470, 33, 133; one from Fort Rae, 480, 45, 138. Ten of the largest specimens from the Fort Simpson series average 466.5, 43, 142.

The following references are quoted mainly because of their bearing on the abundance of rabbits during certain years. MacFarlane found them in great abundance on Lockhart River, a tributary of the Anderson, in the summer of 1857.^a He states that they were fairly abundant in the same region in the summer of 1860.^b Macoun gives them as very abundant along the Clearwater in the early autumn of 1875.^c J. B. Tyrrell, while exploring the country between the eastern part of Athabaska Lake and Churchill River in the summer of 1892, states that rabbits were found everywhere in the denser woods, but did not seem to be anywhere abundant.^d Russell found them

^a Can. Record of Science, IV, p. 32, 1890.

^b Ms. notes.

^c Manitoba and Great Northwest, p. 352, 1882.

^d Ann. Rept. Can. Geol. Surv., VIII (new ser.), p. 13D, 1896.

abundant at Fort Rae in the winter of 1893-94.^a Whitney states that they were plentiful in the region southwest of Smith Landing in February, 1895, and south of Fort Resolution in the following May.^b These two latter notes evidently refer to the cycle of abundance preceding the one which came under my own observation.

Allen records specimens from Methye Portage, Fort Resolution, Fort Rae, Fort Liard, and Fort Simpson.^c

Lepus americanus macfarlani Merriam. MacFarlane Varying Hare.

The varying hares of the Hudsonian zone, as before intimated, are larger than those of the Canadian. This race has been separated under the name *L. a. macfarlani*, described from Fort Anderson.^d Specimens from Fort Franklin and from the Mackenzie near the site of old Fort Good Hope belong to this form. Owing to the great amount of individual variation in the northern varying hares, no satisfactory color differences are apparent. Three specimens taken on the Mackenzie near the site of old Fort Good Hope on June 27, 1904, are in nearly complete summer coat. One still retained much white on the thighs, and all had a few white hairs on the back. These specimens are rather dark; in one black is the predominating color above. The three average: Total length 491.6, tail vertebræ 41.3, hind foot 149. The largest measures 500, 40, 155. Besides specimens from Fort Anderson, the type locality, the collection of the National Museum contains skulls from La Pierre House and Peel River.

Lepus americanus columbiensis Rhoads. British Columbia Varying Hare.

The hares of western Alberta are separable from typical *americanus*, and apparently are referable to *L. a. columbiensis*. Specimens from Jasper House and Fiddle Creek, Alberta, exhibit considerable individual variation, but in general are more rufous than more eastern and northern specimens, and have less black on the back. A large proportion of these Alberta skins have white feet. I may mention that this character, which has been regarded as an important one, I consider of little weight, as it depends merely on altitudinal or latitudinal conditions, the white feet of the winter pelage not being entirely replaced by a summer molt in northern and high ranging individuals of the various forms. The young of all the forms of this group have brown feet. Compared with specimens from the Hudson Bay and Athabaska regions, the skulls from western Alberta are longer and relatively narrower across the zygomata.

^a Expl. in Far North, p. 248, 1898.

^b On Snow Shoes to Barren Grounds, pp. 124 and 298, 1896.

^c Monographs N. A. Rodentia, pp. 312-314, 1877.

^d Merriam, Proc. Washington Acad. Sci., II, p. 30, 1900.

In the early autumn of 1895, during his first trip from Edmonton, Alberta, west to the mountains, J. Alden Loring found these hares abundant, though somewhat local in distribution. Sometimes for days few were seen; then a district was reached where they were very abundant. In some places their runways were very common, and the young aspens and other tender shrubs had been cut down by them in great numbers, but the animals had departed. They were mainly found in the valleys and foothills, few being noted in the high mountains.

In the summer of 1896, during his second trip to the same region, he found the hares much less common; in only one or two localities were they nearly as abundant as during the previous year.

Lepus arcticus Ross. Baffin Land Arctic Hare.

The Arctic hares of Melville Island and the adjacent islands are assumed to be referable to this species. In view of the fact that no specimens from that region are available for study, this assumption is of course somewhat arbitrary, and the consequent division of the published notes subject to revision.

Under the name *Lepus glacialis*, Sabine stated that the species was very abundant on the North Georgia Islands, referring particularly to Melville Island, visited on Parry's first voyage.^a Fisher noted that hares killed near Winter Harbor, late in June, 1820, during the same voyage, were perfectly white excepting the tips of the ears, and weighed from 7 to 8 pounds.^b J. C. Ross recorded this hare as abundant on the south shore of Barrow Strait, and as occurring at Port Bowen;^c he later recorded it from Sheriff Harbor.^d M'Clintock mentions that one shot about the middle of July, 1859, at Port Kennedy, had nearly shed its winter fur, and that the summer coat of dull lead color was exposed.^e Sutherland recorded the species from the southern end of Cornwallis Island, where tracks were rarely seen in the autumn of 1850;^f he stated also that some were shot by Goodsir in the spring of 1851 on the north shore of the same island.^g On North Devon three were seen and one shot in August, 1850, near Cape Riley; the animal weighed 11 pounds.^h Another was seen on the shores of Baring Bay, May 15, 1851.ⁱ Armstrong states that a few Arctic hares were seen September 7,

^a Suppl. to Appendix Parry's First Voyage, p. CLXXXVII, 1824.

^b Journ. Voyage of Discovery, p. 234, 1821.

^c Appendix Parry's Third Voyage, p. 93, 1826.

^d Appendix to Ross's Second Voyage, p. xv, 1835.

^e Voyage of Fox in Arctic Seas, p. 294, 1860.

^f Jour. Voyage to Baffin Bay, I, p. 362, 1850.

^g Ibid., II, p. 106, 1852.

^h Ibid., I, p. 310, 1852.

ⁱ Ibid., II, p. 78, 1852.

1850, near Nelson Head, the southern extremity of Baring Land.^a One was killed on Prince Albert Land near Princess Royal Islands, March 22, 1851;^b the species was common also on Baring Land near the same place on May 5.^c He also records a large number seen at Mercy Bay, Banks Land, October 7, 1851;^d and his tabular list of game secured at that place shows that hares were killed during every month between October, 1851, and April, 1853.^e Arctic hares, probably of this species, were found by Rae to be common on Wollaston Land near Douglas Island in May, 1851.^f

Lepus arcticus canus Preble. Keewatin Arctic Hare.

The Arctic hares of the mainland of this region, so far as known, are referable to *L. a. canus*, described from the Barren Grounds on the west coast of Hudson Bay, 75 miles north of Fort Churchill. A skin in summer pelage in the National Museum, said to be from Athabaska (with no definite locality, but probably from the Barren Grounds northeast of Athabaska Lake), and one or two skulls from near (probably northeast of) Fort Rae, were compared with my specimens of *L. a. canus* when it was described, and found to belong to the same form. Some of these specimens were briefly referred to by Rhoads in 1896 as probably belonging to an undescribed species, but lack of material prevented him from characterizing it.^g A young specimen in the National Museum, taken in June, 1853, during the voyage of the *Enterprise*, and, therefore, from Cambridge Bay, Victoria Land, is apparently referable to *L. a. canus*. Pending further information, therefore, it seems safe to regard the published notes on Arctic hares from the mainland, at least, as referring to *L. a. canus*.

King observed the species near the outlet of Lake McDougall, Back River, in the summer of 1834.^h Simpson noted it at Fort Confidence in the winter of 1837-38.ⁱ Richardson describes a winter specimen from Great Bear Lake, and records the occurrence of the animal near Cape Parry.^j Allen recorded specimens from Fort Rae, Fort Anderson, and Great Bear Lake.^k Warburton Pike noted the species on the upper part of Coppermine River to the eastward of Point Lake in September, 1889.^l James MacKinlay, who accompanied Pike to the

^a Narrative Discovery Northwest Passage, p. 210, 1857.

^b Ibid., p. 304, 1857.

^c Ibid., p. 316, 1857.

^d Ibid., p. 474, 1857.

^e Ibid., p. 601, 1857.

^f Journ. Roy. Geog. Soc., XXII, p. 75, 1852.

^g Proc. Acad. Nat. Sci. Phila., 1896, p. 354.

^h Narrative Journey to Arctic Ocean, I, p. 302, 1836.

ⁱ Narrative Discoveries on North Coast of America, p. 216, 1843.

^j Fauna Boreali-Americana, I, p. 222, 1829.

^k Monographs N. A. Rodentia, pp. 294, 295, 1877.

^l Barren Ground of Northern Canada, p. 63, 1892.

Barren Grounds in the summer of 1890, noted the first traces of this animal on the shores of Lac du Mort, a short distance north of Great Slave Lake, near longitude 112°. These were winter signs; the animals had since gone northward.^a Russell states that one was killed near the Indian camps about 150 miles northeast of Fort Rae late in March, 1894, and brought to him as a specimen rare for the region.^b It sometimes, however, occurs near Fort Rae in winter. In the region to the eastward and northeastward of Athabaska Lake, explored by him in 1893 and 1894, J. B. Tyrrell states that the Arctic hare "was found to range everywhere throughout the Barren Lands from the edge of the woods northward, but it was nowhere found in any abundance."^c J. M. Bell informs me that during his explorations about Great Bear Lake in the summer of 1900, he found Arctic hares common between Great Bear Lake and the lower Coppermine, and on the eastern shore of the lake south to Eda Travers Bay. Hanbury states that the Arctic hare occurs on Thelon or Ark-i-linik River;^d he also mentions two killed a short distance south of Ogden Bay, Arctic coast, on May 8, 1902;^e and early in June of the same year he found the species common on Melville Sound, Arctic coast.^f One killed near the same place about June 10 contained five large embryos which would have been born in a fortnight.^g

MacFarlane states that only a few Arctic hares were observed during his summer and winter journeys in the far north, and that but three specimens were secured during his five years' residence at Fort Anderson.^h In notes sent to the National Museum from Lac du Brochet post, Reindeer Lake, through MacFarlane, the Arctic hare is said to inhabit the country not far to the northward of Reindeer Lake.

Felis hipolestes Merriam. Rocky Mountain Cougar.

The "mountain lion" is known to the Indians who visit Fort Liard and is called by them *E-wed-sie*. They state that they seldom see the animal, but occasionally see its tracks, and that it has been known to kill moose. The species was reported to me also from the neighborhood of Fort Nelson.

J. S. Edmonton reported seeing the tracks of one on two occasions near Boiler Rapid and Grand Rapid on the Athabaska, one winter during recent years, he thinks in 1897. J. W. Milne gives several

^a Ottawa Nat., VII, p. 108, 1893.

^b Expl. in Far North, p. 247, 1898.

^c Ann. Rept. Can. Geol. Surv., IX (new ser.), p. 166F, 1898.

^d Sport and Travel in Northland of Canada, p. 14, 1904.

^e Ibid., p. 136, 1904.

^f Ibid., p. 159, 1904.

^g Ibid., p. 161, 1904.

^h Proc. U. S. Nat. Mus., XXVIII, p. 739, 1905.

instances of the occurrence of the panther in the southern Canadian Rockies. One was seen by him in 1883 in the mountains in about latitude $51^{\circ} 30'$, and longitude 117. In 1884 a pair were reported near the junction of Bow and Cascade rivers, Alberta. Others were afterwards seen near the Kananaskis River, in the mountains southwest of Calgary.^a

Lynx canadensis Kerr. Canada Lynx.

Though this animal is found nearly throughout the wooded parts of the region, we observed it but once during the season of 1901, seeing one on the banks of Slave River, a few miles above its mouth, on August 1.

During the season of 1903, though tracks were frequently seen, I actually observed the animal but once, noting one on the Mackenzie, a few miles below Blackwater River, on October 6. After the snow fell we frequently saw their tracks as we were ascending the Mackenzie.

The winter of 1903-4 was remarkable for the abundance of lynxes throughout the upper Mackenzie region. The fact that they usually increase coincidentally with the hares, which form their chief food, probably accounts for their abundance that season. Hundreds of skins were traded at Fort Simpson during the winter. I obtained a pair of adults which were snared by James MacKinlay, 30 miles south of Fort Simpson, in November. The male of this pair measured: Total length 950, tail vertebræ 100, hind foot 250; the female measured 920, 105, 235. A female, partially albinistic, being of a nearly uniform light yellowish-brown, with eyes of a deep pink, was brought to me on April 16 from the mouth of Rabbitskin River, 20 miles above Fort Simpson, where it had been snared. It measured 840, 135, 260. A hunter's skin of a young one, a month or two old, obtained at Fort Simpson, is rufous above, gradually shading into white beneath, breast and belly spotted with dusky; tail rufous above, lighter beneath, and tipped with dusky. Besides these specimens, I obtained a large series of skulls from Fort Simpson.

The Indians capture the lynx mainly by snaring, the noose being made of heavy twine or babiche. (Pl. XXII.) In setting the snare, a circular inclosure about 5 feet in diameter is made by sticking pieces of brush into the crusted snow. One or more openings are left, in which the noose is placed at the proper height, so that the animal attempting to enter the pen will put its head into the loop. In the center of the inclosure is placed a split stick smeared with the contents of the musk glands of the beaver, sometimes mixed with perfumery of some sort, which serves to attract the animal. The snare is attached

^a Biological Rev. of Ontario, I, pp. 81-83, 1894.

to the middle of a stout stick 3 or 4 feet long, which acts as a drag when the animal is caught. It thus generally becomes entangled in the brush and after a few struggles remains passive, and if the weather is cold quickly freezes to death. The flesh of the lynx is said to be very palatable, and is eaten by the natives and to some extent by the white residents.

During my trip down the Mackenzie in June, I frequently saw tracks between Fort Simpson and Fort Wrigley. A lynx was seen to cross Nahanni River as we were ascending it June 3. It swam readily in the swift current, and on reaching the shore bounded away into the forest, apparently little fatigued by its violent exertions.

Though this animal extends its range nearly to the limit of trees, its preference for the Canadian zone is decided. At Fort Norman I ascertained that not over a dozen had been traded during the winter. I saw no skins at Fort Good Hope, and only about half a dozen had been brought in to Fort McPherson and its outpost, Arctic Red River, during the winter. Fort Anderson during the first year of its existence (outfit 1861) received in trade only four skins of this species, and the same number were traded during the following year. These notes regarding lynxes within the confines of the Hudsonian zone probably refer to subspecies *mollipilosus*, but are included here to show the relative scarcity of the animal northward.

Since 1904 the lynx has been declining in numbers in the Mackenzie region. A. F. Camsell reports it scarce at Fort Simpson in December, 1906, and December, 1907.

Richardson states that this animal is found on the Mackenzie as far north as latitude 66°.^a Simpson observed the species on Clearwater River near the mouth of the Pembina.^b Richardson noted it at Isle à la Crosse Lake in June, 1848.^c Ross, referring to the Mackenzie River region, states that the lynx "ranges to the Arctic Coast in summer. In winter it does not leave the shelter of the woods."^d Allen records specimens from Fort Simpson, Liard River, and Peel River.^e Tyrrell, from observations made in 1892, states that the Canada lynx is moderately abundant in some seasons in the more southern part of the region between the eastern end of Athabaska Lake and Churchill River.^f

In the early autumn of 1895, J. Alden Loring saw many tracks of lynxes about the base of the Rocky Mountains in western Alberta. In 1896 he reported the species common in the valleys and foothills 15

^a Fauna Boreali-Americana, I, p. 101, 1829.

^b Narrative Discoveries on North Coast of America, p. 63, 1843.

^c Arctic Searching Expedition, I, p. 106, 1851.

^d Can. Nat. and Geol., VII, p. 137, 1862.

^e Bull. U. S. Geol. and Geog. Surv. Terr., No. 4, Vol. II, p. 325, 1876.

^f Ann. Rept. Can. Geol. Surv., VIII (new ser.), p. 13D, 1896.

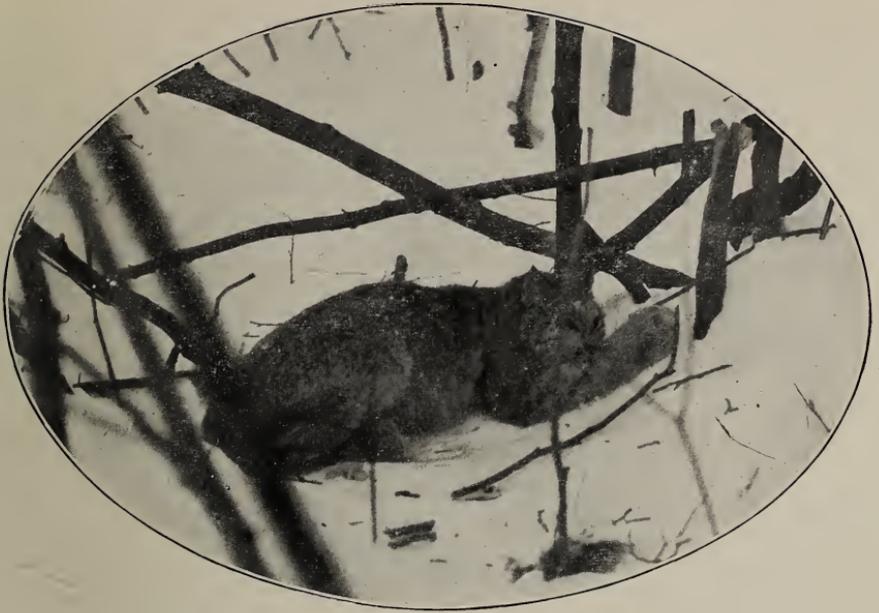


FIG. 1.—LYNX (*LYNX CANADENSIS*) CAPTURED IN SNARE.
[Photographed by J. W. Mills.]



FIG. 2.—SNARE SET FOR LYNX.

miles south of Henry House in July, and in similar situations between Jasper House and Smoky River in the early autumn. He killed one on Grand Cache River, about 70 miles north of Jasper House, on September 3. It measured: Total length 841, tail vertebræ 105, hind foot 227. Another was killed in Rodent Valley, 25 miles west of Henry House, on October 15. Its stomach contained remains of *Microtus* and *Synaptomys*. Its measurements were 872, 93, 222. In the Biological Survey collection are skulls from the following points in Alberta: Snake Lake, 20 miles west of Red Deer; McLeod River (near crossing west of Edmonton); Cache Pecotte; and 40 miles northeast of Jasper House. These skulls are not separable from specimens from eastern Canada.

Lynx canadensis mollipilosus Stone. Northern Canada Lynx.

A skull in the National Museum, taken by C. P. Gaudet at Peel River (Fort McPherson), as well as skulls from several points in northern Alaska, differs from skulls of typical *L. canadensis* from eastern Canada in some particulars, notably in having slender post-orbital processes, a character of subspecies *mollipilosus*. Another skull which I obtained at Fort McPherson does not have the slender postorbitals attributed to this form, and differs from ordinary skulls of *L. canadensis* only in having the bullæ very much flattened. It is in all probability abnormal in this respect. No skins from this region being available for study, it is uncertain whether the skin characters attributed to *mollipilosus* are found in the Peel River animal, but it is highly probable that such is the case.

Canis occidentalis Richardson. Gray Wolf.

Gray or timber wolves are found throughout the wooded parts of the region, and are fairly abundant and apparently increasing in some sections. In 1901 we saw numerous skins at nearly all the posts visited, and found a skull at a trapper's cabin on Slave River, 10 miles below the mouth of the Peace. Among a number of skins seen at Fort Rae, most of which were in the normal or gray phase, was one the color of which was mainly dark bluish gray; the throat and back were nearly black, the latter flecked with a few white hairs; the chest had a white patch; the belly and tail were bluish gray, the latter blackish toward the tip.

During the season of 1903 we heard that wolves had been rather abundant for several years past in the region west of Smith Landing, in the Birch Mountains, and in the vicinity of Athabaska Landing. Tracks were seen at various points along Slave River and on my route between Fort Rae and Great Bear Lake. Late in August, on the large semibarren tract east of Leith Point, on the south shore of Great Bear Lake, my Indian canoeman wounded a large black

wolf, but the animal escaped to the shelter of the woods. While traveling westward along the southern shore of the lake in September, we saw tracks of wolves near Leith Point and near Manito Islands, and while ascending the Mackenzie in October, saw tracks at several points on its banks.

During the early part of the winter of 1903-4 a band of three or four frequented the region about Fort Simpson. A large black male killed by poison early in December was obtained. It measured: Total length 1,680, tail vertebræ 480, hind foot 320. It is entirely black, with the exception of a few white hairs which underlie the longer black hair about the shoulders, and which can be seen only when the coat is rumped. Another of the band, said to have been gray in color, was killed, but I was unable to procure it. The individuals of this band lived largely on rabbits, many of which were taken from the snares of the natives. When rabbits are scarce, much large game is destroyed by wolves, and even sledge dogs, indispensable to the northern resident, frequently fall victims. A young wolf, seen in late May in the possession of J. W. Mills, who obtained it from an Indian near Fort Providence, appeared to be 3 or 4 weeks old.

The Indians of this region are superstitious about wolves and can scarcely be induced to kill them, much less to skin or handle them, for fear of misfortune. They would not skin the one killed at Fort Simpson, but were persuaded to bring the body to the post. The death of a child soon afterwards was supposed to have been the result of this rash act, in which the father had participated. Another child who saw the dead wolf was taken sick, but finally recovered. As a result of this superstition the wolves are said to be increasing in certain localities.

While descending the Mackenzie in June, 1904, I saw tracks of wolves near the mouth of Nahanni River and at several points below, and saw skins at all the posts visited. Dusky or black wolves, as well as gray ones, are found all along the Mackenzie, but the dark phase seems to occur more frequently in the mountains.

Skulls in the National Museum from Fort Rae, Fort Simpson, Fort Anderson, and Peel River are larger, and have less rounded audital bullæ and larger teeth, than skulls of *C. nubilus* from Colorado.

Richardson figured a dusky specimen killed near Fort Resolution, and states that many black ones were seen on the Mackenzie.^a Allen records skulls from Fort Rae, Fort Simpson, and Peel River.^b Tyrrell gives this species as occurring in the country between Athabaska Lake and Churchill River, but not plentifully.^c In the early

^a Fauna Boreali-Americana, I, pp. 69, 70, 1829.

^b Bull. U. S. Geol. and Geog. Surv. Terr., No. 4, Vol. II, p. 314, 1876.

^c Ann. Rept. Can. Geol. Surv., VIII (new ser.), p. 13D, 1896.

autumn of 1896 J. Alden Loring occasionally saw tracks of timber wolves in the country between Jasper House and Smoky River, and heard one on Grand Cache River, September 5. They were reported to him to be of large size and frequently black.

The following extract, showing the numbers of skins of woodland wolves collected by the Hudson's Bay Company, is quoted from MacFarlane's recent paper:^a

From 1858 to 1884, Athabasca District contributed 2,119 skins of the woodland (black, gray, and white) wolf to the London sales. For the outfits 1885 to 1889, it made a further addition of 339 skins. Between 1863 and 1884, inclusive, the district of Mackenzie River supplied a total of 1,880 skins of this animal. Its quota in 1889 was only 49 skins. From 1862 to 1887, Fort Resolution, Great Slave Lake, gave 193, and in 1884, 10 skins. The posts of the upper Peace River, with its lake stations transferred from Edmonton, sent in 48 woodland wolves in 1889.

Canis occidentalis albus Sabine. Barren Ground Wolf.

No specimens of this supposed species are available for study, but the light color of the wolves of the Barren Grounds is probably sufficient to warrant their consideration as a separate form. The name *Canis albus* was based by Sabine on a very large light-colored individual killed at Fort Enterprise during the winter of 1820-21.^b Wolves nearly white in color, but considerably smaller than the Fort Enterprise specimen, were found to inhabit Melville Island by Parry's party, and were seen almost daily during the winter.^c J. C. Ross states that numbers were seen about the Isthmus of Boothia.^d During Back's expedition white wolves were seen near Artillery Lake.^e Simpson recorded two seen August 21, 1838, at Cape Franklin (Point Turnagain).^f Armstrong states that a wolf was seen near Princess Royal Islands in February, 1851;^g and that many were seen at Mercy Bay, Banks Land, during the winter of 1851-52.^h M'Dougall states that a pack of wolves was seen on Melville Island near Cape Russell in June, 1853;ⁱ one was seen on May 27, 1854, near Cape Hotham, Cornwallis Island;^j M'Clintock reports that wolves were observed in October, 1858, at Port Kennedy, and in May, 1859, by Lieutenant Hobson on King William Land.^k Kennedy records

^a Proc. U. S. Nat. Mus., XXVIII, p. 694, 1905.

^b Narrative Journey to Polar Sea, Appendix, p. 655, 1823.

^c Suppl. to Appendix Parry's First Voyage, p. CLXXXV, 1824.

^d Appendix to Ross's Second Voyage, p. x, 1835.

^e Narrative Arctic Land Expedition to Great Fish River, p. 128, 1836.

^f Narrative Discoveries on North Coast of America, p. 294, 1843.

^g Narrative Discovery Northwest Passage, p. 300, 1857.

^h Ibid., p. 484, 1857.

ⁱ Voyage of the *Resolute*, p. 295, 1857.

^j Ibid., p. 402, 1857.

^k Voyage of the *Fox*, pp. 186, 309, 1860.

one seen in the central part of Prince of Wales Land in April, 1852.^a While in the Barren Grounds to the northeast of Fort Rae in the early spring of 1894, Russell found wolves rather common. Of a band of six, two were snow white, the others a light gray.^b During his exploring trip between Great Slave Lake and Hudson Bay in 1900, J. W. Tyrrell found large wolves on the east side of Artillery Lake.^c J. M. Bell informs me that during the same season he occasionally saw wolves near the site of Fort Confidence, near the eastern end of Great Bear Lake. Hanbury, while traveling overland between Baker Lake and the Arctic coast in the early spring of 1902, noted an occasional wolf.^d On April 30, when the party was near latitude 67°, between Lake Garry and Ogden Bay, Darrell, his companion, encountered a band of 16 large wolves.^e Darrell writes me that of this band 13 were of the ordinary dirty white color, 2 were nearly black, and 1 pied. He states that though these wolves live largely on caribou, they are not very successful in killing these animals unless they can separate one from the herd, and that they always seem to be starving. Though of large size, he does not consider them dangerous, and states that only one instance of the death of a man by wolves was related by the natives, and in that case the victim was a cripple. The band of 16 was the largest pack seen, the animals usually being found singly or in pairs, though occasionally half a dozen were observed together. He claims to have seen tracks, made on a hard surface, which measured 7½ by 8½ inches.

Skins of wolves from the Barren Grounds, some nearly pure white in color throughout, were seen at Fort Rae during my visit to that post. The wolf skins at Fort Good Hope also included a large proportion of very light examples, said to have been brought from the Barren Grounds to the northeastward. Fort Anderson, during the first year of its existence (outfit 1861), traded 5 wolves; during the following year it received 4 skins.

Canis latrans Say. Coyote.

In 1901 we heard several prairie wolves on the Athabaska Landing road, about 60 miles north of Edmonton, on the evening of May 3, and saw one on the bank of the Athabaska a few miles above Little Cascade Rapid on May 13. At Fort Smith I was told by Mr. Brabant that one was occasionally killed in the vicinity, and received the same information from an old Indian hunter residing there. A skull, without the lower jaw, was found near a native cabin on the east bank of the Slave, 8 miles below Fort Smith.

^a Narr. Second Voy. *Prince Albert*, p. 139, 1853.

^b Expl. in Far North, p. 241, 1898.

^c Ann. Rept. Dept. Interior (Canada) for 1900-1901, p. 115, 1902.

^d Sport and Travel in Northland of Canada, p. 110, 1904.

^e *Ibid.*, p. 134, 1904.

In 1903, Merritt Cary was informed by William McLeod that two coyotes were killed near Fort Nelson, on Fort Nelson River, about the year 1898. During my stay at Fort Simpson I received confirmatory information, from several persons who had formerly resided at Fort Nelson, regarding the occurrence of the coyote at that place.

Tyrrell reports shooting a coyote on a small lake near the source of Foster River, about 200 miles southeast of Athabaska Lake, in the summer of 1892.^a

J. Alden Loring reported this species common at Edmonton in September, 1894. In 1895 he found it abundant in the foothills of the Rockies in western Alberta, and shot one at Jasper House on August 30. In July, 1896, he occasionally heard coyotes in the mountains 15 miles south of Henry House, but the animal was less abundant there than in the foothills to the eastward. In the early autumn, while making a trip from Jasper House northward to Smoky River, he heard the animals nearly every night, and took a young one at Strawberry Creek, 14 miles north of Jasper House, on August 23. In October of the same year he saw coyote tracks in Caribou Basin and Rodent Valley, and obtained skulls at Prairie Creek and White-mud to the eastward of Jasper House.

Vulpes alascensis Merriam. Alaska Red Fox.

The foxes of the Mackenzie region to the northward of Great Slave Lake are referred to this form. We obtained a series of skulls, comprising specimens from Fort Resolution, Fort Rae, Fort Simpson, and Fort Norman. In addition, the collection of the National Museum contains skulls from Fort Simpson, Fort Good Hope, Peel River (Fort McPherson), La Pierre House, and Fort Anderson. These agree in characters with a large series from the lower Yukon and the Becharof Lake region, representing typical *V. alascensis*. A fine hunter's skin in full winter pelage from Fort Norman, and another from Fort McPherson, agree in most respects with a large series of skins of typical *alascensis* taken by A. G. Maddren at Becharof Lake, Alaska. The lower Mackenzie specimens have slightly paler faces, thighs, and rumps, and the latter part is more flecked with yellowish white. An indistinct stripe on the front of the thigh, representing an extension of the black area on the feet, is dusky at base of fur, though it is tipped with reddish. The tails of the Mackenzie specimens differ decidedly in shape and color from those of this series of *alascensis*. They are much more heavily haired, especially near the base, and taper thence toward the tip, while in typical *alascensis* they are nearly cylindrical. The subapical zone of color is a grayish red, much less bright than in typical *alascensis*.

^a Ann. Rept. Can. Geol. Surv., VIII (new ser.), p. 13D, 1896.

An imperfect specimen in the National Museum from Fort Simpson, taken many years ago by R. MacDonald, differs from the skins from the lower Mackenzie mainly in the greater amount of black on the feet.

The region about Fort Resolution furnishes a great many fox skins, all the color phases occurring. Owing to the rivalry among the different trading companies a very high price is sometimes paid for an unusually fine 'silver' or 'black' fox. Among the large number of skins seen at Fort Rae, the red and cross phases greatly predominated, but there were a few silver and black skins. During the winter of 1903-4, numbers of foxes, including several 'silvers,' were traded at Forts Providence and Simpson. The red and cross phases are common at Fort Norman, but the dark phases seldom occur, and during the same winter none were traded at that post, while at Arctic Red River five 'silver' foxes were secured.

Ross gives a good general account of the foxes of the Mackenzie River region. The red and black phases are considered by him to represent different species or varieties, of which the cross phase represents hybrids. He states that the numbers of red, cross, and silver foxes traded in the Mackenzie River district during a period of ten years were in the proportion of 6, 7, and 2. He states that the species is most numerous about the large lakes and on the Arctic coast, and is tolerably numerous on the Mackenzie, but is rare up the Liard toward the mountains.^a

MacFarlane in a recent paper expresses opinions in regard to the different phases similar to those of Ross, though these are contrary to the conclusions of the natives, and of most naturalists. He gives many interesting observations regarding the habits of the species in captivity and in a state of nature, and statistics regarding the numbers of the various phases for a series of years, and to some extent for different districts. He states that the several phases were fairly abundant about Fort Anderson, and more so on the lower Anderson and along the Arctic coast between Herschel Island and Cape Bathurst.^b

Fort Anderson during the first year of its existence (outfit 1861) traded 115 skins of red foxes, 120 cross foxes, and 32 silver and black foxes. During the following year the returns were 220 red, 187 cross, and 66 silver and black.

Among the skulls examined, a few from Fort Good Hope and Anderson River, and one taken by us on Slave River, have broader rostrums and heavier teeth than the remainder of the series.

^a Can. Nat. and Geol., VI, p. 18, 1861.

^b Proc. U. S. Nat. Mus., XXVIII, pp. 701-704, 1905.

Vulpes alasensis abietorum Merriam. British Columbia Red Fox.

A series of skulls collected on the Athabaska at Little Buffalo River and Fort McMurray, and on Slave River 10 and 15 miles below the Peace and at Smith Landing, are referable to *V. a. abietorum*, agreeing well with skulls from Stuart Lake, British Columbia, the type locality of this form. Skulls collected by J. Alden Loring in Alberta at Whitemud and Prairie Creek, and at Pierre Grey's camp, 40 miles northeast of Jasper House, are also referable to *abietorum*.

Foxes are rather common in the Athabaska and Slave River valleys. We obtained no skins of adults, but took a young one on the lower Athabaska, May 30, 1903. It was one of a family living among drift timber near the river bank. During the early winter the Peace-Athabaska delta is a favorite trapping ground. The foxes are said to be attracted by the large numbers of wounded ducks and geese which escape during the fall hunt. Upward of 50 black and silver foxes, in addition to large numbers of skins in the red and cross phases, a large proportion taken in the immediate region, have been traded at Fort Chipewyan during a single season.

Early in June, 1901, we found a den in spruce woods on a large island near the head of Rocher River. Well-worn paths leading away in various directions showed where the mother fox made frequent excursions for food, and the numerous remains of rabbits, ducks, and grouse formed an index to the results of her labors. The same den was tenanted when we revisited the spot two years later. While descending Slave River in June, 1903, we found the homes of several families of foxes on the right bank about 100 miles below Fort Smith. The old ones eluded us, but a half-grown young one was secured. The various individuals seen were in the normal and cross phases. Owing to the lack of skins of foxes from this region I am unable to describe in detail the color of the normal or red phase. All imaginable shades of gradation occur, from the red phase through the various shades classed as 'cross' to the 'silver,' with white-tipped hairs, and the pure black, fine specimens of which sometimes bring several hundred dollars a skin.

Vulpes lagopus innuitus Merriam. Continental Arctic Fox.

This species occurs in summer throughout the Barren Grounds and the islands of the Arctic Sea. In winter many of the animals migrate southward in search of food, the extent of this wandering varying greatly with the amount of snow and from other causes. During the winter of 1900-1901, the snowfall being light, they penetrated much farther south than for many years previously. We saw a number of skins which were taken during that winter in the vicinity of Fort Smith, where they had not appeared for several years. They

were secured in numbers also near Fort Resolution and Fort Rae. At the former post about 200 were traded, the greater number probably coming from the eastern part of the lake.

During our summer explorations in the Mackenzie region we penetrated only slightly into the summer home of this animal. Tracks of small foxes were numerous on the sandy shores of MacTavish Bay late in August, 1903, and quantities of discarded winter fur, then of a dirty white color, and the testimony of the natives, proved this to be the species concerned.

At Fort Norman I learned that usually about 100 skins are traded during a season, only the white phase being known there. These skins are taken mainly by the Great Bear Lake Indians. Many white skins are annually traded at Fort Good Hope, but the blue phase is rarely obtained there. White foxes were said to be rather common in the vicinity of the post during the winter of 1901-2. At Fort McPherson a great many are traded annually, mainly from the Eskimo, and in winter the species occurs rather commonly in the immediate vicinity. The blue phase is comparatively rare there, occurring probably in a proportion of less than 1 to 10. Skins in the blue phase seen at that post were of a nearly uniform color throughout—a rather dark plumbeous with a slight brownish tinge.

During Parry's first voyage this animal was found to inhabit all the islands of the Polar Sea which were visited, and was ascertained to remain on Melville Island throughout the year.^a One taken at Winter Harbor, October 29, 1819, is said by Fisher to have been perfectly white.^b The species was observed at Point Turnagain during Franklin's first journey.^c J. C. Ross recorded some taken at Port Bowen in the winter of 1824-25; one in the sooty phase was taken in November.^d He later stated that the species was common at Felix Harbor, and that the average weight of 20 males was 7 pounds 4 ounces.^e Osborn occasionally saw the animals on the northern shores of Prince of Wales Land in the spring of 1851.^f Sutherland mentions one taken on October 17, 1850, at Assistance Bay, Cornwallis Land.^g McCormick records a large male weighing 8 pounds, taken on December 2, 1852, at Beechey Island; tracks were seen on North Devon near Cape Osborn, and one of the animals was observed August 31 near Baring Bay.^h M'Clintock records the

^a Suppl. to Appendix Parry's First Voyage, p. CLXXXVII, 1824.

^b Journal Voyage of Discovery, p. 148, 1821.

^c Narrative Journey to Polar Sea, p. 387, 1823.

^d Parry's Third Voyage, Appendix, pp. 92, 93, 1826.

^e Appendix to Ross's Second Voyage, p. xi, 1835.

^f Arctic Journal, p. 220, 1852.

^g Journal Voyage to Baffin Bay, I, p. 411, 1852.

^h McCormick's Voyages, II, pp. 63, 120, 142, 1884.

animal from Port Kennedy, where three were trapped in December, 1858; others were shot in February and March, 1859, and the species appeared in greater numbers about the last of March.^a

Armstrong mentions that a few were taken in December, 1850, in Prince of Wales Strait, near Princess Royal Islands, during the voyage of the *Investigator*, and that a few others were noted later in the winter.^b Among the stomachs examined some were empty, others contained a few small pieces of dwarf willow, while one was distended with the hair and a portion of the hoof of a caribou.^c A specimen taken near the same place May 15, 1851, had assumed its partially brown summer coat.^d He reports a black fox seen near Prince Albert Cape, Banks Land, in September, 1851, probably an example of this species in the sooty phase.^e Allen records skulls of this animal from Fort Anderson, Fort Good Hope, and Peel River.^f Warburton Pike saw one at Lac du Rocher, north of Great Slave Lake, on September 13, 1889.^g Russell observed a family of Arctic foxes near Warren Point, east of Herschel Island, in the summer of 1894.^h

MacFarlane states that this species was usually common in the Anderson River region, and that a few were traded at various posts in Cumberland and English River districts, Cumberland House having received 5 skins in 1876. Lac du Brochet, Reindeer Lake, obtained 785 skins in 1886, mainly from the inland Eskimo. In 1890 one was traded at Portage La Loche. He states that the species has been trapped on the south shore of Great Slave Lake, and that many years ago one was shot some distance up Peace River.ⁱ

In regard to the occurrence of the blue color phase, I extract the following notes from his account. Very few were obtained at Fort Anderson. Farther inland Ross, up to the year 1861, had known of only two examples being taken, both on the edge of the Barren Grounds near the eastern end of Great Slave Lake, but four were obtained from the same quarter a year or two later. A number were secured also in 1859 and 1862 from the region tributary to Fort Fond du Lac, Athabaska Lake, as well as others during succeeding years. In 1889 Lac du Brochet, Reindeer Lake, obtained seven from the inland Eskimo.^j The number of skins in the white phase obtained

^a Voyage of the *For*, pp. 195, 202, 215, 218, 1860.

^b Narrative Discovery Northwest Passage, p. 292, 1857.

^c *Ibid.*, pp. 303, 304, 1857.

^d *Ibid.*, p. 324, 1857.

^e *Ibid.*, p. 426, 1857.

^f Bull. U. S. Geol. and Geog. Surv. Terr., No. 4, Vol. II, p. 325, 1876.

^g Barren Ground of Northern Canada, p. 37, 1892.

^h Expl. in Far North, p. 143, 1898.

ⁱ Proc. U. S. Nat. Mus., XXVIII, p. 704, 1905.

^j *Ibid.*, pp. 706, 707, 1905.

during the same year is not given, but probably ran into the hundreds.

Fort Anderson, during the first year of its existence (outfit 1861), traded 360 skins of this species, including 10 'blue' foxes. During the following year its returns included 330 skins, of which 10 were in the blue phase.

Hubert Darrell, who accompanied Hanbury through the Barren Grounds in 1901-2, writes me that a number were killed during the early spring of 1902 while the party was traveling northward from Aberdeen Lake to the Arctic coast. He states that they were much smaller than the individuals obtained about Fort Resolution, where he had become familiar with the species during the preceding winter.

Several imperfect skins in the National Museum from the Anderson and Lower Mackenzie rivers show considerable variation in color, ranging from the normal to the sooty phase.

Ursus americanus Pallas. Black bear.

The black bear occurs more or less abundantly throughout the greater part of the region now under review, its range being practically coextensive with the forest.

In 1901 we saw a skull in a grove of Banksian pines a few miles south of Athabaska Landing, and the species was said by the residents to be fairly common in the vicinity. The valley of the Athabaska is a favorite resort, and while descending that river early in May we saw a number on the fire-swept hills overlooking the river. Later in the month the fresh tracks of a small individual were noted near our camp at Point La Brie, near Fort Chipewyan. Numerous skins were seen at Fort Smith, Fort Resolution, and Fort Rae, all representing the black phase. In August, while ascending the Athabaska on our return trip, we saw a number between Fort McMurray and Athabaska Landing, noting 5 in a single day, but the necessity for rapid travel forbade hunting. At this season the bears live largely on the ripening berries of cornel (*Cornus stolonifera*), high-bush cranberry (*Viburnum opulus*), few-flowered viburnum (*Viburnum pauciflorum*), mountain cranberry (*Vitisidæa vitisidæa*), raspberries (*Rubus strigosus*), bearberries (*Arctostaphylos uvaursi*), and blueberries (*Vaccinium canadense*). They also pick up an occasional fish in the eddies.

In the spring of 1903, when we again descended the Athabaska, we noted a few black bears along its banks. We saw tracks also at several points on Slave River between Fort Smith and Great Slave Lake in June. After the division of the party Alfred E. Preble and Merritt Cary observed bears at Hay River and at several points on the upper Mackenzie. While making the traverse between Fort Rae

and Great Bear Lake in August I found them to be fairly common throughout the region. I noted tracks on nearly all the portages, but failed to see any of the animals. In several places their well-worn and characteristic trails were very conspicuous. The animals were feeding largely on blueberries, which were ripening abundantly in the muskegs. Along the southern shores of Great Bear Lake in September we frequently saw their tracks. They were then feeding on the ripe berries of *Vaccinium uliginosum*, *Vitisidæa vitisidæa*, and *Empetrum nigrum*. Several parties of Indians, whose camps were passed near the western end of the lake about the middle of September, had lately killed bears.

When we ascended the Mackenzie in October the bears had mostly hibernated and we saw no recent tracks. About December 1, however, James MacKinlay, while on his way to Great Slave Lake, saw a fresh track near the Head of the Line, 70 miles above Fort Simpson. Three black bears were tracked and killed by Indians near Fort Providence about the same time. They were very thin and had not hibernated. The scarcity of berries during the autumn was given as the cause of the animals not being able to fatten and go into winter quarters as usual.

While descending the Mackenzie in June, 1904, I saw tracks of bears at several points. Near the mouth of the Nahanni the animals apparently were quite common. Just after running the Sans Sault Rapid, 125 miles below Fort Norman, on June 19, we killed a bear. The animal proved to be a female about 3 years old. She had evidently never borne young. The stomach was distended with the shoots of *Equisetum*, on which the animal was browsing when first seen. We ascertained that many skins are traded at Forts Norman and Good Hope, and a few at Fort McPherson. While we were ascending the Athabaska during August, on our homeward trip, a number of bears were seen and several were shot by natives accompanying the transport.

The cinnamon or brown phase of color, though of rather common occurrence in the mountains of Alberta, is rare throughout the greater part of the region east of the mountains. I have never seen a skin of this phase on the Athabaska or Slave rivers, but was told that a 'cinnamon' bear was killed on the lower part of Little Buffalo River, near Fort Resolution, about the middle of June, 1903. The fur traders say that an occasional one is brought to Fort Resolution from the eastern end of Great Slave Lake. At Fort Simpson, also, a brown skin is occasionally traded. This phase was reported to be very rare at Fort Good Hope. Ross, writing on the bears of the Mackenzie River district about the year 1860, states that the brown variety of this species is very rare.^a

^a Can. Nat. and Geol., VII, p. 139, 1862.

While in the Jasper House region in the summers of 1895 and 1896 J. Alden Loring found these animals rather common, and secured several specimens. On one occasion in 1895, near Henry House, a female 'cinnamon' bear and her two cubs were observed in a tall dead tree. One of the cubs was black, while the other resembled the mother in color. The old one was wounded and disappeared, and although the young ones bleated loudly, she was with difficulty enticed near enough to be shot, but was finally secured, together with both the young ones. The stomachs of all were filled with blueberries (*Vaccinium*). Another adult, in the black phase, was killed at Jasper House during the same summer. In 1896, while in the same region, Loring saw many tracks of black bears at various points in the mountains and foothills.

Hood mentions seeing 'brown' bears, probably referring to the cinnamon phase of the black bear, on the Clearwater, during the spring of 1820.^a MacFarlane speaks of seeing several black bears on Lockhart River, a tributary of the Anderson, in the summer of 1857.^b In a later paper he states that the species is not common within the Arctic portion of the [lower] Anderson River region, though fairly abundant on both sides of the valley in the forested country to the southward.^c Ross gives the species as common throughout the Mackenzie River region north to beyond the Arctic Circle.^d J. B. Tyrrell, as the result of observations made in the country to the eastward of Athabaska Lake in the summers of 1892, 1893, and 1894, states that the black bear ranges throughout the wooded country.^e J. W. Tyrrell records it from Wolverine (Chipman) River, a short distance northeast of the eastern extremity of Athabaska Lake, where he observed it in the summer of 1893.^f Russell states that only three bears were killed within 20 miles of Fort Rae during the winter of 1893-94; that they are frequently seen along the Mackenzie, but are reported not to occur in the neighborhood of La Pierre House.^g J. W. Tyrrell mentions black bears as occurring on the east side of Artillery Lake near latitude 63°.^h Hanbury states that they are found on the main Ark-i-linik, or Thelon, River.ⁱ This is the most northeastern record and extends the known distribution of the species in this direction to the extreme limit of trees.

^a Franklin's Narrative Journey to Polar Sea, p. 191, 1823.

^b Canadian Record of Science, IV, p. 32, 1890.

^c Proc. U. S. Nat. Mus., XXVIII, p. 721, 1905.

^d Can. Nat. and Geol., VII, p. 139, 1862.

^e Ann. Rept. Can. Geol. Surv., IX (new ser.), p. 166F, 1898.

^f Across the Sub-Arctics of Canada, p. 73, 1898.

^g Expl. in Far North, p. 246, 1898.

^h Ann. Rept. Dept. Interior (Canada) for 1900-1901, p. 115, 1902.

ⁱ Sport and Travel in Northland of Canada, p. 14, 1904.

Ursus horribilis Ord. Grizzly Bear.

Grizzly bears, probably referable to this species, occur throughout the Rocky Mountain range and its eastern spurs west of the Mackenzie, north to the Arctic coast. Specimens of grizzly bears from this region are very rare in museums, hence it is impossible to speak with assurance regarding the species.

We were informed that grizzlies were often killed in the Nahanni Mountains, and that several had been shot near Fort Liard during recent years. A number of skins are traded annually at Forts Liard and Nelson. At Fort Norman I saw several skins which had been taken in the mountains to the westward. They were of course without skulls, and lacked also claws. They were in general of a nearly uniform dark yellowish-brown, the underfur frequently overlaid with long yellowish hair.

From C. P. Gaudet, of Fort Good Hope, I obtained the claws of a large bear said to have been taken near the mouth of the Mackenzie. The fore claws are long and comparatively straight. An imperfect skin obtained at Arctic Red River is smaller, but has similar claws. It is provisionally referred to this species. The termination of the range west of the Mackenzie Delta, locally called Black Mountain, is inhabited by large grizzlies, which are said to be very savage when they come out of their dens in the spring.

This bear was first recorded from the region by Mackenzie, who during his exploration of Peace River noted the species below the mouth of 'Sinew' River, a southern tributary entering the Peace a short distance east of the mountains.^a Richardson states that the species "inhabits the Rocky Mountains and the plains lying to the eastward of them, as far as latitude 61°," and that Drummond found it common in the wooded country skirting the eastern base of the Rocky Mountains and about the source of the Peace.^b Ross gives this species as "not rare in the mountain ranges" of the Mackenzie River region.^c About the last of June, 1894, Frank Russell killed a grizzly bear in the delta of the Mackenzie. Russell does not describe its color, but states that it weighed about 700 pounds, and that its specific gravity was so great "that it required considerable effort to raise the carcass to the surface."^d The skull, now in the collection of the University of Iowa, has been examined by Dr. C. Hart Merriam and pronounced to be a true grizzly.

In the summer of 1895 J. Alden Loring found grizzly bears to be rather common in the mountains in the Jasper House region, where

^a Voyages to Frozen and Pacific Oceans, p. 160, 1801.

^b Fauna Boreali-Americana, I, pp. 28, 29, 1829. (See Drummond's itinerary, p. 60.)

^c Can. Nat. and Geol., VII, p. 139, 1862.

^d Expl. in Far North, p. 246, 1898.

three were killed by his party. These had been feeding on blueberries (*Vaccinium*). In many places the animals had been digging for roots and spermophiles, or overturning rotten logs in search of insects. In 1896 he found traces of the animals in Rodent Valley, and ascertained the fact of their occurrence in the higher parts of the mountains between Jasper House and Smoky River.

Ursus richardsoni Swainson. Barren Ground Bear.

This famous bear occurs in various parts of the Barren Grounds, but seems to be rare over the greater part of its range and is still very imperfectly known. Though constantly on the lookout for this species while traveling along the south shore of the great lake named for it, I failed to see either bears or their tracks. The Indians, however, informed me that many occur on the large eminence usually called Grizzly Bear Mountain, west of McVicar Bay, and that they are found less frequently about the outlet of the lake. Mr. Peter McCallum, who has spent some years about Great Bear Lake, informed me that the region of the Scented Grass Mountains, locally known as the 'Big Point,' is a favorite locality for the animals. Skins from Great Bear Lake, seen at Fort Norman, were of a nearly uniform dark brown throughout. Others seen at Fort Good Hope, said to be from the Barren Grounds, were similar in color, but in some cases the underfur was overlaid with long yellowish hair.

This species was first reported by Samuel Hearne, who saw the skin of an enormous grizzled bear at the tents of the Eskimo at the Bloody Fall, Coppermine River.^a During Franklin's first northern journey this bear was several times observed, and is mentioned in the narrative from Grizzly Bear Lake, a short distance south of Fort Enterprise;^b from the Coppermine near Fairy Lake River and Bloody Fall; from the mouth of Hood River; and from several points on Bathurst Inlet. On one occasion a female with three cubs was seen.^c In the stomach of one killed on the Arctic coast (near Gordon Bay, Bathurst Inlet) were the remains of a seal, a marmot, some roots of plants, some berries, and grass.^d Richardson recognized this species as distinct from other American bears, but not being certain of its distinctness from *Ursus arctos*, on several occasions treated it under that name. Thomas Simpson observed a Barren Ground bear, accompanied by two cubs, on Barry Island, Bathurst Inlet, on August 3, 1838.^e

During the explorations conducted by J. W. Tyrrell in the region between Great Slave Lake and Hudson Bay in the summer of 1900,

^a Journey to the Northern Ocean, p. 372, 1795.

^b Narrative Journey to Polar Sea, p. 220, 1823.

^c *Ibid.*, pp. 334, 342, 377, 378, 1823.

^d Fauna Boreali-Americana, I, p. 23, 1829.

^e Narrative Discoveries on North Coast of America, p. 281, 1843.

tracks of a large bear, undoubtedly of this species, were seen on two occasions on the Thelon, and one was killed by Fairchild, a member of the party. This specimen, unfortunately, was lost in a canoe accident.^a During the same season, J. M. Bell, while exploring in the Great Bear Lake region, met with this species. He writes me that he saw "grizzly bears, large grayish-brown brutes, quite often along the west and north shore of Great Bear Lake." Hanbury failed to meet with any of these bears during his long journey through the Barren Grounds in 1901-2. On reaching the coast near Ogden Bay, early in May, 1902, he learned from the Eskimo that the animals occur all along the Arctic coast, though not numerously, but that they do not emerge from their winter quarters until June. Proceeding westward, he noted tracks in several places between there and Great Bear Lake, but saw none of the animals. He saw the last fresh tracks on the north shore of Great Bear Lake, near the mouth of Haldane River, late in August.^b MacFarlane in his recent paper on northern mammals refers to a number of instances which occurred in his personal experience, illustrating the ferocity of this species. He met with it on several occasions in various parts of the Anderson River and Franklin Bay region. According to the Indians this bear brings forth one or two cubs every third year. The stomachs of the specimens examined by him were mostly full of various edible roots and one or two contained caribou meat.^c He obtained both skins and skulls of this bear in the Anderson River region, and skulls from Anderson River, Franklin Bay, and the 'Arctic Coast' [probably to the northward of Fort Anderson] have been recorded by Merriam in his recent paper on the American bears.^d

A mounted specimen in the National Museum, taken by MacFarlane on the Barren Grounds to the eastward of Fort Anderson in June, 1864, is dull yellowish brown in color. It resembles closely some specimens of the grizzly bear, but the head is more yellowish.

Thalarectos maritimus (Phipps). Polar Bear.

This species occurs all along the northern coast and on the islands of the Arctic Sea. Sabine recorded it from Melville Island, where, however, it was not common, only two individuals being observed during the time (about a year) that the ships were detained there.^e J. C. Ross reported it from Port Bowen; Batty Bay; Fury Beach; and Boothia Felix.^f In his narrative of the voyage of the *Investigator*

^aAnn. Rept. Dept. Interior (Canada), for 1900-1901, p. 122, 1902.

^bSport and Travel in Northland of Canada, pp. 139, 199, 243, 1904.

^cProc. U. S. Nat. Mus., XXVIII, pp. 718-720, 1905.

^dProc. Biol. Soc. Wash., X, p. 78, 1896.

^eSuppl. to Appendix Parry's First Voyage, p. CLXXXIII, 1824.

^fAppendix to Ross's Second Voyage, p. VII, 1835.

Armstrong records the species from Franklin Bay, where one was seen swimming; ^a from Prince of Wales Strait, where one was seen March 29, 1851; ^b and from near Prince Albert Cape, Banks Land, where it was common August 19, 1851. ^c M'Dougall records it from near Cape Mecham, southern part of Prince Patrick Island, where two were seen in the spring of 1853. ^d Two seen at Camden Bay in the autumn of the same year are recorded by Collinson. ^e Kennedy reported tracks of polar bears as numerous on the northern shore of North Somerset. ^f Sutherland recorded the species from the western coast of North Devon, where several were seen late in May, 1851, passing northward up the channel. ^g He reported it also from Cape Martyr; Assistance Bay; Cape De Haven; and other points on Cornwallis Island. ^h M'Dougall found the animals numerous in the summer of 1853 in Melville Sound between Cape Cockburn and Baker Island. ⁱ McCormick noted one August 10, 1852, at Beechey Island, and saw tracks later in the month on the shore of North Devon near Cape Osborn. ^j Gilder reported three killed by the Eskimo in October, 1879, on King William Land near Terror Bay. ^k

Russell reports the species from Herschel Island, where he obtained skins and skulls, and where the species was said sometimes to gather by scores. He was informed also that a few years since one of the animals penetrated inland as far as Fort McPherson, a very unusual circumstance for this maritime species. ^l J. M. Bell writes me that during his explorations to the northeast of Great Bear Lake in August, 1900, one was seen near Dismal Lake. Hanbury, during his journey along the Arctic coast early in the summer of 1902, did not meet with any polar bears. According to the Eskimo, the animals were scarce near Ogden Bay, but were numerous on Coronation Gulf later in the season. They were stated to be numerous on Lind Island during the winter. ^m Darrell writes me that the natives state that the animals do not come to the coast until the ice breaks up in August. MacFarlane states that during his residence at Fort Anderson he annually received a few skins of this bear from the

^a Narrative Discovery Northwest Passage, p. 202, 1857.

^b Ibid., p. 304, 1857.

^c Ibid., p. 391, 1857.

^d Voyage of the *Resolute* to Arctic Regions, p. 292, 1857.

^e Journal of H. M. S. *Enterprise*, p. 302, 1859.

^f Narrative Second Voy. *Prince Albert*, p. 150, 1853.

^g Journ. Voy. to Baffin Bay, II, p. 88, 1852.

^h Ibid., I, p. 397, II, 138, 141, 127, etc., 1852.

ⁱ Voyage of the *Resolute*, p. 266, 1857.

^j McCormick's Voyages, II, pp. 49, 120, 1884.

^k Schwatka's Search, p. 192, 1881.

^l Expl. in Far North, pp. 244, 245, 1898.

^m Sport and Travel in Northland of Canada, pp. 139, 152, 1904.

Eskimo, and that he sent three specimens, taken on Liverpool Bay and near the mouth of Wilmot Horton River, to Washington.^a

Mephitis hudsonica Richardson. Northern Plains Skunk.

The skunk is rather common in the rolling country between Edmonton and Athabaska Landing, and occurs less abundantly northward to the vicinity of Fort Smith. Of its presence in central Alberta we obtained abundant evidence in 1901. Farther north J. S. Edmonton informed me that three were killed near the mouth of Peace River in 1898, and that he had seen the skins of two which were taken near Fort Smith. Mr. Brabant, of that post, told me that the animal was occasionally killed in the vicinity, and a specimen is included in a collection of skulls since received from there.

During our second trip to the region, in 1903, my brother and Cary saw two skins at Fort Smith, and a live individual on Slave River near the mouth of the Peace. While ascending the Athabaska above Fort McMurray, and while on the road between Athabaska Landing and Edmonton, they often saw tracks. Skins were seen at Athabaska Landing and near Lily Lake.

During my outward trip in the autumn of 1904 I saw the body of a skunk in the possession of some natives on the Athabaska below Grand Rapid, and obtained a hunter's skin from W. E. Whiteley at Sandy Creek, 20 miles south of Athabaska Landing. He reported the animal fairly common there.

A. F. Camsell writes me that two skunks were killed near Fort Simpson in the autumn of 1905. One of these was taken near the Mackenzie about 25 miles above Fort Simpson; the other near Liard River 10 miles from its mouth. The skins of both animals were traded at Fort Simpson.

King records a skunk killed beyond the sixty-first parallel on the route between Athabaska and Great Slave lakes.^b Ross mentions finding the bones and part of the skin of one a short distance from the shores of Great Slave Lake.^c

J. Alden Loring took a specimen at Jasper House, August 25, 1895, but reported the animal as not common. He saw another at Henry House, October 9, 1896. The Jasper House specimen and a skull from Great Slave Lake have been recorded by Howell.^d

MacFarlane gives data showing that this animal is fairly abundant in the Lesser Slave Lake and Isle à la Crosse regions. In 1889 Lesser Slave Lake sent out 62 skins; Sturgeon Lake, 3; Trout Lake, 2; Whitefish Lake, 20; and Portage la Loche, 11. English River

^a Proc. U. S. Nat. Mus., XXVIII, p. 723, 1905.

^b Narrative of Journey to Arctic Ocean, II, p. 127, 1836.

^c Can. Nat. and Geol., VII, p. 139, 1862.

^d N. A. Fauna, No. 20, p. 25, 1901.

district, comprising the posts in the Isle à la Crosse region, sent out 461 skins in 1889, and 207 in 1890, mostly from Isle à la Crosse and Green Lake. He also mentions obtaining specimens at Fort Chipewyan.^a

Lutra canadensis (Schreber). Canadian Otter.

The otter occurs throughout the wooded portion of the region, but is rare over most of this area. Skins were seen at all the posts visited, but although an occasional track was noted none of the animals were observed during our trips except in the region between Fort Rae and Great Bear Lake. While making this traverse in August, 1903, otters, sometimes in pairs, were observed on several of the lakes, and 'otter sign' indicated that the animals were fairly common along the rapids of most of the streams. On the lakes north of Lake Hardisty several were pursued, but we failed to secure specimens, with the exception of a skull picked up at a rapid near MacTavish Bay. When pursued they swam altogether beneath the surface, rising at intervals of a minute or two to breathe and reconnoiter. On first reaching the surface the animal raises its head about a foot above the water to survey the situation. After remaining a few seconds in this position it sinks until only the head remains in sight while it regains its breath, remaining quiescent for some seconds. It then dives again, especially if hard pressed, and swims for a distance of 200 yards or more before reappearing, usually in an unexpected direction. If the animal is wounded, it raises only the nose above the surface, and in this position usually escapes detection if there be ever so slight a ripple on the water.

While ascending the Athabaska in August, 1903, Merritt Cary saw otter tracks near Brulé Rapid. Reports from the Liard indicate that a fair number are annually traded at Forts Nelson and Liard, and a few are received also at Fort Simpson. On the lower Mackenzie the animal is rare, only one or two being annually traded at Fort Good Hope. Fort Anderson also received comparatively few skins during the five years of its existence. In 1861 five were traded, and in 1862, three.

At the time of Franklin's second northern journey these animals were rather common about Fort Franklin and did considerable damage to fish nets; on one occasion six were seen in one day.^b Richardson states that the otter inhabits the Mackenzie and other rivers nearly to the Arctic Sea.^c J. B. Tyrrell states that in the region to the eastward of Athabaska Lake the otter occurs on all the streams

^a Proc. U. S. Nat. Mus., XXVIII, pp. 714, 715, 1905.

^b Narrative Second Expedition to Polar Sea, p. 72, 1828.

^c Fauna Boreali-Americana, I, p. 58, 1829.

throughout the wooded country.^a Russell recorded it from Fort Rae, and was told that the animal was comparatively common near Fort Nelson, on a southern tributary of the Liard.^b MacFarlane records an otter seen on Lockhart River in the summer of 1857.^c In a later paper he states that the animal was not common on the lower Anderson, and that the young number from three to five.^d

Taxidea taxus (Schreber). Badger.

Concerning this species Richardson says: "The *Meles Labradoria* frequents the sandy plains or prairies which skirt the Rocky Mountains as far north as the banks of the Peace River, and sources of the River of the Mountains, in latitude 58°."^e Thomas Simpson, on January 28, 1837, saw a recently killed specimen in the possession of an Indian on the Athabaska below the mouth of the Clearwater.^f I find no late records of its occurrence north of the Saskatchewan region, but as the animal is rapidly being extirpated throughout its range, it is not unlikely that it formerly extended farther north. MacFarlane states that in 1889 Isle à la Crosse and Green Lake each traded one badger skin.^g

Lutreola vison energumenos (Bangs). Western Mink.

The mink is rather common throughout the wooded portion of the region now under review. During the season of 1901 we frequently saw tracks along the muddy margins of the rivers, but failed to see any of the animals. Skulls were obtained at the following localities: Athabaska River (near Brulé and Boiler rapids); Slave River (at points 10 and 15 miles below Peace River, and 30 and 100 miles below Fort Smith); Fort Resolution; and Fort Rae.

During our trip northward to Great Slave Lake in 1903 we made few observations on this species, though we obtained a few skulls at trappers' cabins along the route, and occasionally noted tracks on the river banks. In the region between Fort Rae and Great Bear Lake I found the mink rather common. Along the lower part of the rapid stream which we descended to MacTavish Bay it was especially abundant, and a number were observed and two adult males secured. One of these I trapped in an unusual manner. While making a portage to avoid a rapid I caught several large lake trout in the eddy at its foot. These I tossed among the boulders on the shore as fast as I secured them. On gathering the fish I missed one,

^a Ann. Rept. Can. Geol. Surv., IX (new ser.), p. 166F, 1898.

^b Expl. in Far North, p. 239, 1898.

^c Canadian Record of Science, IV, p. 32, 1890.

^d Proc. U. S. Nat. Mus., XXVIII, p. 716, 1905.

^e Fauna Boreali-Americana, I, p. 38, 1829.

^f Narrative Discoveries on North Coast of America, p. 64, 1843.

^g Proc. U. S. Nat. Mus., XXVIII, p. 715, 1905.

and after a short search found it partially hidden beneath a boulder, where it had been dragged by a mink which was still engaged with it. I set a small steel trap, and while holding it by the chain with one hand I seized the fish by the tail and gently led the mink into the trap.

I saw no minks about Fort Franklin, where the species was said by the Indians to be rare. While ascending the Mackenzie to Fort Simpson in October I frequently noted tracks, and on one occasion saw a mink on the river bank. I found it to be rather common about Fort Simpson, where numbers are annually traded. Many are obtained also at Forts Norman and Good Hope.

Skins and skulls from this region are not essentially different from specimens of *L. energumenos* from southern British Columbia, and it seems best to refer the interior mink to this form. A skull in the National Museum from Fort Good Hope has the broad rostrum of *Lutreola ingens* of Alaska, and it is probable that the mink of the lower Mackenzie is referable to this form.

During his exploring trip to the Anderson River region in the summer of 1857 MacFarlane noted the mink on Lockhart River.^a In a recent paper he states that it occurs along the Anderson and other Arctic rivers to the coast. The usual number of young are said by him to be five or six, though as many as twelve had been reported.^b Russell states that the mink is rare at the mouth of the Mackenzie.^c

While in the Jasper House region in 1895 and 1896 J. Alden Loring found the mink to be common throughout most of that section, and obtained skulls from 40 miles northeast of Jasper House, Whitemud, and Moose Creek.

***Putorius cicognanii* (Bonaparte).** Bonaparte Weasel.

This weasel occurs in the mountains of Alberta, and in all probability northward to the region of the upper Peace River, or beyond. A young weasel taken by J. Alden Loring in the mountains 15 miles south of Henry House, July 21, 1896, is referable to this species. Another weasel was seen in Rodent Valley, 25 miles west of Henry House, in October of the same year. Two specimens in winter pelage from St. Albert, Alberta, are intermediate between *P. richardsoni* and *cicognanii*, and some of our Athabaska River specimens, though referred to *P. richardsoni*, also show a tendency in the direction of *cicognanii*. A female weasel from near Fort Providence also approaches so closely to *cicognanii* in characters as to suggest that *P. richardsoni* and *cicognanii* must intergrade from about that point

^a Canadian Record of Science, IV, p. 32, 1890.

^b Proc. U. S. Nat. Mus., XXVIII, p. 714, 1905.

^c Expl. in Far North, p. 238, 1898.

southward. Farther east, however, on the lower Athabaska and Slave rivers, *richardsoni* does not show this tendency.

Putorius cicognanii richardsoni (Bonaparte). Richardson Weasel.

This is the common weasel throughout the wooded portion of the region, with the exception of the upper part of the Hudsonian zone, which is occupied by *P. arcticus*. Our collection includes skins and skulls from points on the Athabaska near Crooked Rapid and 60 miles above Grand Rapid; from Fort Chipewyan; Fort Smith; Fort Resolution; near Fort Providence; Fort Simpson; and Fort Franklin; and odd skulls from various points on the Athabaska and Slave rivers. Fort Rae and Big Island, Great Slave Lake, are represented by specimens taken many years ago and now in the National Museum.

In 1901, during our northward trip, we occasionally secured a specimen along the route to Great Slave Lake, and while returning, collected two on the Athabaska above Crooked Rapid, and one 60 miles above Grand Rapid.

Early in July, 1903, I collected an adult female and several young ones at Fort Resolution. During my trip northward from Fort Rae in August I failed to detect weasels, though the species undoubtedly ranges throughout the region. During September, while traveling along the southern shore of Great Bear Lake, I saw tracks on the sandy beaches on several occasions. At Fort Franklin, the type locality of *P. richardsoni*, I made special efforts to secure weasels, and was rewarded by the capture of two adult males. The first one was trapped in spruce woods on September 19. It was in nearly complete winter pelage, retaining on the back only a few of the brown hairs of the summer pelage. During the night of September 20, while encamped at the same place, I several times heard something moving about the tent. In the morning I found that a rabbit which had been left on the ground had been eaten about the back of the neck. My Indian canoeman at once declared that it was the work of a weasel. A close examination showed that pieces of refuse meat had been dragged away along a narrow path, evidently the runway of some small mammal, and a trap set here secured an adult male weasel during the day. The animal had just commenced to turn white on the tail, sides, legs, and feet. Though we trapped carefully during the remainder of our stay no others were secured.

While ascending the Mackenzie in October I frequently saw weasel tracks in the freshly fallen snow. At Fort Simpson tracks were occasionally seen, and I obtained three specimens during the late autumn, trapping them about the post buildings. A male taken on October 29 still retained on the back a few dark hairs of the summer pelage, and the tail still showed a considerable amount of brown. The habit

of entering storehouses, especially in winter, is common throughout the north and is referred to by Richardson.^a When they take up their abode in such situations the animals are ruthlessly destroyed by the inhabitants, unmindful of the fact that they prey on mice, which form such a pest in the trading stores and which are doubtless the chief attraction of the weasels, though of course they help themselves to meat and fish. In winter they feed also on the bodies of rabbits which they find in the snares.

The winter pelage, with the exception of the black terminal portion of the tail, is white, usually tinged with sulphur yellow posteriorly. In perfect specimens the black occupies about two-fifths of the entire length of the tail. A winter skin from Fort Rae is strongly suffused with orange-yellow throughout, except on the head and nape. This color is deepest on the flanks, and is palest, nearly sulphur yellow, on the sides of the neck.

Mustela richardsoni^b was based on Richardson's Fort Franklin specimen of *Mustela erminea*,^c of which he gives measurements, and on the assumption that the species about Fort Franklin would prove to be identical with that inhabiting the Mackenzie, the name *richardsoni* has been generally used for this animal. Fortunately this assumption proves to have been well founded, the Mackenzie specimens differing from topotypes from Fort Franklin only in slightly smaller size. The measurements of various adult specimens follow: Two males from Fort Franklin measure, respectively: Total length 340, tail vertebræ 111, hind foot 48; and 340, 102, 48; a male from Fort Simpson measures 325, 91, 43; a male from Fort Smith, 320, 96, 45; a male from Fort Chipewyan, 340, 110, 47; a male from near Crooked Rapid, Athabaska River, 350, 107, 43. Females are considerably smaller. One from Fort Resolution measured 282, 85, 34. *Putorius arcticus imperii*,^d recently described by Barrett-Hamilton from a specimen received from B. R. Ross, and said to have been collected at Fort Simpson, 'British Columbia', undoubtedly came from Fort Simpson on the Mackenzie, where Ross collected extensively, and the name is consequently a synonym of *P. richardsoni*.

Putorius arcticus Merriam. Tundra Weasel.

This large weasel occupies portions of the upper part of the Hudsonian zone and the Barren Grounds. It differs from *P. richardsoni* in having darker colored under parts; the white of the toes extends much farther up on the feet, and there are other minor differences of coloration; it has a much broader skull. I met with this weasel only

^a Fauna Boreali-Americana, I, p. 46, 1829.

^b Bonaparte, Charlesworth's Mag. Nat. Hist., II (new ser.), p. 38, 1838.

^c Fauna Boreali-Americana, I, p. 47, 1829.

^d Ann. and Mag. Nat. Hist., ser. 7, XIII, p. 392, 1904.

at Fort Good Hope, in June, 1904, where a family of young occupied the meat cellar of the Hudson's Bay Company establishment. They resented any intrusion into their adopted home, and their excited and angry scoldings greeted me from behind the log walls whenever I descended into the cellar. Three specimens were secured here, but they proved to be young ones.

Merriam, in his description of *P. arcticus*, recorded specimens from Anderson River, Franklin Bay, and old Fort Good Hope.^a In addition to specimens from these points, the collection of the National Museum contains skins from the following localities: La Pierre House, Fort McPherson, Fort Anderson, and Barren Grounds near Horton River. In notes accompanying a male taken by MacFarlane at Fort Anderson, June 5, 1864, the extreme length (probably measured to tip of tail pencil) is given as nearly 12 inches; another taken at the same place June 15, 1864, measured $13\frac{7}{8}$ inches (353 mm.) in extreme length.

J. C. Ross recorded *Mustela erminea* from Victoria Harbor, where it was not numerous.^b Armstrong records two weasels, probably of this species, which were killed at Mercy Bay, Banks Land, in July, 1852.^c M'Clintock recorded the 'ermine' from Port Kennedy, where one was taken on October 2, 1858. Its extreme length was 13 inches. Another, in the summer coat, was taken on July 2, 1859.^d Hubert Darrell writes me that he saw weasels on the Barren Grounds near the source of Great Fish River in December, 1900, and thinks that they are found in small numbers along the coast between the Coppermine and Bathurst Inlet.

Putorius longicauda (Bonaparte). Long-tailed Weasel.

This plains species apparently does not extend north of the Saskatchewan basin. Three specimens from Edmonton, Alberta, taken, respectively, on September 10, 11, and 14, 1894, by J. Alden Loring, are in the Biological Survey collection. They were taken in a single trap, which was set in a rabbit runway in a brushy tract. Another, a male, taken at St. Albert, Alberta, November 1, 1895, is assuming the winter pelage, which is complete except along the center of the back. These specimens are typical, not differing appreciably from a series taken by Loring at Wingard, near Carlton House, Saskatchewan, the type locality of the species.

Three males from Edmonton and St. Albert average: Total length 441, tail vertebræ 160.6, hind foot 50.6; the female from Edmonton measured 387, 145, 45.

^a N. A. Fauna, No. 11, p. 15, 1896.

^b Appendix to Ross's Second Voyage, p. x, 1835.

^c Narrative Discovery Northwest Passage, p. 537, 1857.

^d Voyage of the *Fox*, pp. 185, 292, 1860.

Putorius rixosus Bangs. Least Weasel.

This diminutive weasel is found probably throughout the wooded portion of the region. Since its slender body enables this species to enter the burrows of the small rodents with ease, it must constitute one of their worst enemies.

We first took this interesting species at Fort Smith, trapping an immature but full-grown male on June 21, 1901. It was taken in a mouse trap set in a runway of *Microtus xanthognathus*.

This specimen measured: Total length 195; tail vertebræ 38; hind foot 22. Another specimen, an adult male, was taken by Alfred E. Preble at Fort Resolution on July 13. It was trapped in a *Microtus* runway in a garden near the post, and measured 190, 38, 23. It is in a lighter, more worn pelage than the younger specimen.

During my trip in 1903 I took no specimens of this species, but diminutive weasel tracks seen at a number of points on the Mackenzie between Fort Norman and Fort Simpson in October were stated to belong to this species by my Indian canoeman, who seemed familiar with the animal. At Fort Simpson also I saw tracks so small that they could have been made by no other species. The animals had burrowed into the snow, and the tiny holes thus made also pointed to this slender species as the probable author. Few of the white residents in the north know of such an animal, and I never saw a skin at any of the trading posts. Probably its small size and the fact that the tail lacks the black tip, making it of little value as 'ermine,' prevent the natives from taking the trouble to preserve skins.

A skin from Fort Resolution, probably the one recorded by Coues under the name *Putorius vulgaris*,^a is now in the National Museum.

Mustela americana actiosa Osgood. Alaska Marten.

The marten is rather common throughout the forest belt of the Athabaska and Mackenzie regions. It varies greatly in color, being more or less subject to melanism throughout this area. The 'dark' martens are more highly prized than the lighter ones, and bring a higher price, sometimes as much as four or five times the value of ordinary skins. Independent of this individual variation, which may occur anywhere within the range of the animal, but which is more frequent in some districts than in others, marten skins average darker in southern than in northern portions of the region. Thus average skins from the lower Mackenzie are much paler than those from the Athabaska, Slave, and Liard rivers, and consequently bring a lower price. Sufficient material from the lower Mackenzie and the Great Bear Lake region has been examined to show fairly well the range of color in that region. Material from Alberta and southern Mac-

^a Fur Bearing Animals, p. 104, 1877.

kenzie, however, is too scanty to allow of an intelligent discussion of the variation in color in that section.

During the season of 1901, though we occasionally saw tracks of martens along the Athabaska and Slave rivers, we took no specimens, with the exception of a series of skulls obtained mainly about trappers' cabins. On my later trip, however, I obtained a few. Early in September, 1903, while encamped on the south shore of Great Bear Lake near Leith Point, two were trapped at the body of a moose killed a day or two before. Another was taken later in the month near the site of Fort Franklin, and about the middle of November another was trapped by James MacKinlay about 50 miles south of Fort Simpson. These specimens are males and in different conditions of pelage and color, and will be referred to in detail beyond.

Martens are common along the Athabaska, Slave, and Peace rivers, and large numbers are traded at all the posts on their banks. Skins taken in these valleys average rather dark in color and furnish a good grade of fur. The valley of the Athabaska below Grand Rapid is said to be especially good trapping ground. The number annually taken by each trapper varies from a few to a hundred or more. James MacKinlay informed me that three hunters working in the Caribou Mountains, southwest of Great Slave Lake, trapped in one season nearly 500 martens, an unusually large catch. The lower Liard River region and the Horn Mountains also are good trapping grounds. Upward of 3,000 skins are said to be usually traded at Fort Norman. Fort Good Hope also receives a large number, and as many as 6,000 have been collected at Fort McPherson during an unusually good season. In the Great Bear Lake region the animals are said to be fairly common on the south and west shores of the lake, and the mountainous peninsula separating Smith and Keith bays and mainly covered by the Scented Grass Hills is a favorite trapping ground of the Hare Indians, and yields a good supply of martens. Comparatively few (300 in 1861, 350 in 1862) were traded at Fort Anderson during the few years of its existence, the region tributary to it comprising too much sparsely wooded country to constitute a favorable habitat. The Mackenzie, however, carries to its mouth a luxuriant forest growth, and martens occur there in abundance, as before intimated. Martens vary greatly in abundance in the same locality in different years, and to some extent this increase and decrease is periodic. The winter of 1903-4 was marked by a great scarcity of martens over much of the upper Mackenzie Valley, though in other sections the catch was about normal. They were scarce about Fort Simpson in 1906 and 1907.

An adult male taken near Leith Point, Great Bear Lake, September 7, 1903, apparently is in the process of changing from the summer to the winter pelage. The head is grizzled brown and gray; the ears

are similar, bordered and lined with creamy white; the chin and cheeks are grayish brown. An area along the middle of the back is dark brown, the fur there being rather short and apparently worn. Beneath this a fine yellowish-brown fur is visible, evidently the winter coat coming in. This last prevails on the sides and is there interspersed with longer brown-tipped hairs. The lower parts are dark yellowish brown, the throat patch bright orange, the feet and legs dusky brown. The tail is dark brown with a few yellowish hairs intermixed. A younger animal, evidently a young one of the year, taken near Leith Point on the same date, is colored beneath and on the legs as in the adult, but the fur is shorter and has the appearance of immaturity. The back is covered with short, stiff, dusky hair underlaid with yellowish-brown fur, evidently the winter fur coming in. This is most conspicuous on the sides. The face and chin are dusky brown, slightly lighter on the cheeks than elsewhere; ears dusky brown, bordered with yellowish white. The tail is dark brown mixed with yellowish brown, with the hair much shorter than in the adult. A male, fully grown and at least in its second year, taken at Fort Franklin, September 23, 1903, is in nearly complete winter pelage. The fur is soft and about an inch in length, but is evidently not fully grown. It is yellowish brown above, flecked with longer brownish hairs, which are most numerous on the back. The head, chin, and cheeks are grayish drab, darkening on the nose; outside of ears concolor with the head and bordered with creamy white. The legs, feet, and tail are dusky brown, the latter darker at tip. Color beneath slightly darker than on back and sides; throat yellowish brown, but the throat patch practically wanting.

A series of skins in the National Museum, taken at Fort McPherson by Robert Kennicott, shows considerable variation in color, but in general the skins agree with the Fort Franklin specimen just described. Some of them are accompanied by skulls, which form a part of a large series from that place. This series agrees exactly with the type series of *M. a. actuosa* from Fort Yukon, Alaska.

Through the kindness of D. G. Elliot, of the Field Columbian Museum, Chicago, I have been enabled to compare the type and two topotypes of *Mustela borvia*, recently described by him from the lower Mackenzie, with my specimens, and with the large series from Fort McPherson and Fort Yukon. The specimens of *M. borvia* vary slightly in color among themselves, but in general are a dark umber brown. While they are darker than the ordinary type of color in this region, they agree precisely with several picked winter skins now in my possession which were taken near Fort McPherson. They represent the dark phase of color which this animal exhibits throughout its range. The type of *M. borvia* is closely matched in color also by a specimen in the Biological Survey collection taken near Fort

Simpson, November 15, 1903. In the latter the tinge of the underfur of the back is a trifle more ochraceous than in the type of *M. boria*; the hind feet and legs agree precisely; the fore feet and legs are less black; the general color beneath differs only in being slightly more ochraceous than the type, but agrees exactly with a topotype (No. 13487). On the head and face the Fort Simpson specimen and the type of *M. boria* agree precisely; the throat patch is less extensive in the former but agrees in color. A young animal taken near Fort Simpson early in the summer of 1904, and examined late in July, was of a nearly uniform umber brown throughout. It was then about half grown and had become quite tame. It was very playful, but was inclined to use its teeth, which were too sharp for comfort.

The average measurements of a number of skulls from various localities follow. These were taken from specimens which had attained full size. They were mainly old, were selected on account of their large size, and probably are all males. Five from the Jasper House region average: Basal length (measured from inferior lip of foramen magnum to posterior base of middle incisors) 76; zygomatic breadth 48; breadth across postorbital processes 22.6. Five from the Athabaska below Grand Rapid average: Basal length 79; zygomatic breadth 49.6; postorbital breadth 23.8. Five from Slave River average: 78.8, 46.4, 23.2; five from Fort Rae, 77, 48, 23.6; five from Fort McPherson, 80, 48.2, 23.2; an adult from Fort Simpson measures 79, 50, 23; the skull of the Fort Franklin specimen measures 75, 45, 21; the adult male from near Leith Point, Great Bear Lake, measures 69, 44, 22; the immature male measures 68, 40, 20. These latter specimens, in conjunction with their small size, have very small teeth and may represent a dwarfed race occupying the extreme edge of the timbered belt.

The flesh measurements of a number of specimens are as follows: An adult male from Fort Simpson, total length 585, tail vertebræ 188, hind foot 90; the male from Fort Franklin, 615, 180, 100; the adult male from near Leith Point, 570, 160, 90; the immature male from same place, 545, 150, 85.

A male taken by J. Alden Loring near Henry House, Alberta, September 26, 1895, agrees almost precisely in color with the specimen from Fort Franklin, described above, with the exception of the feet and legs, which are a much lighter brown. It measured: Total length 589, tail vertebræ 155, hind foot (measured dry) 82. It is referred only provisionally to *M. a. actuosa*. Cranially it agrees essentially with this form and differs widely in characters from the *Mustela caurina* type, to which the animal occupying the Rocky Mountains to the southward belongs.

A skin of an almost perfect albino was sent to the National Museum from Fort Chipewyan some years ago by MacFarlane. The head and neck are pure white; general color of rest of fur white, tinged

with very light fawn, slightly darker on the median line of the back and on the tail.

Ross published a general account of the martens of the Mackenzie River region, describing in some detail their variation, distribution, and general habits within this area.^a Coues recorded specimens from Peel River (Fort McPherson) and Fort Good Hope. The detailed flesh measurements of a series of 17 males and 7 females taken by Kennicott at the former place are given by him in tabular form. The standard measurements, reduced to millimeters, average as follows: Males, total length 643; tail vertebræ 197; hind foot 105; the extremes are 661, 198, 112, and 612, 180, 102. The females average 579, 173, 94; the extremes are 603, 184, 95, and 558, 165, 90.^b Warburton Pike saw tracks of martens to the northward of Fond du Lac, Great Slave Lake, in 1889.^c During his trip to western Alberta in 1895 and 1896, J. Alden Loring reported martens common throughout most of the region, and frequently saw tracks in the freshly fallen snow. He obtained one specimen, already described.

MacFarlane states that comparatively few skins were obtained from the country north of Fort Anderson, though martens were fairly abundant some years in the forest region to the southward. The Indians attribute their periodical fluctuation in numbers partly to migration.^d

***Mustela pennanti* Erxleben. Fisher.**

The fisher is found throughout the region north to Great Slave Lake and Liard River. It seems to be nowhere abundant, and becomes rare toward the northern limits of its range. Along the Athabaska and Slave rivers a limited number of skins are collected at all the posts north to Fort Resolution, and I was informed that the animal was rather common in the region about the mouth of Peace River. In the Liard River region I was informed that numbers of skins are traded at Fort Nelson, and a few at Fort Liard, annually. A. F. Camsell writes me that the skins of two which were killed near Fort Simpson were traded at that post in the winter of 1906-7. One of these was taken 10 miles southeast of the post; the exact locality of the other was not ascertained.

Ross mentions a fisher killed in the delta of Slave River, near Fort Resolution, which weighed 18 pounds.^e Regarding the northern range of the fisher, Russell says:

They extend northward as far as the Great Slave Lake, but are not found between Athabasca and the Great Slave Lake except along the Slave River.

^a Can. Nat. and Geol., VI, p. 25, 1861.

^b Fur Bearing Animals, pp. 88, 90, 1877.

^c Barren Ground of Northern Canada, p. 123, 1892.

^d Proc. U. S. Nat. Mus., XXVIII, pp. 711, 712, 1905.

^e Can. Nat. and Geol., VI, p. 24, 1861.

They have been seen just north of the Mackenzie at Providence. A trader who has spent twenty years in the North assured me that he had seen but one fisher in the Mackenzie District and that one was taken at Lake Bischo in 1881.^a

MacFarlane presents figures showing that the fisher is fairly numerous in the Isle à la Crosse and Lesser Slave Lake regions, though rarer to the northward. The northernmost post mentioned by him as trading skins is Fort Simpson, which received, in 1889, 6 skins which were trapped at some distance to the southward.^b

Gulo luscus (Linn.). Hudson Bay Wolverine.

This powerful animal occurs throughout the region now under review north to the Arctic islands, but is nowhere common, though a few skins are collected at all the posts we visited. During our trip in 1901 more skins were seen at Fort Rae than at any other post, and these had been brought mainly from the Barren Grounds, where the animal occurs more commonly than in the wooded country. These skins varied greatly in color. The back was usually nearly black, but in some cases the entire upper parts were overlaid with yellowish white. Most of them had a broad light band on either side, generally meeting on the rump, and often isolating an oval dorsal patch of blackish brown or black. The face, and sometimes the throat, was in most cases yellowish white.

During the season of 1903, though tracks were seen occasionally, I observed the animal only in the country between Fort Rae and Great Bear Lake. A large one was seen on an island in Lake Mazenod, near the height of land, on August 6. On August 17, as we were paddling among the numerous islands on Lake Hardisty, a wolverene was seen to run over an exposed ledge of rock into the scattering forest. We found the animal after a short search, and as it stood upright to reconnoiter, killed it with a rifle shot. It proved to be an old female, and evidently had a litter of young in the vicinity. In the semibarren country along the southern shore of Great Bear Lake, tracks of wolverenes were common, especially near Leith Point. Here certain passes between small lakes were well marked with trails made by various animals, among which this marauder was conspicuously represented by its characteristic footprints.

During my trip down the Mackenzie in 1904 I saw a few skins at Fort Norman and Fort Good Hope, and obtained a hunter's skin at the latter place.

A large proportion of the wolverene skins which are obtained from the Indians of the Mackenzie are shipped to Fort McPherson and

^a Expl. in Far North, p. 239, 1898.

^b Proc. U. S. Nat. Mus., XXVIII, p. 709, 1905.

traded to the Eskimo, who prize this fur highly for trimming their clothing. The supply never seems to equal the demand. The Eskimo craze for this fur is well illustrated by an incident in which my party figured. While ascending Peel River on June 30, on our way to Fort McPherson, we passed a party of Eskimo, who ascertained by inquiry that we were the bearers of a small package of wolverene skins, consigned to the Hudson's Bay trader at Fort McPherson. The party immediately broke camp and started for the post in their whaleboat. Fearing that we should arrive before them they proposed that we embark in their boat and tow our canoe. We declined their close company, however, and the wind having died down, they were unable to keep pace with our light canoe and were speedily left behind. Ten miles below the post we passed another Eskimo family, also eager for wolverene fur. The man immediately launched his kayak and by great exertion kept with us until we reached Fort McPherson. Here he lost no time in trading for the skins, so that when the larger party reached the post a few hours later, the fur was beyond their reach, to their deep chagrin. A large party will sometimes remain for weeks near a post if there is a prospect of obtaining their favorite fur.

In the National Museum are skulls from Great Slave Lake, Fort Simpson, Fort Anderson, and Peel River (Fort McPherson). Some of these, as well as specimens from Liard River, have been already recorded by different writers.

An imperfect skull was picked up on Melville Island during Parry's first voyage; ^a J. C. Ross recorded this animal as numerous at Victoria Harbor, and states that tracks were seen and skins obtained at Felix Harbor, in the same region. ^b King noted the animal at Portage La Loche (Methye Portage), in the summer of 1833. ^c Warburton Pike found it common in the country between the eastern part of Great Slave Lake and the source of the Coppermine in the autumn of 1899; ^d Russell observed it at the Mackenzie delta in the summer of 1894. ^e Tyrrell noted the occurrence of this species on the east side of Artillery Lake in the summer of 1900. ^f Hanbury mentions shooting a female which was swimming across Dease River, on the upper part of its course, in August, 1902. She bore in her mouth a ground squirrel. ^g Darrell, who accompanied Hanbury, writes me

^a Suppl. to Appendix Parry's First Voyage, p. CLXXXIV, 1824.

^b Appendix to Ross's Second Voyage, p. ix, 1835.

^c Narrative Journey to Arctic Ocean, I, p. 91, 1836.

^d Barren Ground of Northern Canada, p. 35 et seq., 1892.

^e Expl. in Far North, p. 139, 1898.

^f Ann. Rept. Dept. Interior (Canada) for 1900-1901, p. 115, 1902.

^g Sport and Travel in Northland of Canada, p. 232, 1904.

that the animal was met with throughout their trip through the Barren Grounds.

In 1896 J. Alden Loring obtained a skull in the mountains 15 miles south of Henry House, and reported it rather common among the mountains between Jasper House and Smoky River in the early autumn.

Odobænus obesus (Illiger). Pacific Walrus.

MacFarlane states that the walrus was formerly numerous between Point Barrow and Cape Bathurst. On several occasions during his trips to Franklin Bay in 1862 to 1865, he observed a few on the ice pack. The Anderson River Eskimo frequently brought to Fort Anderson articles made from walrus ivory, and the covering of their boats was usually made from its hide.^a

During later years the species, of course, has greatly decreased in numbers, but I have no data regarding its present range or comparative numbers.

Obobænus rosmarus (Linn.). Atlantic Walrus.

Walruses, probably referable to the Atlantic form, have been recorded from a number of points as far west as Wellington Channel and the western extremity of Barrow Strait. J. C. Ross states that the animal was occasionally seen in the northern part of Prince Regent Inlet.^b Sutherland states that about a dozen were seen on September 11, 1850, between Griffith Island and Cornwallis Island.^c He records also that some were seen by Goodsir in the spring of 1851 near the north shore of Cornwallis Island; others were seen by Captain Penny May 17, 1851, near Cape Surprise; in June, 1851, near Point Decision; and in Queen Victoria Channel north of Baring Island.^d

Phoca vitulina. Linn. Harbor Seal.

Parry records that one was killed by the crew of the *Griper* off Melville Island on August 9, 1820; ^e Armstrong records one killed on July 23, 1852, at Mercy Bay, Banks Land, during the voyage of the *Investigator*; ^f Sutherland records one shot March 8, 1851, near the southern extremity of Cornwallis Island.^g Capt. J. W. Mills informs me that he has seen articles of clothing, made from the skins of this species, in the possession of Eskimo at Fort McPherson. Though

^a Proc. U. S. Nat. Mus., XXVIII, p. 725, 1905.

^b Appendix to Ross's Second Voyage, p. XXI, 1835.

^c Journ. Voyage to Baffin Bay, I, p. 106, 1852.

^d *Ibid.*, II, pp. 106, 133, 150, 176, 1852.

^e Journal Parry's First Voyage, p. 239, 1821.

^f Narrative Discovery Northwest Passage, p. 538, 1857.

^g Journ. Voyage to Baffin Bay, I, p. 504, 1852.

many references to 'seals' are found in the narratives of various expeditions, the particular species is seldom indicated.

***Phoca hispida* Schreber. Rough Seal.**

Referring to this species Richardson says: "They form * * * the chief dependence of the Esquimaux that frequent the mouth of the Coppermine River in the months of March, April, May, and June."^a J. C. Ross reports this species from Port Bowen;^b and as occurring on both sides of the Isthmus of Boothia.^c The common seal mentioned by Hanbury as observed on Melville Sound, Arctic coast, early in June, 1902, is probably referable to this species.^d

I saw a number of skins at the Hudson's Bay posts at Arctic Red River and Fort McPherson in the summer of 1904. These had been traded by the Eskimo who frequent the mouth of the Mackenzie. In notes sent to the Smithsonian MacFarlane records a seal which was shot on Franklin Bay. It was called by the Eskimo 'natshuk,' which identifies it as this species.

***Phoca groenlandica* Fabr. Harp Seal.**

J. C. Ross states that skins of this seal were obtained from the natives of the west side of the Isthmus of Boothia.^e Sutherland states that the 'ocean, or Greenland, seal' was common in August, 1850, in the southern part of Wellington Channel.^f

***Erignathus barbatus* (Erxleben). Bearded Seal.**

Sutherland states that the bearded seal was common in August, 1850, in the southern part of Wellington Channel.^f M'Clintock records it from Port Kennedy, where it was observed during the voyage of the *Fox*.^g

Hanbury records the 'ugyuk' (the Eskimo name for this species), as rather common early in June, 1902, on Melville Sound.^h It probably occurs all along the Arctic coastline from Hudson Bay to that vicinity, and perhaps farther west.

***Sorex personatus* I. Geoffroy. Common Eastern Shrew.**

This common species is quite generally distributed throughout the region north to the Arctic Sea. During our various trips we secured a series of over a hundred specimens, from the following localities: Thirty miles above Athabaska Landing; Athabaska Land-

^a Appendix to Parry's Second Voyage, p. 334, 1825 (1827).

^b Parry's Third Voyage, Appendix, p. 94, 1826.

^c Appendix to Ross's Second Voyage, p. xix, 1835.

^d Sport and Travel in Northland of Canada, p. 159, 1904.

^e Appendix to Ross's Second Voyage, p. xxi, 1835.

^f Journ. Voyage to Baffin Bay, I, p. 293, 1852.

^g Voyage of the *Fox*, p. 168, 1860.

^h Sport and Travel in Northland of Canada, p. 161, 1904.

ing; Calling River; 25 and 50 miles above Pelican Rapid; Pelican Rapid; Cascade Rapid; Mountain Rapid; Fort Chipewyan; Slave River, 10 miles below Peace River; Smith Landing; Fort Smith; Slave River, 100 miles below Fort Smith; Fort Resolution; Trout Rock, 25 miles south of Fort Rae; Fort Rae; Grandin River; Lac St. Croix; Fort Franklin, Great Bear Lake; Fort Providence; Fort Simpson; mountains near mouth North Nahanni River; Fort Wrigley; and Fort Norman. We took specimens in nearly all kinds of situations, but found the animals most common in marshes and about the margins of muskeg ponds. They enter the storehouses of the trading posts freely, especially in winter, and several were taken in such situations. Embryos were noted in only two instances, as follows: Fort Chipewyan, June 3, 1901, 10 embryos; mountains near mouth of Nahanni River, July 18, 1903, 6 embryos. The side glands, which apparently are to be found on all adult male shrews in the summer or breeding season, are small in this species, occupying a space only 2 or 3 mm. in length. They are covered with short stiff hair of about the same color as the surrounding fur. They are conspicuous only during the breeding season, probably serving a sexual purpose, are barely discernible in autumn, and can scarcely be detected, in this species, at least, in winter.

The series taken at Fort Franklin late in September, 1903, comprises specimens in both summer and winter pelages, showing the approximate date of the autumn molt in that region. At Fort Simpson a small series in full winter pelage was taken in the late autumn and early winter of the same year. During the winter their tiny tracks and tunnels were often seen in the woods, and when the temperature stands at 40° below zero and constant motion is necessary to keep one from freezing, one can not help wondering that this tiny creature manages to sustain life.

In addition to the large series collected by our party, I have examined a collection of nearly a hundred specimens of shrews (skins and alcoholics) sent to the Smithsonian Institution by various members of the Hudson's Bay Company years ago, and which has never before been critically studied. As might be expected, the collection contains much interesting material, and supplements our series admirably. It contains about 40 specimens of *S. personatus* from the following localities: Cumberland district, Saskatchewan; Fort Resolution; Fort Rae; Big Island, Great Slave Lake; Fort Simpson; Fort Liard; Mackenzie River below Fort Good Hope; Fort McPherson; mouth of Porcupine River; Fort Anderson; mouth of Anderson River; and [south end of] Franklin Bay.

Ten adult specimens from the Athabaska average in measurements: Total length 95.6, tail vertebræ 38.9, hind foot 12; ten from Great Slave Lake, 101.6, 38.8, 12; ten from Fort Franklin, 96.7, 38.1, 11.9.

Specimens from Edmonton, St. Albert, and Island Lake, Alberta, taken by J. Alden Loring in 1894 and 1895, were recorded by Merriam;^a in 1896 the species was taken by the same collector at the following places: Stony River, 25 miles northwest of Jasper House; Smoky Valley; Muskeg Creek, at points 15 and 20 miles from its mouth; Smoky River trail, north of Baptiste River; and Rodent Valley, west of Jasper House. Allen has recently recorded specimens from Liard River [mouth of Black River] and Fort Norman.^b The specimen of *Sorex forsteri*, recorded by King from the mouth of Great Fish River,^c was in all probability referable to this species.

***Sorex obscurus* Merriam.** Rocky Mountain Shrew.

During our first trip to the Great Slave Lake region in 1901 a single adult male was taken by Alfred E. Preble on Mission Island, near Fort Resolution, on July 21. The specimen calls for no special comment except that its tail is longer than is usual in typical *obscurus*.

On our next visit to the region we further extended the range of the species. While collecting on the mountains at the mouth of Nahanni River in July, 1903, my brother and Cary trapped one, and on their return trip they collected a number on the Athabaska at Swift Current and 30 miles above Athabaska Landing. During the early part of the winter of 1903 I took 2 specimens at Fort Simpson. They were secured about the post buildings. Another was taken at the same place on November 2, 1904, by J. W. Mills.

The discovery of this species on Great Slave Lake and the upper Mackenzie is somewhat of a surprise, since no shrew of the *obscurus* type has hitherto been recorded from the interior of British America north of the Jasper House region in western Alberta.

Five adults from the Athabaska average in measurements, total length 114, tail vertebræ 45, hind foot 13.3; the Fort Resolution specimen measured 124, 51, 13; two from Fort Simpson average 112.5, 47, 13.5; one from the mountains at the mouth of Nahanni River measured 111, 45, 13.

The side glands in this species are quite conspicuous, occupying a space about 6.5 mm. in length, or half the length of the hind foot.

Two specimens taken by J. Alden Loring at Henry House, Alberta, in the autumn of 1895, have been recorded by Merriam.^a In the season of 1896 Loring took the species at the following localities in Alberta: Mountains 15 miles south of Henry House, July 8 and 9; Stony River, 35 miles northwest of Jasper House, August 26; Smoky

^a N. A. Fauna, No. 10, p. 62, 1895.

^b Bull. Am. Mus. Nat. Hist., XIX, p. 564, 1903.

^c Narrative Journey to Arctic Ocean, II, p. 17, 1836.

^d N. A. Fauna, No. 10, p. 73, 1895.

Valley, 50 miles north of Jasper House, August 27; Sulphur Prairie, Grand Cache River, September 11 and 14; at several points on Muskeg Creek, September 17 to 29; Rodent Valley, 25 miles west of Henry House, October 14. The specimens taken subsequent to September 26 are mainly in the dark winter pelage.

An alcoholic specimen in the collection of the National Museum (No. 11323) proves referable to this species. It was collected by Kennicott and is labeled simply 'Arctic America,' without definite locality, though probably taken somewhere in the Mackenzie region.

Sorex richardsoni Bachman. Richardson Shrew.

This is one of the less abundant of the shrews of this region, and extends northward to Fort Rae and the mouth of Bear River.

In the summer of 1901 we first trapped this species at our camp on Slave River, 10 miles below the mouth of Peace River, where we took an adult male on June 10. A single specimen was secured 25 miles below the Peace three days later, and another at Fort Smith June 21. The species was next detected at Trout Rock, 25 miles south of Fort Rae, where I took 4 specimens, including adults and young, on July 17 and 18. Another was secured at Fort Rae, July 26.

In 1903 my brother and Cary took specimens on the Athabaska at Pelican Rapid and near Athabaska Landing in the early autumn, and in the late autumn of the same year I trapped a few in the full winter pelage at Fort Simpson, finding it both in the woods and about the post buildings. During my trip down the Mackenzie in the summer of 1904 I took an adult male at Fort Norman, the most northerly point from which the species is known.

The side glands in this species are conspicuous, occupying a space about 7 mm. in length, or half the length of the hind foot. They are covered with short, stiff hair, of the same color as the surrounding fur, but so glossy as to appear of a silvery color in certain lights.

J. Alden Loring found this species common in central Alberta in 1894 and 1895, and specimens taken by him at Edmonton, St. Albert, and Island Lake (15 miles west of Ste. Anne), have been recorded by Merriam.^a They were taken mainly in tall grass bordering lakes.

A comparison of the specimens taken by us in the Athabaska and Mackenzie region, with an extensive series from Alberta and Keewatin, shows no important difference. Merriam (loc. cit.) gives the average measurements of 25 specimens from Edmonton as follows: Total length 113.2, tail vertebræ 40.4, hind foot 13.9; two from Slave River average 120.5, 43, 14; four from near Fort Rae average 116.5, 40.7, 13.5; two from Fort Simpson, 113, 42.5, 13.7; one from Fort Norman measures 120, 45, 14.

^a N. A. Fauna, No. 10, p. 64, 1895.

In the National Museum series of shrews I find a number of specimens of this species from the region now under review and will refer to them briefly. A skin taken at Portage La Loche by B. R. Ross, August 5, 1860, is chiefly interesting as from a locality now seldom visited. Several alcoholic specimens furnish a record for Fort Resolution, where we did not detect it. One was taken at Buffalo River, Great Slave Lake, July 5 (probably 1860), by B. R. Ross, who also collected one at Fort Simpson in December, 1860. Another was taken at Big Island, Great Slave Lake, by John Reid.

Allen has recorded three specimens taken at Fort Norman by A. J. Stone, September 15 to 17, 1898.^a

Sorex sphagnicola, described by Coues from Fort Liard or vicinity,^b and which has been more or less doubtfully referred to by authors in recent years as distinct from *S. richardsoni*, is beyond all doubt identical with this species. I have recently made a careful comparison between the type of *S. sphagnicola* and our large series of *richardsoni*, some of which are from the same general region, as shown above. The type of *Sorex sphagnicola* now consists merely of fragments of a skin, the head and nape and the hinder third, including the hind feet and tail. It was plainly taken in summer and was molting, a condition which probably accounts for the alleged peculiarities of the color pattern which have been supposed to characterize this species. When compared with summer skins of *S. richardsoni* the agreement is very close. The color of the head and neck is exactly matched in some specimens of *richardsoni* from Great Slave Lake; the color of the hinder parts match almost equally well, the type of *sphagnicola* being just appreciably darker than ordinary summer specimens of *richardsoni*. The feet and tail agree precisely in size, and, allowing a little for the fading of the type, in color. Doctor Merriam has compared this specimen and agrees with me that *S. sphagnicola* must be considered a synonym of *S. richardsoni*.

***Sorex tundrensis* Merriam. Tundra Shrew.**

In the collection of shrews in the National Museum I find about 25 specimens of this species from several localities in the lower Mackenzie region, thus materially extending its previously recorded range. A number of specimens were brought to MacFarlane by the Eskimo from the mouth of the Anderson and the Arctic coast in that quarter in 1862, 1863, and the winter of 1865-66. There are several also from Fort Anderson taken by MacFarlane, one from Peel River (Fort McPherson) taken by C. P. Gaudet, and one or two from the mouth of Porcupine River collected by Kennicott. In addition to

^a Bull. Am. Mus. Nat. Hist., XIX, p. 566, 1903.

^b Bull. U. S. Geol. and Geog. Survey Terr., 111, No. 3, p. 650, 1877.

these, which are definitely labeled, there are a number of specimens labeled, in some cases doubtfully, 'Arctic America.' These were probably taken by MacFarlane in the Anderson River region. They bear original numbers, but Mr. MacFarlane, in answer to a letter, though of the opinion that the specimens were collected by him, is not able to supply exact data, owing to the loss of some of his notebooks, but thinks from the numbers that they were collected by the Eskimo of the lower Anderson in 1862 and 1863, in which case they are from a locality already represented by authentically labeled material.

The specimens from northern Mackenzie do not differ in marked degree from a large series in the Biological Survey collection from St. Michaels, the type locality, and other points in Alaska. Though this species has the same tooth characters and color pattern as *S. richardsoni*, and it has been thought that there might be intergradation between them, the series now brought together affords no evidence that such is the case. Typical *S. richardsoni* occurs at Fort Norman, and *S. tundrensis* at Fort Anderson, and it is hardly probable that these widely different forms intergrade in the comparatively narrow intervening area over which practically uniform climatic and physiographic conditions prevail.

Neosorex palustris (Richardson). Marsh Shrew.

This species apparently is of rather rare occurrence in the region now under review, but occurs north at least to the region of Great Slave Lake.

During my trip northward from Fort Rae in 1903 I took a female at the edge of a muskeg on the upper part of Grandin River on August 5. It is grayish beneath, resembling in this respect some summer specimens from southern Keewatin.^a It presents no distinctive characters except its rather small size, which is probably due to immaturity, though owing to the loss of the skull this can not be determined with certainty. It measures: Total length 137, tail vertebræ 61, hind foot 18. On September 23 of the same year, while on their homeward trip, Alfred E. Preble and Merritt Cary collected a skull of this species on the trail 35 miles south of Athabaska Landing. The specimen was picked up in the road.

In the collection of the National Museum I find an alcoholic *Neosorex* (No. 6276), taken at Fort Rae by L. Clarke. The skull, which I have removed and cleaned, agrees well with a series of specimens from Alberta and Keewatin. The specimen measured: Total length 125, tail vertebræ 64, hind foot 19. On account of the hardened condition of the specimen, the total length, by present measurement, is manifestly too small; the other measurements are approximately correct.

^a N. A. Fauna, No. 22, p. 71, 1902.

Another specimen (No. 6275) from Fort Resolution, is catalogued, but I can not find it in the collection, unless a specimen labeled doubtfully 'Arctic America,' without other data, is the same one—reentered in the catalogue because of mistake. At any rate, the specimen is in nowise peculiar. It measures: Total length 150, tail vertebræ 67, hind foot 19.

A specimen taken by J. Alden Loring at Edmonton, Alberta, September 15, 1894, has been recorded by Merriam.^a It was taken in tall grass, and measured 157, 68, 20.

Neosorex palustris navigator Baird. Rocky Mountain Marsh Shrew.

A specimen taken by Loring near Henry House, September 6, 1895, has been recorded by Merriam.^b During the following season, Loring took one in Smoky Valley, 50 miles north of Jasper House, on August 27. It is a Rocky Mountain form of *N. palustris*, and the specimens mentioned furnish all the information we have regarding its range within the region now under review.

Microsorex eximius (Osgood). Alaska *Microsorex*.

In the course of our collecting, a series of over a dozen shrews of this genus, hitherto unrecorded from this region, was obtained. It comprises specimens from Fort Chipewyan, Smith Landing, Fort Smith, Fort Resolution, Fort Rae, Fort Simpson, and Fort Franklin. They were usually taken in traps set in damp places, mainly in the runways of *Microtus*, and in situations similar to those inhabited by *Sorex personatus*, the two species being frequently captured in the same trap on successive days. On one or two occasions we took *Microsorex* in storehouses. Usually we trapped at least 10 *S. personatus* to one *Microsorex*, but at Fort Smith we found the latter occupying certain tracts almost to the exclusion of the common species, judging by the results of our trapping. The series thus brought together fortunately shows both summer and winter pelages. The summer pelage is sepia brown above, slightly paler beneath. The color, together with the short tail and small hind foot, usually suffices to distinguish the animals from *S. personatus*, without reference to the skull. Compared with the two known specimens of *Microsorex eximius* (which differ somewhat from each other), the summer specimens of the present series average slightly darker above, but the difference is not important. In winter the upper parts are grayer than in summer and the lower parts are much lighter, being nearly pure white. The rostrum and tooth row average slightly broader in our specimens than in typical *eximius* from Alaska, but the difference is scarcely appreciable.

^a N. A. Fauna, No. 10, p. 92, 1895.

^b *Ibid.*, p. 93, 1895.

Compared with a series of winter skins of *Microsorex hoyi* from Elk River, Minnesota, specimens in corresponding pelage from Fort Simpson and Fort Franklin are slightly grayer above. Beneath they are grayish white, lacking entirely the rusty tinge of *hoyi*. I am unable to compare the summer pelages, the series of *hoyi* being deficient in this respect.

The skull of *M. eximius* differs from that of *hoyi* mainly in the shape of the brain case, which is more inflated in the former. In *eximius*, also, the unicuspid teeth are more crowded, with the result that the minute third and fifth, especially the former, are scarcely visible when the crowns are viewed.

The side glands of *Microsorex* are very conspicuous, occupying a space about 9 mm. in length, or nearly the length of the hind foot, being relatively larger than in any other shrew examined, and are covered with short stiff hair of a silvery color. They are conspicuous in all the males in our series taken in the summer months.

A *Microsorex* taken on Muskeg Creek, Alberta, a tributary of Smoky River, September 26, 1896, by J. Alden Loring, is in the Biological Survey collection. It closely resembles skins of *Microsorex eximius* in winter pelage. Its skull, however, can not be found and the specimen is therefore only provisionally referred to the present species.

An adult male from Fort Chipewyan measured: Total length 90, tail vertebrae 30, hind foot 10; five specimens of both sexes from Fort Smith average 92, 30.4, 10.2; one from Fort Simpson measured 85, 30, 10; one from Fort Franklin, 92, 34, 10.

In the museum collection of alcoholic shrews I find 4 specimens of this species from Fort Resolution, one taken in December, 1862, by James Lockhart, the others collected about the same time by A. McKenzie. Another (No. 59621), labeled Great Slave Lake, and collected by John Reid, was in all probability taken at Big Island. Its skull is the smallest of the series. The skull of another (No. 59624) from Cumberland district, Saskatchewan, taken by MacFarlane, closely resembles that of *M. hoyi*, and the specimen is perhaps properly referable to that species.

The type of *Microsorex alnorum*, described by me, from Robinson Portage, Keewatin, still remains unique, none of the large series now before me equaling it in the size of the skull, especially the brain case, or in the length of the hind foot.

Myotis lucifugus (Le Conte). Little Brown Bat.

A small bat which was dislodged from the loose bark of a poplar stub near our camp 10 miles below the mouth of the Peace on June 7, 1901, was probably of this species. It darted into the adjacent forest and could not be found. With the exception of one or two seen on

the Athabaska between Athabaska Landing and Grand Rapid early in May, it was the only bat seen during that season.

During the evening of May 29, 1903, while we were floating down the Athabaska near the site of Pierre au Calumet, we saw a number of small bats, probably of this species, flying about over the river. During their outward trip in the autumn of the same year, my brother and Cary saw two, one of which was secured, at La Biche River, August 29. It proves to be of this species.

Hubert Darrell, who accompanied Hanbury through the Barren Grounds in 1901-2, writes me that he saw small dark-brown bats at the Big Fall on Hanbury River in the summer of 1901. In the following summer he saw one among some cliffs on the Arctic coast 50 miles east of the mouth of the Coppermine. Since *M. lucifugus* appears to be the most northern-ranging bat, it is probable, though by no means certain, that they were of this species. In spite of uncertainty as to the species, the occurrence of bats at these points on the Barren Grounds seems worthy of record.

At least one species is said to be occasionally seen at Fort Simpson, but though constantly on the lookout for bats during the spring of 1904, I failed to observe any. I saw a small brown bat at Grand Rapid, Athabaska River, August 22, but was unable to secure it.

Myotis subulatus (Say). Say Bat.

Richardson records a specimen of *Vespertilio subulatus* procured on Back's expedition. The locality is not stated definitely, but the context leaves it to be inferred that the specimen was taken at Great Slave Lake.^a Ross notes this species as being found north to Salt River, but as very rare.^b In view of the imperfect knowledge in former years regarding the species of bats, these records are quite as likely to refer to *M. lucifugus*, which is probably the commoner species in this region, though it is highly probable that *M. subulatus* also occurs well northward. Miller records one taken near Red Deer, Alberta.^c

Lasiorycteris noctivagans (Le Conte). Silver-haired Bat.

As we were ascending the Athabaska near the mouth of House River, August 24, 1904, a bat of this species was seen flying about near the boats. It was bright sunlight at the time. The crew began to throw stones at it, whereupon it took refuge on the awning of one of the boats and was secured. It proved to be a male. Another, a female, was secured 60 miles below Athabaska Landing on August 29.

^a Back's Narrative Expedition to Great Fish River, Appendix, p. 485, 1836.

^b Can. Nat. and Geol., VII, p. 142, 1862.

^c N. A. Fauna, No. 13, p. 76, 1897.

Two specimens taken by J. Alden Loring at Henry House, Alberta, early in October, 1895, have been recorded by Miller.^a

Lasius cinereus (Beauvois). Hoary Bat.

Alfred E. Preble and Merritt Cary obtained a fine female of this large species on the Athabaska near the mouth of La Biche River, August 29, 1903. It was caught among shrubbery on the river bank. The species is evidently rare here, since none of the boatmen seemed to be acquainted with it.

Miller has recorded a specimen taken near Red Deer, Alberta.^b Richardson described a specimen taken at Cumberland House.^c Though its size serves to distinguish this species from all other northern bats, it seems to have been seldom recorded and is probably rather rare, though doubtless of regular occurrence in Alberta and southern Mackenzie.

BIRDS OF THE ATHABASKA-MACKENZIE REGION.

The following list is believed to include all species of birds that have been authoritatively recorded from the region treated in the present report. In the account of each species our own observations are usually given first, in chronological order, the published records following. Of the published references relating to the various species only those have been utilized which best represent the distribution, dates of migration, breeding, and other interesting features of their life history, preference usually being given to the notes earliest published. Notes not accompanied by reference to the place of publication are derived from manuscript records or verbal communications.^d

Colymbus holbœlli (Reinh.). Holbœll Grebe.

This handsome grebe is a fairly common breeder in suitable places throughout the wooded parts of the region. In 1903 a single individual was seen on Lily Lake, Alberta, May 13, and several at Two Lakes, May 14. The species was next noted in the marshes near Rocher River, June 6 and 7, and a pair was seen on the lake near Fort Resolution, Mackenzie, June 20. Alfred E. Preble and Merritt Cary noted it daily at Hay River, June 27 to July 1, and at Fort Providence, July 4. On their return trip they saw one on the

^a N. A. Fauna, No. 13, p. 86, 1897.

^b N. A. Fauna, No. 13, p. 114, 1897.

^c Fauna Boreali-Americana, I, p. 1, 1829.

^d Canon 50 of the American Ornithologists' Union Code of Nomenclature is here interpreted to mean that the authority for a name shall be inclosed in parentheses only when the specific name is now used in combination with a generic name not employed by the original describer.

Athabaska at Athabaska Landing, Alberta, September 15. During my trip northward from Fort Rae I found it rather common and undoubtedly breeding in the small marshy lakes along lower Grandin River, August 1 to 4. An individual which had succumbed to the weather, probably having been wounded, was picked up on the Mackenzie 10 miles above the mouth of the Blackwater, October 8.

In the spring of 1904 the species was first brought to my notice late in May, when a fine male, taken near Fort Providence, May 25, was brought to me at Fort Simpson. While descending the Mackenzie I observed a pair in a small lake near Nahanni River, June 4. The nest, a floating bunch of coarse grass, was anchored to a submerged log 15 feet from the shore. It appeared to be nearly finished, and was held in place by a limb which projected above the surface of the water, and around which the nest had been constructed. Numbers of the species were evidently breeding in the ponds which studded the valley of the Nahanni, and several were observed on the following day. I saw a pair in a small lake on Manito Island, near Fort Good Hope, June 23, and noted the species on the Mackenzie, 75 miles below Fort Good Hope, June 27, and near the mouth of Peel River, June 30. I observed one on lower Peel River, July 1, and found the species common about the small lakes near Fort McPherson during the first half of July, seeing or hearing it nearly every day.

The species was first recorded from this region by Richardson, who quotes from Sabine a description of "a mature individual, killed at Great Slave Lake, May, 1822."^a Sabine, whose description^b Richardson quotes in part, apparently was not aware of the precise locality of the specimen, but Richardson, probably from personal knowledge, was able to supply this information. Ross gives the species as being found north in the Mackenzie Valley to Peel River, and as having been taken at Fort Simpson.^c Baird, Brewer, and Ridgway record its occurrence at Fort Rae, Fort Simpson, Fort Anderson, Peel River, and in the mountains west of the lower Mackenzie, and mention eggs from Fort Simpson and Peel River.^d MacFarlane records two nests, containing, respectively, 4 and 5 eggs, found 40 or 50 miles south of Fort Anderson.^e More recently Frank Russell has recorded it from Fort Rae, where he took a specimen, which I have examined, August 22, 1893.^f MacFarlane, in notes recently sent me, states that this grebe was found breeding at Green Lake, Saskatchewan, in June, 1880, by W. S. Simpson, and at Fond du Lac, Athabaska Lake, in 1885, by J. Mercredi.

^a Fauna Boreali-Americana, II, p. 411, 1831.

^b Franklin's Narr. Journey to Polar Sea, Appendix, p. 692, 1823.

^c Nat. Hist. Rev., II (second ser.), p. 290, 1862.

^d Water Birds N. A., II, p. 430, 1884.

^e Proc. U. S. Nat. Mus., XIV, p. 415, 1891.

^f Expl. in Far North, p. 254, 1898.

Colymbus auritus Linn. Horned Grebe.

This species breeds throughout the region north nearly to the border of the forest, being especially common within the Canadian zone. In the spring of 1901 we first met with it on Athabaska River near Fort McMurray, May 14, when a single bird was seen. While encamped on a large island near the outlet of Lake Athabaska, June 1 to 4, we saw a pair daily in a small slough, where they doubtless intended nesting. The bird was noted in the marshes bordering Rocher River, June 5, and a number were seen in a slough near Slave River 25 miles below the mouth of the Peace, June 11 and 12; an adult male was collected on the latter date. At Fort Smith, Mackenzie, the species was seen in a marsh, June 22. On our return trip one was seen on the river at Smith Landing, August 6.

In 1903 two horned grebes were seen on Lily Lake, Alberta, May 13, and several at Two Lakes, May 14. The species was next observed in the marshes adjoining Rocher River, where it was common June 6 to 8, and where a nest containing six eggs was found by Merritt Cary on the latter date. It was noted near the mouth of Peace River, June 9; 50 miles below Fort Smith, Mackenzie, June 16, and at Fort Resolution, June 20. I saw one on Great Slave Lake, near the mouth of the Northern Arm, July 24, and next observed the species on the Mackenzie, 10 miles above the mouth of the Blackwater, October 8, noting two individuals.

In the spring of 1904 this species was noted May 13 at Willow River, near Fort Providence, by J. W. Mills. It was not observed again during the season.

This bird is quite generally distributed throughout the region. It was first recorded from there by Richardson, who described a specimen killed at Great Slave Lake.^a Ross, in 1862, recorded it as common north to La Pierre House, and as having been taken at Fort Simpson.^b Baird, Brewer, and Ridgway record specimens obtained in the breeding season at Fort Resolution, Fort Simpson, Fort Rae, and Big Island, and on the Anderson and Lower Mackenzie rivers, mainly by various officers of the Hudson's Bay Company.^c MacFarlane secured the species near Lockhart River in June, 1861, and took a female with her nest and five eggs 60 miles southeast of Fort Anderson in June, 1866.^d Frank Russell took a specimen at Fort Rae, August 22, 1893, which I have had the opportunity of examining. In some notes recently received from MacFarlane, he states that W. S. Simpson found a nest of this species at Green Lake, Saskatchewan, in June, 1880.

^a Fauna Boreali-Americana, II, p. 411, 1831.

^b Nat. Hist. Rev., II (second ser.), p. 290, 1862.

^c Water Birds N. A., II, p. 434, 1884.

^d Proc. U. S. Nat. Mus., XIV, p. 415, 1891.

Colymbus nigricollis californicus (Heerm.). American Eared Grebe.

A specimen taken by Kennicott at Fort Resolution, Mackenzie, is in the National Museum. This seems to be the only authentic record for the region. A specimen recorded by Russell from Fort Rae,^a proves on examination to be referable to *C. auritus*.

Podilymbus podiceps (Linn.). Pied-billed Grebe.

In 1903, on May 14, we saw two individuals at Two Lakes, Alberta, about 50 miles north of Edmonton. Previously the species was known from this region only from the capture of a few individuals about Great Slave Lake, and apparently is rare. Richardson quoted from Sabine a description of a specimen which he said was killed at Great Slave Lake in May, 1822.^b Ross listed it as rare at Great Slave Lake.^c Baird, Brewer, and Ridgway record eggs from the same place;^d and I find a specimen in the National Museum (No. 20756) taken by Kennicott at Fort Resolution, June 13 [1860], and marked "with 4 eggs." These are probably the eggs referred to by Baird, Brewer, and Ridgway.

Gavia immer (Brünn.). Loon.

The great northern diver occurs in summer throughout the region north to the Arctic islands, arriving with the breaking up of the ice. In 1901 we heard its notes at the mouth of Peace River, on the night of June 5, and on July 15 and 16 on the Northern Arm of Great Slave Lake, near Yellowknife Bay.

In 1903 we saw the species on Athabaska River, near Grand Rapid, May 20; at Fort Chipewyan, June 5; and on Rocher River, June 6. After leaving Fort Resolution for the Mackenzie, Alfred E. Preble and Merritt Cary observed two near Sulphur Point, Great Slave Lake, June 27. They noted the species also near the mouth of Nahanni River, July 15 and 17; about 20 miles above Fort Wrigley, July 20; between Fort Wrigley and Fort Simpson, July 23; and on Great Slave Lake, near Fort Rae, July 28. On their return trip they saw several on Lily Lake, Alberta, 34 miles north of Edmonton, September 24. I noted the species at Fort Resolution, June 28, and near Gros Cape, Great Slave Lake, July 23. I found it breeding commonly during August on nearly all the lakes on the route followed between Fort Rae and MacTavish Bay, Great Bear Lake, and noted several pairs with young during the early part of the month. I saw a pair with young the size of green-winged teals on Lake Mazenod, near the head of Grandin River, August 6, and noted the

^a Expl. in Far North, p. 254, 1898.

^b Fauna Boreali-Americana, II, p. 412, 1831.

^c Can. Nat. and Geol., VII, p. 155, 1862.

^d Water Birds N. A., II, p. 442, 1884.

species almost daily on the various lakes between there and Great Bear Lake during the remainder of the month. On Great Bear Lake I noted it at my camp east of Leith Point, September 2, and nearly every day while traveling westward along the south shore of the lake. I saw one at Fort Franklin, September 20, and one on lower Bear River, September 30. The last one was seen on the Mackenzie near Nahanni River, October 15.

In the spring of 1904 I first observed this loon at Fort Simpson, Mackenzie, on May 23, noting two on the river near the post. Their notes, however, had been heard previously by the natives. While descending the Mackenzie I saw a few 50 miles below Fort Simpson, June 2, and near Nahanni River, June 6. I saw one near the mouth of Peel River, June 30, and at Fort McPherson obtained from Mr. W. H. Walker the skins of two which he had taken there late in May. On my return trip I noted the bird near the outlet of Athabaska Lake, August 6.

The natives, especially the Dogribs, relish the flesh of this bird, and frequently obtain it by concealing themselves on the margin of a lake and decoying the bird within range by means of a tin plate or other bright object, which they so manipulate as to attract its attention and excite its curiosity.

Richardson was the first to formally record this species, describing a specimen from Great Bear Lake.^a Later he speaks of observing the birds migrating toward the southeast along the Arctic coast, near Darnley Bay, August 17, 1848.^b King recorded the species from Clinton-Colden Lake;^c and Ross, specimens from Fort Simpson and Peel River.^d Armstrong recorded it under the name *Colymbus glacialis* from Mercy Bay, Banks Land, where 5 were killed July 13, 1852.^e Loons probably of this species were recorded by Parry from Winter Harbor, Melville Island,^f and by Sutherland from Assistance Bay.^g

The catalogue in the National Museum shows that specimens were received from Fort Resolution, Fort Norman, and Big Island. MacFarlane found 9 nests, each with 2 eggs, in the Anderson River region;^h and the head of a female taken by him there in July, 1864, is still in the National Museum. Hanbury noted a common loon, the

^a Fauna Boreali-Americana, II, p. 474, 1831.

^b Arctic Searching Expedition, I, p. 282, 1851.

^c Narrative of Journey to Arctic Ocean, I, p. 235, 1836.

^d Can. Nat. and Geol., VI, p. 444, 1861.

^e Narrative Discovery Northwest Passage, p. 536, 1857.

^f Journ. Parry's First Voyage, p. 218, 1821.

^g Journ. Voy. to Baffin's Bay and Barrow Strait, II, p. 209, 1852.

^h Proc. U. S. Nat. Mus., XIV, p. 416, 1894.

first individual observed that season, on Melville Sound, Mackenzie, June 14, 1902.^a

J. Alden Loring reported seeing several on Spotted Lake, 15 miles west of Lake Ste. Anne, Alberta, in August, 1895. In the summer of 1896 he found it common in suitable places along the trail between Edmonton and the Rocky Mountains, and also noted it on the route between Jasper House and Smoky River, August 20 to October 8.

Gavia adamsi (Gray). Yellow-billed Loon.

This handsome loon breeds along the northern border of the region now under review, and occurs in migration on the larger bodies of water in the interior, from Athabaska Lake northward.

I observed this species but once—on the Mackenzie, a few miles above the mouth of the Nahanni, October 15, 1903. During my stay at Fort McPherson in July, 1904, I was informed by an Indian, who spoke English and described the species accurately, that he had seen one on a lake near the post, July 8. At Hay River, Great Slave Lake, it is frequently shot in May, when the ice begins to break up, but it is less often seen at Fort Resolution. Two mounted specimens, taken at Fort Providence some years ago, are in the Hudson's Bay Company museum at Fort Simpson.

The first specific reference to this species as an inhabitant of the Mackenzie region, and one of the first appearances of the bird in literature, is Franklin's mention of it from Fort Enterprise, late in October, 1820, as follows:

The last of the water fowl that quitted us was a species of diver, of the same size with the *Colymbus arcticus*, but differing from it in the arrangement of the white spots on its plumage, and in having a yellowish white bill. This bird was occasionally caught in our fishing nets.^b

Ross was the next to detect it in the region, shortly after the bird had been formally described, referring to it as abundant on Great Slave Lake, and as having been collected at Fort Simpson.^c Under the name *Colymbus glacialis* J. C. Ross records three loons, which his description shows were of this species, obtained about Boothia during John Ross's second voyage.^d Baird, Brewer, and Ridgway record specimens from Fort Resolution, Big Island, Fort Rae, Fort Simpson, Fort Norman, and Peel River,^e and MacFarlane says it abounds during the season of reproduction in Franklin and Liverpool bays.^f He informs me that a fine example was killed by an

^a Sport and Travel in Northland of Canada, p. 162, 1904.

^b Narrative Journey to Polar Sea, p. 247, 1823.

^c Nat. Hist. Rev., II (second series), p. 289, 1862.

^d Appendix to Ross's Second Voyage, p. XLII, 1835.

^e Water Birds N. A., II, p. 462, 1884.

^f Proc. U. S. Nat. Mus., XIV, p. 416, 1891.

Indian at Fond du Lac, Athabaska Lake, in the spring of 1885, and sent to J. J. Dalglish. H. W. Jones (in letter) reports this loon on the Mackenzie above Fort Simpson, May 20, 1905.

Gavia pacifica (Lawr.). Pacific Loon.^a

This species breeds commonly in the larger lakes throughout the region from Great Slave Lake northward. In 1901 we first saw it on Great Slave Lake, near Gros Cape, on July 15. It was common on the Northern Arm between Yellowknife Bay and Trout Rock, July 16, and about Trout Rock, July 17. In 1903 I first observed it on Great Slave Lake, near Gros Cape, on July 23, when it was abundant. During my trip northward to Great Bear Lake in August I found it to be a common breeder in most of the lakes along the route. I noted it daily along Grandin River, August 1 to 3; on Lake Mazenod, August 6; Sarahk Lake, August 7; Lake Rae, August 8; Lake St. Croix, August 9; Lake Hardisty, August 15, and at several points on the lakes between Lake Hardisty and MacTavish Bay on August 22, 23, and 26. On Great Bear Lake I observed it near McVicar Bay, September 9.

In 1904 I first observed the species at Fort McPherson early in July. It was fairly common on the lakes in the vicinity and was noted July 2, 3, and 11, one being obtained on July 2.

Baird, Brewer, and Ridgway first recorded the breeding of the species in the Anderson River region, where MacFarlane found over 100 nests, not more than 2 eggs being found in any instance. They state also that specimens of the birds were obtained from Fort Anderson, Fort Rae, Rendezvous Lake, Liverpool Bay, Franklin Bay, 'Barren Grounds,' and 'Arctic Coast' [east of Fort Anderson], and the Gens de Large Mountains.^b A specimen (No. 27899), collected at Fort Anderson by MacFarlane, is still in the National Museum. Seton records the species as common along the route from Fort

^a *Gavia arctica*, though several times reported, is of very doubtful occurrence in Mackenzie, as all the specimens of loons of this type available are referable to *G. pacifica*. MacFarlane records "a well-authenticated set of eggs, obtained from Fort Anderson in 1865, and which are now in the oölogical collection of the U. S. National Museum." (Proc. U. S. Nat. Mus., XIV, p. 416, 1891.) There are, however, no skins of *G. arctica* to bear out this identification. He states also, in a manuscript list recently sent me, that a set of 2 eggs, accompanied by the female parent, were brought in to Fort Chipewyan by a Chipewyan Indian [probably from the eastward] early in June, 1885. These were sent to J. J. Dalglish. There are several other records, but as they were published before *G. pacifica* was known to be a common species in the region, they probably refer to it.

^b Water Birds N. A., II, p. 457, 1884.

Resolution to Aylmer Lake in 1907, but as most abundant on Great Slave Lake.^a

Gavia stellata (Pontoppidan). Red-throated Loon.

The red-throated loon is the commonest representative of its genus in this region. It breeds abundantly from Great Slave Lake northward and probably to some extent south of that latitude.

In the summer of 1901 several loons, apparently of this species, were seen on Lily Lake, Alberta, May 2. Several were seen on Great Slave Lake near Stone Island, June 10. On a semibarren island about 50 miles north of Fort Resolution, where we were detained by high winds July 11 to 14, five pairs were found breed-



FIG. 15. Nesting pond of red-throated loon (*Gavia stellata*), Loon Island, Great Slave Lake.

ing. Several shallow ponds, from 5 to 50 yards wide and connecting with the lake at times of high water, extend nearly across the central part of the island, and each was occupied by a pair of loons, together with their two young, a few days old (fig. 15). The age of the different broods varied but a day or two. The nests, rather well made of dry grass, were placed at the margins of the ponds, usually in a patch of grass, and in one or two cases still contained the abandoned egg shells. When the nesting pond was approached, the male usually flew away, but the female invariably refused to leave her offspring, and if absent soon appeared and alighted beside them, diving, swimming about, and encouraging them in their efforts to

^aAuk, XXV, p. 68, 1908.

escape, and endeavoring to attract the attention of the intruder to herself. The old birds fished in the lake near by and were often seen carrying small fishes to the young. An adult male and two of the downy young were taken.

In 1903 a red-throated loon was seen on Athabaska Lake near Fort Chipewyan, June 2. The species was next observed near Gros Cape, on Great Slave Lake, where I saw several July 23. In the region north of Fort Rae I noted it on Sarahk Lake, August 7; Lake Faber, August 8; Lake Rae, August 9; near Lake St. Croix, August 14; and nearly every day during the following week on the various lakes north of the latter point. On Great Bear Lake I noted the species on MacTavish Bay, August 27; at our camp near Leith Point, August 28; near McVicar Bay, September 9 and 10; and at Fort Franklin, September 22 and 27, this being the last date recorded.

In the summer of 1904 I saw a pair on the Mackenzie near the mouth of Nahanni River, June 3; one below Fort Norman, June 17; and one near Rampart Rapid, June 19.

The red-throated loon apparently was first recorded from the Mackenzie region by Richardson, who observed it on the Arctic coast west of Liverpool Bay, in the summer of 1848.^a Armstrong noted its arrival at Mercy Bay, Banks Land, about June 1, 1852, during the voyage of the *Investigator*, and specimens were afterwards taken.^b M'Clintock noted several early in July, 1859, at Port Kennedy;^c McCormick observed numbers in Wellington Channel, near Beechey Island, in August of 1852 and 1853.^d Ross spoke of two having been taken at Fort Good Hope.^e Baird, Brewer, and Ridgway record that specimens of the bird were procured at Fort Resolution, Fort Rae, Big Island, Fort Simpson, Liard River, Anderson River, and Great Bear Lake; and eggs from Great Slave Lake and Anderson River.^f MacFarlane considered it the least abundant of the loons in the Anderson River region, finding about 40 nests, each usually with 2 eggs.^g Pike found it common in the Barren Grounds south of Lake Mackay June 11, 1890.^h Hubert Darrell, who accompanied Hanbury along the Arctic coast in 1902, writes me that the species was observed on Melville Sound on June 16. Oates records eggs taken by Collinson at Cambridge Bay, Victoria Land.ⁱ

^a Arctic Searching Expedition, I, p. 251, 1851.

^b Narrative Discovery Northwest Passage, pp. 522-529, 1857.

^c Voyage of the *Fox*, p. 292, 1860.

^d McCormick's Voyages, II, pp. 89, 137, 1884.

^e Can. Nat. and Geol., VI, p. 444, 1861.

^f Water Birds N. A., II, p. 460, 1884.

^g Proc. U. S. Nat. Mus., XIV, p. 416, 1891.

^h Barren Ground of Northern Canada, p. 162, 1892.

ⁱ Cat. Birds' Eggs Brit. Mus., I, p. 139, 1901.

Cephus mandti (Licht.). Mandt Guillemot.

This species is stated by J. C. Ross to be the only water bird which remains in the Arctic throughout the winter. It is extremely abundant about the large islands of the Arctic Sea to the northward of Mackenzie, having been noted at various points west to Melville Island. It has usually been recorded as *Uria grylle*.

Parry was the first to record this guillemot from the region, noting one at Melville Island, August 8, 1820.^a J. C. Ross recorded it as abundant at Port Bowen;^b and later from Fury Point, February, 1833, and as breeding abundantly between Fury Point and Batty Bay.^c Armstrong states that it was abundant about Beechey Island in the summer of 1854.^d Walker records one taken in February, 1859, at Bellot Strait.^e

Uria lomvia (Linn.). Brünnich Murre.

Under the name *Uria brünnichii*, J. C. Ross recorded the occurrence of this bird at Port Bowen, Prince Regent Inlet, where it arrived in early June.^f

Alle alle (Linn.). Dovekie.

Richardson describes a specimen killed in August near Melville Island.^g The species is abundant in Baffin Bay, especially on the east side, but is rare to the westward of that region.

Stercorarius pomarinus (Temm.). Pomarine Jaeger.

Published reports indicate that this jaeger occurs nearly throughout the region, but probably breeds only along the Arctic coast.

Sabine reported this species from Melville Island and Prince Regent Inlet;^h and Ross recorded one from Fort Simpson.ⁱ Baird, Brewer, and Ridgway record specimens from Fort Resolution, Fort Rae, Big Island, and Fort Simpson.^j MacFarlane speaks of a pair obtained by the Eskimo near the mouth of Anderson River, and of a male shot on Franklin Bay, July 11, 1865.^k A specimen collected by Ross at Fort Simpson, October 16, 1860, and one by Lockhart at Fort Resolution, are still in the National Museum.

^a Journal First Voyage, p. 239, 1821.

^b Parry's Third Voyage, Appendix, p. 107, 1826.

^c Appendix Ross's Second Voyage, p. XLIV, 1835.

^d Narrative Discovery Northwest Passage, p. 591, 1857.

^e Proc. Roy. Soc. Dublin, III, p. 67, 1860.

^f Parry's Third Voyage, Appendix, p. 106, 1826.

^g Fauna Boreali-Americana, II, p. 479, 1831.

^h Suppl. to Appendix Parry's First Voyage, p. CCVI, 1824.

ⁱ Can. Nat. and Geol., VI, p. 443, 1861.

^j Water Birds N. A., II, p. 333, 1884.

^k Proc. U. S. Nat. Mus., XIV, p. 417, 1891.

Stercorarius parasiticus (Linn.). Parasitic Jaeger.

This freebooter breeds rather commonly about the eastern and northern parts of Great Slave Lake, abundantly on the Barren Grounds, and probably to some extent on the lakes in the intermediate region.

In 1901 we first saw this species about some semibarren islands in Great Slave Lake, a few miles north of Stone Island, July 10, when several melanistic individuals were observed. During the evening of the same day a male and female, evidently a pair, were shot on Loon Island. Both were in the dark sooty plumage, the male being slightly lighter in color beneath, the female nearly uniform sooty throughout. Several, including one in the normal white-breasted plumage, were seen about Loon Island, July 11 to 14. While we were crossing from Loon Island to the north shore of the lake during the night of July 14, a number were seen and two females were collected. One of these is of a nearly uniform sooty color throughout. The other is white beneath, slightly barred with dusky; lower tail coverts conspicuously barred with black and brownish; upper tail coverts slightly barred with dull fawn. The stomach of one of these contained various insects and the bones of a small bird, evidently a young tern; the other had eaten a dragon fly, various beetles, and a small fish. Several individuals were seen July 15 near the mouth of the Northern Arm of Great Slave Lake, but the species was not afterwards noted.

In 1903 I observed numbers of this species on the Northern Arm between Gros Cape and Trout Rock, July 23 and 24, and noted it near Fort Rae, July 28.

In the summer of 1904, while descending the Mackenzie, I saw three individuals, exhibiting both the normal and melanistic plumages, near Roche Trempe-l'eau, June 8, and one near Fort Norman, June 10. A specimen taken at Fort Providence is in the museum at Fort Simpson.

Swainson and Richardson, under the name *Lestris richardsoni*, described a specimen killed at Fort Franklin.^a Fisher recorded four seen June 10, 1820, on Melville Island.^b McCormick noted the species on Wellington Channel August 30, 1852.^c King reported the parasitic jaeger from Clinton-Colden Lake.^d Armstrong records the arrival of this species at Mercy Bay, Banks Land, May 31, 1852.^e Baird, Brewer, and Ridgway recorded specimens from Fort Resolution, Fort Rae, Fort Simpson, and Fort Anderson.^f MacFarlane

^a Fauna Boreali-Americana, II, p. 433, 1831.

^b Journ. Voy. of Discovery, p. 217, 1821.

^c McCormick's Voyages, II, p. 141, 1884.

^d Narrative Journey to Arctic Ocean, I, p. 242, 1836.

^e Narrative Discovery Northwest Passage, p. 521, 1857.

^f Water Birds N. A., II, p. 338, 1884.

speaks of many nests being discovered on the Barren Grounds between Fort Anderson and Franklin Bay, and of specimens being obtained from the Eskimo of the lower Anderson.^a A specimen from Big Island, Great Slave Lake, is still in the National Museum.

Stercorarius longicaudus Vieill. Long-tailed Jaeger.

This is apparently the least abundant of the jaegers in this region. It has been observed at various points in the interior in migration, but seems to breed only in the far north.

While descending the Mackenzie in 1904 I saw one near Sans Sault Rapid on June 19. It was flying northward over the tops of the trees which fringed the valley. Probably referring to the present species, Sabine records, under the name *Lestris parasiticus*, a jaeger which was abundant, though less so than the pomarine, in the islands of the Polar Sea. On Melville Island it was frequently met with, seeking its food along the water courses.^b Ross collected *S. longicaudus* at Fort Simpson.^c Baird, Brewer, and Ridgway state that MacFarlane found it abundant at Fort Anderson and on Franklin Bay, and record a specimen taken at Peel River.^d I have recently examined a specimen obtained at Fort Rae by Frank Russell, and recorded by him.^e A specimen collected for MacFarlane by the Eskimo on Anderson River in July, 1865 (the label bearing the inscription "2 eggs"), is still in the National Museum. A mounted specimen in the Fort Simpson museum was taken some years ago at Fort Providence. Seale states that this species was abundant along the Arctic coast from Icy Cape to Herschel Island, July to September, 1896.^f Reed records two eggs from Baillie Island [Arctic Sea], taken July 12, 1901, by H. H. Bodfish.^g

Pagophila alba (Gunn.). Ivory Gull.

Parry recorded the ivory gull from Winter Harbor, Melville Island, where the first were observed May 24, 1820.^h J. C. Ross records it as breeding commonly at Port Bowen, but as rare west of Prince Regent Inlet.ⁱ Harting records a specimen taken at Assistance Harbor in 1851;^j and McCormick noted the species in Wellings-

^a Proc. U. S. Nat. Mus., XIV, p. 417, 1891.

^b Suppl. to Appendix Parry's First Voyage, p. ccvi, 1824.

^c Nat. Hist. Rev., II (second ser.), p. 289, 1862.

^d Water Birds N. A., II, pp. 342, 343, 1884.

^e Expl. in Far North, p. 255, 1898.

^f Proc. Acad. Nat. Sci. Phila., 1898, p. 131.

^g N. A. Birds' Eggs, p. 24, 1904.

^h Journal First Voyage, p. 178, 1821.

ⁱ Appendix to Ross's Second Voyage, p. xxxv, 1835.

^j Proc. Zool. Soc. London, 1871, p. 122.

ton Channel as late as September 5, 1852; ^a Richardson reported it breeding on Darnley Bay on August 16, 1848, when the young were nearly fledged. ^b

Rissa tridactyla (Linn.). Kittiwake.

Concerning the breeding of this species on Franklin Bay, Richardson states under date of July 22, 1826: "The common kittiwake breeds in great numbers on the rocky ledges in this quarter, and their young were already fledged." ^c Armstrong reported shooting the species on Prince Albert Land, near Princess Royal Islands, June 9, 1851. ^d J. C. Ross states that the kittiwake breeds on the south shore of North Somerset; ^e and in Prince Regent Inlet. ^f McCormick noted the kittiwake as common on September 2, 1852, in Wellington Channel. ^g

Larus hyperboreus Gunn. Glaucous Gull.

This beautiful gull is abundant along the Arctic coast in summer, and occurs in small numbers in the interior during migration. In 1903 I saw one, a bird of the year, on the Mackenzie near Roche Trempe-l'eau, October 9. In 1904, while descending the Mackenzie, I saw one near the mouth of Blackwater River, June 9. It was flying northward along the Mackenzie.

Parry recorded it first at Winter Harbor on June 3, 1820; and observed young in the nest on August 5. ^h J. C. Ross noted the bird as common at Port Bowen in June, 1825, and as breeding commonly on the south shore of North Somerset in July, 1825. ⁱ Collinson recorded two seen May 31, 1852, near Walker Bay, Prince Albert Land. ^j Sutherland records several seen June 6, 1851, near Cape Osborne, North Devon. ^k Armstrong, in his narrative of the voyage of the *Investigator*, mentions shooting glaucous gulls off the southern part of Baring Land September 13, 1850; on Prince Albert Land, near Princess Royal Islands, June 9, 1851; and at Mercy Bay, Banks Land, May 31, 1852. ^l MacFarlane reported about 20 nests collected in Franklin and Liverpool bays and on islands in the lower part of Anderson River. ^m Frank Russell records a specimen taken at Herschel

^a McCormick's Voyages, II, p. 151, 1884.

^b Arctic Searching Expedition, I, p. 281, 1851.

^c Narrative Second Expedition to Polar Sea, p. 237, 1828.

^d Narrative Discovery Northwest Passage, p. 347, 1857.

^e Parry's Third Voyage, Appendix, p. 105, 1826.

^f Appendix to Ross's Second Voyage, xxxv, 1835.

^g McCormick's Voyages, II, p. 146, 1884.

^h Journal First Voyage, pp. 207, 235, 1821.

ⁱ Parry's Third Voyage, Appendix, p. 103, 1826.

^j Journ. H. M. S. *Enterprise*, p. 202, 1889.

^k Journ. Voy. to Baffin Bay, II, p. 88, 1852.

^l Narrative Discovery Northwest Passage, pp. 222, 347, 521, 1857.

^m Proc. U. S. Nat. Mus., XIV, p. 418, 1891.

Island August 4, 1894.^a Another, taken by him at Fort Rae, September 30, 1893, but not recorded, has been examined. Hubert Darrell informs me that he observed large gulls with wings entirely white near the base of Kent Peninsula, June, 1902. Ross's notes on *L. glaucescens*, which he records as occurring on Great Slave Lake, and as having been procured at Fort Simpson,^b probably refer to the present species. Seale states that glaucous gulls were abundant all along the Arctic coast east to Mackenzie Bay in the late summer of 1896.^c Reed records a set of 3 eggs, taken on Herschel Island July 1, 1900, by I. O. Stringer.^d

Larus leucopterus Faber. Iceland Gull.

J. C. Ross states that this gull breeds at Felix Harbor, Boothia.^e Baird, Brewer, and Ridgway state that it has been obtained at Melville Island,^f and that "MacFarlane procured several sets of the eggs of this species on the Arctic coast in July, 1863, and again in July, 1865."^g Reed records eggs taken at Mackenzie Bay, Arctic America, June 18, 1899.^h Three eggs, taken by Collinson at Cambridge Bay, Victoria Land, are in the British Museum.ⁱ These are the principal records regarding the occurrence of the bird within the region, and the more westerly of these seem open to question.

Larus schistisagus Stejn. Slaty-backed Gull.

An adult male taken at Franklin Bay, Mackenzie, June 9, 1901, was identified by Dr. A. K. Fisher, of the Biological Survey, in 1902. This appears to be the only record for the region.

Larus argentatus Pontoppidan. Herring Gull.

The widely distributed herring gull is abundant throughout the region now under review. In 1901 a few were seen on Athabaska River below the mouth of La Biche River, May 7. The species was common on the lower river between the mouth of the Clearwater and Athabaska Lake, May 15 and 16, and on Athabaska Lake in the vicinity of Fort Chipewyan, May 18 to 31, and was noted near the outlet, June 3. Several individuals were seen at Fort Smith, Mackenzie, June 27. It was common on Great Slave Lake about Fort Resolution, and between there and Fort Rae, during the month

^a Expl. in Far North, p. 255, 1898.

^b Nat. Hist. Rev., II (second series), p. 289, 1862.

^c Proc. Acad. Nat. Sci. Phila., 1898, p. 131.

^d N. A. Birds' Eggs, p. 27, 1904.

^e Appendix Ross's Second Voyage, p. xxxiv, 1835.

^f Water Birds N. A., II, p. 218, 1884.

^g Ibid., p. 219, 1884.

^h N. A. Birds' Eggs, p. 28, 1904.

ⁱ Cat. Birds' Eggs Brit. Mus., I, p. 221, 1901.

of July. On July 13, while detained by wind on Loon Island, 50 miles north of Fort Resolution, I visited a breeding colony on a small island a quarter of a mile to the westward. The island was merely a rock about 50 yards in diameter and only 3 or 4 feet out of water, and was bare except for small patches of grass growing in the crevices. Upon it were nesting about 100 pairs of herring and California gulls, the latter outnumbering the herring gulls two to one. Most of the nests of the two species, which were indistinguishable after the eggs were hatched, contained young which varied in size from chicks just hatched to birds the size of a teal. Many of the larger young scrambled to the water and swam away, but the greater number sought to conceal themselves in the crevices or beneath tufts of grass. The entire company of old birds flew about, keeping up a deafening clamor, the herring gulls being much more wary than their smaller relatives. An adult male was collected. While ascending Slave River from Fort Resolution to Fort Smith, Mackenzie, August 1 to 3, we noted an occasional bird.

In 1903 we observed the herring gull on the Athabaska near Pelican River, May 18; between there and Grand Rapid, May 19 and 20; near Little Buffalo River, May 25; and 50 miles below Fort McMurray, May 29. We saw a few on Athabaska Lake, June 2, 3, and 4; at Fort Smith, Mackenzie, June 15; and on Slave River 50 miles below Fort Smith, June 16, and near Limestone Point, June 17. The species was common on Great Slave Lake near Fort Resolution during the latter part of June. Alfred E. Preble and Merritt Cary noted it commonly on Great Slave Lake between Fort Resolution and Hay River, June 27, and saw a few at Fort Providence, June 2 and 3. They also observed it at Fort Simpson, July 10; found it abundant near the mouth of Nahanni River, July 11 and 19, and noted it near Fort Wrigley, July 20. On their return trip they saw it on the Mackenzie, above Fort Simpson, July 25; on Great Slave Lake, between its outlet and Fort Rae, July 27 and 28; found it common at the delta of the Athabaska, August 4; and noted one at Brulé Rapid, on the Athabaska, August 19. After the division of the party, I frequently observed the species near Fort Resolution during the early part of July, and while crossing the lake to Fort Rae, July 17 to 29. It was an abundant breeder on most of the lakes along the route traversed between Great Slave and Great Bear lakes in August, and greater or less numbers were seen almost daily. While traveling along the south shore of Great Bear Lake, August 28 to September 17, I observed the species nearly every day, and took an immature bird east of Leith Point on August 28. Two young which had not been long on the wing and were still attended by the mother were seen on McVicar Bay, September

10. During my stay at Fort Franklin, September 18 to 27, I observed one or more nearly every day, and one was seen near the head of Bear River, September 28. While ascending the Mackenzie I saw one near the Blackwater, October 8; another 10 miles below Fort Wrigley, October 10; and a few daily between Fort Wrigley and Nahanni River, October 11 to 13.

In the spring of 1904 large gulls, probably of this species, were first observed near Fort Providence by J. W. Mills, May 4. I did not see any at Fort Simpson until May 24. The species undoubtedly had arrived some time previously, but from its scarcity had been overlooked. It was several times observed during the latter part of the month. While descending the Mackenzie in June, I occasionally noted a few between Forts Simpson and Good Hope, taking one at the mouth of the Blackwater, about 50 miles below Fort Wrigley, June 9. Along the lower Mackenzie and Peel rivers, between Forts Good Hope and McPherson, I saw it daily, June 26 to July 1. While ascending the Mackenzie during the latter part of July, I occasionally observed the species, and it was common on Great Slave Lake, July 31 and August 1.

Sabine recorded a specimen of this species killed on a cliff in the North Georgia Islands (Melville Island).^a M'Clintock states that the silvery gull breeds at Bellot Strait, where it had eggs June 25, 1859.^b McCormick took it near Beechey Island, Wellington Channel, September 8, 1852, and July 21, 1853.^c Armstrong, in his narrative of the voyage of the *Investigator*, states that the species was shot on Prince Albert Land, June 9, 1851; ^d he also noted it at Mercy Bay, Banks Land, May 31, 1852.^e Saunders records two specimens taken by Doctor Anderson of the *Enterprise* on Prince Albert Land.^f Baird, Brewer, and Ridgway state that it was found breeding at Fort Resolution, Fort Rae, Big Island, Fort Simpson, Fort Anderson, and on the lower Anderson and Horton rivers.^g The National Museum catalogue shows that the species was received also from Great Bear Lake; and a specimen from Fort Resolution taken by Kennicott, June 16 [1860], and one from Big Island, are still in the collection.

Hubert Darrell informs me that he observed a large gull with black on the wings, probably this species, on Bathurst Inlet, June 29, 1902.

^a Suppl. to Appendix Parry's First Voyage, p. cciv, 1824.

^b Voyage of the *Fox*, p. 290, 1860.

^c McCormick's Voyages, II, pp. 157, 84, 1884.

^d Narr. Discovery Northwest Passage, p. 347, 1857.

^e *Ibid.*, p. 521, 1857.

^f Cat. Birds Brit. Mus., XXV, p. 266, 1896.

^g Water Birds N. A., II, p. 238, 1884.

Larus californicus Lawr. California Gull.

This western gull is a common breeder about Great Slave Lake, and has been noted also from the lower Anderson.

In 1901 we first noted it at Fort Resolution, Mackenzie, July 8, when several were seen flying about over the lake. They are usually easily distinguished from the herring gulls by their smaller size, different cry, and by the greater amount of black on the primaries. The species was abundant about Loon Island, July 11 to 14, where 60 or 70 pairs were nesting on the small adjoining island before referred to. They seemed to lay a little later than the herring gulls, as most of the unhatched eggs were of the present species. Three fine adults and a young one a few days old were collected July 13 and 14. A few were seen at Trout Rock, July 16, and at Fort Rae, July 24. While crossing Great Slave Lake by steamer from Fort Rae to Fort Resolution, July 30, many were observed near Hardisty Island.

In 1903 I noted the California gull at Fort Resolution, July 7, and several times among the islands between Fort Resolution and Fort Rae, July 17 to 26.

In 1904, while on my return trip, I found it rather common on Great Slave Lake, July 30 and 31.

Baird, Brewer, and Ridgway record eggs taken near Fort Resolution, and specimens of the birds from the same place, and from Fort Simpson and Big Island.^a MacFarlane reported nests found near Fort Anderson, and received specimens with eggs from lower Anderson River.^b

Larus delawarensis Ord. Ring-billed Gull.

This species occurs in summer north to Great Slave Lake, where it is one of the rarest of the breeding gulls.

While we were descending Athabaska River in 1901 a flock of these gulls was seen at the mouth of Pelican River, 100 miles below Athabaska Landing, on May 9.

In 1903 we saw a few at a small slough near Sturgeon River, Alberta, May 12, and several on the Athabaska near Pelican River, May 18. While at Fort Chipewyan we noted a few, June 3 and 4, and we observed the species near Smith Landing, June 10. Alfred E. Preble and Merritt Cary noted two near the Desmarais Islands, July 1, and one at Fort Providence a few days later.

Baird, Brewer, and Ridgway record eggs of the ring-billed gull from Great Slave Lake.^c Russell has recorded specimens taken at Fort Chipewyan in the spring of 1893,^d and an adult taken by him there has been examined during the preparation of this report.

^a Water Birds N. A., II, p. 244, 1884.

^b Proc. U. S. Nat. Mus., XIV, p. 418, 1891.

^c Water Birds N. A., II, p. 247, 1884.

^d Expl. in Far North, p. 255, 1898.

Larus brachyrhynchus Rich. Short-billed Gull.

This small gull, originally described from Great Bear Lake, is one of the commonest breeders of its genus from the lower part of Slave River northward to the Arctic coast.

In 1901 we first met with this species on Slave River 75 miles below Fort Smith, July 1, when several individuals were seen and one was taken. During the next two days, while following the course of the river to its mouth, we observed the birds in considerable numbers. We did not note it again until July 16, while sailing among the spruce-covered islands of the Northern Arm of Great Slave Lake between Yellowknife Bay and Trout Rock, when we passed through the breeding ground of a large colony. The birds perched freely on the summits of the spruces, and were noisy and familiar. Many young ones, still unable to fly, left the small islands on our approach, and attempted to escape by swimming. An adult female was collected. A small flock was seen feeding on the lake at Fort Rae, July 22, and a nearly full-grown bird was taken. The last were noted while we were crossing the lake, July 30, when a number were seen near Hardisty Island.

In 1903 we first saw the short-billed gull on Slave River, 50 miles below Fort Smith, Mackenzie, June 16, observing about 25, and we noted it in numbers between there and Limestone Point, June 17. While on the Mackenzie, Alfred E. Preble and Merritt Cary observed it below the mouth of the Nahanni, July 19. On their return trip they noted it at Smith Landing, August 2. While crossing Great Slave Lake to Fort Rae, I found the species common among the islands of the Northern Arm, July 24 to 26, and observed many young birds just commencing to fly. Along my route between Great Slave and Great Bear lakes it seemed to be a common breeder. Adults accompanied by newly fledged young were common on lower Grandin River, August 1. I observed it on Sarahk Lake, August 7; Lake Rae, August 9, when young with the dark-banded tail were noted; and near Lake St. Croix, August 13. On the lakes between Lake Hardisty and Great Bear Lake I observed it in numbers on August 20, 24, and 25, this being the last date noted.

In the spring of 1904, I first saw the short-billed gull at Fort Simpson, Mackenzie, May 8, when several individuals, evidently newly arrived, were seen flying back and forth over the river. I next saw the bird on May 10, and it was common from that date, being noted nearly every day through May. Three specimens collected May 12 had been feeding on water beetles (*Dytiscus dauricus*). I noted the iris as light hazel. While descending the Mackenzie I

observed the species daily between Nahanni River and Fort Norman, June 6 to 10; between Wolverine Rock and Fort Good Hope, June 18 to 21; and frequently on the lower Mackenzie and Peel, June 25 to July 1. At Fort McPherson I noted it on July 4, 15, and 16; and on my return trip saw a few near Fort Providence, July 29.

Larus brachyrhynchus was first described by Richardson from a young female taken at Fort Franklin, Great Bear Lake, May 23, 1826.^a Another specimen, an adult male, killed at the same place, June 7, 1826, and recorded under the name *Larus canus*,^b is referable to the same species. Ross next referred to it as a bird of this region under the name *Rissa septentrionalis*, recording it as common on Great Slave Lake, and as having been collected at Fort Simpson.^c Baird, Brewer, and Ridgway recorded specimens taken during the breeding season on Slave River, and at Fort Resolution, Big Island, and Fort Rae; and eggs from Fort Resolution, Fort Rae, Anderson River, and Peel River. They also describe the location of various nests found by MacFarlane. One nest, merely a cavity in the sand, was found on Lockhart River, May 28; another found June 10, near Fort Anderson, was placed on a stump 4 feet from the ground; another found June 21, near Rendezvous Lake, was in a tree at least 10 feet from the ground.^d Specimens from Fort Resolution and Fort Rae are still in the collection of the National Museum, and the catalogue of the birds there shows that skins were received also from Fort Simpson, Fort Norman, Peel River, Anderson River, and Great Bear Lake. A specimen collected by Frank Russell at Fort Chipewyan in the spring of 1893 has been examined.

***Larus philadelphia* (Ord). Bonaparte Gull.**

This gull is a common breeder in suitable places throughout the region north at least to the borders of the wooded country. In 1901 this bird was first observed on Slave River about 50 miles below Fort Smith, Mackenzie, June 30, when several were seen. A number were observed, and one was collected, 25 miles below there on July 1, and during the next two days the species was found to be common along the lower part of the river. Though doubtless occurring, it was not seen after we reached Great Slave Lake.

In 1903 we noted three individuals about a small pond 70 miles north of Edmonton, Alberta, May 14, and one near Athabaska Landing, May 15. We next saw the species on the lower Athabaska near Poplar Point, May 30. While crossing Great Slave Lake, I

^a Fauna Boreali-Americana, II, p. 422, 1831. (This specimen is now in the U. S. National Museum.)

^b Ibid., p. 420, 1831.

^c Nat. Hist. Rev., II (second ser.), p. 289, 1862.

^d Water Birds N. A., II, p. 249, 1884.

found it common near Trout Rock, Northern Arm, July 25, and between there and Fort Rae, July 26, and I saw a pair on Lake Marian, July 31.

In 1904, J. W. Mills first observed this bird near Fort Providence, May 9, and H. W. Jones collected two at the same place on May 20. At Fort Simpson I first saw it May 12, and it was common on May 19, when I took a specimen. On May 25 I observed about 25 individuals on the river near the post.

A female specimen, taken near Fort Providence, May 14, 1905, by H. W. Jones, has recently been received.

This bird apparently was first recorded from this region by Richardson, who, under the name *Larus bonaparti*, describes a male said to have been killed on Great Slave Lake, May 26, 1826.^a In his account of his third Arctic journey, he states that this bird breeds on Bear Lake River, where it builds in colonies, sometimes placing 7 or 8 nests on a single tree.^b The following year large flocks arrived at Fort Franklin on May 18.^c Kennicott mentions that one was shot by W. L. Hardisty at Fort Resolution, May 18, 1860.^d Baird, Brewer, and Ridgway state that specimens and eggs were procured at Fort Resolution, Fort Rae, Big Island, Fort Simpson, Fort Good Hope, Peel River, Fort Anderson, and on the lower Anderson River.^e MacFarlane records that 37 nests with eggs were found near Fort Anderson, and on the lower Anderson River, all being built on trees.^f Hubert Darrell informs me that he observed small black-headed gulls, probably referable to this species, on Melville Sound, on the Arctic coast, June 15, 1902.

Rhodostethia rosea (Macgil.). Rosy Gull.

Though occurring, sometimes abundantly, in the Arctic regions to the eastward and westward, apparently the only record for the region now under review is that of J. C. Ross, who states, under the name *Larus rossii*, that it was reported once at Felix Harbor, Boothia.^g

Although the rosy gull has been known for eighty years, its breeding grounds remained undiscovered until 1905. In June of that year the bird was found breeding commonly in the Kolyma Delta, eastern Siberia, by S. A. Buturlin, who describes for the first time its breeding habits, eggs, and young.^h

^a Fauna Boreali-Americana, II, p. 425, 1831.

^b Arctic Searching Expedition, I, pp. 200, 201, 1851.

^c Ibid., II, p. 106, 1851.

^d Trans. Chicago Acad. Sci., I, p. 171, 1869.

^e Water Birds N. A., II, p. 263, 1884.

^f Proc. U. S. Nat. Mus., XIV, p. 418, 1891.

^g Appendix Ross's Second Voyage, p. xxxvi, 1835.

^h Ibis, 1906, pp. 131-139; 333-337.

Xema sabini (Sab.). Sabine Gull.

This small fork-tailed gull has been found breeding at several points on the Arctic coast of Mackenzie, but has not been detected in the interior. Sutherland recorded it from near Beechey Island, where several were observed June 6, 1851.^a J. C. Ross recorded it from Felix Harbor, and states that it was reported to breed on the west side of Boothia.^b It was recorded from this region by Richardson, who found it breeding on an island off Point Dalhousie, August 8, 1848. At this time the spotted young were accompanying their parents on the wing. The eggs had been deposited in hollows in the short and scanty mossy turf.^c MacFarlane found it breeding on Franklin Bay in June, 1865, and Baird, Brewer, and Ridgway describe eggs collected by him.^d MacFarlane states that eggs were obtained by the Eskimo on Liverpool Bay.^e Seale states that in 1896 this gull was first seen at Herschel Island on August 28.^f An egg taken by Collinson at Cambridge Bay, Victoria Land, is in the collection of the British Museum.^g

Sterna caspia Pallas. Caspian Tern.

The widely distributed Caspian tern occurs in summer in a few localities, notably the deltas of the larger rivers, north to the mouth of the Mackenzie. In 1901 we met with it but once, on July 9, when a single bird was seen flying over the shallow lagoons between the mouth of Slave River and Stone Island, Great Slave Lake.

In 1903 we observed it first at the delta of the Athabaska, June 2, when several birds were seen. I frequently noted the species at Fort Resolution, June 20 to July 17, but seldom saw more than one or two at a time. I saw several among the islands of the Northern Arm, between Yellowknife River and Fort Rae, July 25 and 26, and one on Lake Marian, July 31.

Richardson, undoubtedly referring to the present species, recorded the "Great Tern *Sterna cayana*" from below Harrison Island, near the mouth of the Mackenzie, where he saw it on August 1, 1848.^h Ross, in 1862, noted the species as rare on Great Slave Lake.ⁱ During the next few years the Smithsonian Institution received a number

^a Journ. Voy. to Baffin Bay, II, p. 88, 1852.

^b Appendix Ross's Second Voyage, p. xxxvii, 1835.

^c Arctic Searching Expedition, I, p. 262, 1851.

^d Water Birds N. A., II, p. 272, 1884.

^e Proc. U. S. Nat. Mus., XIV, p. 419, 1891.

^f Proc. Acad. Nat. Sci. Phila., 1898, p. 133.

^g Oates, Cat. Birds' Eggs Brit. Mus., I, p. 203, 1901.

^h Arctic Searching Expedition, I, p. 231, 1851.

ⁱ Nat. Hist. Rev., II (second ser.), p. 289, 1862.

of specimens from Fort Resolution, Fort Rae, and Big Island;^a skins from these localities are still in the collection.

Sterna hirundo Linn. Common Tern.

This widely distributed tern breeds in suitable places throughout the region. It is rather rare north of Great Slave Lake, being largely replaced by the Arctic tern, but occurs with that species in some localities.

In 1901 this species was first seen at the delta of the Athabaska the date of our arrival, May 17, when a number were observed. It was common at the mouth of the Quatre Fourches, near Fort Chipewyan, May 23, and a few were seen near the outlet of Athabaska Lake, June 2.

In 1903 we noted it at the delta of the Athabaska, June 2, and saw a few on Rocher River, June 6. Alfred E. Preble and Merritt Cary observed two near Hay River, Great Slave Lake, June 27, and on their return trip observed a few in company with Arctic terns at the mouth of the Athabaska, August 5. I saw a few, associated with Arctic terns, among the islands of the Northern Arm, July 24 and 26.

Ross recorded the common tern as being very rare on Great Bear and Great Slave lakes, and as having been collected at Fort Simpson.^b Baird, Brewer, and Ridgway record specimens from Fort Rae, Big Island, and the Arctic coast below Anderson River.^c

Sterna paradisæa Brünn. Arctic Tern.

This tern is a common breeder in suitable places from lower Slave River northward, replacing the common tern to a great extent north of Great Slave Lake.

In 1901 we first observed this bird 50 miles below Fort Smith, June 30, when a number of individuals were seen flying over the river, and one was collected. During the next three days we noted the species frequently between that point and Great Slave Lake, and found it breeding on some low sandy islands in the lower part of the river, July 3. While crossing Great Slave Lake we found it common among the islands. On Loon Island, 50 miles north of Fort Resolution, where we were detained by wind, July 11 to 14, about 50 pairs were nesting. At this time most of the eggs were hatched, but the colony raised very few young. Many were killed by the cold storm which kept us from leaving the island, and the jaegers and gulls were frequently seen to swoop down and snatch a young one. A number of the birds, including a young one a few days old which I picked up dead, were preserved.

^a Water Birds N. A., II, p. 283, 1884.

^b Nat. Hist. Rev., II (second ser.), p. 289, 1862.

^c Water Birds N. A., II, p. 297, 1884.

In 1903 we first observed this species on Slave River, 50 miles below Fort Smith, June 16. We found it common between there and Limestone Point, June 17; and near the mouth of the river, June 19; and noted several at Fort Resolution, June 20. While on the Mackenzie, Alfred E. Preble and Merritt Cary found the species common at Fort Providence, June 7 and 8; observed upward of 500 on the Little Lake, near Fort Providence, July 9; and several at Fort Simpson, July 10. On their return journey they noted it commonly between Fort Simpson and Fort Providence, July 25 and 26; and observed about 50 near the mouth of the Athabaska, August 5. I found it common on Great Slave Lake, especially among the islands of the Northern Arm, when I crossed late in July, and it was abundant on Lake Marian on July 31.

In 1904 J. W. Mills first noted this species near Fort Providence May 25. I did not observe the bird during the spring migration, but found it common at the head of the Mackenzie delta, June 30. On July 1, while ascending the Peel to Fort McPherson, I observed several nesting colonies on its grassy banks, finding about a dozen nests containing incomplete sets of eggs. Several families of Eskimo also traveling along the river were interesting themselves in these nests, doubtless considering the eggs an agreeable change from a diet of fish and putrid geese. While at Fort McPherson on July 11 and 16 I noted a few individuals, probably stragglers from these breeding colonies.

Sabine recorded two immature birds which were killed July 8, probably at Winter Harbor, Melville Island.^a Richardson gives a description of one killed at Great Bear Lake [probably at Fort Franklin] June 7, 1826.^b J. C. Ross states that this species is rare on the east and west coasts of Boothia.^c McCormick records it from Wellington Channel as late as August 28, 1852.^d Baird, Brewer, and Ridgway state that the species has been found occurring in abundance at Fort Resolution; Fort Rae; Big Island; Fort Simpson; Peel River; Fort Anderson; Franklin Bay; Rendezvous Lake; and other localities.^e Seale states that the species was abundant at Herschel Island on August 27, 1896.^f

^a Suppl. to Appendix Parry's First Voyage, p. cciii, 1824.

^b Fauna Boreali-Americana, II, p. 414, 1831.

^c Appendix Ross's Second Voyage, p. xxxiii, 1835.

^d McCormick's Voyages, II, p. 137, 1884.

^e Water Birds N. A., II, p. 300, 1884.

^f Proc. Acad. Nat. Sci. Phila., 1898, p. 133.

Hydrochelidon nigra surinamensis (Gmel.). Black Tern.

The black tern occurs commonly in suitable places north to Great Slave Lake. The marshes at the delta of Slave River appear to mark its northern limit of abundance in this region.

In the spring of 1901 it was first met with on the lower part of Athabaska River May 17, when we saw large numbers flying to and from the numerous marshes which cover the face of the country back of the fringe of trees which borders the river. We next noted the species about 50 miles below Fort Smith July 30, and during the next three days found it numerous along the lower part of Slave River, where the many outlying marshes afford a congenial habitat.

In 1903 we found this species common on the lower Athabaska, May 31 to June 2; and noted it on Slave River near the mouth of the Peace, June 9; and between there and Smith Landing, June 10.

Ross listed this tern as rare on Great Slave Lake.^a Baird, Brewer, and Ridgway recorded specimens from Fort Resolution.^b A skin collected there by Kennicott is still in the National Museum.

Fulmarus glacialis (Linn.). Fulmar.

Armstrong noted the fulmar petrel near the southern extremity of Baring Land, where it was observed September 7, 1850.^c McClintock observed it at Brentford Bay August 10, 1859.^d McCormick noted the species in Wellington Channel, September 2, 1852.^e

Phalacrocorax auritus (Lesson). Double-crested Cormorant.

This cormorant breeds commonly on some of the lakes in the Saskatchewan and upper Churchill basins, and a few stragglers have been taken about Great Slave Lake. Ross recorded it as being rare on Great Slave Lake;^f and the catalogue of the birds in the National Museum contains the record of a specimen (No. 20139) taken at Big Island by John Reid. Macoun, on the authority of Dippie, records it as breeding on Buffalo Lake, Alberta.^g Seton records it as breeding in large numbers at Isle à la Crosse.^h

Capt. J. W. Mills informed me that one was shot at Willow River, near Fort Providence, about October 10, 1901. This was the only instance of the occurrence of the species known to the natives who saw the specimen.

^a Nat. Hist. Rev., II (second ser.), p. 289, 1862.

^b Water Birds N. A., II, p. 320, 1884.

^c Narrative Discovery Northwest Passage, p. 213, 1857.

^d Voyage of the *Fox*, p. 300, 1860.

^e McCormick's Voyages, II, p. 146, 1884.

^f Nat. Hist. Rev., II (second ser.), p. 288, 1862.

^g Cat. Canadian Birds, Part I, p. 66, 1900.

^h Auk, XXV, p. 69, 1908.

Pelecanus erythrorhynchos Gmel. American White Pelican.

In the spring of 1901 we saw about ten pairs at the mouth of Pelican River, 100 miles below Athabaska Landing, May 9. The birds are said to be usually found at this point and to nest among the rapids which occur on the lower part of Pelican River. A large number nest on the islands at Smith Rapids, and while encamped at Smith Landing near the head of the rapids, we saw straggling individuals on June 14 and 16. At Fort Smith, near the foot of the rapids, we saw the birds almost daily, June 19 to 28. After leaving Fort Smith we did not again observe the species until August 3, when a single young bird was seen about 15 miles below Fort Smith.

In 1903 we saw several individuals near Fort Smith, June 14. Merritt Cary was informed that several pairs breed annually on a small rocky islet, one of the Desmarais group, in Great Slave Lake. J. W. Mills tells me that during the past few years he has seen three small flocks near Fort Providence.

The Smith Rapids colony occupy the most northern breeding station of this species in North America (excepting the small colony on Great Slave Lake), and have evidently occupied this site from time immemorial, as Alexander Mackenzie refers to the 'Pelican' as one of the portages passed in these rapids when he descended the river in 1789.^a Richardson mentions the species as numerous on Isle à La Cross Lake, in flocks of 40 or 50, in June, 1848.^b Ross recorded it as common north to Big Island:^c and the catalogue of the birds in the National Museum contains the record of a specimen taken there. Frank Russell collected young birds and eggs at the Smith Rapids breeding ground, July 3, 1893. He reported many scores of young birds in different stages of development.^d J. Alden Loring reported seeing a number of these pelicans on Lake Ste. Anne, Alberta, in August, 1895; he also noted several on an island in the same lake, May 26, 1896. Fleming records one taken by the Eskimo in Liverpool Bay in June or July, 1900.^e The bird was new to the natives, and was probably merely a straggler.

Mergus americanus Cass. American Merganser.

This merganser occurs as a rather uncommon breeder north to Great Slave Lake. While descending the Athabaska, May 6 to 17, 1901, we saw a pair or two almost daily. We observed the species on the marshes at the mouth of the Quatre Fourches, near Fort Chipewyan, May 24; and at Point La Brie, 12 miles northeast of the post,

^a Voyages to Frozen and Pacific Oceans, p. 4, 1801.

^b Arctic Searching Expedition, I, p. 101, 1851.

^c Nat. Hist. Rev., II (second ser.), p. 288, 1862.

^d Expl. in Far North, p. 256, 1898.

^e Auk, XXIII, p. 218, 1906.

May 30 and 31; and saw several birds on Great Slave Lake near Stone Island, July 11. We did not note the species again until we were ascending the Athabaska on our return, when we saw a number of individuals near the mouth of Big Mouth Brook, August 26.

The Hudson's Bay Company museum at Fort Simpson contains a specimen said to have been taken at Fort Providence several years since. An alleged specimen taken by Russell near Fort Rae^a has been examined and proves referable to *M. serrator*.

Mergus serrator Linn. Red-breasted Merganser.

This species breeds throughout the region north to the tree limit. In 1901 it was positively identified but once, near the north shore of Great Slave Lake, at the mouth of the Northern Arm, where a female was shot July 15.

In 1903 we noted the species at Edmonton, Alberta, May 8; on the Athabaska, below Grand Rapid, May 25 and 26; and on the lower Athabaska on May 29, 30, and 31. We next observed it on Great Slave Lake, where it was frequently seen between Fort Resolution and Fort Rae, July 17 to 29. During my trip northward from Fort Rae I observed the bird on Lake Hardisty on August 16 and 17, and a few miles south of MacTavish Bay, August 21, when a female, with young about a week old, was observed. While traveling along the south shore of Great Bear Lake I found the species common, noting it nearly every day, August 28 to September 17, and taking one near Manito Islands, September 15. While encamped at Fort Franklin, September 18 to 27, I observed it on several occasions, and while ascending the Mackenzie noted it near Blackwater River, October 7; a few miles above there, October 8; at Roche Trempe-l'eau, October 9; and above Nahanni River, October 15 and 16.

In the spring of 1904 I first observed this species at Fort Simpson on May 19, though it had doubtless arrived earlier. While descending the Mackenzie I observed it near Roche Trempe-l'eau, June 8; near Fort Norman, June 10; near Sans Sault Rapid, June 19; near the Ramparts, June 20; and on the lower Mackenzie and Peel rivers, June 30 and July 1. On my return trip I saw a few on the Mackenzie near Roche Trempe-l'eau, July 22.

Ross notes this species as being found commonly north to Peel River, and as having been collected at Fort Simpson;^b MacFarlane collected several sets of eggs in the vicinity of Fort Anderson and on the border of the 'Barrens' to the eastward of that post.^c Specimens were received by the Smithsonian Institution from Fort Resolution, Fort Rae, Big Island, Fort Simpson, and Peel River. Seton

^a Expl. in Far North, p. 256, 1898.

^b Nat. Hist. Rev., II (second ser.), p. 289, 1862.

^c Proc. U. S. Nat. Mus., XIV, p. 419, 1891.

reports the bird abundant on Great Slave Lake, and northeast to Clinton-Colden Lake in 1907.^a

Lophodytes cucullatus (Linn.). Hooded Merganser.

This beautiful merganser is a rather rare summer resident north to Great Slave Lake and the upper Mackenzie. While ascending the Mackenzie in the autumn of 1903 I observed a fine male a few miles below Fort Wrigley, October 9. This seems to be the most northern record for the region.

Ross seems to have been the first to record the hooded merganser from this region, noting it as being rare north to Great Slave Lake.^b Baird, Brewer, and Ridgway recorded specimens collected at Fort Resolution by J. Lockhart.^c J. Alden Loring reported taking one on Fishing Lake, a few miles west of Jasper House, Alberta, in the summer of 1895, and saw another, which had been killed on Spotted Lake, 60 miles west of Edmonton, November 3, 1896. A specimen in the National Museum (No. 124705) labeled Lac du Brochet, May 18, 1891, was collected at the post of that name on Reindeer Lake. The Hudson's Bay Company museum at Fort Simpson contained a mounted specimen, but I did not ascertain its locality.

Anas platyrhynchos Linn. Mallard.

One of the most abundant and generally distributed ducks throughout the wooded region. In 1901 we noted it daily on the Athabaska between Athabaska Landing and Fort Chipewyan, May 6 to 17. A nest found near the bank of the river about 50 miles above Athabaska Lake, May 16, contained 9 eggs about one day incubated. We noted the bird almost daily while collecting at Fort Chipewyan, while descending Slave River, and at Fort Smith. We saw females with young a few days old in the marsh near the latter place, June 26 and 27; found the species common on lower Slave River July 2 to 4, collecting an adult male July 3; and noted the species several times at Fort Resolution during July. While crossing Great Slave Lake I noted it near the mouth of the Northern Arm July 15, and observed females with young about a week old among the islands near Yellowknife Bay July 16, and at Trout Rock, July 17. While on our return trip we noted the species on Smith Portage August 5, at Fort Chipewyan August 8, near Crooked Rapid August 15, and below Pelican Rapid August 23.

In 1903 we saw mallards at Edmonton, Alberta, May 10, and nearly every day on the way to Athabaska Landing, May 11 to 15, and between there and Fort Chipewyan, May 16 to June 2. We found the species common also along our route between Fort Chipewyan

^a Auk, XXV, p. 69, 1908.

^b Nat. Hist. Rev., II (second ser.), p. 288, 1862.

^c Water Birds N. A., II, p. 124, 1884.

and Fort Resolution, and noted it nearly every day, collecting a specimen near Fort Resolution June 19. Alfred E. Preble and Merritt Cary noted it in the marsh at Hay River June 30 and July 1, and below the mouth of Nahanni River July 19. On their return trip they observed it at Grand Rapid August 20, House River August 21, Quito River August 29, where several small flocks were noted, and near Athabaska Landing September 13. While crossing Great Slave Lake to Fort Rae I found it common among the islands of the Northern Arm July 23 to 26. While on my trip northward to Great Bear Lake I noted it on Lake Marian July 31, Grandin River August 2, Lake Mazenod August 6, Sarahk Lake August 7, and Lake Hardisty August 16. While ascending the Mackenzie I saw a small flock 20 miles below Nahanni River October 13.

In the spring of 1904 the mallard was noted near Fort Providence by H. W. Jones April 27. At Fort Simpson it was first observed May 3, four being seen. While descending the Mackenzie June 6 I observed a few near Nahanni River, and on my return trip saw two near the same place July 26, and several on the Athabaska near Little Buffalo River August 21.

Ross recorded this species as being abundant in the Mackenzie River district north to the Arctic coast, and as having been collected at Fort Simpson.^a Kennicott noted its arrival at Fort Resolution on May 7, 1860,^b and obtained a set of 9 eggs on the 25th of the same month.^c MacFarlane met with it throughout almost the entire wooded portion of the Anderson River region.^d The National Museum catalogue shows that specimens were received from Fort Resolution, Fort Rae, Big Island, and Fort Simpson, and the species has also been taken at Fort Good Hope. J. Alden Loring reported it as common at Edmonton, September 7 to 26, 1894.

Anas rubripes Brewst. Dusky Duck; Black Duck.

MacFarlane found the black duck on Anderson River, where it was not uncommon, and where several specimens were shot, but failed to find nests.^d I was informed by A. F. Camsell, of Fort Simpson, that this species was sometimes shot at that post in spring.

Chaulelasmus streperus (Linn.). Gadwall.

Eggs of the gadwall were collected at Lesser Slave Lake, probably in 1868, by Strachan Jones. Macoun says it breeds in large numbers at Edmonton, Alberta, and states on the authority of Dippie

^a Nat. Hist. Rev., II (second ser.), p. 287, 1862.

^b Trans. Chicago Acad. Sci., I, p. 170, 1869.

^c Ibid., p. 172, 1869.

^d Proc. U. S. Nat. Mus., XIV, p. 420, 1891.

that it was common at Buffalo Lake, Alberta, in July, 1895.^a MacFarlane in a manuscript list states that a female gadwall was obtained at Fond du Lac, Athabaska Lake, by J. Mercredi. The species seems to be mainly a bird of the prairie region, and has not been recorded from the Mackenzie Valley.

Mareca americana (Gmel.). Baldpate.

In 1901 we first noted this species on the lower Athabaska, May 16 and 17, when we saw it in numbers. We next observed it on Rocher River, June 5, and at the mouth of Peace River, June 6, collecting a male and female at the latter place. We again noted it and collected a male 25 miles below Peace River, June 11, and saw it at Smith Landing, June 13. While descending Slave River, June 30, about 40 miles below Fort Smith, Mackenzie, we saw a large flock composed entirely of males. They were resting on drift logs and sandbars in a shallow part of the river, and were not at all shy. I saw a single bird in a marsh at Fort Resolution, July 6; and shot one on Great Slave Lake near the mouth of the Northern Arm, July 15. While ascending the Athabaska we observed a few below Pelican Rapid, August 23.

In 1903 we first observed this species on the Athabaska above Stony Rapid, May 26, and next noted it on Athabaska Lake near Fort Chipewyan, June 1. It was common on the marshes adjoining Rocher River, June 6 to 8, and a pair was taken on the latter date. We also noted it near the mouth of the Peace, June 9, and found it common on Slave River between Fort Smith and Fort Resolution, Mackenzie, June 15 to 19. Alfred E. Preble and Merritt Cary noted about 25 individuals between Desmarais Islands and Fort Providence, July 2; about the same number between Fort Providence and Fort Simpson, July 9; and a few near Nahanni River, July 11. On their return trip they saw large flocks flying up the Athabaska, evidently on their southward migration, near the mouth of Quito River, August 29. While on my way to Fort Rae, I saw a few near Stone Island, July 18. During my trip through the lake country north of Fort Rae, I noted the species in considerable numbers. Females accompanied by young, many of which were just beginning to fly, were common along Grandin River, August 1 to 4. I noted it also on Lake Mazenod, August 6; Sarahk Lake, August 7; and Lake Hardisty, August 16.

In the spring of 1904 I first noted this duck at Fort Simpson, Mackenzie, April 28, when I saw half a dozen. I next saw it May 3, and found it rather common May 4, and during the remainder of the month. While descending the Mackenzie I saw several near

^a Cat. Canadian Birds, Part I, p. 79, 1900.

the mouth of Nahanni River, June 6, and noted it almost daily on the lower Mackenzie and Peel, between Forts Good Hope and McPherson, June 25 to July 1.

This is an abundant species throughout the wooded portion of the region. Ross recorded it as common north to Peel River and as having been collected at Fort Simpson.^a Baird, Brewer, and Ridgway state that it has been reported in the breeding season from Fort Resolution, Fort Anderson, Anderson River, and Swan River, east of Fort Anderson.^b Specimens were received by the Smithsonian Institution also from Big Island, Peel River, and Fort Rae, one from the latter place being still in the collection.^c J. Alden Loring reported it common at Edmonton, Alberta, September 7 to 26, 1894, and in the various lakes a short distance northwest of Edmonton, November 4, 5, and 6, 1896.

Nettion carolinense (Gmel.). Green-winged Teal.

The green-winged teal occurs throughout the forested portion of the region, but is rare in the northern part of its range. In 1901 we saw several on Sturgeon River, 25 miles north of Edmonton, Alberta, May 2, and found the species common on the Athabaska between Grand Rapid and Athabaska Lake, May 11 to 17. We saw a number on the marshes at the mouth of the Quatre Fourches, near Fort Chipewyan, May 23 and 24, and took a pair on the latter date. We noted the species on Rocher River, June 5; 25 miles below Peace River, June 13; and on several occasions at Fort Smith, Mackenzie, June 19 to 28; and 50 miles below that post, June 30. We collected one at the mouth of Slave River, July 4; and observed a pair near Fort Resolution, July 6. In a small pond near Fort Rae, July 22, I observed a female with eight young about one-fourth grown.

In 1903 we first noted this teal at Edmonton, Alberta, May 8. We saw about 25 near Sturgeon River, May 12, and noted the species among the small sloughs to the northward of that place on May 13. While descending the Athabaska we noted it near Athabaska Landing, May 16; below Grand Rapid, May 25; and on the lower Athabaska, May 31 and June 1. We found it common on Rocher River, June 6 to 8; and noted it on Slave River, near the mouth of the Peace, June 9; and near Limestone Point, June 17. We observed it also in a small pond near Fort Resolution, June 23; among the Simpson Islands, 50 miles northeast of Fort Resolution, July 21; and near Gros Cape, July 23. During my trip northward from Fort Rae, I

^a Nat. Hist. Rev., II (second ser.), p. 287, 1862.

^b Water birds N. A., I, p. 524, 1884.

^c A specimen from Fort Rae, recorded by Russell as *Anas penelope* (Expl. in Far North, p. 257, 1898), has been examined by Mr. Ridgway, and proves referable to *M. americana*.

observed the species on Marian Lake, July 31; and on MacTavish Bay, August 25. On their return trip Alfred E. Preble and Merritt Cary noted flocks near Athabaska Landing, Alberta, August 31 and September 7.

In the spring of 1904 I first observed this species at Fort Simpson, May 3, noting two. I saw others on May 4, 5, and 11, and collected a female on the last date. During the remainder of the month the bird was only noted once or twice. While descending the Mackenzie I saw one near the mouth of Nahanni River, June 3; and several between Fort Good Hope and the site of the old fort, June 25 and 26, collecting a male on the former date.

Richardson, under the name *Anas crecca*, gives a description of a male killed at Fort Franklin.^a Ross records the species as common in the Mackenzie River district north to Peel River, and as having been collected at Fort Simpson.^b Baird, Brewer, and Ridgway state that Kennicott saw it on October 2 at Fort Liard, and found it abundant at Fort Resolution; they note its occurrence also at Fort Rae, La Pierre House, and Big Island; ^c and a skin from the latter locality is still in the National Museum. In the vicinity of Fort Anderson, MacFarlane found it one of the rarest of the breeding ducks, discovering but one nest during the several seasons spent there.^d In the spring of 1897, Spreadborough found greenwings abundant about Edmonton, where the birds arrived about April 17, and were common by April 24. Nests containing 9 and 7 eggs were found May 25 and June 1, respectively.^e

J. Alden Loring found it common along the route between Edmonton and the Rocky Mountains in the summer of 1896, and shot one a short distance west of Edmonton, November 3.

Querquedula discors (Linn.). Blue-winged Teal.

This duck is a rather rare or local summer resident north to Great Slave Lake. Ross recorded it as being found north to Fort Resolution, but as being rare.^f Kennicott noted one at Fort Resolution May 7, 1860,^g and a specimen taken by him there June 8 [1860], is still in the National Museum. The Museum catalogue also records a specimen collected at Fort Simpson. J. Alden Loring found the species common at Edmonton, Alberta, in September, 1894, and on the trail between Edmonton and Jasper House in the early autumn of

^a Fauna Boreali-Americana, II, p. 443, 1831.

^b Nat. Hist. Rev., II (second ser.), p. 287, 1862.

^c Water Birds N. A., II, p. 7, 1884.

^d Proc. U. S. Nat. Mus., XIV, p. 420, 1891.

^e Macoun, Cat. Canadian Birds, Part I, p. 82, 1900.

^f Nat. Hist. Rev., II (second ser.), p. 287, 1862.

^g Trans. Chicago Acad. Sci., I, p. 170, 1869.

1895. In the spring of 1897 Spreadborough found it common at Edmonton. It was first observed April 28, was common by May 3, and a nest was found May 19.^a MacFarlane, in a list recently sent me, states that a nest containing three eggs was found by an Indian near Fort Providence on June 1, 1885. H. W. Jones, by letter, reports this teal from Hay River, Great Slave Lake, where he observed three pairs in the summer of 1907.

Spatula clypeata (Linn.). Shoveler; Spoonbill.

The shoveler is a common species in the southern part of the region, and occurs in small numbers north to the mouth of the Mackenzie. In 1901 we observed several individuals a few miles north of Edmonton, Alberta, May 1; and single birds a short distance below Athabaska Landing, May 6; below Grand Rapid, May 11; and at Smith Landing, June 16.

In 1903 we first observed this species in small numbers near Sturgeon River, Alberta, May 12, and saw several among the sloughs to the northward on May 13. While descending the Athabaska we noted the species near Little Buffalo River, May 25, and near the Athabaska delta, June 1. On their return trip up the Athabaska, my brother and Cary noted a few at Quito or Calling River, August 29.

In 1904 I observed spoonbills but once, noting two pairs near the mouth of Peel River, July 1.

Richardson was the first to report this species from the Mackenzie region, describing a specimen taken at Fort Franklin in May, 1826.^b Kennicott mentions a pair shot by Hardisty, May 18, 1860, at Fort Resolution.^c Ross recorded it as being found, not commonly, however, in the Mackenzie River district north to Fort Good Hope, and as having been collected at Fort Simpson.^d Baird, Brewer, and Ridgway state that it was reported as breeding at Fort Resolution, Fort Rae, Big Island, and Anderson River.^e The bird catalogue of the National Museum records specimens collected at the first three of these localities, as well as one (No. 60123) from Lesser Slave Lake. MacFarlane recorded it as very rare on Anderson River, only two having been shot during the several seasons he collected there.^f Russell records that a male was taken at Fort Chipewyan, May 7, 1893, when the species was not uncommon, and was breeding.^g Macoun reports that a few pairs were breeding at Lake Ste. Anne in the summer of

^a Macoun, Cat. Canadian Birds, Part I, p. 83, 1900.

^b Fauna Boreali-Americana, II, p. 439, 1831.

^c Trans. Chicago Acad. Sci., I, p. 171, 1869.

^d Nat. Hist. Rev., II (second ser.), p. 287, 1862.

^e Water Birds N. A., I, p. 530, 1884.

^f Proc. U. S. Nat. Mus., XIV, p. 420, 1891.

^g Expl. in Far North, p. 257, 1898.

1898.^a J. Alden Loring shot several at Edmonton, Alberta, September 13, 1894.

Dafila acuta (Linn.). Pintail.

This fine duck breeds throughout the region now under review, being abundant from Great Slave Lake northward to the Arctic coast, and nesting commonly in portions of the Barren Grounds.

In 1901 we saw several on the marshes a few miles north of Edmonton, Alberta, May 1, and several on the Athabaska below Athabaska Landing, May 6. We observed one near the mouth of the river, May 17, and a number near the outlet of Athabaska Lake, June 2 and 4. Between this point and Smith Landing we saw the species almost daily. A nest found on a sandy island 10 miles below the mouth of Peace River, June 8, contained 9 eggs on the point of hatching. We did not note the species again until August 12, when we saw a large flock at Fort McMurray.

In 1903 we first saw this species near Sturgeon River, Alberta, May 12, and noted several a few miles to the northward, May 13. We noted it daily on the lower Athabaska, May 31 to June 2; and found it common on Rocher River, June 6 to 8, finding a nest with 2 eggs on the latter date. The nest was among thick grass on dry ground at a distance of 25 yards from a slough. On Slave River we noted pintails near Smith Landing, June 10; and found them common between Fort Smith, Mackenzie, and Fort Resolution, June 15 to 19, noting the species nearly every day, and taking a male 100 miles below Fort Smith, June 17. Alfred E. Preble and Merritt Cary observed the species at Fort Providence, July 6, and on the Little Lake, July 9. On their return trip, at Athabaska Landing, Alberta, August 31, they saw several large flocks evidently migrating southward. During my trip northward from Fort Rae, I found it to be an abundant breeder along lower Grandin River, noting many females with young, August 1 to 3, when some of the broods were able to fly. While traveling along the south shore of Great Bear Lake I saw a small flock at our camp east of Leith Point, August 29; and others near McVicar Bay, September 9 and 10, and took one on the latter date. While encamped at Fort Franklin, September 18 to 27, I observed small flocks daily. They resorted to the shallow water of the small bay, where our camp was situated, to feed in their characteristic fashion on the small mollusks (*Lymnæa palustris*) which abounded there.

In the spring of 1904 the pintail was first observed near Fort Providence, April 27. At Fort Simpson I noted it April 28, when 10 individuals were observed. It was next seen May 4, and was common

^a Cat. Canadian Birds, Part I, p. 84, 1900.

from that date. While descending the Mackenzie I saw several near the mouth of Gravel River, June 9 and 10.

Richardson reported this species from Fort Confidence, Great Bear Lake, where Doctor Rae observed it May 22, 1849;^a Ross recorded it as common in the Mackenzie River district north to La Pierre House, and as having been collected at Fort Simpson.^b Baird, Brewer, and Ridgway state that it was reported from Fort Resolution, Fort Anderson, the lower Anderson River, and Rendezvous Lake;^c and the bird catalogues of the National Museum show that specimens were received also from Fort Rae, Big Island, Fort Simpson, and La Pierre House. MacFarlane states that this is one of the most numerous of the ducks that breed in the Anderson River country, and one of the earliest to arrive.^d Russell records specimens collected May 18 and June 3, 1893, at Fort Chipewyan, where the species was breeding commonly.^e

Aix sponsa (Linn.). Wood Duck.

This beautiful duck is apparently a rare summer resident in the southern part of the region, north to the Peace River Valley. A duck whose description applies unquestionably to this species was examined by Reverend Mr. Warwick of Fort Chipewyan, in the summer of 1904. It had been killed in the vicinity. John Gullion, captain of the steamer *Grahame*, who seemed familiar with the species, informed me that he occasionally saw it on the lower part of Peace River.

Marila americana (Eyton). Redhead.

Macoun records a specimen taken at Edmonton, Alberta, where Spreadborough found the species rare and late in arriving.^f It is a bird of the prairie sloughs, and apparently does not regularly range to the northward of their limits.

Marila vallisneria (Wils.). Canvasback.

This northwesterly ranging species occurs rather commonly in certain marshy districts in the Mackenzie Valley, but has rarely been detected to the eastward of that stream. In the north, where its food is doubtless similar to that of most of the other species of the genus, its flesh is not distinguishable in flavor. Among a bunch of ducks which I saw in the possession of an Indian at Fort Chipewyan, August 8, 1901, and which were killed in the near-by marshes, was a female of this species. On my next trip I obtained a specimen

^a Arctic Searching Expedition, II, p. 105, 1851.

^b Nat. Hist. Rev., II (second ser.), p. 287, 1862.

^c Water Birds N. A., I, p. 513, 1884.

^d Proc. U. S. Nat. Mus., XIV, p. 420, 1891.

^e Expl. in Far North, p. 257, 1898.

^f Cat. Canadian Birds, Part I, p. 89, 1900.

which was shot at Willow River, near Fort Providence, late in September, 1903. The species is stated to be of regular occurrence there and to be rather common in autumn.

Ross first recorded the canvasback from the region, giving it as common north to Great Slave Lake;^a Baird, Brewer, and Ridgway state that it was found breeding at Fort Resolution, Fort Simpson, Fort Rae, and on Anderson River;^b and the bird catalogue of the National Museum shows that specimens were received also from Big Island, Great Slave Lake. MacFarlane found a few nests in the vicinity of Fort Anderson;^c and specimens of the bird and its eggs were taken at Lesser Slave Lake by Strachan Jones in 1868. Macoun states that he had seen it in immense numbers on Lesser Slave Lake and in the Peace River country; and that Spreadborough found it common and breeding near Edmonton in the summer of 1898.^d

Marila marila (Linn.). Scaup Duck.

The large 'bluebill' occurs commonly north at least to the region of the upper Mackenzie.

In the summer of 1901 several scaups were seen on the marshes at the mouth of the Quatre Fourches, near Fort Chipewyan, May 24, and on Athabaska Lake near the same place, May 31. While detained by wind on Loon Island, Great Slave Lake, 50 miles north of Fort Resolution, July 11 to 14, I observed a few daily and took a pair on July 11. The crop of one of them contained nearly a handful of small mollusks (*Lymnaea*). On July 26, 1903, I observed a female, accompanied by young, among the islands between Trout Rock and Fort Rae.

In the spring of 1904 I did not detect this species at Fort Simpson until May 24, when I shot an adult male from a small flock composed of this species and *M. affinis*.

This bird was apparently first recorded from this region by Ross, who gave it as occurring north to Fort Resolution;^e Baird, Brewer, and Ridgway state that it was found breeding at Big Island and Fort Rae;^f Macoun states that Spreadborough found it breeding in small lakes between Edmonton and Lake Ste. Anne in June, 1898.^g

Marila affinis (Eyton). Lesser Scaup Duck.

The little bluebill abounds in suitable places throughout the region north to the tree limit. An adult male, shot by one of the canoemen

^a Nat. Hist. Rev., II (second ser.), p. 287, 1862.

^b Water Birds N. A., II, p. 35, 1884.

^c Proc. U. S. Nat. Mus., XIV, p. 421, 1891.

^d Cat. Canadian Birds, Part I, p. 89, 1900.

^e Nat. Hist. Rev., II (second ser.), p. 287, 1862.

^f Water Birds N. A., II, p. 19, 1884.

^g Cat. Canadian Birds, Part I, p. 91, 1900.

on the Athabaska above Pelican Rapid, May 7, 1901, was identified, but was not preserved.

On May 13, 1903, we saw two individuals on a small slough north of Sturgeon River, Alberta, and noted the species on the Athabaska at Grand Rapid, May 25, and near Poplar Point, May 30. We saw several in the marshes adjoining Rocher River, June 6 to 8, and on Slave River below Fort Smith, June 15 and 16. I next observed the species at Fort Franklin, Great Bear Lake, September 20, when I shot two from a small flock in the bay; I saw another flock at the same place, September 27. While ascending the Mackenzie, I noted a few nearly every day between Fort Norman and Fort Wrigley, October 2 to 11, and daily to the mouth of Nahanni River, October 12 to 16.

In the spring of 1904 I first observed this species at Fort Simpson, May 24, when I shot an adult male from a mixed flock on the river. I saw a few in the lakes on Manito Island, near Fort Good Hope, June 23, and a pair in a small lake near Fort McPherson, July 8.

This species has been reported from a number of localities throughout the wooded portion of the region. Ross records it as abundant in the Mackenzie River district north to Peel River, and as having been collected at Fort Simpson.^a In the Anderson River region, MacFarlane found it breeding in fair numbers to the very edge of the wooded country east of Fort Anderson.^b Entries in the bird catalogue of the National Museum, in Baird's handwriting, record specimens from Fort Resolution, Big Island, Fort Simpson, Fort Norman, and Fort Rae, and one from the latter locality is still in the collection. Macoun records a specimen taken at Edmonton;^c and J. Alden Loring reported shooting several at the same place in September, 1894.

Marila collaris (Donov.). Ring-necked Duck.

This duck has not been observed north of Fort Simpson, and is rather rare up to that latitude. In the season of 1901 we detected it but once, near the mouth of Peace River, June 5, when we saw a pair and collected the male. The birds were in a small land-locked pond in dense spruce woods, in company with a pair of green-winged teals, and both species were extremely tame.

On September 3, 1903, Alfred E. Preble and Merritt Cary collected 2 specimens on the Athabaska, a few miles above Athabaska Landing.

The ring-necked duck was first recorded from the Mackenzie River region by Ross, who states that it was rare north to Fort

^a Nat. Hist. Rev., 11 (second ser.), p. 287, 1862.

^b Proc. U. S. Nat. Mus., XIV, p. 421, 1892.

^c Cat. Canadian Birds, Part I, p. 94, 1900.

Simpson, and had been taken at that post.^a Russell records a specimen taken by him at Fort Chipewyan, May 22, 1893, no others being seen.^b

Clangula clangula americana Bonap. American Golden-eye.

This is an abundant breeder along the Athabaska and Slave rivers, especially on their lower courses, and occurs also, though much less abundantly, on the Mackenzie nearly to its mouth.

In 1901 we saw a number on Lily Lake, Alberta, May 2, and found the species common on the lower Athabaska, May 16 and 17. We found it fairly common also on upper Slave River, and collected a female 10 miles below the mouth of the Peace, June 11. A nest found the same day was just completed, but no eggs had been deposited. The site consisted of the nesting cavity of a flicker in the top of a dead poplar, which, weakened by the excavation, had been broken off. We saw several and took a female on Slave River, 100 miles below Fort Smith, Mackenzie, July 1, and found the species rather common on the lower Slave, July 3 and 4. While on our outward trip we observed a few near Fort Chipewyan, August 8.

On May 14, 1903, we noted a few individuals at Two Lakes, Alberta, and while descending the Athabaska saw the species nearly every day. It was especially common on the lower river, where numerous large balsam poplars afford convenient nesting sites. On May 31, at a point about 30 miles above the mouth of the river, 7 pairs were seen inspecting a hollow in a high stub. They repeatedly circled about it, one or two frequently alighting at the entrance for a few seconds. We saw several at Fort Chipewyan, June 4; and found the species common on Rocher River, June 6 to 8. A set of 10 fresh eggs was collected, June 6, from a hollow in a poplar stub, 15 feet from the ground. The nest was composed of down from the breast of the parent, and a small quantity of grass. The species was common on Slave River between Peace River and Smith Landing, June 9 and 10, and between Fort Smith, Mackenzie, and the lower river, June 15 to 18. Alfred E. Preble and Merritt Cary noted several near the mouth of Nahanni River, July 11 and 12, and on their return trip found it common on the lower Athabaska, August 5 and 6.

In the spring of 1904, the golden-eye was first noted at Fort Simpson on April 28, when one was shot by an Indian. Two were seen May 2, two on May 4, and several on May 12. While descending the Mackenzie, I found it rather common between Forts Norman and Good Hope, June 16 to 20.

^a Nat. Hist. Rev., II (second ser.), p. 287, 1862.

^b Expl. in Far North, p. 257, 1898.

This species was recorded from the Mackenzie River region by Ross, who listed it as occurring north to the Arctic coast, and as having been collected at Fort Simpson.^a Kennicott noted its arrival at Fort Resolution on May 7, 1860.^b Baird, Brewer, and Ridgway record eggs from Fort Rae;^c and the bird catalogue of the National Museum shows that specimens were received from Fort Rae, Big Island, Fort Simpson, and Peel River [Fort McPherson]; one from the latter locality is still in the collection. Macoun states that he has found it breeding on Buffalo Lake, near Methye Portage.^d J. Alden Loring reported shooting several along the upper Athabaska, near Jasper House, in the fall of 1895.

Clangula islandica (Gmel.). Barrow Golden-eye.

This golden-eye is known from the region only from a few scattering specimens which have been taken in the Mackenzie and Anderson River valleys. Brewer states that "a single individual was taken by Mr. M. McLeod, June 29, 1863, in the vicinity of Fort Anderson. On the 14th of June in the following year (1864) Mr. MacFarlane secured a fine male example at Fort Anderson. This individual had been in the habit of flying over the fort for several evenings in succession, and was at length secured on a small lake just behind the reservation. The female had her nest somewhere in the vicinity, but eluded all their endeavors to discover the place. Mr. MacFarlane speaks of this species as the rarest of the ducks that visit those parts."^e MacFarlane mentions the same circumstances more briefly;^f and Baird, Brewer, and Ridgway also record the two specimens,^g one of which is still in the National Museum. The museum catalogue records also a specimen of *Bucephala islandica* from Fort Rae, but apparently it is not at present in the museum.

In the collection of mounted birds in the museum of the Hudson's Bay Company at Fort Simpson are two specimens, shot some years ago at Willow River, near Fort Providence.

Charitonetta albeola (Linn.). Buffle-head.

The buffle-head is an abundant breeder along the Athabaska and Slave rivers, especially along the lower parts of their courses, where nesting sites are easily found, and occurs less commonly along the Mackenzie to its mouth. In the spring of 1901 we found this bird abundant on the Athabaska, noting it daily between Athabaska Landing and Athabaska Lake May 6 to 17. We saw a few near Fort Chip-

^a Nat. Hist. Rev., II (second ser.), p. 288, 1862.

^b Trans. Chicago Acad. Sci., p. 170, 1869.

^c Water Birds N. A., II, p. 47, 1884.

^d Cat. Canadian Birds, Part I, p. 95, 1900.

^e Bull. Nutt. Orn. Club, IV, pp. 150, 151, 1879.

^f Proc. U. S. Nat. Mus., XIV, p. 421, 1891.

^g Water Birds N. A., II, p. 44, 1884.

ewyan May 24, and after leaving Athabaska Lake noted it on Rocher River June 5; 10 miles below Peace River June 7, and 25 miles below the Peace June 12 and 13. I saw a pair at Fort Smith, Mackenzie, June 21, and while on the way to Great Slave Lake noted it a short distance below Fort Smith June 29, and 100 miles below July 2. I saw a few on Great Slave Lake near Stone Island July 9.

In 1903 we first noted this species near Sturgeon River, Alberta, May 13, and saw several at Two Lakes, May 14. We found the bird common on the Athabaska, and noted it nearly every day while we were descending the river. We found it common also on Rocher River June 6 to 8; and on Slave River between Fort Smith, Mackenzie, and Fort Resolution June 15 to 19. While crossing Great Slave Lake to Fort Rae I saw several on the lake near Gros Cape July 23.

In the spring of 1904 I saw a pair at Fort Simpson May 11 and a few near the same place May 12 and 14. During the remainder of May I occasionally noted a pair or two on the small ponds in the vicinity, near which the birds are said to nest. While descending the Mackenzie I noted the species between Fort Simpson and Nahanni River June 2 and 3, and 75 miles below Fort Good Hope June 26. I saw a female with her brood of young near Fort McPherson July 8, and two young, probably from the same brood, were obtained from an Indian the same day.

Ross lists the buffle-head as abundant in the Mackenzie River region north to the Arctic coast, and as having been taken at Fort Simpson.^a Baird, Brewer, and Ridgway state that it was found breeding at Fort Resolution, Fort Simpson, and Fort Rae.^b In the summer of 1895 J. Alden Loring reported it as common on the lakes along the route between Edmonton and Jasper House, Alberta. In 1896 he found it common and breeding in the vicinity of Henry House in July, and noted it on most of the lakes on the route between Jasper House and Smoky River August 20 to October 8.

Harelda hyemalis (Linn.). Old-squaw.

In spring and fall these interesting birds pass through the region now under review in large numbers, while migrating to and from their breeding grounds along its northern border. In spring they appear soon after the breaking up of the ice and move leisurely northward with the advancing season, easily reaching their summer homes near and on the Barren Grounds as early as they are ready for occupancy. The various tribes of the north designate the species by names derived from its characteristic note, and these names have been

^a Nat. Hist. Rev., II (second ser.), p. 288, 1862.

^b Water Birds N. A., II, p. 51, 1884.

adopted to some extent by the whites. The Crees along the Athabaska call it *ca-ca-wee'*; the Chipewyans and related tribes of the Slave and Mackenzie rivers refer to it as *a-ha-lik'*; while the Eskimo are said to give it the name *a-hau-lin'*. A few were still lingering on the lower Athabaska when we descended it in the spring of 1901, and we saw a flock 50 miles below Fort McMurray on the evening of May 15.

In 1903 this species was first observed on Great Bear Lake east of Leith Point, where I saw a large flock August 28. It was next observed near the same place on September 4, a few being seen. While coasting along the south shore of the lake several flocks were observed near Leith Point September 8, and between there and McVicar Bay September 9. Between this point and the outlet of the lake, which we reached September 17, flocks were seen nearly every day.

In the spring of 1904 I first saw this species at Fort Simpson May 10, from which date it was common. The birds, usually in small flocks, floated down with the current among the ice floes, occasionally rising and winging their way swiftly upstream to regain lost ground. The males played about on the water, chasing each other and uttering their loud, clear notes, which soon became associated in the mind with the long, cool evenings of the Arctic spring, with the sun hanging low in the northwestern horizon. When they are lightly swimming about, the long tails are elevated at an angle of about 45° , and with their striking color pattern the birds present a very jaunty appearance. They are usually rather tame, sometimes rising and coming to meet the canoe, and actually becoming less wild if shot at. When slightly wounded they are among the most expert of divers and are difficult to secure. The males played together considerably before the females arrived, but after that important event their gymnastic and vocal performances knew no bounds. Several males were taken May 11, and the first female was secured May 23, though apparently they had arrived several days earlier. During the remainder of May the birds were noted almost daily.

While I was descending the Mackenzie in June the species was still slowly moving northward, and small flocks were seen between Fort Simpson and Nahanni River, June 2 and 3; near Fort Wrigley, June 7; near Blackwater River, June 9; near Gravel River, June 10; 50 miles below Fort Norman, June 17; near Wolverine Rock, June 18; below Fort Good Hope, June 25; and above the lower Ramparts, June 29.

Sabine states that this species "breeds in the North Georgia Islands, but is not common there."^a Franklin, during his first journey to the Arctic coast, observed it on Melville Sound, August 14 and 15, 1821. The birds were molting and were assembled in immense

^a Suppl. to Appendix Parry's First Voyage, p. ccviii, 1824.

flocks.^a Simpson also noted this circumstance near the same locality August 5, 1838.^b King recorded the species from Clinton-Colden Lake.^c Richardson noted it on the Arctic coast west of Cape Hope in the summer of 1848,^d and states that Rae observed it June 1, 1849, at Fort Confidence, Great Bear Lake.^e J. C. Ross noted it at Port Bowen, where it arrived early in June, 1825.^f M'Clintock records it from Port Kennedy.^g Greely records it as seen by the members of Belcher's squadron on July 11, 1851, in Wellington Channel.^h Armstrong noted it as common near Prince Alfred Cape, Banks Land, August 19, 1851; he records it also from Merey Bay and states it is the last duck to arrive in spring, and the last to leave in autumn.ⁱ Ross lists it as abundant in the Mackenzie River region north to the Arctic coast;^j and MacFarlane found it breeding in great numbers near Fort Anderson; along Anderson River; on the Barren Grounds; and on the shores of the Arctic Sea [Franklin Bay]. The number of eggs in a set ranged from 5 to 7.^k The bird catalogue of the National Museum records specimens from Fort Rae, Big Island, Fort Simpson, and Peel River [Fort McPherson]. Russell noted the species in the delta of the Mackenzie in the summer of 1894.^l Seale intimates that this species was abundant about the mouth of the Mackenzie in late August, 1896.^m Seton mentions it as breeding on the Barren Grounds northeast of Great Slave Lake in the summer of 1907, and as common near Fort Reliance in mid-September.ⁿ

Histrionicus histrionicus (Linn.). Harlequin Duck.

This beautiful species apparently occurs throughout the wooded portion of the region, but is rather rare. It usually frequents rapid streams, and is generally detected during migration. Adult males, roughly mounted, said to have been shot near the post, were obtained from natives at Fort Resolution in 1901 and 1903.

During my trip northward from Great Slave Lake in 1903 I took a specimen among the rapids on the river north of Lake Hardisty on August 20, and noted another on the lower part of the same

^a Narrative of Journey to Polar Sea, p. 383, 1823.

^b Narrative Discoveries on North Coast of America, p. 283, 1843.

^c Narrative Journey to Arctic Ocean, I, p. 235, 1836.

^d Arctic Searching Expedition, I, p. 287, 1851.

^e Ibid., II, p. 105, 1851.

^f Parry's Third Voyage, Appendix, p. 106, 1826.

^g Voyage of the *Fox*, p. 292, 1860.

^h Rept. Exped. Lady Franklin Bay, II, p. 35, 1888.

ⁱ Narrative Discovery Northwest Passage, pp. 391, 522, 1857.

^j Nat. Hist. Rev., II (second ser.), p. 288, 1862.

^k Proc. U. S. Nat. Mus., XIV, p. 421, 1891.

^l Expl. in Far North, p. 139, 1898.

^m Proc. Acad. Nat. Sci. Phila., 1898, p. 137.

ⁿ Auk, XXV, p. 69, 1908.

stream August 24. Those seen allowed themselves to be carried downstream by the swift current on our approach, and on rising invariably attempted to fly past us up the river.

In the spring of 1904 a pair was secured from a flock of 4 near Fort Simpson, May 25. They were the first detected, though the species must have arrived some time previously. This duck is said to be often seen on Bluefish Creek, a small rapid stream emptying into the Mackenzie opposite Fort Simpson.

Richardson states that the harlequin frequents Bear Lake River, and notes its habit of allowing itself to be carried down a rapid, while it seeks its food in the eddies;^a Ross lists it as rare in the Mackenzie River region north to the Arctic coast, and as having been collected at Fort Simpson;^b Baird, Brewer, and Ridgway state that specimens were obtained near Fort Resolution, Fort Simpson, Fort Rae, La Pierre House, Fort Halkett, and on the Barren Lands;^c and the bird catalogue of the National Museum shows that skins were received also from Peel River and Fort Liard. Russell took a female at Fort Rae, July 27, 1893.^d In 1895 J. Alden Loring procured a skin near Jasper House from an Indian, who said he had shot the bird on one of the streams in the high mountains. Reed records eggs from Peel River, taken June 13, 1898, by C. E. Whittaker.^e

Somateria mollissima borealis (C. L. Brehm). Northern Eider.

The common northern eider occurs in the eastern part of the Arctic Archipelago, being replaced by *S. v-nigra* to the westward, probably in the region of Banks Land.

J. C. Ross recorded '*Anas mollissima*' from Port Bowen, where it arrived abundantly early in June, 1825.^f Sutherland noted the first eiders at Assistance Bay, June 3, 1851.^g Osborn reported the species abundant in Wellington Channel the last week in August, 1850, when the birds were going south.^h Eider ducks have been reported also from various points about Melville Island.

Somateria v-nigra Gray. Pacific Eider.

During my descent of the Mackenzie in June, 1904, an adult male in the flesh was obtained at Fort Good Hope from an Indian. He had killed it on the Mackenzie, 20 miles below the post, on June 14,

^a Arctic Searching Expedition, I, p. 202, 1851.

^b Nat. Hist. Rev., II (second ser.), p. 288, 1862.

^c Water Birds N. A., II, p. 54, 1884.

^d Expl. in Far North, p. 257, 1898. (Specimen probably from Yellowknife River.)

^e N. A. Birds' Eggs, p. 79, 1904.

^f Parry's Third Voyage, Appendix, p. 106, 1826.

^g Journ. Voyage to Baffin Bay, II, p. 139, 1852.

^h Stray Leaves from Arctic Journal, p. 121, 1852.

and had saved the specimen for me. Its occurrence was considered very unusual. On my return I obtained a second specimen, which had been killed near the post about June 30. Another, killed by a native near Fort Providence in the spring, was obtained from Joseph Hodgson of that post. Another individual, a male, was observed on the Mackenzie near Fort Providence, on June 21, by J. W. Mills.

This is the common eider on the Arctic coast of Mackenzie, replacing *S. mollissima*, according to Baird, Brewer, and Ridgway, as far east at least as the mouth of the Coppermine.^a Richardson, on August 11, 1848, observed eider ducks, probably of this species, near Cape Bathurst. They were assembled in immense flocks and were migrating westward along the coast.^b Probably referring to the present bird, Armstrong speaks of seeing many eiders, which he supposed to belong to the common species, on Banks Land near Prince Alfred Cape, August 19, 1851.^c MacFarlane found it breeding in immense numbers on Franklin Bay, and also notes it as abundant on Liverpool Bay.^d

Though essentially maritime, the Pacific eider has been taken in the interior on a few occasions previous to our visits. Ross, in 1862, summed up the evidence relating to this point as follows: "A male specimen of this very rare bird was shot by me at Fort Resolution in 1858, and a female was obtained by Mr. Alex. McKenzie in 1861 at the same place."^e

A specimen collected at Fort Resolution by McKenzie, probably the one referred to by Ross, is still in the National Museum.

Somateria spectabilis (Linn.). King Eider.

This eider is rather common on the coast and islands of the Arctic Sea, and our observations show that it migrates through the interior in small numbers. On October 25, 1903, a few days after my arrival at Fort Simpson, a flock of 4 was seen on the Mackenzie, and a female was secured. The birds were quietly resting on the water and allowing themselves to be carried down stream by the ice-laden current.

In the summer of 1904, on my return trip, I obtained the skin of an adult male from James MacKinley, of Fort Resolution. It had been killed by a native during the spring, somewhere on Great Slave Lake to the eastward of that post, and was considered a great rarity. These seem to be the first records of its occurrence in the interior of this region.

Sabine stated that the king eider was abundant on the North Georgia Islands (referring more particularly to Melville Island),

^a Water Birds N. A., II, p. 81, 1884.

^b Arctic Searching Expedition, I, p. 269, 1851.

^c Narrative Discovery Northwest Passage, p. 391, 1857.

^d Proc. U. S. Nat. Mus., XIV, p. 422, 1891.

^e Nat. Hist. Rev., II (second ser.), p. 288, 1862.

where it nested on the ground in the neighborhood of fresh-water ponds.^a J. C. Ross recorded it from Port Bowen, where it arrived abundantly in early June, 1825.^b M'Clintock noted it at Port Kennedy;^c M'Dougall from Winter Harbor;^d and McCormick from Beechey Island.^e Armstrong observed many near Prince Alfred Cape, Banks Land, August 19, 1851, and noted the arrival of the bird at Mercy Bay about June 1, 1852.^f MacFarlane found it numerous on Franklin Bay, and also received eggs from the Eskimo of Liverpool Bay.^g Hubert Darrell informs me that he observed king eiders on Melville Sound on June 10, 1902.

Oidemia deglandi Bonap. White-winged Scoter.

This species, the 'big black duck' of the residents, occurs on nearly all the lakes throughout the wooded portion of the region. In 1901 we saw a number on Athabaska Lake near Fort Chipewyan May 24, and found it common on the Northern Arm of Great Slave Lake July 15 and 16.

In 1903 we first noted this bird on Athabaska Lake June 2, and saw several on Rocher River June 6, and near Smith Landing June 10. Several were seen on Great Slave Lake near Fort Resolution, June 23. Alfred E. Preble and Merritt Cary noted it on the way to Hay River June 27, and between there and Desmarais Islands July 1; saw a number between Desmarais Islands and Fort Providence July 2; and found it common below the mouth of Nahanni River July 19. On their return trip they noted it near Slave Point, Great Slave Lake, July 27, and saw one at Athabaska Landing September 4, and a few on Lily Lake September 24. While crossing Great Slave Lake to Fort Rae I found it common among the islands of the Northern Arm July 24 to 26. During my trip northward from Fort Rae I noted the species on lower Grandin River August 1, and on Sarahk Lake August 7. A few were seen on Great Bear Lake to the eastward of Leith Point August 28; I noted it also near McVicar Bay September 9; east of Manito Islands September 13 and 14, collecting one on the latter date; and near the outlet of Great Bear Lake September 17. While ascending the Mackenzie I noted the species 10 miles below Gravel River October 4; below Roche Trempe-l'eau October 8 and 9; near Fort Wrigley October 10; and several times between there and Nahanni River October 12 to 14. Some of these later birds were wounded individuals which could not

^a Suppl. to Appendix Parry's First Voyage, p. ccvii, 1824.

^b Parry's Third Voyage, Appendix, p. 106, 1826.

^c Voyage of the *Fox*, p. 292, 1860.

^d Voyage of the *Resolute*, p. 259, 1857.

^e McCormick's Voyages, II, p. 90, 1884.

^f Narrative Discovery Northwest Passage, pp. 391, 522, 1857.

^g Proc. U. S. Nat. Mus., XIV, p. 422, 1891.

migrate, but some were strong on the wing and evidently were remaining voluntarily.

In the spring of 1904 I first noted this bird at Fort Simpson May 18, when I saw a small flock on the river. The species was common the next day and was several times observed during the remainder of the month. It was most abundant in some small lakes near the post, where the natives reported that it breeds. While descending the Mackenzie in June I noted it nearly every day. Several were seen near Fort McPherson July 15, and a few on my return trip up the Mackenzie late in July.

MacFarlane found the white-winged scoter breeding throughout the Anderson River region, both in the wooded country and on the 'Barrens'.^a Baird, Brewer, and Ridgway state that it was taken at Fort Resolution by Kennicott;^b and the bird catalogue of the National Museum shows that specimens were received also from Fort Rae, Fort Simpson, and Fort Norman. Salvadori records specimens from Big Island and Fort Simpson.^c Macoun states that Spreadborough found it common on Lake Ste. Anne, near Edmonton, June 9, 1898.^d Seton records the species from Artillery Lake.^e

Oidemia perspicillata (Linn.). Surf Scoter.

This widely distributed species, usually called 'black duck' by the inhabitants, breeds commonly throughout the wooded portion of the region north of Athabaska Lake, and to some extent north of the limit of trees.

In the spring of 1901 we first noted the surf scoter on the Athabaska below Fort McMurray, where a few were seen on May 14. While we were coasting along the shore of the lake from Fort Chipewyan to Point La Brie, May 25, we saw numbers, and while returning, May 31, we again noted the species. The birds were rather common on the Northern Arm of Great Slave Lake July 15 and 16, and a number were seen near Fort Rae July 22.

In 1903 we first saw this scoter on the Athabaska, above Grand Rapid, May 20. We next noticed it near Smith Landing June 10, and saw numbers on Slave River between Fort Smith and Fort Resolution, Mackenzie, June 16, 18, and 19. My brother and Cary noted the species at Hay River, June 28, and saw upward of 500 on the lake between Hay River and Desmarais Islands, July 1. On July 2 they saw immense flocks, aggregating thousands of individuals, on the upper part of Mackenzie River, between the lake and Fort Providence. They noted the species also at Fort Providence, July 2 and 7,

^a Proc. U. S. Nat. Mus., XIV, p. 422, 1891.

^b Water Birds N. A., II, p. 96, 1884.

^c Cat. Birds Brit. Mus., XXVII, p. 410, 1895.

^d Cat. Canadian Birds, Part I, p. 110, 1900.

^e Auk, XXV, p. 69, 1908.

and on the way to Fort Simpson, July 9. On the return trip they again found it common near Fort Providence, July 26. After the division of the party I saw the bird daily on the lake near Fort Resolution during the latter part of June and the first half of July, and while crossing the lake to the northward noted it nearly every day, finding it especially common among the islands of the Northern Arm, July 23 to 26, and on Lake Marian, July 31. I next noted it among the small lakes north of Lake St. Croix, August 14, when the young were nearly full grown. On most of the lakes from this point northward to Great Bear Lake it was common, and numbers were noted nearly every day. A flock containing several hundred molting individuals was seen on Lake Hardisty, August 15, but generally the species was observed in small flocks or family parties. While traveling along the southern shore of Great Bear Lake I saw several near McVicar Bay, September 9 and 10, and noted the species almost daily between there and the outlet of the lake. I took a specimen near Manito Islands, September 14, and saw a few near Fort Franklin on September 17, the latest record for Great Bear Lake. While ascending the Mackenzie I noted the species nearly every day between Fort Norman and Fort Wrigley, October 2 to 11, and saw a few between Fort Wrigley and a point about 50 miles below Fort Simpson, October 12 to 16. By this time the ice had commenced to run in earnest and most of the ducks able to fly had departed, while nearly all the wounded ones had succumbed to the cold or their enemies.

In the spring of 1904 I first saw this scoter at Fort Simpson, May 13, and on May 18 saw a large flock on the river. I found it common in the vicinity during the remainder of the month, and while descending the Mackenzie noted it between Fort Simpson and Nahanni River, June 2 and 3; near the mouth of the Blackwater, June 9, collecting a male; and between Forts Good Hope and McPherson, June 25 to July 1, noting it daily on the latter stretch. At Fort McPherson I saw the species on July 5, 8, and 16; and on my return trip observed it 50 miles below Fort Good Hope, July 18; near Nahanni River, July 23; and near Fort Providence, July 28. I saw numbers on Great Slave Lake, between Desmarais Islands and Hardisty Island, July 30, and on the lower Slave, August 2.

Richardson describes a male killed at Fort Franklin;^a Ross lists it as occurring abundantly throughout the Mackenzie River region north to Peel River, and as having been collected at Fort Simpson;^b Baird, Brewer, and Ridgway state that MacFarlane found it breeding at Fort Anderson; on the lower Anderson River; and on Franklin Bay; and that it was reported from Fort Resolution, Fort Rae, Fort Simpson, and La Pierre House.^c

^a Fauna Boreali-Americana, II, p. 449, 1831.

^b Nat. Hist. Rev., II (second ser.), p. 288, 1862.

^c Water Birds N. A., II, pp. 102, 103, 1884.

***Erismatura jamaicensis* (Gmel.). Ruddy Duck.**

This is one of the rarest of the ducks in the Athabaska region, and has not been detected to the northward of Great Slave Lake. We did not observe it during our trips through the country. In the museum of the Hudson's Bay Company at Fort Simpson are three specimens taken some years ago at Fort Providence.

This species was first recorded from the region by Ross, who lists it as occurring north to Great Slave Lake, and as rare.^a Baird, Brewer, and Ridgway state that it was found breeding near Fort Resolution by Kennicott in June, and at the same place by Lockhart, who took its eggs in July.^b A male collected June 5, 1860, by Kennicott is now in the National Museum, and the bird catalogue records a specimen from Fort Rae. Macoun, on the authority of Dippie, says that it breeds on Buffalo Lake, Burnt Lake, and many other lakes in Alberta.^c

***Chen hyperborea* (Pall.). Lesser Snow Goose.**

The snow geese, universally called in the north 'white wavies,' pass through the region now under review in great numbers in spring and fall, while migrating to and from their summer homes on the shores and islands of the Arctic Sea. Since their breeding grounds are not ready for occupancy until well into the summer, their spring movement northward is correspondingly late in comparison with the Canada goose, which breeds at lower latitudes.^d During their semi-annual visits they are much sought after by the inhabitants, and, being killed with comparative ease, are procured in great numbers, to be frozen or salted for future use. The beauty of the birds and their importance as food to northern travelers have caused them to be frequently mentioned in narratives of Arctic journeys.

The valleys of the Athabaska and the Mackenzie lie in the path of migration of great numbers of snow geese of both the eastern and western forms. The rivers themselves, however, are seldom followed by the birds, except for short distances, since their general courses trend somewhat toward the west, while the lines of flight of the geese are usually nearly due north and south. Flocks of snow geese, leaving in spring the marshes at the delta of the Peace and Athabaska, a favorite stopping place, strike nearly due northward over the rocky hills, probably not again alighting until several hundred

^a Nat. Hist. Rev., II (second ser.), p. 288, 1862.

^b Water Birds N. A., II, 108, 1884.

^c Cat. Canadian Birds, Part I, p. 113, 1900.

^d According to Ross, the three forms of snow geese pass through the Great Slave Lake region in the following order: First the lesser snow goose; then *Chen rossi*, and lastly the form now known as *nivalis*. Nat. Hist. Rev., II (second ser.), p. 286, 1862.

miles nearer their breeding grounds. Thus they press onward, close on the heels of retreating winter, feeding, when suitable open water is denied them, on the various berries which have remained on the stems through the winter.

Pursuing the course of the river northward, the next favorite goose ground is the delta of the Slave, where great numbers stop both spring and fall for rest and food. The low country about the outlet of Great Slave Lake is also a favorite resort. Leaving this point, the geese in spring take a general northerly course, which suggests that their breeding grounds are north of the east end of Great Bear Lake. Most of the specimens which I have examined were taken on this line of flight. Most of them prove referable to *hyperborea*, but an occasional large specimen must be referred to *nivalis*. It thus appears that this line of flight lies not far west of the imaginary line dividing the two races, which in this region may be roughly represented by the longitude of 118°. It must be understood that much more material is needed to settle definitely this question, but for present purposes the records may be divided in accordance with this plan.

It seems desirable to place on record the measurements of a few prepared specimens, as well as those of a number of birds which I was able to examine hastily, but could not preserve. An adult male taken on Great Bear Lake, east of Leith Point, September 7, 1903, measured as follows: Wing 422 mm., exposed culmen 60 mm. A male and female, evidently young of the year, taken at the same time measured, respectively: wing 445, culmen 63; wing 419, culmen 51. These birds would seem to be intermediate between *hyperborea* and *nivalis*, though perhaps nearer *hyperborea*. I took measurements also of a number of birds shot at Willow River, near Fort Providence, about September 25, 1903. The sex of these birds could not be determined, but the measurements and the few notes taken are here given: (1) Adult, wing 430, culmen 50; (2) young of the year, wing 400, culmen 50; (3) young of the year, wing 405, culmen 56; (4) young of the year, wing 415, culmen 56; (5) evidently adult, head yellowish, bill reddish with white nail, feet and legs yellowish, wing 400, culmen 55; (6) similar to No. 5, wing 400, culmen 53; (7) similar to No. 5, wing 425, culmen 58. They may safely be referred to *hyperborea*, as may also a specimen in the National Museum, taken many years ago at Big Island, Great Slave Lake, by John Reid, which measures: wing 395, culmen 52.

In 1903 I saw a flock of about 40 on the south shore of Great Bear Lake, to the eastward of Leith Point, September 7, and secured three individuals, one of which was preserved. Their measurements have already been given. They had been feeding almost exclusively on the crowberries (*Empetrum nigrum*), which grow luxuriantly on

the sandy shores above high-water mark. While descending Bear River, September 29, I noted several large flocks flying southward. The species was last seen on October 3, when I saw a flock flying southward along the Mackenzie, 20 miles below the mouth of Gravel River.

In the spring of 1904 I first saw snow geese at Fort Simpson on May 2, noting upward of 40. On May 3 several small flocks, aggregating about 50 individuals, were seen. The bulk of the species passed over May 9 to 11, many large flocks, daily aggregating hundreds of individuals, being observed during this time, and smaller numbers daily, May 12 to 17. The last, a few scattering individuals, were seen May 24 and 25. They all passed in V-shaped flocks, never alighting in the vicinity, usually flying high, and but rarely descending low enough for even a chance shot. With rare exceptions, the flocks did not follow the course of the Mackenzie, but first appeared in sight over the land from the southward or from the Liard, and disappeared nearly due northward.

While at Fort McPherson early in July I saw numbers of these geese in possession of the Eskimo. They had been killed on their breeding grounds, about the mouth of the Mackenzie, in June, and preserved by being kept in the water, hanging in bunches from the stern of the boat. When the birds are desired for use the feathers are scraped off and the birds roughly drawn. On account of their high condition at this stage only a slight amount of cooking is required, but during this brief process close proximity to the kettle is undesirable. I was informed by E. S. Jones, a young missionary who had accompanied a party of Eskimo from Herschel Island, that large numbers of the birds were found nesting on the western shore of Richards Island in June.

During Richardson's journey along the Arctic coast in the summer of 1848, snow geese were procured on Darnley Bay August 17, at which date they were migrating along the coast toward the southeast.^a Many were seen near Bloody Fall, Coppermine River, on September 5.^b They were stated by Richardson to breed on Wollaston Land, "to which they cross in the beginning of June. We had noticed, while on the coast of Dolphin and Union Straits, the earliest bands traveling southward again in the middle of August, so that their stay in their native place falls short of three months."^c In the following spring Richardson noted their arrival at Fort Franklin, Great Bear Lake, May 18, while Doctor Rae observed large flocks passing northward at Fort Confidence on May 30 and 31.^d In 1838, Thomas

^a Arctic Searching Expedition, I, p. 282, 1851.

^b *Ibid.*, p. 318, 1851.

^c *Ibid.*, p. 320, 1851.

^d Arctic Searching Expedition, II, pp. 105-106, 1851.

Simpson had noted their arrival at the latter point on May 17.^a In Prince of Wales Strait, near Princess Royal Islands, Armstrong noted a flock passing to the northward on May 31, 1851;^b he saw large numbers on the northwest coast of Baring [Banks] Land August 19, 1851;^c and during the following year saw two individuals at Mercy Bay, Banks Land, on the same date.^d Billings (apparently quoting from the British 'Blue Book'), states that two large flocks were seen by Meham at the entrance of Liddon Gulf, Melville Island [in the summer of 1853].^e MacFarlane did not find the 'white wavies' breeding on Franklin Bay, but was assured by the Eskimo that they nested on Liverpool Bay.^f In notes sent to the Smithsonian he records their arrival at Fort Anderson on May 20, 1864, and May 27, 1865. McConnell noted their arrival at Fort Simpson May 5, 1888.^g Seale states that in 1896 they were fairly common at Herschel Island late in August, and that a number were killed by natives at the mouth of the Mackenzie on August 23.^h

Chen hyperborea nivalis (Forst.). Greater Snow Goose.

In the spring of 1901 we did not see snow geese until we reached the delta of the Athabaska May 17, when several flocks were noted. The residents of Fort Chipewyan were then shooting large numbers and salting them for future use. Flocks were seen overhead daily while we were encamped at the Fort, May 18 to 24. We saw none while at Point La Brie, probably being out of their line of flight; but while returning from there May 31 we saw two, presumably a pair, alight on the high rocky shore of the lake near the post, and secured a fine male. These were the last seen. The bird taken is referable to *C. h. nivalis*. The wing measures 435 mm.; exposed culmen, 63.

In the spring of 1903 we saw a small flock on the Athabaska near Pelican Rapid on May 18, and found a few still lingering at the delta of the Athabaska when we arrived there on June 2. One was killed on Slave River, about 100 miles below Fort Smith, by a party descending the river, about July 12. It probably had been injured during migration. My brother and Cary saw a large flock flying southward over Athabaska Landing, September 19. A bird killed at Willow River, near Fort Providence, about September 25, and which I was able to examine in a frozen state, seemed referable to *nivalis*.

^a Narrative Discoveries on North Coast of America, p. 241, 1843.

^b Narrative Discovery Northwest Passage, p. 336, 1857.

^c Ibid., p. 391, 1857.

^d Ibid., p. 521, 1857.

^e Can. Nat. and Geol., II, p. 175, 1857.

^f Proc. U. S. Nat. Mus., XIV, p. 423, 1891.

^g Ann. Rept. Can. Geol. Surv., IV (new ser.), p. 86D, 1891.

^h Proc. Acad. Nat. Sci. Phila., 1898, p. 138.

It was evidently a bird of the year. The back was grayish, the head tinged with rusty, the bill, feet, and legs dull black. The wing measured 445; exposed culmen, 63. A bird killed at Fort Simpson May 7, 1904, measured as follows: Wing, 444; exposed culmen, 54.

During Franklin's first journey to the Arctic Sea, snow geese were seen passing southward about September 1, 1820, at Winter Lake, near Fort Enterprise; ^a large flocks were observed feeding on crowberries at Point Lake on September 12 of the same year. ^b During the following summer snow geese were observed near Parry Bay, Melville Sound, on August 13. ^c Thomas Simpson states that numerous snow geese had bred on the borders of lakes on Victoria Land opposite Kent Peninsula. ^d Walker saw a flock at Port Kennedy in June, 1859. ^e Kennicott noted the first arrivals at Fort Resolution on May 17, 1860; ^f and Baird, Brewer, and Ridgway record two specimens taken there by him on May 26. ^g Pike found the species abundant near Lake Mackay June 11, 1890, when they were still "resting by thousands, waiting till the warm weather should have melted the snow from their feeding grounds along the seacoast." ^h

The dates of spring arrival of this species at Fort Chipewyan, during a series of years, appear in a table given on page 23.

Chen caerulescens (Linn.). Blue Goose.

This beautiful goose, which breeds, so far as known, only in northern Ungava, has been observed on a few occasions in the Mackenzie region. As the birds are well known to accompany flocks of snow geese migrating northward along the western coast of James Bay, it is not unlikely that an occasional individual may keep with these flocks instead of turning off to its usual summer home, and eventually return southward by way of southern Mackenzie.

Richardson stated that it had been seen at Fort Enterprise and Slave Lake. ⁱ While in the north I was informed by David McPherson, of Fort Simpson, that a few years ago a blue goose (probably this species) was shot at Willow River, near Fort Providence.

Chen rossi (Cassin). Ross Snow Goose.

This diminutive snow goose, usually called 'scabby-nosed wavey' at Great Slave Lake, is a regular spring and autumn migrant over

^a Narrative Journey to Polar Sea, p. 230, 1823.

^b Ibid., p. 234, 1823.

^c Ibid., p. 382, 1823.

^d Narrative Discoveries on North Coast of America, p. 383, 1843.

^e Proc. Roy. Soc. Dublin, III, p. 65, 1860.

^f Trans. Chicago Acad. Sci., I, p. 171, 1869.

^g Water Birds N. A., I, p. 444, 1884.

^h Barren Ground of Northern Canada, p. 161, 1892.

ⁱ Appendix Parry's Second Voyage, p. 365, 1825 (1827).

the eastern part of the region. Its breeding grounds remain unknown.

In the spring of 1901 this species was not identified with certainty among the snow geese seen, but the remains of one killed earlier in the season, or during the previous autumn, were seen on the Quatre Fourches marsh, May 24.

In 1903, on May 31 and June 1, we saw numbers on the lower Athabaska and took a male on the latter date. Upward of 1,000 individuals were seen at the mouth of the river on June 2, and many flocks were leaving the lake for the north on June 3. The species was last noted on the morning of June 4, when several flocks, aggregating about 200 individuals, were seen leaving the marshes in a northeasterly direction. They were about the last migrants of the season. I was informed by J. W. Mills that he has known of two being shot at Willow River, near Fort Providence.

This species, the 'horned wavey' of Hearne, was first formally described by Cassin from specimens sent to the Smithsonian Institution from Fort Resolution, Great Slave Lake, by Kennicott.^a Baird, Brewer, and Ridgway state that a large number were taken at Fort Resolution in May, 1860, by Kennicott, and in May, 1863 and 1865, by J. Lockhart. A specimen (No. 44029) taken by the latter in May, 1865, is still in the National Museum. MacFarlane records one shot May 25, 1865, at Fort Anderson, where it was the least abundant of the genus. He never discovered its nesting ground, and it was said by the Eskimo not to breed at Liverpool Bay.^b Russell noted flocks flying southward at Yellowknife Bay September 1, 1893.^c Hanbury records two individuals passing northward near the base of Kent Peninsula on June 2, 1902.^d

Anser albifrons gambeli Hartl. American White-fronted Goose.

This is the 'gray wavey' of the inhabitants. It is reputed to be the shyest and most difficult of all the geese to call, and is said to be almost invariably in good condition. Though the bulk of the species nest on the Barren Grounds, a few remain to breed in the northern part of the wooded country.

A flock was seen overhead while we were descending the Athabaska, about 50 miles below Fort McMurray, May 15, 1901.

In 1903 we failed to see this species in the spring, and noted the bird first on Great Bear Lake, about 20 miles east of its outlet, on September 15. Large flocks passed southward over our camp at Fort Franklin on September 18 and 19. We last noted it on the

^a Proc. Acad. Nat. Sci., Phila., [XIII], p. 72, 1861.

^b Proc. U. S. Nat. Mus., XIV, p. 423, 1891.

^c Expl. in Far North, p. 81, 1898.

^d Sport and Travel in Northland of Canada, p. 157, 1904.

Mackenzie near Roche Trempe-l'eau, where a large flock was seen flying southward on October 9. An immature bird, taken at Willow River, near Fort Providence, about the last of September, 1903, and obtained at Fort Simpson in a frozen state, was preserved.

In the spring of 1904 I first saw this species at Fort Simpson on May 11, noting five individuals. Several flocks were seen passing on the following day. While ascending the Mackenzie on my return trip I saw a small flock a short distance above Fort Wrigley, July 23. They were molting their wing quills and took to the woods on the approach of the steamer. In all probability they had nested in the vicinity.

The white-fronted goose was apparently first recorded from the region by Richardson, who refers to a specimen taken at Fort Enterprise May 17 [1821].^a Thomas Simpson, during his journey along the Arctic coast, observed numbers breeding on the borders of the swamps and ponds near the mouth of Coppermine River.^b Doctor Rae shot the species on Point Lockyer, Coronation Gulf, May 31, 1851.^c Ross listed it as occurring commonly in the Mackenzie River region north to the Arctic coast and as having been taken at Fort Simpson.^d Kennicott noted its arrival at Fort Resolution on May 7, 1860.^e In notes sent to Professor Baird, MacFarlane noted its arrival at Fort Anderson on May 16, 1864, and May 17, 1865. Baird, Brewer, and Ridgway state that MacFarlane found it breeding abundantly on the Lower Anderson, and on the coast and islands of the Arctic Sea [Franklin Bay];^f and MacFarlane records the same facts, with many additional particulars regarding the nesting. On July 5, 1864, while his party was returning across the 'Barrens' from Franklin Bay to Fort Anderson, 30 molting ganders, most of which were captured, were observed on a small lake.^g Salvadori lists a specimen taken on the Arctic coast east of Fort Anderson;^h and the bird catalogue of the National Museum shows that skins were received from Fort Simpson; Franklin Bay; Fort Anderson; Liverpool Bay;ⁱ and Fort Resolution; one from the latter locality, collected by Kennicott, May 24, 1860, is still in the collection. Warburton Pike observed the 'grey wavy' breeding in the marshes along Back River above Lake Beechey on July 18, 1890;^j and

^a Fauna Boreali-Americana, II, p. 466, 1831.

^b Narrative Discoveries on North Coast of America, p. 262, 1843.

^c Journ. Roy. Geog. Soc., XXII, p. 80, 1852.

^d Nat. Hist. Rev., II (second ser.), p. 286, 1862.

^e Trans. Chicago Acad. Sci., I, p. 170, 1869.

^f Water Birds N. A., I, p. 450, 1884.

^g Proc. U. S. Nat. Mus., XIV, p. 423, 1891.

^h Cat. Birds Brit. Mus., XXVII, p. 97, 1895.

ⁱ Barren Ground of Northern Canada, p. 183, 1892.

Macoun records that a specimen was shot on Red Deer River, Alberta, September 12, 1896, by Dippie.^a Reed records eggs taken on an island in the delta of the Mackenzie June 10, 1899, by I. O. Stringer.^b Seton noted the bird on Aylmer Lake, August 15, 1907.^c

Branta canadensis (Linn.). Canada Goose.

This wide-ranging species breeds in suitable places throughout the wooded portion of the region and constitutes an important article of food of the inhabitants. It is the earliest goose to arrive in spring, and its advent marks a welcome break in the monotonous winter bill of fare. Though associating with the smaller Hutchins goose during the latter part of the migrating season, it usually arrives before that form. The records of spring arrival of 'geese' or 'Canada geese' refer almost exclusively to this species, the others being designated by different names.

In 1901 we observed migrating flocks at Sturgeon River, Alberta, May 1; on the Athabaska, 50 miles below Athabaska Landing, May 7; and on the lower Athabaska May 17. While at our various camps in the vicinity of Fort Chipewyan, May 18 to June 5, we occasionally saw small flocks, and we started a very large one on the Quatre Fourches marsh May 23. While descending Slave River we saw a pair a short distance above Smith Landing June 13, and observed small flocks at Smith Landing June 16 and 17, and at Fort Smith June 19. While on our way to Great Slave Lake we saw several females with young the size of teals on the lower Slave on July 3. Later we saw small flocks at Fort Resolution July 8, and at the mouth of Slave River July 9. When we were ascending the Athabaska on our return trip a small flock was seen below Grand Rapids August 20.

In the spring of 1903 we first noted the Canada goose on the Athabaska, 50 miles below Athabaska Landing, on May 17, noting a small flock. We noted a few on the lower Athabaska May 31, and several near the mouth of the river June 1. We saw it next on Slave River, near Smith Landing, June 10. Small flocks were seen on lower Slave River on June 17 and 19, and a few at Fort Resolution June 22, 23, and 24. During my trip northward from Fort Rae I observed it on but one occasion, noting a small flock just south of MacTavish Bay on August 24.

In the spring of 1904 the first goose was reported at Fort Simpson April 22, and the next April 26. The species was common by May 3, and large flocks passed northward daily from this date on. While

^a Cat. Canadian Birds, Part I, p. 118, 1900.

^b N. A. Birds' Eggs, p. 84, 1904.

^c Auk, XXV, p. 70, 1908.

we were descending the Mackenzie in June small flocks referred to this form were seen near Roche Trempe-l'eau June 8, and near Sans Sault Rapid June 19.

From information mainly compiled from the journals of the traders Richardson gave the approximate dates of the arrival of this species at several points in the region as follows: Athabaska Lake, April 20 to 25; Great Slave Lake, May 1 to 6; Fort Enterprise, May 12 to 20.^a Franklin recorded its arrival at Fort Chipewyan on April 8, 1820.^b At Fort Confidence Thomas Simpson noted the first Canada goose May 15, 1838,^c while during the previous autumn the species had been last seen at the same place on September 25.^d Referring mainly to this form, Richardson says: "The most northern localities in which we observed them were the channels between the alluvial islands which form the delta of the Mackenzie."^e In the following spring (1849) he observed the first one near Fort Franklin on May 11.^f Kennicott took its eggs at Fort Resolution May 19, 1860.^g Baird, Brewer, and Ridgway state that it was found breeding at Fort Resolution, Fort Rae, Fort Simpson, and among the mountains west of the lower Mackenzie.^h MacFarlane speaks of it as follows:

This well-known goose breeds throughout the entire wooded region of the Mackenzie Basin. Nests were discovered in the vicinity of Fort Anderson and to the borders of the forest on the east and west sides of the river of that name, but none were met with in the Barrens proper, nor on the Arctic coast. Several deserted hawks' nests on trees were found occupied by incubating female birds of this species.ⁱ

In notes sent to Professor Baird, MacFarlane noted its arrival at Fort Anderson on May 15, 1864, and May 17, 1865. At Fort Simpson McConnell noted its arrival on May 1, 1888.^j Russell gives the dates of arrival at Fort Simpson from 1881 to 1894 (inclusive, excepting 1891). The average date is April 28.^k Macoun states that Spreadborough found the species breeding at Henry House, Athabaska Pass, in 1898.^l J. Alden Loring reported seeing several flocks on Fishing Lake, near Jasper House, Alberta, in the early autumn of 1895. In 1896 he saw a pair at Whitemud Lake, about 135 miles west of Ed-

^a Appendix Parry's Second Voyage, p. 363, 1825 (1827).

^b Narrative Journey to Polar Sea, p. 144, 1823.

^c Narrative Discoveries on North Coast of America, p. 241, 1843.

^d *Ibid.*, p. 198, 1843.

^e Arctic Searching Expedition, I, p. 320, 1851.

^f *Ibid.*, II, p. 106, 1851.

^g Trans. Chicago Acad. Sci., I, p. 171, 1869.

^h Water Birds N. A., I, p. 464, 1884.

ⁱ Proc. U. S. Nat. Mus., XIV, p. 424, 1891.

^j Ann. Rept. Can. Geol. Surv., IV (new ser.), p. 86D, 1891.

^k Expl. in Far North, p. 258, 1898.

^l Cat. Canadian Birds, Part I, p. 118, 1900.

monten, on June 8, and while returning to Edmonton saw large flocks about Lake Ste. Anne on November 3, 4, and 5.

A skin referable to this species, collected by B. R. Ross at Fort Simpson, May 13, 1860, is now in the National Museum. It is labeled '*Bernicla Barnstoni*,' and is in all probability the type of that nominal species. The spring dates of arrival of this species at Lac du Brochet Post, Reindeer Lake, as observed by J. Hourston for the years 1874 to 1889, inclusive, are incorporated in a table given on page 22. The spring dates of arrival at Fort Chipewyan, for a number of years, appear in a table on page 23.

***Branta canadensis hutchinsi* (Rich.). Hutchins Goose.**

This form breeds mainly in the Barren Grounds, associating in migration to a considerable extent with *B. canadensis*. A flock of about 30 was seen on the Athabaska, 50 miles below Fort McMurray, May 15, 1901. A number of small geese, probably referable to this form, were seen among flocks of Canada geese near Fort Chipewyan on May 23, and at Smith Landing on June 16 of the same year. In 1903 I first met with this species on the shores of Great Bear Lake east of Leith Point, where a few were noted August 29, and a large flock was seen August 30. They had alighted on the shore near our camp to feed on the berries of *Empetrum nigrum*, which grew there in great luxuriance. Two were shot, but were not preserved. One, a male, had 16 tail feathers and wings measuring 445 mm.; the other was slightly smaller. Small flocks were seen near McVicar Bay on September 10 and 11. The species was last noted on the Mackenzie 20 miles above Fort Wrigley October 12, when a single bird, identified by its small size, was observed.

In 1904, though it was probably present among flocks of Canada geese seen late in May, this form was positively identified only on the lower Mackenzie. A small flock, comprising two or three family parties, was seen a short distance below the site of old Fort Good Hope June 28, and an adult male and downy young were taken. Several adults referred to the same form were seen on the lower Mackenzie and Peel rivers June 30 and July 1. At Fort McPherson I was informed that the birds had arrived there on May 11.

J. C. Ross recorded this goose from Felix Harbor, Boothia, where it arrived about the middle of June and bred commonly.^a Thomas Simpson noted it at Fort Confidence on May 17, 1838;^b the last had been seen near Cape McDonnell on September 25 of the previous year.^c Richardson states that many were seen near Bloody Fall,

^a App. to Ross's Second Voyage, p. xli, 1835.

^b Narrative Discoveries on North Coast of America, p. 241, 1843.

^c Ibid., p. 198, 1843.

Coppermine River, September 5, 1848.^a Baird, Brewer, and Ridgway record specimens from Fort Resolution, Big Island, Fort Simpson, Anderson River, and Franklin Bay.^b MacFarlane describes the nesting of this bird on the lower Anderson, and on the shores and islands of the Arctic Sea [Franklin Bay].^c A skin taken by him on Franklin Bay, June 5, 1864, and labeled as having been taken with three eggs, is still in the National Museum. King, probably referring to this form, records geese from Lake Pelly, Back River, where they commenced to migrate southward on September 4.^d J. W. Tyrrell noted many broods of a small gray goose, undoubtedly this form, on the upper Thelon River in July, 1900.^e Geese, undoubtedly referable to this form, were seen by Hubert Darrell on Melville Sound July 9, 1902. Oates records two eggs taken by Collinson at Cambridge Bay, Victoria Land.^f

***Branta bernicla glaucogastra* (Brehm).** White-bellied Brant.

The eastern brant, as nearly as can be determined by migration and breeding records, inhabits the islands bordering the Gulf of Boothia, Prince Regent Inlet, and Wellington Channel, within this area apparently not breeding south of latitude 74°, and being the only goose which penetrates north to that point. There seems to be no definite record of brant west of Cornwallis Island until Melville Island is reached, the birds of which seem properly referable to the western form.

J. C. Ross states that the brant goose was abundant at Felix Harbor in migration, but did not breed, and that it was common, probably breeding, at Fury Point.^g Sutherland recorded it as common and probably breeding at Assistance Bay, July 7, 1851.^h M'Dougall reported it from Beechey Island, June 17, 1854;ⁱ and there are many other records for Wellington Channel. Belcher found brant geese common June 19, 1853, near the extreme northern part of North Devon, near latitude 77°, longitude 95°.^j

***Branta nigricans* (Lawr.).** Black Brant.

The black brant inhabits the Arctic coast east at least to Franklin Bay, and northeastwardly on the islands. Judging by what has

^a Arctic Searching Expedition, I, p. 318, 1851.

^b Water Birds N. A., I, p. 466, 1884.

^c Proc. U. S. Nat. Mus., XIV, p. 424, 1891.

^d Narrative Journey to Arctic Ocean, II, p. 77, 1836.

^e Ann. Rept. Dept. Interior (Canada) for 1900-1901, p. 122, 1902.

^f Cat. Birds' Eggs Brit. Mus., II, p. 152, 1902.

^g App. Ross's Second Voyage, p. XL, 1835.

^h Journ. Voyage to Baffin Bay, p. 203, 1835.

ⁱ Voyage of the *Resolute*, p. 421, 1857.

^j Last of Arctic Voyages, I, p. 315, 1855.

been recorded concerning their migration route, it is reasonably certain that the brent geese which visit Banks Land and Melville Islands are of this species. Though keeping strictly to the seacoast east of the Mackenzie during migration, many of the flocks (probably all the eastern breeding birds) strike across Alaska from near the mouth of the Mackenzie to the north Pacific.

Very little is known regarding the boundaries of the breeding ranges of this and the preceding species, but it is probable that the following records refer to *B. nigricans*.

Sabine states that brent geese breed in great numbers on the islands of the Polar Sea,^a referring particularly to Melville Island, since Fisher in his account of the same expedition states that many were seen near Liddon Gulf (and elsewhere) in June, 1820.^b Armstrong records large numbers of brent geese seen on Banks Land, near Prince Alfred Cape, August 19, 1851.^c

Baird, Brewer, and Ridgway state that—

Mr. MacFarlane found it breeding in abundance on islands northeast of the mouth of Anderson River, in Liverpool Bay, on the Arctic coast, on Franklin Bay, on various other parts of the coast, and especially in regions west of Anderson River.^d

Salvadori records a skin from Liverpool Bay, collected by MacFarlane.^e Reed records eggs from Cape Bathurst, taken June 22, 1901, by H. H. Bodfish.^f

Richardson observed 'brent geese', undoubtedly of this species, near Cape Bathurst on August 11, 1848, and refers to the circumstances as follows:

The eider ducks had now assembled in immense flocks and with the brent geese were migrating to the westward. Both these waterfowl follow the coast line in their migrations. * * * The brents are not seen inland to the eastward of Peel's River.^g

In the same work Richardson published extracts from a letter from Mr. Murray, describing a black goose which regularly passed through the Yukon Valley in migration, the description plainly referring to this species. A few of the birds were said to pass down Peel River, "but they are more abundant on the Yukon."^h

^a Suppl. to Appendix Parry's First Voyage, p. ccvii, 1824.

^b Journal Voyage of Discovery, p. 223, 1821.

^c Narrative Discovery Northwest Passage, p. 391, 1857.

^d Water Birds N. A., I, p. 474, 1884. These records are mainly from Eskimo collecting, since MacFarlane visited the coast in summer only at Franklin Bay.

^e Cat. Birds Brit. Mus., XXVII, p. 124, 1895.

^f N. A. Birds' Eggs, p. 86, 1904.

^g Arctic Searching Expedition, I, p. 269, 1851.

^h Ibid., II, p. 111, 1851.

As confirming this evidence that the bird uses a portion of the valley of the Yukon as a migration route, the following paragraph by Baird, Brewer, and Ridgway is of interest:

Mr. Kennicott, in a note dated Fort Yukon, May 19, refers to procuring three specimens of this bird, known in that region as the 'Eskimo Goose'. He states that it arrives there the latest of all the birds, and after nearly all the other Geese have passed. It flies in large flocks, and very rapidly. The three specimens were the first noticed that season, and the only ones killed, although two dozen or more flocks of from 25 to 50 were seen in all; but in no comparison, in point of numbers, with the other four species. This bird is said to pass La Pierre House in immense numbers both in spring and fall.^a

While at Fort McPherson in the summer of 1904, I learned that large numbers of 'husky or black geese' had passed down Peel River during the latter part of May, the first having been observed about May 17.

Olor columbianus (Ord). Whistling Swan.

Formerly abundant, this species now passes through the region in spring and fall in small numbers, apparently breeding only in the far north. While we were crossing Athabaska Lake from the delta of the Athabaska to Fort Chipewyan during the night of May 17, 1901, we several times heard the loud whistling notes of these birds. They were again heard near Fort Chipewyan during the nights of May 21 and 26.

In 1903 I first noted this fine species on Great Bear Lake, near Manito Islands, September 15, when its soft notes were heard from a group of low islands at some distance offshore, and a few tracks on the sandy beach showed where the great birds had been feeding. Its notes were again heard among some sandy islands in the Mackenzie, 15 miles above Gravel River, on October 6.

In the spring of 1904 two individuals were seen on the Mackenzie near Fort Simpson early on the morning of May 5.

While the birds were still abundant swan skins formed an important article of trade. I was told that sixty or seventy years ago about 500 were annually traded at the Hudson's Bay Company post at Isle à la Crosse, and that an annual average of 300 skins was obtained at Fort Anderson during the five years of its existence.

MacFarlane states that between 1853 and 1877 the Hudson's Bay Company sold a total of 17,671 swan skins. The number sold annually ranged from 1,312 in 1854 to 122 in 1877.

From 1858 to 1884, inclusive, Athabasca district turned out 2,705 swan skins, nearly all of them from Fort Chipewyan. Mackenzie River district, according to a statement in my possession, supplied 2,500 skins from 1863 to 1883. From 1862 to 1877 Fort Resolution, Great Slave Lake, contributed 798 thereof. For

^a Water Birds N. A., I, p. 473, 1884.

1889 Athabasca traded but 33, as against 251 skins in 1853. In 1889 and 1890 Isle à la Crosse, headquarters of English River district, sent out two skins for each outfit.^a

The rapid decrease in numbers of this magnificent bird is well illustrated by these figures.

Under the name *Anas cygnus*, Sabine, probably referring to the whistling swan, says: "Breeds in the North Georgia Islands, but is by no means numerous, and a single specimen only was obtained."^b Ross listed the species as occurring in the Mackenzie River region north to the Arctic coast and as having been collected at Fort Simpson.^c Baird, Brewer, and Ridgway state that MacFarlane found it breeding in considerable numbers in the vicinity of Fort Anderson, where eggs were found from the middle of June to the last of July. Nests were found also on islands in Franklin Bay and in other parts of the Arctic Sea. The above authors also record specimens taken at Big Island, and on Porcupine, Anderson, and Swan rivers, and islands in Franklin Bay.^d Hanbury noted the first swan of the season on June 5, 1902, near the base of Kent Peninsula.^e Reed records a nest found on an island near the mouth of the Mackenzie by I. O. Stringer.^f Oates records an egg taken by Collinson at Cambridge Bay.^g

Olor buccinator (Rich.). Trumpeter Swan.

A more southern breeder than *O. columbianus*, this species also nests far to the north. Richardson states that Rae shot one on Franklin Bay in the summer of 1848.^h Ross listed it as having been collected at Fort Simpson; ^c Baird, Brewer, and Ridgway record specimens from Fort Rae and Big Island, and state that MacFarlane found it breeding on the lower Anderson River, in the Barren Grounds, and on islands in Franklin Bay.ⁱ The bird catalogue of the National Museum shows that the species was received also from Fort Resolution; Kennicott took it at that place on May 23, 1860.^j Oates lists an egg in the collection of the British Museum from Fort Rae.^k

^a Proc. U. S. Nat. Mus., XXVIII, p. 754, 1905. Both species of swans are probably included in these statements.

^b Suppl. to Appendix Parry's First Voyage, p. ccvii. 1824.

^c Nat. Hist. Rev., II (second ser.), p. 286, 1862.

^d Water Birds N. A., I, pp. 429, 430, 1884.

^e Sport and Travel in Northland of Canada, p. 158, 1904.

^f N. A. Birds' Eggs, p. 88, 1904.

^g Cat. Birds' Eggs Brit. Mus., II, p. 139, 1902.

^h Arctic Searching Expedition, I, p. 275, 1851.

ⁱ Water Birds N. A., I, p. 433, 1884.

^j Trans. Chicago Acad. Sci., I, p. 172, 1869.

^k Cat. Birds' Eggs Brit. Mus., II, p. 140, 1902.

Botaurus lentiginosus (Montag.). American Bittern.

This is a rather common summer inhabitant of the marshes of this region north to Great Slave Lake. We saw one at the mouth of the Athabaska May 17, 1901, and found the species common on the Quatre Fourches marsh, near Fort Chipewyan, May 23 and 24. Its notes were heard a few miles west of Fort Chipewyan, May 31, and 25 miles below Peace River, June 12 and 13. A single bird was seen near Smith Landing June 17, and another in the marsh near Fort Smith June 20.

In 1903 we heard the notes of this bird on many occasions while passing the marshes of the lower Athabaska, May 31 and June 1, and we again noted the bird on Rocher River, June 6 to 8. The species was reported common in the marshes near Hay River, where my brother and Cary saw one on June 28. On their return trip they saw one at Pelican Portage, August 25, and one at Lily Lake, September 24. On May 6, 1904, the notes of this species were heard at Willow River, near Fort Providence, by H. W. Jones. He reported the bird common there, and on May 18 shot 2 males. An examination of their stomachs showed that they had been feeding on frogs and large beetles. While descending the Mackenzie I saw a single bird 15 miles below Fort Norman on June 16.

H. W. Jones reports its occurrence near Fort Providence on May 12, 1905. Ross listed this species as occurring in the Mackenzie River region north to the Arctic coast, but as being rare northward.^a The National Museum bird catalogue records specimens from Big Island and Fort Rae.

Ardea herodias Linn. Great Blue Heron.

J. Alden Loring reported seeing one at Spotted Lake, 60 miles west of Edmonton, May 27, 1896.

Grus americana (Linn.). Whooping Crane.

This fine species formerly bred in considerable numbers in suitable places throughout the region north to the Barren Grounds. It has now become almost extinct in the north, and was not observed during our journeys.

King mentions seeing a large flock of these birds at Fort Chipewyan.^b Ross lists the species as rare in the Mackenzie River region north to Fort Simpson, where it had been collected.^c Coues describes eggs collected by J. Lockhart at Great Slave Lake.^d Baird, Brewer, and Ridgway record specimens of the birds taken at Fort

^a Nat. Hist. Rev., II (second ser.), p. 284, 1862.

^b Narrative Journey to Arctic Ocean, II, p. 212, 1836.

^c Nat. Hist. Rev., II (second series), p. 284, 1862.

^d Birds of the Northwest, p. 531, 1874.

Resolution, Big Island, Fort Rae, and Salt River, and describe a set of eggs taken at the latter place in 1864.^a Concerning the status of the species in the Anderson River region, MacFarlane says:

We never succeeded in finding a nest of this crane, which undoubtedly breeds in Arctic America as well as in the country to the southward, as a few flocks were observed flying past Fort Anderson both in spring and autumn.^b

In notes sent to the Smithsonian he records three white cranes seen at Fort Anderson on May 25, 1865. A specimen taken at Willow River, near Fort Providence, is in the museum at Fort Simpson. H. W. Jones reports the occurrence of the species at the same place on May 13, 1905.

Grus canadensis (Linn.). Little Brown Crane.

This species is common throughout the region, breeding to the northward. I was unable to identify satisfactorily many of the cranes seen; but as our records from the more southern portions of the district were made in spring or fall, when the birds were migrating to or from their breeding grounds in the north, I have referred all the birds observed to *G. canadensis*.

In the spring of 1901 migrating flocks were seen near Edmonton May 1; on the Athabaska 40 miles below Athabaska Landing, May 7; and below Fort McMurray May 15. A small flock was seen at Fort Resolution July 8, and another about 15 miles above Pelican Rapid August 25.

In 1903 five migrating cranes were seen at Edmonton, Alberta, May 10, several more near Sturgeon River May 13, and a flock of 6 near Sandy Creek May 14. A few were noted on Rocher River, Alberta, June 8. While we were descending Slave River a few miles above its mouth June 19, four cranes were observed on the shore of a low island, and a pair was secured. The plumage of both is heavily suffused with brownish, especially on the back and breast. They measure as follows: Male, wing 483, exposed culmen 109; female, wing 458, exposed culmen 93. Alfred E. Preble and Merritt Cary saw a single bird below the mouth of Nahanni River July 19. On their return trip they noted 3 near Swift Current Rapid August 27, 5 at Athabaska Landing August 31, and observed large flocks migrating southward near the same place September 14 and 19. They last saw the species 20 miles south of Athabaska Landing on September 22, noting 2. During my trip northward from Fort Rae I saw it only once, noting one on Grandin River August 3.

In 1904 I first heard the notes of this bird at Fort Simpson on May 9 and again noted the species on May 11 and 18. While descending the Mackenzie I saw 2 near Fort Wrigley June 7.

^a Water Birds N. A., I, pp. 405, 407, 1884.

^b Proc. U. S. Nat. Mus., XIV, p. 425, 1891.

Franklin mentions seeing several cranes, undoubtedly referable to this form, on Parry Bay, Melville Sound, August 14, 1821.^a Rae, when at Fort Confidence, observed large flocks passing northward on May 30 and 31, 1849.^b John Ross recorded cranes as common June 5, 1830, near Felix Harbor, Boothia.^c Armstrong observed the species at Mercy Bay, Banks Land, about the middle of May, 1851.^d Ross lists it as occurring in the Mackenzie River region north to the Arctic coast and as having been collected at Fort Simpson.^e Coues records eggs from Great Slave Lake and Liverpool Bay.^f Baird, Brewer, and Ridgway record skins from Fort Resolution and the lower Anderson River,^g and the bird catalogue of the National Museum shows that specimens were received also from Fort Simpson and Big Island. Kennicott noted the first one of the season at Fort Resolution on May 7, 1860.^h Hanbury noted that brown cranes were numerous and paired on Melville Sound early in June, 1902.ⁱ J. Alden Loring reported seeing a pair on Grand Cache River, a tributary of Smoky River, about 125 miles north of Jasper House, on September 13, 1896. H. W. Jones, in a letter, reports this bird near Fort Providence April 28, 1905. Seton observed the species at Fort Reliance, September 14, 1907.^j

Grus mexicana (Müll.). Sandhill Crane.

Under the name *Grus canadensis* Richardson describes a specimen killed at Great Slave Lake May 15, 1822, which, from its measurements, should be referred to the present species.^k Some of our more southern records, here referred to *G. canadensis*, may really relate to the present species. Apparently *G. mexicana* does not regularly extend its range north of the plains country, but much additional information must be gained before all questions regarding the relationship and range of this and the preceding species can be decided.

Porzana carolina (Linn.). Sora Rail.

The familiar sora is an abundant summer resident of the marshes north, at least to the region of Great Slave Lake, but on account of its elusive habits it is seldom seen.

^a Narrative Journey to Polar Sea, p. 383, 1823.

^b Arctic Searching Expedition, II, p. 105, 1851.

^c Narrative Ross's Second Voyage, p. 390, 1835.

^d Narrative Discovery Northwest Passage, p. 522, 1857.

^e Nat. Hist. Rev., II (second ser.), p. 284, 1862.

^f Birds of the Northwest, p. 534, 1874.

^g Water Birds N. A., I, p. 413, 1884.

^h Trans. Chicago Acad. Sci., I, p. 170, 1869.

ⁱ Sport and Travel in Northland of Canada, p. 161, 1904.

^j Auk, XXV, p. 70, 1908.

^k Fauna Boreali-Americana, II, p. 373, 1831.

In the spring of 1901 we heard its voice daily in a marsh near the outlet of Athabaska Lake June 2 to 4. While descending Rocher and Slave rivers to Smith Landing June 5 to 13, we heard the birds almost every day in the swamps near the river and collected 2 specimens in a small marsh 25 miles below the mouth of Peace River June 12. While crossing Smith Portage June 18 we noted its cry on several occasions, and we found it common in the marsh at Fort Smith June 19 to 28. We heard it also near Slave River, about 125 miles below Fort Smith, July 2 and 3. I flushed one from the grassy margin of a small pond on Loon Island, Great Slave Lake, July 10, and my brother saw one at Fort Resolution July 27.

In 1903 the characteristic notes of this bird were heard near Edmonton, Alberta, May 10, and between there and Sturgeon River May 12. The species was next noted near the mouth of the Athabaska June 1 and was frequently heard in the marshes near Rocher River June 6 to 8. It was several times noted at Fort Resolution June 20 to 24. On June 22 I watched a male for some time at the edge of a small slough in a swamp near the post. He leisurely threaded his way among the sprouting grass stems, often jetting his tail, which was carried slightly erected. He frequently paused in his wandering to emit his two-syllabled crying note, holding his body in a nearly horizontal position, with the head extended forward, while he repeated the cry several times. My brother and Cary saw numbers in the marsh at Hay River June 28 to July 1, often hearing their notes in the night. I saw one on the south shore of Great Slave Lake, near the mouth of the Slave, July 18.

In the spring of 1904 I collected a single bird in a small grassy pond at Fort Simpson on May 19.

Ross lists this bird as occurring north to Big Island, Great Slave Lake, but as rare; ^a Baird, Brewer, and Ridgway state that it was found at Fort Resolution and Fort Rae; ^b skins from these places are still in the National Museum. Macoun records eggs taken at Edmonton, and gives instances of its breeding in other parts of Alberta. ^c Strachan Jones took the eggs of this species, probably in the summer of 1868, at Lesser Slave Lake, and sent them to the Smithsonian Institution.

Coturnicops noveboracensis (Gmel.). Yellow Rail.

While traversing the delta of Slave River on the evening of July 17, I heard the characteristic notes of this species, and caught a glimpse of the bird as he ran through the thick grass near the water's edge.

^a Nat. Hist. Rev., II (second ser.), p. 286, 1862.

^b Water Birds N. A., I, p. 371, 1884.

^c Cat. Canadian Birds, Part I, p. 140, 1900.

Under the name *Rallus noveboracensis*, Bonaparte records a male and female, in the collection of Leadbeater, taken on the "Athapescow Lake near the Rocky Mountains."^a Seton records the species from the marshy country along Little Buffalo River, 50 miles south of Fort Resolution, where its notes were heard in the summer of 1907.^b

Fulica americana Gmel. American Coot.

A few records of the occurrence of this species indicate that it is found nearly throughout the wooded region, but is not common except in its southern part.

In 1901 we met with this species but once—near Fort Chipewyan, Alberta, May 23, when a single individual was seen in a small marshy pond.

In 1903 we first observed the bird in a small slough near Sturgeon River, Alberta, May 13, and we noted two on Slave River a few miles below Fort Smith June 15. J. W. Mills writes me that he observed this species at Fort Simpson on June 1, 1905. In a manuscript list recently received from MacFarlane he states that a nest containing six eggs was found near Fort Chipewyan on June 7, 1880. H. W. Jones reports the species from Hay River, Great Slave Lake.

Ross listed this bird as occurring in the Mackenzie River region north to Fort Simpson, and as having been collected at that post.^c Baird, Brewer, and Ridgway state that it was taken at Fort Resolution, Fort Simpson, Big Island, and in the Gens de Large Mountains.^d Eggs, collected probably in 1868, were sent to the Smithsonian by Strachan Jones from Lesser Slave Lake. J. Alden Loring reported the species common at Edmonton September 7 to 26, 1894, and during his trip from Edmonton to Jasper House in 1896 saw many in the lakes along the first 75 miles of the trail during the last week in May.

Phalaropus fulicarius (Linn.). Red Phalarope.

Under the name *Phalaropus platyrhynchus*, Sabine states that this species was found to be abundant during the summer on the North Georgia Islands, probably referring particularly to Melville Island;^e Armstrong says it was frequently shot in June, 1852, at Mercy Bay, Banks Land;^f Baird, Brewer, and Ridgway state that it was found breeding by MacFarlane at Franklin Bay on July 4 and 5, and describe eggs taken by him.^g A specimen (No. 43758), labeled as

^a Zool. Journ., III, p. 50, 1827. (Concerning this locality, see note regarding source of Leadbeater's specimens, p. 61.)

^b Auk, XXV, p. 70, 1908.

^c Nat. Hist. Rev., II (second ser.), p. 286, 1862.

^d Water Birds N. A., I, p. 395, 1884.

^e Suppl. to Appendix Parry's First Voyage, p. cci, 1824.

^f Narrative Discovery Northwest Passage, p. 525, 1857.

^g Water Birds N. A., I, pp. 329, 330, 1884.

having been collected, with three eggs, on Crane Island, Franklin Bay, July 5, 1864, is still in the National Museum.

We did not observe this species during our journeys, but have recently received a specimen in winter plumage taken on the Mackenzie 60 miles below Fort Providence October 4, 1904, by H. W. Jones.

Lobipes lobatus (Linn.). Northern Phalarope.

The northern phalarope, an abundant breeder on the Barren Grounds, passes through the more southern parts of the region in spring and fall, sometimes occurring abundantly in certain localities. During my return trip in 1904 I saw one on Great Slave Lake near the Desmarais Islands July 29. The bird was swimming about in its characteristic energetic manner, seeking food.

In the museum at Fort Simpson I found two specimens collected some years ago at Fort Rae. Captain Mills informs me that he has frequently observed the species on the upper Mackenzie in the autumn.

In the early autumn of 1896 J. Alden Loring observed the species on the Athabaska at Jasper House, Alberta. Numbers alighted on the water above rapids and allowed themselves to be carried down, when they flew back and repeated the performance. He noted the bird also at Sulphur Prairie, Grand Cache River, about 70 miles north of Jasper House, taking a specimen there September 12.

Baird, Brewer, and Ridgway state that MacFarlane found this species in great abundance between the edge of the wooded country and the Arctic Sea [Franklin Bay], where more than 50 nests with eggs were found from June 17 into July.^a The bird catalogue of the National Museum records specimens from Big Island and Fort Rae. Frank Russell took one at Herschel Island July 14, 1894.^b Seton records the species from Sandhill Bay, Aylmer Lake, where one was observed August 20, 1907.^c

Steganopus tricolor Vieill. Wilson Phalarope.

Richard King, naturalist to Back's Expedition to the mouth of Great Fish River, claims to have taken this species near Artillery Lake.^d It is a common bird on the northern plains. Macoun, on the authority of Dippie, states that it breeds at Buffalo Lake, Alberta; that Spreadborough found it nesting commonly from Indian Head, Saskatchewan, to Edmonton; and he records a specimen taken at the latter point.^e

^a Water Birds N. A., I, p. 335, 1884.

^b Expl. in Far North, p. 258, 1898.

^c Auk, XXV, p. 70, 1908.

^d Narrative Journey to Arctic Ocean, I, p. 228, 1836.

^e Cat. Canadian Birds, Part 1, p. 148, 1900.

Recurvirostra americana Gmel. American Avocet.

In the museum at Fort Simpson are two specimens taken some years ago at Fort Chipewyan, Alberta; and I was informed by J. W. Mills that several had been seen at Willow River, near Fort Providence, by J. S. Camsell, who formerly collected quite extensively and was familiar with the species.

First recorded from the Mackenzie region by Ross, who gives it as occurring north to Fort Rae, but as rare.^a Baird, Brewer, and Ridgway state that examples were procured at Fort Rae, Fort Resolution, and on Peace River;^b and the catalogue of the birds in the National Museum records two specimens from Fort Rae, two from Peace River, and one from Fort Resolution, the latter taken June 1, 1864, as well as one taken at Lesser Slave Lake, probably in 1868, by Strachan Jones. Eggs from the same locality, also collected by Jones, are in the National Museum.

Philohela minor (Gmel.). Woodcock.

In August, 1892, while exploring on Black River, between Black Lake and the eastern end of Athabaska Lake, J. B. Tyrrell, of the Canadian Geological Survey, saw a woodcock, and refers to the circumstance as follows:

A quarter of a mile below the foot of the rapid, on the soft bank, the canoes were pushed in among the willows over a soft muddy, swampy flat to the beginning of Woodcock Portage, so called because we aroused a woodcock (*Philohela minor*), in one of the swamps as we passed it, this bird being exceedingly rare so far north.^c

The occurrence of the species at this point must be merely accidental.

Gallinago delicata (Ord). Wilson Snipe.

The common snipe probably breeds throughout the wooded region, but is not common on its extreme northern border. In 1901 it was abundant between Edmonton and Athabaska Landing, Alberta, April 29 to May 5. The males were then performing their aerial evolutions and were heard almost continually morning and evening, and in cloudy weather at all times of the day. After leaving Athabaska Landing, we did not again meet with the species until May 15, when one was heard in a marsh below the mouth of Red River, Alberta. While I was collecting on the Quatre Fourches marsh, near Fort Chipewyan, May 23 and 24, several were seen, and a male was taken on the latter date. About a small marsh near Slave River, 25 miles below the Peace, we saw a pair daily June 11 to 13, and we found their nest, which contained four eggs on the point of hatching, on

^a Nat. Hist. Rev., II (second ser.), p 284, 1862.

^b Water Birds N. A., I, p. 342, 1884.

^c Ann. Rept. Can. Geol. Surv., VIII (new ser.), p. 73D, 1896.

June 12. A pair seen at a marsh on Smith Portage June 18 evidently had a nest near by, and males were heard at Fort Smith June 21, and about a marsh 125 miles below Fort Smith July 2 and 3. On our return trip a single bird was seen at Athabaska Landing August 30.

In 1903 we observed this snipe in numbers at Edmonton on May 9 and 10, and found it abundant along the route to Athabaska Landing May 11 to 15. On May 13, in a marsh about 50 miles north of Edmonton, I saw one alight on the summit of a tall dead spruce, where it remained fully five minutes, uttering continuously a loud, querulous cry. Several were seen or heard on the lower Athabaska June 1, and it was frequently noted on Rocher River June 6 to 8. While we were descending Slave River, between Fort Smith and Fort Resolution, June 15 to 19, numbers were heard nearly every day. It was also frequently heard at Fort Resolution during the latter part of June. My brother and Cary noted two pairs, evidently nesting, at Hay River, June 28 to July 1, and a pair at Fort Providence July 6. On their return trip, on the evening of August 2, they saw several at Smith Landing flying about at dusk, and noted two at Pelican Rapid August 24. After the division of the party I frequently noted the bird at Fort Resolution during the remainder of June and the first half of July, hearing the flight song on July 15 for the last time. I saw one in a marshy spot on Grandin River August 3.

In the spring of 1904 the arrival of this species was noted on May 2 at Willow River, near Fort Providence, by Messrs. Mills and Jones, and a specimen was collected there on May 13. At Fort Simpson I first noted it May 10, when I heard the flight song of several individuals. I again noted the bird May 11 and took a female May 12. During the remainder of the month I frequently saw or heard the bird at Fort Simpson, and while descending the Mackenzie heard its notes about a large marsh a few miles above Wolverine Rock, 100 miles below Fort Norman, June 18.

While collecting at Edmonton in 1894 J. Alden Loring saw a pair September 10. In the early autumn of 1895 he reported seeing several about some small lakes near Jasper House. In 1896 he noted one 15 miles south of Henry House July 5, and one on Fishing Lake, 90 miles north of Jasper House, September 13. Ross recorded specimens collected at Big Island and Fort Simpson,^a and the bird catalogue of the National Museum records skins from Fort Resolution, Fort Rae, Peel River, La Pierre House, and Fort Halkett. Baird, Brewer, and Ridgway state that MacFarlane found it breeding at Fort Anderson June 16 and 29;^b MacFarlane states that it was not

^a Can. Nat. and Geol., VI, p. 443, 1861.

^b Water Birds N. A., I, p. 192, 1884.

numerous there.^a Hanbury noted one on the upper part of Dease River on August 14, 1902.^b H. W. Jones heard the notes of this species near Fort Providence May 1, 1905.

Macrorhamphus griseus (Gmel.). Dowitcher.

A dowitcher in the U. S. National Museum collection (No. 31591), taken at Fort Rae June 9, 1863, is apparently a typical example of this species.

Macrorhamphus scolopaceus (Say). Long-billed Dowitcher.

Judging by the records, dowitchers migrate in large numbers through the Mackenzie Valley, but probably do not breed south of the Barren Grounds. In accordance with the generally accepted idea of the distribution of these two forms, some of the following records, published under the name *griseus*, have been presumed to refer to the western form, though, in spite of various attempts which have been made to determine the relationship and distribution of the American species of this genus, the matter is apparently not yet fully understood, owing to lack of sufficient data.

Richardson describes a female taken at Fort Franklin May 25, 1826.^c Specimens have been recorded by various authors from Big Island, Fort Rae, Fort Simpson, Fort Norman, and La Pierre House. MacFarlane states that nests of *M. scolopaceus* were found in the Anderson River region from June 21 to July 1.^a Macoun records specimens of *scolopaceus* from Edmonton and Banff, Alberta.^d

Micropalama himantopus (Bonap.). Stilt Sandpiper.

This notable species is a rather late spring migrant through the southern portion of the region, and apparently is a fairly abundant breeder on the Barren Grounds. I did not observe it during my investigations, but found a mounted specimen, taken some years since at Fort Rae, in the Hudson's Bay Company museum at Fort Simpson.

Ross recorded this bird as having been taken at Fort Simpson.^e Kennicott took it at Fort Resolution May 19, 1860.^f Baird, Brewer, and Ridgway state that MacFarlane found it breeding at Rendezvous Lake, Franklin Bay, and Langton Harbor, and record specimens from Fort Resolution, Fort Simpson, and Big Island.^g Russell took specimens at Fort Chipewyan June 6 and 12, 1893, and states that

^a Proc. U. S. Nat. Mus., XIV, p. 426, 1891.

^b Sport and Travel in Northland of Canada, p. 233, 1904.

^c Fauna Boreali-Americana, II, p. 399, 1831.

^d Cat. Canadian Birds, Part I, p. 154, 1900.

^e Nat. Hist. Rev., II (second ser.), p. 285, 1862.

^f Trans. Chicago Acad. Sci., I, p. 171, 1869.

^g Water Birds N. A., I, p. 204, 1884.

the species passed northward in considerable numbers during June.^c Specimens from Fort Anderson, Fort Rae, and Big Island are still in the National Museum.

Tringa canutus Linn. Knot.

Edward Sabine, probably referring particularly to Melville Island, says that this species breeds in great abundance on the North Georgia Islands.^b

Arquatella maritima (Brünn.). Purple Sandpiper.

A sandpiper identified as this species was seen on the shore of Great Bear Lake a few miles east of its outlet on September 16, 1903. I had a good view of the bird at a distance of a few yards. At this time all the other sandpipers, with the exception of a very few belated sanderlings, had departed southward.

Armstrong states that this species was frequently shot at Mercy Bay, Banks Land, early in June, 1852.^c J. C. Ross records a few at Port Bowen in early June, 1825,^d and near Fury Point.^e McCormick observed one in Wellington Channel August 23, 1852.^f Russell has recorded specimens from Herschel Island and Fort Chipewyan,^g but they prove, on examination, to have been incorrectly identified.

Pisobia maculata (Vieill.). Pectoral Sandpiper.

This is a rather common migrant in the wooded portion of the region now under review, and it breeds in some parts of the Barren Grounds, though MacFarlane failed to find its nest in the Anderson River region.

In 1903 we first saw this species near Sturgeon River May 12, and we saw a few 20 miles south of Athabaska Landing May 14. My brother and Cary saw a flock of five, apparently passing southward, near the mouth of Willow Lake River, near Fort Wrigley, July 19. On their return trip they saw six at Cascade Rapid August 14; two at Pelican Rapid August 25; a few at Athabaska Landing on August 31 and September 2, and several flocks at the same place September 3. I took a single bird, the only one seen, at my camp on Great Bear Lake, east of Leith Point, August 29. A late straggler was seen on the Mackenzie a few miles above the mouth of the Blackwater October 7.

In the spring of 1904 I first saw this species at Fort Simpson May 16, observing three individuals about a small grass-bordered pond

^a Expl. in Far North, pp. 258, 259, 1898.

^b Suppl. to Appendix Parry's First Voyage, p. cci, 1824.

^c Narrative Discovery Northwest Passage, p. 525, 1857.

^d Parry's Third Voyage, Appendix, p. 101, 1826.

^e Appendix to Ross's Second Voyage, p. xxxii, 1835.

^f McCormick's Voyages, II, p. 121, 1884.

^g Expl. in Far North, p. 259, 1898.

formed by the melting snow. The bird was again noted May 18. On May 26 it was common at the same place and several specimens were collected.

We have received two specimens, both males, taken near Fort Providence, May 14, 1905, by Mills and Jones.

Ross lists this species as occurring in the Mackenzie River region, and as having been collected at Fort Simpson; ^a Baird, Brewer, and Ridgway state that it was taken at Fort Simpson, Fort Resolution, and Fort Anderson; ^b and the bird catalogue of the National Museum shows that it was received also from Fort Rae. Oates records two eggs taken by Collinson at Cambridge Bay, Victoria Land. ^c J. Alden Loring saw four at Edmonton, September 25, 1894, taking one specimen.

Pisobia fuscicollis (Vieill.). White-rumped Sandpiper.

Ross recorded specimens taken at Big Island, Great Slave Lake, ^d and from Fort Simpson, noting the species as rare; ^e the catalogue of the birds in the National Museum shows that specimens were received also from Fort Resolution and Fort Rae. Baird, Brewer, and Ridgway state that MacFarlane found the species breeding on the Arctic coast [Franklin Bay], and on the Barren Grounds [east of Fort Anderson], and describe eggs collected by him. ^f Among sandpipers collected by Frank Russell at Fort Chipewyan, and now in the Museum of the University of Iowa, are four specimens of this species taken June 3 to 8, 1893; a specimen taken by Kennicott at Fort Resolution, May 19, 1860, is still in the National Museum.

Pisobia bairdi (Coues). Baird Sandpiper.

This is the sandpiper most characteristic of the Mackenzie region. Its early appearance at Great Slave Lake at the close of the breeding season seems to indicate that it nests at no great distance to the northward, though probably not south of the Barren Grounds.

In 1901 this bird was first met with on the Quatre Fourches marsh, near Fort Chipewyan, where a small flock was seen and a female taken May 24. On May 25, while we were coasting along the north shore of Lake Athabaska to Point La Brie, we encountered large masses of floating ice, on which were feeding several large flocks of this species, together with smaller companies of turnstones. Two specimens were taken. We next met with the species on Great Slave

^a Nat. Hist. Rev., II (second ser.), p. 285, 1862.

^b Water Birds N. A., I, p. 233, 1884.

^c Cat. Birds' Eggs Brit. Mus., II, p. 55, 1902.

^d Can. Nat. and Geol., VI, p. 443, 1861.

^e Nat. Hist. Rev., II (second ser.), p. 285, 1862.

^f Water Birds N. A., I, p. 229, 1884.

Lake near Loon Island, July 10, when several small flocks were seen and a female was taken. The species was noted also at Fort Rae, July 23. On our return trip up the Athabaska River, we found a small flock at Crooked Rapid August 15, when a specimen was collected, and another above Grand Rapid, August 22.

In 1903 we noted a small flock near the mouth of the Athabaska, June 1. The species was next seen July 13, when a few, probably marking the commencement of the southward migration, appeared at Fort Resolution. On their return trip Alfred E. Preble and Merritt Cary saw a small flock at the delta of the Athabaska, August 4, and a flock of five at Fort McMurray, August 11.

In the spring of 1904, I first saw the Baird sandpiper at Fort Simpson, May 20, and took a single bird on the margin of a small grass-bordered pond. It was common by May 22 and was noted nearly every day up to June 1. The birds were most commonly observed in fair-sized flocks about the fields, occasionally accompanying a flock of golden plovers. During my return trip, while anchored near Hardisty Island, July 31, I observed a large flock flying past the steamer.

This bird was first characterized by Coues, who based his description of the species mainly on specimens from Great Slave Lake.^a He later recorded the species from Fort Resolution and eggs from Anderson River and the Arctic coast.^b MacFarlane speaks of finding a nest containing 4 eggs on the Barren Grounds June 24, 1864, and of subsequently finding other nests, though the bird was uncommon throughout the region.^c A specimen from Fort Resolution, taken May 19, 1860, by Kennicott; one from Fort Simpson, May 26, 1860, by Ross; and one from Fort Rae, by Clarke, are still in the National Museum collection. An egg taken by Collinson at Cambridge Bay, Victoria Land, is listed by Oates.^d Reed records eggs taken with the parent bird by an Indian at Peel River, June 18, 1898.^e Seton has recently recorded the species from Casba River and Aylmer Lake, where he observed it August 8 and 13, 1907.^f I have examined specimens taken by Frank Russell at Fort Chipewyan in the spring of 1893 and at Herschel Island July 13 to August 14, 1894.

Pisobia minutilla (Vieill.). Least Sandpiper.

This diminutive sandpiper is a regular spring and fall migrant through the region and breeds on the Barren Grounds. In 1903 sev-

^a Proc. Acad. Nat. Sci. Phila. [XIII], p. 196, 1861.

^b Birds of the Northwest, p. 485, 1874.

^c Proc. U. S. Nat. Mus., XIV, pp. 426, 427, 1891.

^d Cat. Birds' Eggs Brit. Mus., II, p. 55, 1902.

^e N. A. Birds' Eggs, p. 115, 1904.

^f Auk, XXV, p. 70, 1908.

eral were seen and one was taken about 50 miles north of Edmonton May 14.

On May 17, in the spring of 1904, at Fort Simpson, I took a solitary individual, the first one observed. The species was next seen May 22, was common May 27, and was several times noted during the latter days of May. I usually saw them in company with the larger sandpipers about the grassy margin of a small pond. On my return trip I saw a small flock on the Athabaska below Brulé Rapid August 19.

On May 15, 1905, J. W. Mills took three specimens, all of which proved to be males, at Fort Providence. First recorded from this region by Ross, who took it at Fort Simpson;^a and the bird catalogue of the National Museum shows that specimens were afterwards received from Isle à la Crosse, Fort Resolution, Big Island, and Great Bear Lake. Baird, Brewer, and Ridgway state that it was found breeding abundantly at Fort Anderson; on the Barren Grounds [to the eastward]; at Rendezvous Lake; and near the Arctic coast [Franklin Bay]; and that nests were found between June 21 and July 3; a set of eggs are described.^b A skin from Big Island; one from Fort Resolution, taken May 19, 1860, by Kennicott; and one from near Rendezvous Lake, taken in June, 1864, by MacFarlane, and labeled as having been collected "with 3 eggs," are now in the National Museum. Three eggs taken by Collinson at Cambridge Bay, Victoria Land, are in the British Museum.^c

***Pelidna alpina sakhalina* (Vieill.). Red-backed Sandpiper.**

This bird was recorded by Edward Sabine, under the name *Tringa variabilis*, as being rare in the islands of the Polar Sea, Melville Island being referred to particularly.^d Reed records eggs taken at Peel River, Arctic America, June 30, 1899, by I. O. Stringer.^e J. C. Ross recorded the species as breeding abundantly at Felix Harbor.^f Walker noted a few breeding at Port Kennedy in July, 1859.^g

***Ereunetes pusillus* (Linn.). Semipalmated Sandpiper.**

This tiny sandpiper, closely resembling the least sandpiper superficially, but readily distinguished from it by the slight webbing of the toes, is a rather common migrant through the region. It breeds on the Barren Grounds.

In the spring of 1901 a few were seen on the Quatre Fourches marsh, near Fort Chipewyan, May 24. The species was not again

^a Nat. Hist. Rev., II (second ser.), p. 285, 1862.

^b Water Birds N. A., I, p. 240, 1884.

^c Oates, Cat. Birds' Eggs Brit. Mus., II, p. 53, 1902.

^d Suppl. to Appendix Parry's First Voyage, p. cc, 1824.

^e N. A. Birds' Eggs, p. 116, 1904.

^f Appendix Ross's Second Voyage, p. xxxii, 1835.

^g Proc. Roy. Soc., Dublin, III, p. 63, 1860.

noted until July 24, when a small flock was seen, and a male taken, on the shore of the lake at Fort Rae.

In 1903 we did not detect this species during the spring migration, but the advance guard of the southward movement made its appearance at Fort Resolution on July 13. Single birds were noted on Grandin River August 3 and 5.

In the spring of 1904 I first saw this species at Fort Simpson May 26 and took a single specimen. I took another on the following day, when the species was common, and noted the bird nearly every day up to June 1.

First recorded from the region by Richardson, who described a specimen taken at Great Bear Lake on May 24, 1826.^a Ross listed it as having been taken at Fort Simpson, but as being rare.^b Baird, Brewer, and Ridgway state that MacFarlane found it nesting on Franklin Bay and on the Barren Grounds between there and Fort Anderson, where nests were found between June 20 and July 10.^c Specimens were sent to the Smithsonian Institution from Big Island and Fort Good Hope. Sharpe records specimens in the British Museum from Franklin Bay and Fort Simpson.^d

Calidris leucophæa (Pallas). Sanderling.

This cosmopolitan species migrates through the region now under review in spring and fall. It passes northward in early summer, breeds sparingly on the Arctic coast, but more commonly on the islands of the Arctic Sea, and in autumn lingers in flocks on the storm-swept shores of the larger lakes after most of the other sandpipers have departed. When seen running along the sandy margins of lake or river its singular stiff-legged gait, taken together with its size and light color, serves to distinguish it even at a distance from any of its allies.

In 1903 I first noted this species at our camp on Great Bear Lake, east of Leith Point, August 31, when several flocks were observed. Numbers were seen there nearly every day to September 4, and several specimens were taken. Three individuals were seen on the shore 40 miles east of McVicar Bay September 13, and a few were noted west of Manito Islands September 15, and near Fort Franklin September 16.

In the spring of 1904 I first saw the sanderling at Fort Simpson on May 29, when a small flock was observed feeding along the river shore, and one was shot. A few more were seen near the same place

^a Fauna Boreali-Americana, II, p. 386, 1831.

^b Nat. Hist. Rev., II (second ser.), p. 285, 1862.

^c Water Birds N. A., I, p. 209, 1884.

^d Cat. Birds Brit. Mus., XXIV, p. 518, 1896.

June 1. The species was last noted near Fort Wrigley June 7, when a single individual was observed.

This species apparently was first recorded from the Mackenzie River region by Ross, who mentions a specimen taken at Big Island, Great Slave Lake.^a It had been recorded previously from the North Georgia Islands by Edward Sabine, who, probably referring particularly to Melville Island, states that it was found breeding in considerable numbers and that several specimens were taken.^b Armstrong, in his narrative of the voyage of the *Investigator*, states that a few were shot in Prince of Wales Strait, near Princess Royal Islands, June 7, 1851,^c and that it was frequently shot early in June, 1852, at Mercy Bay, Banks Land.^d On June 29, 1863, MacFarlane discovered a nest of this species, "the only one at that time known to naturalists," on the Barren Grounds, about 10 miles west of Franklin Bay. The bird was rare in this region, and no other nests were found.^e Frank Russell took it at Fort Chipewyan June 7, 1893.^f

Limosa hæmastica (Linn.). Hudsonian Godwit.

Richardson described a specimen taken at Fort Franklin, Great Bear Lake, but otherwise the species apparently was unknown from the region until the officers of the Hudson's Bay Company began to collect birds, when specimens were received by the Smithsonian Institution from Fort Rae, Big Island, and Anderson River. Baird, Brewer, and Ridgway state that MacFarlane found it breeding near Fort Anderson on June 9, and that other nests were found on the lower Anderson, and describes eggs taken by him in that region.^g Reed records eggs from the [mouth of] Mackenzie River, collected by I. O. Stringer.^h

Totanus melanoleucus (Gmel.). Greater Yellow-legs.

The large yellow-legs occurs very sparingly in migration north to the Great Slave Lake region. Its breeding grounds are practically unknown, except inferentially, but the best information at hand indicates that numbers nest in the region between Great Slave Lake and Hudson Bay.

In 1903 we saw one at a small pond near Sandy Creek, 20 miles south of Athabaska Landing, May 14. Another was seen on the lower Athabaska May 31.

^a Can. Nat. and Geol., VI, p. 443, 1861.

^b Suppl. to Appendix Parry's First Voyage, p. cxcix, 1824.

^c Narrative Discovery Northwest Passage, p. 346, 1857.

^d *Ibid.*, p. 525, 1857.

^e Proc. U. S. Nat. Mus., XIV, p. 427, 1891.

^f Expl. in Far North, p. 259, 1898.

^g Water Birds N. A., I, p. 263, 1884.

^h N. A. Birds' Eggs, p. 119, 1904.

In the spring of 1904 I observed this species but once, taking a male from among a flock of lesser yellow-legs at Fort Simpson, May 16.

Ross recorded this yellow-legs as occurring in the Mackenzie River region as far north as Fort Simpson, where it had been taken, but as being rare.^a A skin (No. 19934) taken by Ross at Fort Simpson May 23, 1860, is now in the National Museum, and the catalogue shows that specimens were received also from Big Island and Fort Resolution.

Totanus flavipes (Gmel.). Yellow-legs.

This small tattler breeds in suitable places throughout the region north to the Barren Grounds. We saw two individuals at a prairie slough about 15 miles north of Edmonton May 1, 1901. A pair seen almost daily at a marsh near Fort Smith, June 19 to 28, were undoubtedly breeding. I saw one at Fort Rae July 20 and on July 22, while exploring about some marshy ponds several miles to the eastward of the post, observed a number. While we were ascending the Athabaska a number were seen at Grand Rapid August 21.

In the spring of 1903 we first saw this yellow-legs about some small ponds near Sturgeon River, Alberta, May 12, noting about 50 individuals, and between there and Athabaska Landing we observed a few daily May 13 to 15. Several were seen on the lower Athabaska May 30. Next noted at Hay River, where my brother and Cary saw one June 30. While at Smith Landing during the night of August 2 they heard this species migrating, and they found it common on the bars at the mouth of the Athabaska August 4. During my trip northward from Fort Rae I found it common along Grandin River, August 1 to 3.

In the spring of 1904 I took a specimen, the only one seen at the time, at Fort Simpson May 9. The species was seen also May 10, was common by May 13, and was seen nearly every day during the remainder of May. At Willow River, near Fort Providence, several specimens were taken May 9 to 11 by Messrs. Mills and Jones. The latter observer also noted the species at the same place on May 3, 1905.

Richardson first recorded this species from the region, describing a male killed at Fort Franklin, Great Bear Lake, May 16, 1826;^b Ross listed it as abundant in the Mackenzie River region north to La Pierre House, and as having been collected at Fort Simpson;^c Baird, Brewer, and Ridgway state that it was met with at Fort Resolution May 5, 1860, by Kennicott; at Fort Simpson May 15, by Ross; at Big Island by Reid; and in great abundance at Fort Anderson, on Anderson and Horton [MacFarlane] rivers, and at Rendezvous Lake by Mac-

^a Nat. Hist. Rev., II (second ser.), p. 285, 1862.

^b Fauna Boreali-Americana, II, p. 390, 1831.

^c Nat. Hist. Rev., II (second ser.), p. 285, 1862.

Farlane. Nests were taken at Fort Anderson as early as June 1.^a A male (No. 19946), taken "with four eggs" at Fort Resolution June 1, 1860, by Kennicott, and labeled as having been "shot sitting on nest," is now in the National Museum. In the Anderson River region MacFarlane found it one of the earliest and probably the most abundant of the waders, and discovered upward of 30 nests.^b In notes sent to the Smithsonian he records its arrival at Fort Anderson on May 27, 1865. Macoun states that Spreadborough found it at Edmonton, Alberta, in June, 1897, and that Dippie found it apparently breeding at Buffalo Lake, Alberta, in July, 1896.^c Seton records the bird from Casba Lake, where it was observed August 8, 1907.^d

Helodromas solitarius cinnamomeus (Brewst.). Western Solitary Sandpiper.

This sandpiper occurs rather commonly in the Athabaska and Mackenzie region, where its breeding range is probably nearly coextensive with the forest, though its eggs are still practically unknown. Since our specimens from the Athabaska and Mackenzie region are referable to the western form, I have assumed that the various references to *H. solitarius* in this region belong here. It is likely that the eastern form occurs in eastern Saskatchewan and Mackenzie, but definite records from this region are lacking.

In the spring of 1901, a single individual was seen at a deserted beaver pond near Athabaska Landing May 5. The species was next noted at a marsh near Slave River, 25 miles below the mouth of the Peace, where we saw a pair daily June 11 to 13, and we saw another pair while crossing Smith Portage June 18. We saw one bird at Fort Smith June 19, and several on Slave River a few miles below there June 29.

In 1903 we first noted this species at Edmonton on May 10. Several were seen near Sturgeon River May 12, and 50 miles north of Edmonton May 14, one being taken on the latter occasion. Next observed at Fort Resolution June 22, when I saw a pair on a small marsh near the post. My brother and Cary saw a pair in a tamarack muskeg at Fort Providence July 6 and took the male. On their return trip they heard solitary sandpipers on the night of August 11 at Fort McMurray. During my trip northward from Fort Rae, I saw one on Grandin River August 3.

On May 10, in the spring of 1904, I observed two at Fort Simpson, securing one, and while descending the Mackenzie saw one near the mouth of Nahanni River June 3. On May 14, 1905, H. W. Jones took a male at Willow River, near Fort Providence.

^a Water Birds N. A., II, pp. 276, 277, 1884.

^b Proc. U. S. Nat. Mus., XIV, p. 428, 1891.

^c Cat. Canadian Birds, Part I, pp. 173, 174, 1900.

^d Auk, XXV, p. 70, 1908.

Richardson gives a description of one killed at Great Bear Lake May 14, 1826; ^a Ross listed the species as occurring commonly in the Mackenzie River region north to Fort Simpson, where he had taken it. ^b A specimen (No. 19952) collected by him at Fort Simpson May 30, 1860, is still in the National Museum. Baird, Brewer, and Ridgway record the capture of the species at Fort Rae and Big Island. ^c Macoun, under the name *solitarius*, states that Spreadborough saw numbers in the spring of 1897 at Edmonton, where he believed they were breeding, and found the birds breeding at Jasper Lake, Alberta, in July, 1898. ^d Raine has recently recorded the discovery of three sets of eggs of the solitary sandpiper in northern [now central] Alberta in the summers of 1903 and 1904. ^e

While collecting in the mountains 15 miles south of Henry House, Alberta, July 19, 1896, J. Alden Loring took a young bird of this form. It was accompanied by the female parent, which was not secured, but the male was taken on the following day. The birds were in a meadow which had formerly been a beaver pond.

Catoptrophorus semipalmatus inornatus (Brewster). Western Willet.

This bird, a plains species, reaches the district now under review only in Alberta. Merritt Cary heard its notes at Edmonton, May 9, 1903. Macoun records young found by Dippie at Buffalo Lake, July 4, 1895, and specimens taken by Spreadborough at Edmonton in the spring of 1897. ^f

Bartramia longicauda (Bechst.). Bartramian Sandpiper.

The upland plover occurs in small numbers in suitable places over nearly the entire region and evidently breeds throughout its Canadian range. In 1901 we met with it only in the vicinity of Fort Smith. Here I secured a female in a field on June 21, and while hunting on the 'prairies' several miles to the westward of the post June 24 collected a male. He was first observed on the top of a dead tree at some distance away, but soon left his perch and circled past me, whistling loudly. His gullet was filled with grasshoppers.

In 1903 we heard the notes of this bird a few miles north of Edmonton May 12, and saw 4 individuals in the valley of Sturgeon River May 13. During their return trip my brother and Cary noted the species at Athabaska Landing, where it was migrating abun-

^a Fauna Boreali-Americana, II, p. 393, 1831.

^b Nat. Hist. Rev., II (second ser.), p. 285, 1862.

^c Water Birds N. A., I, p. 280, 1884.

^d Cat. Canadian Birds, Part I, p. 173, 1900.

^e Ottawa Naturalist, XVIII, pp. 135-138, 1904.

^f Cat. Canadian Birds, Part I, p. 176, 1900.

dantly, August 31 to September 3. Concerning this species Baird, Brewer, and Ridgway say:

Mr. R. MacDonald noticed it breeding among the mountains west of the lower Mackenzie, and Mr. J. M'Dougall met with it in the Gens de Large Mountains, 200 miles northeast of the Yukon.^a

Macoun says:

This species is an abundant summer resident in the whole prairie region * * * from the International Boundary to latitude 54° in the eastern part of the region, and northwesterly to far north of the open prairies of the Peace River.

He also records a specimen taken at Edmonton by Spreadborough and a set of eggs obtained by J. B. Tyrrell in northern [now central] Alberta July 1, 1886.^b

Tryngites subruficollis (Vieill.). Buff-breasted Sandpiper.

This beautiful sandpiper migrates through the wooded portion of the region and breeds on the Barren Grounds. During our investigations we met with it but once, noting several on the Quatre Fourches marsh, near Fort Chipewyan, May 24, 1901. A mounted specimen in the museum at Fort Simpson was procured some years ago at Fort Rae.

Ross noted the species as having been collected at Fort Simpson; ^c Baird, Brewer, and Ridgway state that MacFarlane found upward of 20 nests on the Barren Grounds between Horton River and the Arctic coast between June 26 and July 9 and describe eggs taken by him.^d A specimen (No. 19954) taken by Ross at Fort Simpson, May 29, 1860, is still in the National Museum, and the bird catalogue shows that skins were received also from Fort Rae and Big Island. Frank Russell took one at Herschel Island, August 13, 1894.^e

Actitis macularia (Linn.). Spotted Sandpiper.

Abundant and generally distributed throughout the region as far north as the limit of trees. In the season of 1901 we first saw it near Athabaska Landing May 6, and noted it almost daily while descending the river to Athabaska Lake May 6 to 17. We observed it near Fort Chipewyan May 23, and near the outlet of Athabaska Lake June 2 to 4. While collecting along the Rocher and Slave rivers between Athabaska Lake and Smith Landing, June 5 to 18, we saw numbers daily. The first nests were seen on a sandy island 25 miles below the Peace June 8. We found it common at Fort Smith June 19 to 28 and saw several nests on the shelving banks of the

^a Water Birds N. A., I, p. 297, 1884.

^b Cat. Canadian Birds, Part I, p. 178, 1900.

^c Nat. Hist. Rev., II (second ser.), p. 285, 1862.

^d Water Birds N. A., I, p. 308, 1884.

^e Expl. in Far North, p. 259, 1898.

river. We saw numbers daily, the old birds now usually accompanied by young, along Slave River between Fort Smith and Fort Resolution June 29 to July 4. The species was noted by my brother several times at Fort Resolution during July, and I saw a few individuals on islets in Great Slave Lake near Loon Island July 10. While ascending Slave and Athabaska rivers by steamer we seldom saw the bird, but while traveling by boats up the Athabaska between Fort McMurray and Athabaska Landing, August 10 to 29, we observed the species nearly every day.

In 1903 we found spotted sandpipers abundant on the Athabaska, noting them nearly every day between Athabaska Landing and Fort Chipewyan May 16 to June 2. They were abundant also along our route to Fort Resolution. The first nest, containing four eggs, was found at Smith Landing June 10. The species was occasionally seen at Fort Resolution during the latter part of June. My brother and Cary found it common at Hay River June 28 to July 1, at Fort Providence July 3 to 8, and near the mouth of Nahanni River July 11 to 19, noting young birds about a week old on the former date. They observed the species also near Fort Wrigley July 20. On their return trip they saw several flocks near Nahanni River July 23 and frequently observed it on the Slave and Athabaska. It was abundant at Red River August 6, Fort McMurray August 8 to 11, and Brulé Rapid August 18, and was last observed at Athabaska Landing September 3. During my trip northward from Fort Rae, after the division of the party, I observed the species on Lake Marian July 30, Grandin River August 2, 3, and 4, Sarahk Lake August 6 and 7, and a few miles south of MacTavish Bay, Great Bear Lake, August 25. While ascending the Mackenzie I saw a single bird about Gravel River October 5, and another, or perhaps the same individual, a few miles farther on, October 6.

In the spring of 1904 the spotted sandpiper was first observed at Willow River, near Fort Providence, May 17, by J. W. Mills. At Fort Simpson I first saw the species May 19, noting it about a small pond in the woods. It was next seen May 21 and 23, and was observed nearly every day during the remainder of the month. While descending the Mackenzie during June I noted numbers nearly every day. The first nest, not quite finished, was seen near Fort Norman June 10. The species was common at Fort McPherson during the first half of July, and eggs were collected July 7. While I was ascending the Mackenzie during the latter part of July the species was common along its entire course, and it was observed nearly every day along the Athabaska between Fort McMurray and La Biche River August 10 to 31.

Although this widely distributed species is found in suitable localities throughout the wooded portion of the region, Richardson, for some reason, did not note it, at least during his earlier journeys. Ross found it abundant along the Mackenzie, collecting it at Fort Simpson.^a MacFarlane found it abundant along Anderson and Lockhart rivers.^b Seton records the bird from Clinton-Colden and Aylmer lakes, where it was observed in mid-August, 1907.^c The catalogue of the birds in the National Museum records specimens from Peace River, Slave River, Fort Resolution, Fort Rae, Big Island, Fort Norman, Great Bear Lake, and Peel River. Eggs were sent to the Smithsonian from Lesser Slave Lake by Strachan Jones in 1868, and from Pelican Lake, eastern Saskatchewan, by H. MacKay, who took them there in June, 1891.

In 1896 J. Alden Loring found the species common and breeding during the early summer all along the trail from Edmonton to Jasper House, on July 15 discovered a nest containing four eggs 15 miles south of Henry House, and during the late summer and early autumn found the bird common on all the streams and lakes between Jasper House and Smoky River.

Numenius americanus Bechstein. Long-billed Curlew.

A mounted specimen, catalogued as having been taken at Fort Simpson some years ago, is in the museum of the Hudson's Bay Company at Fort Simpson. This curlew inhabits the northern plains and seldom wanders north of their borders.

Numenius hudsonicus Lath. Hudsonian Curlew.

A male was taken at my camp on Great Bear Lake east of Leith Point September 30, 1903. This bird, the only one observed, had been feeding on the berries of *Empetrum nigrum*.

Ross recorded this species from Great Slave Lake, where he regarded it as rare;^d and the bird catalogue of the National Museum records a specimen from Big Island. Eggs were brought to MacFarlane by the Eskimo from the Barren Grounds to the westward of the lower Anderson River, and have been described by Coues.^e In notes sent to the Smithsonian MacFarlane records one seen at Fort Anderson May 29, 1865. A mounted specimen taken at Fort Simpson some years ago is in the museum at that place.

^a Nat. Hist. Rev., II (second ser.), p. 285, 1862.

^b Proc. U. S. Nat. Mus., XIV, p. 428, 1891.

^c Auk, XXV, p. 70, 1908.

^d Nat. Hist. Rev., II (second ser.), p. 290, 1862.

^e Birds of the Northwest, p. 494, 1874.

Numenius borealis (Forst.). Eskimo Curlew.

A melancholy interest attaches to this species, which evidently has become practically exterminated within the past few years, although formerly enormously abundant and fairly common up to about 1890. It was first recorded from this region by Richardson, who says: "On the 13th of June, 1822 [1821], I discovered one of these curlews hatching on three eggs on the shore of Point Lake."^a He met with the birds also at Fort Franklin, Great Bear Lake, late in May, 1849, when they were feeding on large ants.^b Kennicott mentions taking one at Fort Resolution May 26, 1860.^c MacFarlane found the species breeding abundantly on the Barren Grounds to the eastward of Fort Anderson, where some thirty sets of eggs were taken.^d In notes sent to the Smithsonian he states that the species arrived at Fort Anderson on May 27, 1865. The bird catalogue of the National Museum records skins from Fort Resolution, Big Island, Fort Simpson, Anderson River, and Rendezvous Lake. Sharpe records a specimen from Fort Good Hope.^e

Squatarola squatarola (Linn.). Black-bellied Plover.

This handsome plover migrates through the Athabaska and Mackenzie region and associates to some extent with the golden plover, but is much less common than that species. It breeds on the Barren Grounds.

In the spring of 1901 we noted the black-bellied plover only on the Quatre Fourches marsh, near Fort Chipewyan, where a small flock was seen May 23.

In 1903 we observed a flock of about 25 near Sturgeon River May 12. The species was not again seen until September 5, when I took a female on the shore of Great Bear Lake east of Leith Point. It was in company with a small flock of golden plovers and had been feeding on *Empetrum* berries.

In the museum at Fort Simpson is a specimen obtained at that place some years ago.

J. C. Ross recorded this bird as breeding near Somerset House (Fury Point), and as taken near Felix Harbor.^f B. R. Ross recorded it from the Mackenzie River region, where he regarded it as rare.^g Baird, Brewer, and Ridgway state that MacFarlane found it breeding on islands in Franklin Bay, where he took eggs on July 4 and 5,

^a Fauna Boreali-Americana, II, p. 378, 1831.

^b Arctic Searching Expedition, II, p. 108, 1851.

^c Trans. Chicago Acad. Sci., I, p. 172, 1869.

^d Proc. U. S. Nat. Mus., XIV, p. 429, 1891.

^e Cat. Birds Brit. Mus., XXIV, p. 370, 1896.

^f Appendix to Ross's Second Voyage, p. xxx, 1835.

^g Nat. Hist. Rev., II (second ser.), p. 285, 1862.

1864, and in 1865.^a Sharpe records specimens taken at Fort Simpson and Fort Resolution.^b The bird catalogue of the National Museum records a specimen from Fort Rae; another from Fort Resolution, taken June 2, 1860, by Kennicott; and one taken on the Arctic coast east of Fort Anderson July 8, 1865, by MacFarlane, and labeled as the parent of four eggs, are still in the collection. Russell took one June 8, 1893, at Fort Chipewyan;^c Macoun records one taken at Edmonton in May, 1897.^d

Charadrius dominicus Müll. American Golden Plover.

In 1903 I first saw this species on Great Bear Lake east of Leith Point August 28. Here it was common until September 6, and a number of specimens were collected. The birds kept in small flocks, sometimes frequenting the sandy beach, but usually frequenting the semibarren rocky areas, where they fattened on berries. After leaving this place I noted the species 40 miles east of McVicar Bay September 12, and lastly near Manito Islands September 14.

In the spring of 1904 I first noted golden plovers at Fort Simpson on May 19, when two or three flocks, aggregating about 50 individuals, were seen flying northward along the Mackenzie. On May 21 a flock of 9, comprising both sexes, made its appearance on the fields about the post and remained during the rest of the month. A female from this flock was collected May 23, and others of both sexes were taken on May 25 and 30. A. F. Camsell informed me that a flock almost invariably lingered about the fields for a week or so during each spring.

Edward Sabine, probably referring particularly to Melville Island, states that this species breeds in considerable abundance in swampy parts of the North Georgia Islands.^e

J. C. Ross states that this species arrived at Port Bowen, Prince Regent Inlet, about the middle of May, 1825; ^f he later reports it as breeding abundantly at Felix Harbor.^g Walker records eggs taken at Port Kennedy in June, 1859.^h Armstrong mentions that the species was shot near Princess Royal Islands, Prince of Wales Strait, June 7, 1851; ⁱ and that it was frequently taken at Mercy Bay, Banks Land, early in June, 1852.^j Doctor Rae saw golden plovers near Admiralty

^a Water Birds N. A., I, pp. 136, 137, 1884.

^b Cat. Birds Brit. Mus., XXIV, p. 190, 1896.

^c Expl. in Far North, p. 259, 1898.

^d Cat. Canadian Birds, Part I, p. 185, 1900.

^e Suppl. to Appendix Parry's First Voyage, p. cxcix, 1824.

^f Parry's Third Voyage, Appendix, p. 102, 1826.

^g Appendix to Ross's Second Voyage, p. xxx, 1835.

^h Proc. Roy. Soc. Dublin, III, pp. 63, 1860.

ⁱ Narrative Discovery Northwest Passage, p. 346, 1857.

^j Ibid., p. 525, 1857.

Island, Albert Edward Bay, Victoria Land, August 15, 1851, when they were migrating toward the southeast.^a Kennicott noted the species arriving in large flocks at Fort Resolution May 23, 1860.^b Ross listed it as abundant in the Mackenzie River region north to the Arctic coast, and as having been collected at Fort Simpson.^c MacFarlane found it abundant throughout the Barren Grounds in the Anderson River region, discovering upward of 170 nests.^d Russell records two specimens, one taken at Fort Chipewyan June 1, 1893, and one at Herschel Island August 13, 1894, on which date the species arrived from the northwest.^e Macoun records two specimens taken at Edmonton in May, 1897, by Spreadborough; ^f and J. Alden Loring reported that he saw three at the same place September 23, 1894, and took one. The bird catalogue of the National Museum records specimens from Fort Rae, Fort Resolution, Big Island, Fort Halkett, La Pierre House, and Fort Simpson, one from the latter locality having been taken September 10, 1860. Two specimens, one from Big Island, and another, a male, taken at Fort Simpson May 26, 1860, are still in the collection. Reed records eggs taken at Peel River, Arctic America, June 1, 1898, by C. E. Whittaker.^g

Oxyechus vociferus (Linn.). Killdeer.

This widely distributed species occurs regularly, though not commonly, north to the region of Great Slave Lake and in all probability farther. We saw three individuals about a marshy spot on the plains 15 miles north of Edmonton May 1, 1901.

In 1903 we noted the killdeer near Edmonton May 12, found it common along our route a few miles north of Sturgeon River May 13, and saw a few 60 miles north of Edmonton May 14. It was next observed at Smith Landing June 12, three being seen on the flat near the post. Two or three, the last individuals noted, were seen at Fort Resolution June 25.

Specimens of both birds and eggs were received by the Smithsonian from Lesser Slave Lake, where Strachan Jones collected them in 1868. Macoun records specimens of the birds from Edmonton, as well as eggs taken by Spreadborough at the same place, May 19, 1897.^h

^a Journ. Royal Geog. Soc., p. 91, 1852.

^b Trans. Chicago Acad. Sci., I, p. 171, 1869.

^c Nat. Hist. Rev., II (second ser.), p. 284, 1862.

^d Proc. U. S. Nat. Mus., XIV, p. 429, 1891.

^e Expl. in Far North, p. 259, 1898.

^f Cat. Canadian Birds, Part I, p. 187, 1900.

^g N. A. Birds' Eggs, p. 127, 1904.

^h Cat. Canadian Birds, Part I, p. 189, 1900.

Ægialitis semipalmata Bonap. Semipalmated Plover.

First noted May 23, 1901, when a number were seen on the shore of the lake near Fort Chipewyan. The species was next met with on some low, sandy islands in the lower part of Slave River, where several pairs, undoubtedly breeding, were seen July 3. It was not again noted until we were ascending the Athabaska, where several migrants were seen at Middle Rapid, 40 miles below Grand Rapid, on August 15, and several above Pelican Rapid August 24.

J. C. Ross reports this species as abundant in summer on Boothia.^a Walker records several taken in June and July, 1859, at Port Kennedy.^b Kennicott mentions taking this species at Fort Resolution on May 23, 1860.^c Ross listed it as common in the Mackenzie River region and as having been collected at Fort Simpson;^d MacFarlane found it quite common on the Arctic coast [Franklin Bay], along Anderson and Lockhart rivers, and between Fort Anderson and Fort Good Hope.^e Sharpe records specimens from Fort Simpson and Horton River.^f The bird catalogue of the National Museum shows that specimens were received from Slave River, Big Island, Fort Resolution, Fort Simpson, and Franklin Bay. Russell records two specimens taken June 2 and 12, 1893, at Fort Chipewyan, where he regarded it as not common.^g Seton records the bird as breeding on Artillery Lake in 1907.^h

Ægialitis hiaticula (Linn.). Ring Plover.

This wide-ranging plover, a regular breeder about Greenland, Cumberland Gulf, and other localities in that region, is included among the birds of the Mackenzie region on the authority of Baird, Brewer, and Ridgway, who state: "An undoubted specimen of it has been taken at great Slave Lake."ⁱ

Arenaria interpres morinella (Linn.). Ruddy Turnstone.

This showy species occurs in the Mackenzie apparently only in spring, as it is migrating to its breeding grounds on the shores and islands of the Arctic Sea.

While we were coasting along the north shore of Athabaska Lake, about 10 miles northeast of Fort Chipewyan, May 25, 1901, we saw

^a Appendix to Ross's Second Voyage, p. xxx, 1835.

^b Proc. Roy. Soc. Dublin, III, p. 63, 1860.

^c Trans. Chicago Acad. Sci., I, p. 171, 1869.

^d Nat. Hist. Rev., II (second ser.), p. 284, 1862.

^e Proc. U. S. Nat. Mus., XIV, p. 430, 1891.

^f Cat. Birds Brit. Mus., XXIV, p. 253, 1896.

^g Expl. in Far North, p. 260, 1898.

^h Auk, XXV, p. 70, 1908.

ⁱ Water Birds N. A., I, p. 158, 1884.

two or three small companies, aggregating about 20 individuals, feeding on the floating fields of ice. Two males and a female in fresh spring plumage were taken. Their stomachs were filled with insects, mainly beetles, which they had evidently picked up on the ice.

In the spring of 1904 I first observed the turnstone at Fort Simpson, May 29, when a solitary female was secured. Snow was falling, and several inches had already accumulated on the river shore, but the bird did not seem to be much troubled by these conditions. I next noted the species June 7, observing a flock of about 50 near Fort Wrigley. They were feeding on a broad stretch of muddy shore.

Under the name *Streptilas collaris*, Edward Sabine recorded specimens from the North Georgia Islands [probably Melville Island], where the species was stated to breed.^a Doctor Rae, while traveling along the southern coast of Victoria Land, in August, 1851, observed old and young birds, indicating that the species breeds on that coast.^b J. C. Ross states that one was seen at Felix Harbor in early July, and others between Victoria Harbor and Fury Point, Boothia, in June.^c MacFarlane refers to the species in the Anderson River region as follows:

In June, 1864, a dozen birds were observed at Fort Anderson, and one was shot. The species breeds on the shores of Liverpool and Franklin bays, and on the lower Anderson River. Several nests were secured in the latter region; but none were met with in the Barren Grounds.^d

Under the name *Streptilas interpres*, Baird, Brewer, and Ridgway record specimens received from Fort Resolution, Fort Rae, Big Island, Fort Simpson, Fort Anderson, and the lower Anderson River.^e A specimen from Fort Anderson collected June 10, 1864, one from Fort Resolution taken June 1, 1860, by Kennicott, and one from Big Island, are still in the National Museum.

Dendragapus obscurus richardsoni (Dougl.). Richardson Grouse.

This large and handsome grouse inhabits the Rocky Mountains and reaches the vicinity of the Mackenzie only among the spurs of that range. Our records are the most northerly for this region, though the species may exist still farther to the northward among the unexplored ranges. Alfred E. Preble and Merritt Cary, while collecting on Mount Tha-on'-tha, near the mouth of Nahanni River, July 16, 1903, took an adult male and female and two young birds. They were found near the summit of the mountain, where the timber

^a Suppl. to Appendix Parry's First Voyage, p. cc, 1824.

^b Canadian Record of Science, III, p. 135, 1888.

^c Appendix to Ross's Second Voyage, p. xxxi, 1835.

^d Proc. U. S. Nat. Mus., XIV, p. 430, 1891.

^e Water Birds N. A., I, p. 123, 1884.

was dwarfed and scrubby. The Indian guide reported the species common on the foothills west of Fort Simpson and on all the mountains along Liard River.

On June 4, 1904, while collecting near the summit of the same mountain, I flushed and killed an adult male. Its crop was filled with leaves of low willows (*Salix myrtillofolia*), berries of mountain cranberry (*Vitisidæa vitisidæa*), and berries and flowers of bearberry (*Arctostaphylos uvaursi*).

This well-marked form was first described by David Douglas under the name *Tetrao richardsoni*, from specimens collected by him in the Rocky Mountains near the sources of the Athabaska.^a Two years later Richardson described a male taken by Drummond "on the Rocky Mountains," probably not far from where Douglas collected his specimens.^b The next important note on the species which I find is also by Richardson, who refers to the bird under the name '*Tetrao Sayi*,' stating that it "has not been killed farther north than the Nõhhané Bute."^c Ross listed *T. richardsoni* as being found north to Fort Halkett "only in the mountains."^d Specimens from Fort Halkett are still in the National Museum. Ogilvie-Grant lists specimens in the British Museum from the same place and from Fort Simpson;^e and the National Museum bird catalogue shows that skins were received also from Fort Liard and the mountains west of Fort Simpson. The British Museum specimens also, listed by Ogilvie-Grant from Fort Simpson, in all probability were taken in the mountains to the westward.

J. Alden Loring collected a pair near Jasper House, Alberta, August 27, 1895. In 1896 he reported seeing a female with young 15 miles south of Henry House in July, and speaks of shooting four individuals near the head of Grand Cache River, 60 miles north of Jasper House, late in August. He collected a female 15 miles west of Henry House on October 12.

MacFarlane writes me that a Richardson grouse was shot at Fort Providence on March 20, 1885.

Canachites canadensis (Linn.). Hudsonian Spruce Grouse.

Though found throughout the region, this species was not noted during our 1901 trip until we reached Fort Chipewyan, where a female was taken May 21. It was uncommon in the immediate vicinity of that post, but at Point La Brie, on the north shore of the

^a Trans. Linn. Soc. London, XVI, p. 141, 1829.

^b Fauna Boreali-Americana, II, p. 345, 1831.

^c Arctic Searching Expedition, I, p. 179, 1851.

^d Nat. Hist. Rev., II (second ser.), p. 283, 1862.

^e Cat. Birds Brit. Mus., XXII, p. 77, 1893.

lake 12 miles to the northeastward, we found it abundant in the spruce woods May 25 to 30, and took several specimens. The crop of one killed May 29 was filled with berries of *Arctostaphylos uva-ursi*. We next met with the species 25 miles below Peace River June 12. At Fort Smith females with young a few days old were seen June 24 and 25. At Fort Resolution my brother noted it July 20 and 22. While we were ascending the Athabaska we saw one at Big Cascade Rapid August 13, and a brood at Grand Rapid August 22.

In 1903 we did not observe the spruce partridge until June 22, when several were seen at Fort Resolution. The stomach of one contained, besides a small quantity of gravel, only spruce leaves. My brother and Cary noted the species at Fort Providence July 6, and on the mountain near the mouth of Nahanni River July 13, taking one on the latter date. While crossing Great Slave Lake I took a female, with young just ready to fly, on one of the islands of the Simpson Group, July 20. Its crop contained leaves of fern (*Cryptogramma acrostichoides*) and berries of a blueberry (*Vaccinium uliginosum*), and of the mountain cranberry (*Vitisidæa vitisidæa*). Other females, also with young, were noted near Gros Cape on July 23 and 24. During my trip northward from Fort Rae I noted the species on Lake St. Croix, August 11, and on Lake Hardisty, August 18, noting a single bird on each occasion. One was observed near our camp east of Leith Point on September 5. At Fort Franklin I took a male, the only one seen there, September 22. It had just risen from the margin of a small inlet, and its crop contained several mollusks (*Lymnæa palustris*), which it had just picked up. I saw several birds in the possession of a hunter encamped near the rapid on Bear River, where the species was reported common, on September 29. While ascending the Mackenzie the species was observed above Nahanni River, October 15, and a short distance below Fort Simpson, October 19 and 20. The crops of three shot near Nahanni River, October 15, contained nothing but leaves of spruce (*Picea canadensis*). At Fort Simpson I occasionally observed the species during November and December, usually in spruce or pine woods. A pair taken on October 25, and a single one on November 14, had filled their crops with the leaves of Banksian pine (*Pinus divaricata*).^a

During the first three months of 1904 this bird was seldom observed, but several were taken early in April. Their crops contained nothing but leaves of *Pinus divaricata*. The birds were always found singly or in twos, and were very tame. As a result, by this time they were practically exterminated in the vicinity of the post, and were not observed during the remainder of the spring.

Six eggs, perhaps an incomplete set, taken at Fort Simpson, May 29, 1905, have recently been received from J. W. Mills. He writes that

^a Fort Simpson and Fort Chipewyan specimens are referable to *C. c. osgoodi*.

the nest was a small hollow at the base of a clump of willows, and that the eggs were fresh.

This species occurs throughout the region nearly to the limits of the forest, and figures frequently in the narratives of northern travel. Franklin noted it about Fort Franklin, Great Bear Lake, about the last of October, 1825;^a Douglas stated that occasionally a solitary individual was seen near the sources of the Athabaska, and that the species abounded about Lesser Slave Lake;^b Richardson described a male "killed on the eastern declivity of the Rocky Mountains" [probably in the Jasper House region], and figured the head of a female from Great Bear Lake;^c Ross listed the species as occurring in the Mackenzie River region north to the Arctic coast, and as having been collected at Fort Simpson;^d Baird, Brewer, and Ridgway describe eggs from Fort Resolution, collected by Kennicott;^e MacFarlane frequently observed the species in the forested country to the southward of Fort Anderson.^f The bird catalogue of the National Museum records skins sent by various officers of the Hudson's Bay Company about forty years ago from Methye Portage, Fort Resolution, Fort Rae, Big Island, Fort Simpson, mountains west of Fort Simpson, Fort Liard, and Fort Halkett; skins from Fort Rae, Fort Resolution, and Liard River are still in the collection. Bendire records eggs taken by Ross near Fort Simpson as early as May 23;^g eggs taken by H. MacKay at the Hudson's Bay Post on Pelican Lake, eastern Saskatchewan, in June, 1891, were received by the National Museum through MacFarlane.

During his trip to western Alberta in 1895 J. Alden Loring took a male about 40 miles west of Henry House October 1. In this region the range of the Hudsonian spruce grouse overlaps that of the Franklin grouse, a closely related species. In 1896 he took specimens of the former 100 miles west of Edmonton about May 30, reported the species as common in the foothills and valleys between Jasper House and Smoky River August 20 to October 8, and took a male and female in the Blueberry Hills, on the Jasper House trail, about 100 miles west of Edmonton, on October 29.

Canachites franklini (Dougl.). Franklin Grouse.

The Franklin grouse occurs within the area now under review only about the headwaters of the Athabaska, where its range overlaps slightly that of the spruce grouse. It was first described by Douglas

^a Narrative Second Expedition to Polar Sea, p. 60, 1828.

^b Trans. Linn. Soc. London, XVI, p. 147, 1829.

^c Fauna Boreali-Americana, II, pp. 347, 348, 1831.

^d Nat. Hist. Rev., II (second ser.), p. 283, 1862.

^e Hist. N. A. Birds, Land Birds, III, p. 418, 1874.

^f Proc. U. S. Nat. Mus., XIV, p. 430, 1891.

^g Life Hist. N. A. Birds [I], p. 56, 1892.

from specimens taken by him in the Rocky Mountains near the sources of Columbia River.^a Two years later Richardson described a male taken by Drummond near the sources of the Athabaska, in the same region.^b J. Alden Loring took males at Banff, Alberta, August 26 and 28, 1894. He took a female about 40 miles west of Henry House on October 1, 1895, and a male 15 miles west of Henry House on October 18, 1896. Macoun states that Spreadborough reported the species common about Jasper House in the summer of 1898.^c

***Bonasa umbellus umbelloides* (Dougl.). Gray Ruffed Grouse.**

The ruffed grouse occurs commonly in the wooded parts of the region north to Great Slave Lake, and to about latitude 63° on the Mackenzie. In 1901 it was seen or heard nearly every day along the road between Edmonton and Athabaska Landing April 29 to May 5, and along the Athabaska between the Landing and the mouth of the river, May 6 to 17. The birds were especially abundant along the Athabaska from the mouth of Red River to within a short distance of Athabaska Lake, and their drumming was heard almost constantly, several being frequently noted at once. On the evening of May 15 several females were seen hurriedly gathering a supper of the buds of the balsam poplar. They had probably left their nests to fill their crops with the food most readily available.

At our several camps near Fort Chipewyan we found the species fairly abundant May 18 to June 5. On May 25 and 26 I observed a male in the act of drumming. He had several drumming stands within a distance of 25 yards in rather heavy mixed woods. If disturbed at one place he was soon heard at another, but owing to the surrounding vegetation I was able to observe him plainly at but one of these stands, and there only after a careful and tedious approach through a mosquito-infested muskeg. While drumming he stood erect on the log, and his wings, not extended to their full length, but held about half open, were raised above the back and brought downward against the body, at the end of the stroke apparently occupying the same position that they ordinarily do when closed. During the intervals between the drummings he walked slowly back and forth on the log, holding himself erect, with his feathers closely compressed to the body. He was oblivious of my presence, and I watched him from a distance of 20 yards until the mosquitoes overcame my enthusiasm.

The species was noted near the mouth of Peace River June 5, and was fairly common, June 7 to 11, at our camp 10 miles below the

^a Trans. Linn. Soc. London, XVI, p. 139, 1829.

^b Fauna Boreali-Americana. II, p. 349, 1831.

^c Cat. Canadian Birds, Part I, p. 201, 1900.

mouth of Peace River, where two males were taken. At this place we pitched our camp within 5 yards of the stand of an old drummer. Soon after sunset he came to drum, but not relishing the proximity of our camp, walked away after clucking a protest. He was so loath to forsake his accustomed stand, however, that next evening, after all was quiet, he again visited the place, and this time ventured to drum several times, and he came back on the third evening also. The drumming of one was heard 25 miles below the Peace June 12, and females with young were seen at Smith Landing June 15, and at Fort Smith June 28. The species was next noted near Fort Resolution, where one was heard drumming July 3. We saw broods of well-grown young on the Athabaska near Big Mouth Brook, 65 miles below Athabaska Landing, August 25; and near La Biche River August 27. Several individuals were seen on the road 40 miles north of Edmonton September 3.

In 1903 we noted the ruffed grouse on several occasions between Edmonton and Athabaska Landing May 11 to 15, and between Athabaska Landing and Pelican Rapid May 17 to 18. Its drumming was heard near Stony Rapid May 26, and a number of individuals were seen or heard on the lower Athabaska on May 29 and 31 and June 1. The crops of two taken June 1 contained only the catkins and young leaves of willows. We found the species common on Rocher River, where, on June 6, we took one whose crop contained willow catkins and fertile heads of *Equisetum*. We noted it also on Slave River, below Fort Smith, June 15 to 17, usually detecting it by its drumming. My brother and Cary noted females with fledged young at Fort Providence on July 6 and 8. On their return trip they noted one at Swift Current Rapid late in August, and found it common between Athabaska Landing and Lily Lake September 21 to 24.

During the same season I did not observe the species during my journey between Great Slave and Great Bear lakes, and on my fall trip up the Mackenzie first saw it near Roche Trempe-l'eau October 9. During October, November, and December I occasionally observed it at Fort Simpson, and collected a few specimens. The crop of one shot November 7 contained rose hips, buds of *Salix* and *Lepargyræa*, and seeds of a species of grass. Though the birds usually were solitary, three were seen together on December 5. The pectinations on the toes were fully developed, nearly 5 millimeters in length, early in November.

In 1904 I occasionally noted the species at Fort Simpson during the latter part of the winter and during the spring, and took several specimens. A fine male shot April 14 has 20 rectrices. Drumming was first heard on April 26. By the latter part of April nearly all the pectinations had been shed. I examined the crops of several and

noted the contents as follows: Male, April 14, buds of *Populus balsamifera*, *Salix*, and *Lepargyrea canadensis*, and leaves of *Pyrola*; male, April 21, buds of *Salix* and *Lepargyrea*, and young shoots of *Equisetum*; male, April 28, catkins of *Salix*; male, May 16, young leaves of *Populus tremuloides*. While descending the Mackenzie I saw one near Roche Trempe-l'eau June 8. This point is near the northern limit of the bird's range on the Mackenzie.

This form was first described by Douglas, who stated that it inhabited the Rocky Mountains in latitude 54° north, and near the sources of Peace River.^a Ross listed the species as common in the Mackenzie River region as far north as La Pierre House, and as having been collected at Fort Simpson.^b The bird catalogue of the National Museum records skins from Fort Resolution, Fort Rae, Fort Simpson, Fort Liard, and Big Island, specimens from the last three localities being still in the collection.

While collecting in Alberta in 1894, J. Alden Loring reported the species common at Edmonton September 7 to 26, taking one specimen. In 1896, he took a male at Henry House October 12, and a female at Jasper House October 22. Macoun states that Spreadborough reported the species common between Edmonton and Jasper House in 1898.^c

Lagopus lagopus (Linn.). Willow Ptarmigan.

This species occurs throughout the region, breeding mainly in the Barren Grounds, and to some extent southward along the mountains, and in winter migrating more or less regularly to the Saskatchewan region.

In 1903, the willow ptarmigan was first noted at Fort Resolution June 28, when an Indian brought me a female which he had shot near the post. It was, of course, merely a straggler and was the only one the native had ever seen at this season. Its crop contained young leaves of *Populus balsamifera*. My Indian canoeman reported seeing ptarmigan in the mountains south of MacTavish Bay, Great Bear Lake, on August 25 and 26. At our camp on the shore of Great Bear Lake east of Leith Point the species was first seen August 29, several broods of nearly grown birds being observed. Three old males, two of which were secured, were seen August 31. The crop of one contained leaves of dwarf willow (*Salix reticulata*), wild rosemary (*Andromeda polifolia*), and a small vetch (*Aragalbus*), catkins of dwarf birch (*Betula nana*), and berries of blueberry

^a Trans. Linn. Soc. London, XVI, p. 148, 1829.

^b Nat. Hist. Rev., II (second ser.), p. 283, 1862. If this record for La Pierre House is well founded, the bird must reach there from the Yukon or along the mountains, since it is certainly absent from the lower Mackenzie.

^c Cat. Canadian Birds, Part I, p. 203, 1900.

(*Vaccinium uliginosum*) and crowberry (*Empetrum nigrum*). Several broods and small companies were seen September 3 and 4, and a number were collected, including old and young birds of both sexes. The crops of two adult males killed September 3 contained mushrooms (95 per cent), a few leaves of dwarf willow (*Salix reticulata*), and fruit of *Andromeda polifolia*. Their stomachs were filled with the seeds of *Empetrum nigrum*, and the linings and to some extent the muscular tissue of the gizzards were stained with the purple juice of this fruit. Among the contents of the crops of other individuals taken on these dates were found the tops and seeds of grass, seeds of *Hedysarum americanum*, and berries of alpine bearberry (*Mairania alpina*). The old birds at this date had acquired many of the feathers of the winter plumage, and the young were just beginning to show the same change. These feathers, especially when first acquired, show a delicate pink tinge, like the breast feathers of certain gulls. The birds undoubtedly breed all along this part of the shore in considerable numbers, and were usually in small companies, evidently family groups, though a large flock was seen near McVicar Bay September 9. One taken near the same place September 10 had been eating the leaves of *Betula nana*, *Salix reticulata*, and a vetch, and the berries of *Empetrum* and *Vitisidæa*. A few individuals were seen to the westward of McVicar Bay September 10, 11, and 12, and a single adult bird showing much white was seen at Fort Franklin September 22. A few seen in the possession of Indians at the same place, September 28, had nearly completed the change to the winter plumage. While ascending the Mackenzie a few miles above Fort Norman, October 2, I noted two in complete winter plumage; and I saw another near Gravel River October 5; near Roche Trempe-l'eau October 8; and a short distance below Fort Simpson October 20. One that was pursued by a goshawk flew high and straight out over the river, and soon distanced its pursuer, which gave up the chase. The ptarmigan then descended nearly to the surface of the river and regained the shore by a long, circuitous flight.

During the winter of 1903-4, the willow ptarmigan was not common in the vicinity of Fort Simpson, but occasionally was observed in twos and threes, and a number were collected. Their crops invariably contained buds and twigs of willows, mainly *Salix bebbiana*, usually to the exclusion of other food, though in one instance a few buds of *Populus balsamifera* were found. The last ptarmigan observed, still in complete winter plumage, was taken March 12.

While at Fort McPherson I was informed that these birds breed among the mountains a few miles to the westward. J. W. Mill informs me that on one occasion late in September some years ago, while the brigade of York boats was traversing Great Slave Lake,

large numbers of ptarmigan appeared on Deadman Island, on the south side of the lake west of Little Buffalo River, evidently having crossed the lake from the northern shore. All of them were exhausted, and many, unable to fly farther, fell into the water before reaching the island.

As was stated by Richardson, the willow ptarmigan undoubtedly breeds in the Rocky Mountains, south to the Jasper and Henry House region. While collecting in that region in 1895, J. Alden Loring found the species abundant at a point about 50 miles west of Henry House during the latter part of September. The camp was close to the timber line, and a heavy snow had driven the birds down into the open parks, where they were feeding on the seeds of grasses. Four specimens were taken at Henry House, September 26. They had commenced to assume the winter plumage, most of the lower parts being white, and white feathers appearing also on the back, head, and throat. In the case of the female the molt is slightly more advanced than in either of the three males taken. In 1896, Loring reported taking one in Smoky Valley, 50 miles north of Jasper House, on August 27, and on October 18 collected three from a flock of nine in Caribou Basin, 15 miles west of Henry House. In these specimens the winter plumage is complete, except for a few scattering feathers about the heads, and on the back of one.

These specimens from the Henry House region are considerably smaller than birds from Hudson Bay and the Mackenzie. Five adult males from Great Bear Lake and Fort Simpson have an average wing measurement of 194; six adult females from the same localities average 188. Adult males from Fort Churchill and the 'Barrens' south of there have a wing measurement of 203, and females from 190 to 203, while males from near Henry House measure about 190 and females about 171. Since no specimens in summer plumage from the latter region are available, no satisfactory color comparisons can be made, but it is probable that the willow ptarmigans breeding in the southern Canadian Rockies will be found to be separable from those inhabiting the Barren Grounds and now included under the name *L. lagopus*.

The dates of the arrival of willow ptarmigan at Lac du Brochet Post, Reindeer Lake, during the autumnal movement southward, as observed during a series of years, are incorporated in a table given on page 22. Corresponding dates for Fort Chipewyan appear in tabular form on page 23.

Franklin enumerated 'ptarmigan,' doubtless referring mainly to the present species, as one of the four birds which still remained about Fort Enterprise at the latter end of October, 1820.^a

^a Narrative Journey to Polar Sea, p. 247, 1823.

On his second northern journey he noted the 'willow partridge' at Fort Franklin the last of October, 1825.^a Richardson, under the name *Tetrao saliceti*, made many general observations on the habits and other characteristics of the species, and gave a description of a male killed in July in the Rocky Mountains in latitude 56°.^b During his third northern trip he recorded the species from Fort Franklin, where it commenced to assume the summer plumage toward the end of April.^c In the winter of 1833-34 King noted the presence of willow ptarmigan at Fort Reliance, at the eastern end of Great Slave Lake, where they arrived about December 7.^d Thomas Simpson, probably referring to this species, stated that ptarmigan had become perfectly white on September 24, 1837, on Dease Bay, Great Bear Lake;^e and he found them numerous and mating at Dease River on June 8, 1838.^f While crossing Great Bear Lake between Cape McDonnell and the Scented Grass Hills in the autumn of 1839, he observed many white partridges which had been drowned in crossing the lake.^g

Under the name *Lagopus albus*, Ross listed the species as having been collected at Fort Simpson.^h Willow ptarmigan have been recorded, under various names, from a number of points on the Arctic islands. J. C. Ross states that they were seen at Port Bowen every month except January during the winter of 1824-25;ⁱ and that one pair was seen on the east side of Boothia in latitude 71°, and a few at Felix Harbor.^j Walker records the species from Port Kennedy.^k Armstrong states that willow grouse were tolerably common in Prince of Wales Strait near Princess Royal Islands, May 31, 1851.^l He also states, referring to the willow grouse (since he elsewhere states that no rock ptarmigan were killed there), that ptarmigan were killed at Mercy Bay, Banks Land, every month between October, 1851, and April, 1853.^m

In the early sixties MacFarlane found the willow ptarmigan exceedingly abundant in the neighborhood of Fort Anderson and in the wooded country to the eastward, and found many nests. The

^a Narrative Second Expedition to Polar Sea, p. 60, 1828.

^b Fauna Boreali-Americana, II, p. 358, 1831.

^c Arctic Searching Expedition, II, p. 254, 1851.

^d Narrative Journey to Arctic Ocean, I, p. 161, 1836.

^e Narrative Discoveries on North Coast of America, p. 198, 1843.

^f Ibid., p. 248, 1843.

^g Ibid., p. 396, 1843.

^h Nat. Hist. Rev., II (second ser.), p. 284, 1862.

ⁱ Parry's Third Voyage, Appendix, p. 101, 1826.

^j Appendix to Ross's Second Voyage, p. xxviii, 1835.

^k Proc. Roy. Soc. Dublin, III, p. 63, 1860.

^l Narrative Discovery Northwest Passage, p. 337, 1857.

^m Ibid., p. 601, 1857.

birds commenced to lay their eggs about the last of May, the molt to the summer plumage beginning a week or two earlier. They assembled in large flocks in autumn, but during the winter only small numbers remained in that neighborhood, though the species was numerous at that season at Fort Good Hope and other posts on the Mackenzie.^a Eggs taken by MacFarlane near Fort Anderson have been described by Bendire.^b Ogilvie-Grant has recorded specimens from Fort Resolution and Fort Simpson; ^c and the Smithsonian Institution received skins from Big Island, Anderson River, and La Pierre House. Warburton Pike found ptarmigan, undoubtedly this species, to be numerous about Lake Camsell, 75 miles north of the narrows of Great Slave Lake, on September 15, 1899.^d During the following year James MacKinlay, who accompanied Pike, found the birds numerous about Lac du Mort, south of Lake Mackay, on June 2, and noted that the necks of the birds were dark brown, though the rest of the plumage still remained white. On June 20 he noted that the female birds had acquired their summer plumage, but that the males were still white, with brown necks.^e Russell observed the species at Fort Rae in the winter of 1893-4, where he took specimens from October 2 to May 7. They arrived there on the 1st of October, and, having already begun to assume their winter plumage, were very conspicuous. They were much preyed upon by goshawks. A male taken May 7 had commenced to acquire the summer plumage.^f During his journey down Telzoa River in the summer of 1893 J. B. Tyrrell first saw ptarmigan at a rapid, which he named from the circumstance, below Hinde Lake, in about latitude 61° 30'.^g J. W. Tyrrell records eggs found on Artillery Lake on May 30, 1900,^h and states that the birds were common on the eastern shore of that lake in latitude 63°, June 8 to 11 of the same year.ⁱ Hanbury noted that ptarmigan had commenced to assume their summer plumage on May 21, 1902, at White Bear Point, near Ogden Bay; ^j he found them common on Melville Sound early in June; ^k and noted fledgelings near the mouth of Kendall River July 30.^l

^a Proc. U. S. Nat. Mus., XIV, pp. 430, 431, 1891.

^b Life Hist. N. A. Birds [I], p. 74, 1892.

^c Cat. Birds Brit. Mus., XXII, p. 43, 1893.

^d Barren Ground of Northern Canada, p. 41, 1892.

^e Dowling (from MacKinlay's notes), Ottawa Nat., VII, p. 109, 1893.

^f Expl. in Far North, pp. 86, 260, 1898.

^g Ann. Rept. Can. Geol. Surv., IX (new ser.), p. 46F, 1897.

^h Ann. Rept. Dept. Interior (Canada), 1900-1901, p. 137, 1902.

ⁱ Ibid., p. 115, 1902.

^j Sport and Travel in Northland of Canada, p. 149, 1904.

^k Ibid., p. 162, 1904.

^l Ibid., p. 209, 1904.

Lagopus rupestris (Gmel.). Rock Ptarmigan.

The distribution of this species is similar to that of the willow ptarmigan, but in general it is a more northern bird than *L. lagopus* and is much less migratory. Edward Sabine states that during Parry's first voyage it was found in great abundance on Melville Island, where it arrived on May 12, still in its winter plumage. The females completed their summer plumage by the end of the first week in June, but some of the males had not begun to change by the middle of the month.^a During Franklin's second overland journey the species was noted at Fort Franklin late in October, 1825;^b and Richardson described a winter specimen from the same place and a female taken in summer on the Rocky Mountains in latitude 55°.^c This last record indicates that *L. rupestris* breeds in the higher parts of the Rockies to the southward of its generally recognized range. The record has not been confirmed by later investigations, but it is not improbable. King noted the occurrence of the rock ptarmigan in the winter of 1833-34 at Fort Reliance, at the eastern end of Great Slave Lake;^d and Richardson observed it in the summer of 1848 at Point Maitland, Liverpool Bay.^e J. C. Ross records it from Port Bowen in October, 1824, where it was also seen from March to May, 1825.^f Armstrong states that it was common on Prince of Wales Strait.^g Harting records a specimen from Wellington Channel.^h M'Dougall states that ptarmigan (probably of this species) were shot near Cape Hay, Prince Patrick Island (latitude 76°), and also on Eglinton Island, in the summer of 1853.ⁱ Ross recorded a specimen taken at Fort Good Hope.^j In the early sixties of the last century MacFarlane found this species to be far less plentiful in the Anderson River region than *L. lagopus*, and met with it in numbers only between Wilmot Horton River and the shores of Franklin Bay. He intimates, however, that a few breed near the lower Anderson. In winter many were found in the forested country to the eastward of Fort Anderson.^k Bendire records eggs taken in Gens de Large or Romanzoff Mountains, northeast of Fort Yukon, Alaska, in May, 1869, by James McDougall.^l Russell states that one was killed in the Barren Grounds

^a Suppl. to Appendix Parry's First Voyage, pp. cxcv, cxcvi, 1824.

^b Narrative Second Expedition to Polar Sea, p. 60, 1828.

^c Fauna Boreali-Americana, II, pp. 355, 356, 1831.

^d Narrative Journey to Arctic Ocean, I, p. 166, 1836.

^e Arctic Searching Expedition, I, p. 264, 1851.

^f Parry's Third Voyage, Appendix, p. 99, 1826.

^g Narrative Discovery Northwest Passage, p. 521, 1857.

^h Proc. Zool. Soc. London, 1871, p. 117.

ⁱ Voyage of *Resolute* to Arctic Regions, pp. 291, 298, 1857.

^j Can. Nat. and Geol., VI, p. 443, 1861.

^k Proc. U. S. Nat. Mus., XIV, pp. 431, 432, 1891.

^l Life Hist. N. A. Birds [I], p. 78, 1892.

northeast of Fort Rae, over 100 miles from the edge of the woods, in April, 1894.^a James MacKinlay, who accompanied Pike to the Baren Grounds in 1890, first noted the bird on Lockhart River, between Mackay and Aylmer lakes, on June 25. At this time the males were still white, but the females had assumed the brown summer plumage.^b In the National Museum are specimens from Fort Anderson taken in February, 1863; from Fort Rae, January 28, 1863; and from the Arctic coast east of Fort Anderson, taken by the Eskimo in July, 1865. The bird catalogue records also skins from Fort Resolution, Fort Rae, and Anderson River. Specimens from Cape Bathurst and Baillie Island, taken in June and July, 1901, probably by a whaler, were identified by Dr. A. K. Fisher, of the Biological Survey, in March, 1902.

Lagopus leucurus Swains. and Rich. White-tailed Ptarmigan.

The white-tailed ptarmigan occurs on the alpine summits of the Rocky Mountains throughout nearly their entire length.

A young man who passed the winter of 1903-4 on Liard River a few miles above its mouth told me that among some ptarmigan brought in by the natives he noticed a very small one that was entirely white. This must have been a white-tailed ptarmigan.

This species was first described from specimens taken by Drummond "on the Rocky Mountains in the fifty-fourth parallel," probably in the Jasper House region. Four specimens from this region are mentioned, and another is said to have been taken on the same chain 9 degrees farther north.^c Ross listed the species as occurring in the mountains of the Mackenzie River region north to La Pierre House, and as having been collected at Fort Simpson.^d A specimen in winter plumage, taken in the Nahanni Mountains to the westward of Fort Simpson, and which is probably the one alluded to, is still in the National Museum. Ross recorded also one collected at La Pierre House.^e Baird, Brewer, and Ridgway describe one in winter plumage from Fort Halkett, on Liard River.^f

Pediocetes phasianallus (Linn.). Sharp-tailed Grouse.

The distribution of this grouse in the region now under consideration is nearly coextensive with the forest, though the bird is absent or very rare on its northern border. It breeds throughout this range, but to some extent is migratory.

^a Expl. in Far North, p. 261, 1898.

^b Dowling, from MacKinlay's notes, Ottawa Nat., VII, p. 109, 1893.

^c Fauna Boreali-Americana, II, pp. 356, 357, 1831.

^d Nat. Hist. Rev., II (second ser.), p. 284, 1862.

^e Can. Nat. and Geol., VI, p. 443, 1861.

^f Hist. N. A. Birds, Land Birds, III, p. 464, 1874.

During the summer of 1901 we observed the first sharp-tailed grouse referred to this form near Poplar Point, 90 miles below Fort McMurray, May 16, when we saw one flying across the Athabaska. We saw several and took one near Fort Chipewyan June 1. After this we did not again see the bird until we reached Fort Smith, where we found it common and observed it daily June 19 to 28. An adult was taken on June 24 and a young one a few days old on June 27. The birds were abundant at Trout Rock July 16 and 17. Several broods of young were seen at Fort Rae July 19 to 29, and two were taken July 19. On our return trip a few old birds were seen on Smith Portage August 5.

In 1903 this species was reported to occur at Hay River, and eggs taken about June 1 were shown in support of the assertion. It was reported common on the upper reaches of Hay River. I first observed it on the eastern shore of the Northern Arm of Great Slave Lake, 40 miles south of Trout Rock, July 24. At Fort Rae a brood of young, accompanied by the parents, was seen July 28. One bird was noted on the lower part of Grandin River August 1. The species was not again detected until we reached the rapid on Bear River, September 29, where it was common. It was abundant and apparently migrating at Fort Norman October 1, and between there and Gravel River October 2 and 3. A few were noted near Fort Wrigley October 11, and above Nahanni River October 15. During the autumn of 1903 the species was occasionally observed at Fort Simpson, and a number were collected. Their crops and stomachs usually contained nothing but the catkins of alders (*Alnus alnobetula* and *incana*), but one shot November 7 had eaten also a few berries of *Viburnum pouciflorum*.

During January and February, 1904, I did not observe the species at Fort Simpson. I saw two on March 12, and others during the latter part of the month, noting 10 in a flock on March 24. During April the birds are said to dance on the crusted snow, but by that time they again had become rare in the vicinity, probably having moved northward, and I had no opportunity to observe the habit. During my voyage down the Mackenzie I failed to note the species, though it is said to occur at all the posts north to Fort McPherson.

This bird was first recorded from the region by Richardson, who gave a description of a male killed at Great Slave Lake in November, 1826.^a He afterwards traced the species as far north as the delta of the Mackenzie.^b Ross listed it as occurring in the Mackenzie River region north to Fort Good Hope, and as wintering in the region.^c

^a Fauna Boreali-Americana, II, p. 362, 1831.

^b Arctic Searching Expedition, I, p. 179, 1851.

^c Nat. Hist. Rev., II (second ser.), p. 283, 1862.

Suckley, comparing specimens from Great Slave Lake with examples of one of the southern forms, renamed the species *Pediocætes kennicottii* in 1862, recording specimens from Fort Rae and Big Island.^a Baird, Brewer, and Ridgway describe a specimen from Fort Resolution,^b and the catalogues of the National Museum show that skins were received also from Fort Simpson, mountains west of Fort Simpson, Fort Good Hope, and Fort Rae, as well as eggs from the latter place. MacFarlane found the species breeding in the forests on both sides of the Lockhart and upper Anderson rivers, and found a few nests.^c Russell observed it near Prospect Lake, near the headwaters of Yellowknife River, late in July, 1893, and took specimens at Fort Rae October 4 to 7, referring to the bird as rather common there during the autumnal migration.^d

Pediocætes phasianellus columbianus (Ord). Columbian Sharp-tailed Grouse.

This southern form of sharp-tailed grouse was abundant on the road between Edmonton and Athabaska Landing April 29 to May 5, 1901. They were found in small companies and when flushed usually alighted on poplars at a little distance away and excitedly resented our intrusion. They were especially abundant in the farming lands near Edmonton. On our return trip several small flocks were seen in the fields near Sturgeon River September 3.

In 1903 we noted a small flock near Sturgeon River May 12. The crop of a female collected there contained barley (60 per cent), small green leaves, myriapods, ants, and two species of beetles. Another small flock was noted 50 miles north of Edmonton May 14. During their return trip my brother and Cary found this grouse rather common in the open country and cultivated fields between Athabaska Landing and Edmonton September 1 to 26.

During my trip from Athabaska Landing to Edmonton, September 2 to 4, 1904, I observed this bird daily in small numbers.

J. Alden Loring reported the birds common at Edmonton September 7 to 26, 1894. They were found in flocks frequenting the grain fields, plowed land, and edges of thickets. In 1895, while returning from the mountains, he saw six individuals at Whitemud, on McLeod River, 135 miles in a direct line west of Edmonton, about the middle of October. Macoun reports that in the summer of 1898 Spreadborough (presumably while on his way to the mountains) saw the last birds of this species about 25 miles west of Edmonton.^e

^a Proc. Acad. Nat. Sci. Phila. [XIV], p. 362, 1861.

^b Hist. N. A. Birds, Land Birds, III, p. 434, 1874.

^c Proc. U. S. Nat. Mus., XIV, p. 432, 1891.

^d Expl. in Far North, pp. 76, 261, 1898.

^e Cat. Canadian Birds, Part I, p. 212, 1900.

Ectopistes migratorius (Linn.). Passenger Pigeon.

This famous species formerly reached the Mackenzie River Valley, but apparently only in small numbers. Alexander Mackenzie, during his voyage of exploration to the mouth of the river in the summer of 1789, mentions seeing it in the Hare Indian country—that is, in the Fort Good Hope region.^a Hood mentions pigeons as occurring at Isle à la Crosse about the last of June, 1820, during Franklin's first northern journey.^b Thomas Simpson noted the occurrence of the species at Fort Simpson in the summer of 1837, referring to it as follows:

The fields here looked well, but had a troublesome enemy in the passenger pigeons. Except one at Salt River, we saw none of these graceful birds elsewhere throughout our journey.^c

Ross recorded it as occurring in the Mackenzie River region north to Fort Norman, and as having been collected at Fort Simpson, but as being uncommon.^d I find no later records of the occurrence of the species anywhere in the region.

Cathartes aura septentrionalis (Wied). Northern Turkey Vulture.

Macoun states that three individuals were seen at different times at Edmonton, Alberta, during May, 1897.^e

Circus hudsonius (Linn.). Marsh Hawk.

This harrier is apparently quite generally distributed throughout the wooded region, but is not common. A few were seen almost daily on the road between Edmonton and Athabaska Landing, April 29 to May 5, 1901. After this, single individuals were seen at the mouth of the Athabaska, May 17; at Smith Landing, June 14; at Fort Smith, June 20, and 50 miles below Fort Smith, June 30. On our return trip one was seen near the mouth of La Biche River August 27, and one at Athabaska Landing August 31.

In the spring of 1903 we saw half a dozen migrating individuals between Edmonton and Sturgeon River May 12, and four a short distance north of there May 13. We next saw the species at Fort Resolution June 22, and noted one bird on lower Grandin River August 1. During their return trip Alfred E. Preble and Merritt Cary noted the species at Grand Rapid August 20, and near House River August 22.

In 1904 I first noted this bird at Fort Simpson on April 23, and next recorded it on June 1. On June 11, while collecting in a muskeg

^a Voyages to Frozen and Pacific Oceans, p. 81, 1801.

^b Narrative Journey to Polar Sea, p. 186, 1823.

^c Narrative Discoveries on North Coast of America, p. 93, 1843.

^d Nat. Hist. Rev., II (second ser.), p. 283, 1862.

^e Cat. Canadian Birds, Part II, p. 220, 1903.

at Fort Norman, I saw a pair and collected the male. Another bird was seen near the same place June 14. During my return trip single birds were observed near Little Red River, August 9; near Fort McMurray, August 10; and above Little Buffalo River, August 21. It was noted also below Athabaska Landing, September 1, and near Lily Lake, September 3.

Richardson noted the marsh hawk as being found on Great Bear Lake.^a Baird, Brewer, and Ridgway state that it was found breeding at Fort Resolution, Fort Rae, Fort Simpson, La Pierre House, and on lower Anderson River.^b Concerning the latter record MacFarlane says:

In June, 1865, an Esquimaux snared a female bird on her nest on a willow bush along the lower Anderson River. It contained five eggs. In June, 1866, a nest composed of twigs and grasses, etc., was found in a similar position; there were six eggs, but they were unfortunately among those lost that season.^c

Bendire records an egg from this locality, probably one of the first set mentioned, stating that it is the largest specimen in the series examined.^d Besides specimens from the localities mentioned by Baird, Brewer, and Ridgway, the bird catalogue of the National Museum shows that skins were received from Fort Good Hope and Fort Halkett; and an adult from the latter locality, taken by Lockhart in May, 1863, is still in the collection. Russell records one taken near Fort Rae, August 22, 1893.^e Macoun records eggs taken by Spreadborough at Edmonton, Alberta, June 2, 1897.^f

J. Alden Loring reported the species common at Edmonton, September 7 to 26, 1894, and along the trail between Jasper House and Smoky River in the early autumn of 1896.

Accipiter velox (Wils.). Sharp-shinned Hawk.

In 1901 this species was first met with at our camp on Slave River, 10 miles below the Peace, where one was seen June 9, and where a specimen, perhaps the same individual, was taken the next day. Single birds were afterwards seen on Slave River, at points 25 miles below the Peace June 12, and 100 miles below Fort Smith July 2. On our return trip one was seen on Smith Portage August 5, and several on the Athabaska, between Grand Rapid and Athabaska Landing, August 22 to 29.

In 1903 we first noted the sharp-shinned hawk at Edmonton May 10. We saw several between Athabaska Landing and Pelican Rapid May 17 and 18, and next noted it on Slave River, 100 miles below

^a Fauna Boreali-Americana, II, p. 57, 1831.

^b Hist. N. A. Birds, Land Birds, III, p. 220, 1874.

^c Proc. U. S. Nat. Mus., XIV, p. 432, 1891.

^d Life Hist. N. A. Birds [I], p. 186, 1892.

^e Expl. in Far North, p. 261, 1898.

^f Cat. Canadian Birds, Part II, p. 224, 1903.

Fort Smith, June 17. On their return trip my brother and Cary noted one near Boiler Rapid August 17, and another at Athabaska Landing September 5. A pair with their nest, which contained young about to fly, was seen by myself in an open forest of pine and spruce on upper Grandin River, a short distance south of Lake Mazenod, August 5. The species was seen also on a small lake north of Lake Hardisty August 19.

In the spring of 1904, I first observed this bird at Fort Simpson May 20, taking a male specimen. Other individuals were noted on May 28 and 30. While descending the Mackenzie, I saw one below the site of old Fort Good Hope June 28. During my return trip I noted it at Fort McMurray August 12, near Mountain Rapid August 15, and near Grand Rapid August 22.

Ross listed this species as occurring north to Fort Simpson, where he collected it;^a Ridgway recorded specimens from Fort Rae, Fort Simpson, La Pierre House, and Fort Resolution, the latter locality represented by a specimen taken April 26 [1860], by Kennicott.^b Baird, Brewer, and Ridgway state that it was found breeding on the upper Slave River by Ross, and at Fort Resolution by Kennicott;^c eggs taken at Fort Resolution June 16, 1860, by the last-named naturalist, are recorded by Bendire.^d Russell took a specimen at Fort Rae August 17, 1893.^e

Accipiter cooperi (Bonap.). Cooper Hawk.

While we were ascending the Athabaska in the autumn of 1901, one was seen at close range and satisfactorily identified near the mouth of La Biche River, August 27. This is apparently the only record for this region.

Astur atricapillus (Wils.). Goshawk.

This beautiful hawk breeds throughout the wooded parts of the region, and to some extent is migratory. A fine male was taken in a trap June 8, 1901, at our camp on Slave River 10 miles below the Peace. While we were on our way to Great Slave Lake, another was seen 150 miles below Fort Smith. He was feeding on a full-grown varying hare, and on our approach flew away with his quarry.

Alfred E. Preble and Merritt Cary, during their return journey in the autumn of 1903, noted single birds at Swift Current Rapid August 27, La Biche River August 28, and Athabaska Landing September 5 and 12. They saw several also between Athabaska

^a Nat. Hist. Rev., II (second ser.), p. 276, 1862.

^b Bull. 2, U. S. Geol. and Geog. Surv. Terr., II, pp. 114, 115, 1876.

^c Hist. N. A. Birds, Land Birds, III, p. 229, 1874.

^d Life Hist. N. A. Birds [I], p. 187, 1892.

^e Expl. in Far North, p. 261, 1898.

Landing and Lily Lake September 21 to 24. One seen a few miles north of the latter point on September 24 had a freshly killed ruffed grouse in its talons. It was flying through the pine woods with its quarry, and, becoming startled by suddenly perceiving the party, dropped the grouse, which fell into the midst of the company, then at breakfast. While ascending Grandin River on August 3, I found a nest of this species from which the young had just flown, and collected one of the young birds near by. The nest was bulky and was built in a medium-sized birch 15 feet from the ground. I noted one individual on the shore of Great Bear Lake 40 miles west of McVicar Bay September 12, and several near Manito Islands September 15. A bird of the year shot at the latter place had been eating a ptarmigan. I noted another at Fort Franklin September 18. While ascending the Mackenzie, I saw the species near Roche Trempe-l'eau October 9, and daily between Nahanni River and Fort Simpson October 13 to 20. The birds observed appeared to be mostly young of the year, though a few were adults. During the latter part of October and the first part of November I found the species rather common at Fort Simpson, but during December I noted it but twice—on the 2d and 27th.

During January, 1904, I saw only a single bird—on January 14—and during February saw none. On March 24 I observed two pairs evidently newly arrived from the south. During the early part of April I noted goshawks, usually in pairs, on several occasions. In one instance I surprised one in the act of eating a varying hare which it had taken from a snare. A pair were evidently contemplating nesting in a tract of poplar woods near the banks of Liard River to the southward of the post, but the breaking up of the ice late in April put a stop to my excursions in that direction. I failed to observe the bird during the summer. While ascending the Athabaska on my return trip I saw one a short distance below Athabaska Landing, Alberta, September 1, and I observed another a short distance south of that place September 2.

Under the name *Astur palumbarius*, Richardson mentions a specimen killed near Jasper House.^a Ross listed this species as being found in the Mackenzie Valley north to Fort Good Hope, but as rare.^b A specimen from Fort Simpson, taken by R. MacDonald, is in the National Museum, and the catalogue of the birds shows that skins were received also from Big Island and Fort Good Hope. MacFarlane believed that the species bred in small numbers in the wooded country between Fort Good Hope and Anderson River.^c

^a Fauna Boreali-Americana, II, p. 43, 1831.

^b Nat. Hist. Rev., II (second ser.), p. 276, 1862.

^c Proc. U. S. Nat. Mus., XIV, p. 432, 1891.

Russell took a number of specimens in the late summer and the autumn of 1893 at Fort Rae, where he reported it the commonest representative of the order. After the arrival of the ptarmigan from the north about the 1st of October, the goshawks preyed principally upon them.^a Macoun states that Spreadborough found the species not uncommon and evidently breeding at Edmonton, Alberta, in June, 1897;^b and records, on the authority of Raine, a set of three eggs taken by Doctor George in northern [now central] Alberta, May 10, 1894.^c

Eggs, collected with the female parent at the Hudson's Bay Company post on Pelican Lake, eastern Saskatchewan, in April, 1891, by Daniel Thomas, were received by the National Museum through MacFarlane. J. Alden Loring reported the species common in the foothills of the Rockies west of Edmonton, Alberta, in the early autumn of 1895.

***Buteo borealis calurus* Cass.** Western Red-tailed Hawk.

This powerful hawk occurs throughout the region north to the limit of trees. In the spring of 1901 one was seen on the road near Sturgeon River May 1. The species was next noted near the outlet of Athabaska Lake June 2, when a pair was observed, and another pair was seen near the mouth of the Peace June 6. Single birds were observed 10 miles below the Peace June 6, 25 miles below June 13, and near Fort Smith June 24. At a point on Slave River 100 miles below Fort Smith a pair was seen July 1, and their nest, which contained young, was discovered in a large balsam poplar near the river. One or two single birds were observed not far below here on the following day. On our return trip, single birds were seen at Fort McMurray August 12, below Pelican Rapid August 23, near La Biche River August 27, and 50 miles north of Edmonton September 2.

In 1903 we first noted this species near Athabaska Landing May 14, and again near that place May 15. We next saw it on the Athabaska 50 miles below the Landing May 17, and observed a melanistic individual a few miles farther down on the following day. We saw a pair near the outlet of Athabaska Lake June 5, and a single one near the mouth of the Peace June 9. A nest was found on an island a few miles below Fort Smith June 15, and the male, a melanistic bird, secured. The female was seen to be normally colored. The species was noted between there and Fort Resolution on June 16, 18, and 19. My brother and Cary observed it at Fort Simpson July 10 and at Nahanni River July 12. On their return trip they fre-

^a Expl. in Far North, pp. 86, 261, 1898.

^b Cat. Canadian Birds, Part II, p. 227, 1903.

^c Ibid., p. 229, 1903.

quently noted the bird while ascending the Athabaska, and found it common near Athabaska Landing August 31 to September 21, observing two melanistic birds September 5. Several individuals were seen at Lily Lake September 24. During my trip northward from Fort Rae, I observed the species on Grandin River August 1 and 3 and on Lake Faber August 8. I next noted it while descending Bear River September 30, when I saw several a few miles above Fort Norman. They seemed to be hunting varying hares, which were abundant.

In the spring of 1904 I saw the first redtail at Fort Simpson May 7, and others on May 15 and 22. While descending the Mackenzie I saw the species nearly every day between Fort Simpson and Fort Norman June 2 to 10. The melanistic and normal phases seemed to be about equally represented. I saw one near the head of the Ramparts June 20 and another below Fort Good Hope June 25. On my return trip I observed a melanistic individual a short distance below Fort Norman July 25, and birds of the normal coloration below Fort Smith August 3, near Poplar Point August 8, near Grand Rapid August 22, near House River August 24, and near Pelican Rapid August 26, collecting the last one.

J. Alden Loring saw red-tailed hawks at Edmonton, Alberta, on September 13 and 20, 1894, and reported the species common on the Jasper House trail between Edmonton and the Rocky Mountains in the summers of 1895 and 1896.

Macoun records a nest of two eggs, probably belonging to the western form, taken at Edmonton May 17, 1897, by Spreadborough.^a

Buteo swainsoni Bonap. Swainson Hawk.

This western hawk is rare over most of the region now under consideration, but has been reported from a few localities. On May 13, 1903, we saw a single bird, apparently a male, a few miles north of Sturgeon River, Alberta.

This species was taken by MacFarlane in the Anderson River country and referred to as follows:

In July, 1861, we discovered a nest of this species, which was built on a spruce tree along Onion River, the principal tributary of the Lockhart. It contained two well-grown birds. Both parents were about and made a great ado in endeavoring to protect their offspring. The male was shot. In June, 1865, another nest was found on the top crotch of a tall pine in a ravine some 20 miles southeast of Fort Anderson. In composition it was similar to the nest of an *Archibuteo*. The female was shot as she got off her nest, which contained but one egg in a well-developed stage. The male was not seen.^b

The male obtained by MacFarlane, a melanistic specimen, was described by Baird, Brewer, and Ridgway, who state that the species

^a Cat. Canadian Birds, Part II, p. 231, 1903.

^b Proc. U. S. Nat. Mus., XIV, p. 432, 1891.

was obtained also by Ross on the Mackenzie.^a Ross, however, does not appear to have taken specimens and may have been mistaken as to the species.

***Buteo platypterus* (Vieill.).** Broad-winged Hawk.

Apparently a regular summer inhabitant of the southern part of the Athabaska region. On May 8, 1903, we saw one in the wooded valley of the Saskatchewan near Edmonton. It was in suspicious proximity to an old nest and possibly intended to reoccupy it. Alfred E. Preble and Merritt Cary saw one on the Athabaska a few miles above Athabaska Landing on September 5 of the same year.

J. Alden Loring found a nest of this species on the Jasper House trail 12 miles west of Ste. Anne, Alberta, May 27, 1896. It was in the crotch of a poplar about 40 feet from the ground, was loosely constructed of dry twigs, with a lining of green leaves, and contained two eggs. The female was shot as she left the nest and is now in the Biological Survey collection.

***Archibuteo lagopus sancti-johannis* (Gmel.).** American Rough-legged Hawk.

This Arctic species has been recorded from various points in the region now under consideration. It probably breeds throughout this area, though most abundantly in its northern portion. In the spring of 1901 single birds were seen 10 miles north of Edmonton, May 1; on the Athabaska below Fort McMurray, May 14; and on the Quatre Fourches marsh, near Fort Chipewyan, May 24.

The species was noted near Sturgeon River May 12, 1903, when two birds were seen. It was next observed on Great Bear Lake to the eastward of McVicar Bay, where I saw two individuals on September 8. I observed several while descending Bear River, September 29 and 30, and while ascending the Mackenzie from Fort Norman noted these birds daily, October 1 to 16, moving southward along the valley. The latter date, when the cold had increased so that the ice had begun to drift freely in the river, seemed to mark the departure of this and several other species, and the bird was last noted at this time, 50 miles north of Fort Simpson. While ascending the Athabaska the same autumn, my brother and Cary saw several between Quito River and La Biche River, August 27 to 29. They found it common about Athabaska Landing, September 1 to 15, and on the Edmonton trail between the Landing and Lily Lake, September 21 to 24, noting many immature birds. Though so common in the valley of the Mackenzie in autumn, this species must perform its spring migration by some other route, since during the spring of 1904 only two individuals were seen, on April 28 and May 3. at Fort Simpson.

^a Hist. N. A. Birds, Land Birds, III, pp. 264, 269, 1874.

Richardson mentions a specimen killed by Drummond on 'Smoking River.'^a Ross listed *A. lagopus* as common throughout the Mackenzie River region north to La Pierre House, and as having been taken at Fort Simpson;^b and the bird catalogue of the National Museum shows that skins were received from these localities and from Fort Resolution. Kennicott noted the species at Fort Resolution on May 7, 1860.^c MacFarlane found the bird abundant in the Anderson River region, both in the forested country and on the Arctic coast, and saw upward of 70 nests during the several seasons. The majority were built on trees, but 15 were on cliffs or banks.^d Bendire records eggs taken by MacFarlane on Anderson River on May 23 and June 16, 1863.^e Baird, Brewer, and Ridgway describe an adult male in the normal plumage taken at Fort Resolution by Lockhart.^f Russell records a specimen taken at Herschel Island August 4, 1894.^g Macoun, on the authority of Raine, records eggs taken by Stringer at Mackenzie Bay; he also mentions a nest with 3 eggs found by Bishop Lofthouse on Artillery Lake, June 4, 1900.^h In the summer of 1896 J. Alden Loring reported seeing several in the foothills of the Rocky Mountains in western Alberta, and took a male on the Smoky River trail between Muskeg Creek and Baptiste River, September 30.

Aquila chrysaëtos (Linn.). Golden Eagle.

This cosmopolitan species is found throughout the wooded region, but occurs more commonly in the vicinity of mountains, probably on account of the advantages they afford for nesting. It is migratory to some extent, though many individuals brave the winter in high latitudes.

In 1901 one was seen a short distance below Athabaska Landing May 6. The species were not again noted until we were crossing Great Slave Lake July 10, when I observed one about an island 50 miles north of Fort Resolution.

In 1903 I noted the first individual of this species near Gros Cape, Great Slave Lake, July 24. Several were seen in the range of mountains south of MacTavish Bay, Great Bear Lake, August 26. Eyries were common on the cliffs here, but as the bald and golden eagles were equally common, particular nests could not be attributed to either species with certainty. The species was next noted on the Mackenzie near Gravel River October 6, and a fine individual was seen

^a Fauna Boreali-Americana, II, p. 52, 1831.

^b Nat. Hist. Rev., II (second ser.), p. 276, 1862.

^c Trans. Chicago Acad. Sci., I, p. 170, 1869.

^d Proc. U. S. Nat. Mus., XIV, pp. 432, 433, 1891.

^e Life Hist. N. A. Birds [I], p. 259, 1892.

^f Hist. N. A. Birds, Land Birds, III, p. 304, 1874.

^g Expl. in Far North, p. 262, 1898.

^h Cat. Canadian Birds, Part II, p. 241, 1903.

sailing about over Roche Trempe-l'eau, a fitting resort for this majestic bird, on October 9. Another was noted 20 miles below Nahanni River October 13. While ascending the Athabaska, Alfred E. Preble and Merritt Cary saw two flying about the sandstone cliffs near Brulé Rapid August 19.

While descending the Mackenzie in June, 1904, I saw a fine adult flying about some steep cliffs on Mount Tha-on'-tha on July 4, and another near the same place two days later. They were probably nesting in the vicinity, as ideal sites were plentiful. Later I saw one near the site of old Fort Good Hope, July 18, and on my return trip noted another at Spence River, 35 miles above Fort Simpson, July 28. While ascending the Athabaska in August I collected a female at Crooked Rapid, August 17. It had just eaten a woodchuck (*Marmota m. canadensis*), leaving only the skin and head. Perceiving the eagle perched on a limestone ledge, I approached stealthily under cover of its overhanging edge, and not having a gun, bowled her over with a stone. I observed another near Athabaska Landing September 2.

Richardson described a specimen killed by Drummond on the eastern side of the Rocky Mountains in latitude 55°. ^a Ross recorded the species as rare in the Mackenzie River region north to the Arctic coast, and as having been collected at Fort Simpson. ^b About the same time MacFarlane found about a dozen nests in the Anderson River Valley, and on the banks of Horton River. Most of these were on the faces of steep banks, and contained two eggs. ^c The bird catalogue of the National Museum records skins received from Fort Resolution; Fort Simpson; Fort Liard; Fort Anderson; Anderson River; Arctic coast; and Cape Bathurst, the latter specimen collected by the Eskimo. Baird, Brewer, and Ridgway describe eggs taken by R. MacDonald in the mountains west of the lower Mackenzie. ^d J. B. Tyrrell mentions that a large golden eagle was shot beside its nest on a rocky cliff overlooking Stone River, just east of Athabaska Lake, in the summer of 1892. ^e

In the early autumn of 1895 J. Alden Loring found the golden eagle common along the trail between Edmonton, Alberta, and the Jasper House region, four being seen together on one occasion in the mountains. The stomach of a female shot near Jasper House contained the remains of young varying hares. In 1896 Loring reported the species quite common in the high mountains near Henry House

^a Fauna Boreali-Americana, II, p. 13, 1831.

^b Nat. Hist. Rev. II (second ser.), p. 277, 1862.

^c Proc. U. S. Nat. Mus., XIV, p. 433, 1891.

^d Hist. N. A. Birds, Land Birds, III, p. 320, 1874.

^e Ann. Rept. Can. Geol. Surv., VIII (new ser.), p. 14D, 1896.

July 3 to 21, as well as above timber line in the mountains to the northward of Jasper House in the late summer and early autumn.

Haliaeetus leucocephalus alascanus Townsend. Bald Eagle.

The bald eagle is quite generally distributed over the wooded portion of the region and breeds throughout this area. Though the birds usually migrate, some remain in winter as far north at least as Great Slave Lake. While descending the Athabaska in the spring of 1901 we saw a single bird near Brulé Rapid May 11. This was the only one seen during the season.

In 1903 Alfred E. Preble and Merritt Cary noted the species at Fort Providence on July 2 and 8. I saw one individual among the Simpson Islands, about 50 miles northeast of Fort Resolution, July 21. During my trip northward from Fort Rae I found this a common species in the mountainous country south of Great Bear Lake. It was first noted on Lake Hardisty August 18, when a nest, near which the birds still lingered, was seen on a cliff near the water. It was also noted almost daily in the mountains immediately south of MacTavish Bay August 22 to 27.

In 1904 I saw the species but once, noting a fine adult near the junction of the Peel and the Mackenzie June 30.

The 'nonne' or bald eagle is enumerated among the birds of Great Bear Lake by George Keith, a trader of the Northwest Company, in a letter written from there in 1812, containing the earliest account of the fauna of that region.^a Richardson stated that it was common in the country between Lake Superior and Great Slave Lake;^b and King noted it on the Athabaska below the mouth of the Clearwater in the summer of 1833.^c During Richardson's third journey to the Arctic Sea he found it nesting on Great Bear River.^d Ross listed it as occurring commonly in the Mackenzie River region north to the Arctic coast, and as having been collected at Fort Simpson.^e MacFarlane found several nests in high trees on Anderson and Lockhart rivers, where, however, the species was not numerous.^f Besides specimens from these two localities, the bird catalogue of the National Museum records skins from Fort Resolution, Big Island, and Fort Rae, the last accompanied by eggs. In the summer of 1892, while engaged in exploring the country between Athabaska Lake and Churchill River, J. B. Tyrrell observed a few bald eagles.^g Russell mentions seeing one in the lake country to the north of Fort Rae

^a Masson, *Les Bourgeois*, II, p. 102, 1890.

^b *Fauna Boreali-Americana*, II, p. 15, 1831.

^c *Narrative Journey to Arctic Ocean*, I, p. 95, 1836.

^d *Arctic Searching Expedition*, I, p. 202, 1851.

^e *Nat. Hist. Rev.*, II (second ser.), p. 277, 1862.

^f *Proc. U. S. Nat. Mus.*, XIV, p. 434, 1891.

^g *Ann. Rept. Can. Geol. Surv.*, VIII (new ser.), p. 14D, 1896.

early in November, 1893;^a and several near the mouth of Peel River June 25, 1894.^b Macoun, on the authority of Raine, records eggs taken in northern (now central) Alberta.^c In the early autumn of 1895 J. Alden Loring saw one near Jasper House, Alberta.

Falco rusticolus gyrfalco Linn. Gyrfalcon.

On August 29, 1903, I saw a gyrfalcon on the 'barrens' near our camp east of Leith Point, Great Bear Lake. Another was seen near the same place August 31. It appeared to be in pursuit of a wounded ptarmigan, which had towered and finally fallen, and which it had evidently seen from a distance. Though loath to leave its prospective prey, the hawk was shy and eluded my efforts to approach, and after a few short flights from tree to tree flew away to the southward.

A species of gyrfalcon to which this name is supposed to apply was found by MacFarlane to be common in the wooded country on both sides of Anderson River, where over 20 nests were found, most of which were in trees. The earliest nest was found May 10. A specimen (No. 43139, "♀ and two eggs"), taken by MacFarlane at Fort Anderson May 25, 1864, which served as the type of Ridgway's description of *Falco g. sacer*^d and another taken at Fort Anderson May 27, 1864, are now in the National Museum. Bendire records that eggs were taken by MacFarlane near Anderson River;^e and various other published records are based on the same specimens. Under the name *Falco islandicus* Richardson speaks of finding a nest about the middle of June (1821) on a lofty precipice on the shore of Point Lake.^f This record probably refers to the present form. Armstrong, under the name of *Hierofalco candicans*, states that an individual was shot near Prince Alfred Cape, Banks Land, September 5, 1851, and that several others were seen later.^g J. C. Ross, under the name *Falco islandicus*, records several seen at Victoria Harbor in August and September, 1832, and states that the species breeds at Felix Harbor.^h These records may also refer to the present species.

Falco peregrinus anatum Bonap. Duck Hawk.

This powerful falcon is distributed in summer throughout the wooded portion of the region. Since it requires cliffs or cut banks for nesting, it is necessarily of somewhat local distribution, but is fairly common along the larger rivers and in mountainous districts.

^a Expl. in Far North, p. 90, 1898.

^b Ibid., p. 138, 1898.

^c Cat. Canadian Birds, Part II, p. 247, 1903.

^d Hist. N. A. Birds, Land Birds, III, p. 115, 1874.

^e Life Hist. N. A. Birds [I], p. 285, 1892.

^f Fauna Boreali-Americana, II, p. 28, 1831.

^g Narrative Discovery Northwest Passage, p. 426, 1857.

^h Appendix to Ross's Second Voyage, p. xxv, 1835.

In 1901 we saw a pair about a high bank beside the Athabaska near Brulé Rapid May 11, and a single bird on the Quatre Fourches marsh May 23. We next noted the species 25 miles below Fort Smith June 30, when we saw a pair and discovered their nest on the brink of the river bank, at this point about 40 feet in height and nearly perpendicular. The nest was merely a slight hollow beneath the drooping branches of a white spruce, and contained two young, 10 or 12 days old, and slightly clothed with white down. Their stomachs contained the remains of small birds, of which I could identify only one species, the Louisiana tanager. The duck hawk was not again noted until we were ascending the Athabaska August 17, when we saw several immature birds near Boiler Rapid. We noted single birds above Grand Rapid August 22, and above La Biche River August 27.

In 1903 we noted single birds on the Athabaska, 50 miles below Athabaska Landing, May 17, and below Grand Rapid May 25, and on Slave River, near Smith Landing, June 10: My brother and Cary saw a pair about a high cliff on Mount Tha-on'-tha July 13, and another pair near the base of the mountain on July 14 and 16. On their return trip they frequently observed duck hawks about the high banks along the Athabaska during August. Near House River on August 21 one swooped down at a drake mallard which was flying up the river, and was seen to pursue it until a sharp bend hid the birds. While ascending Grandin River August 2 I passed through a gorge where the stream was bordered by precipitous granitic cliffs. On one of these I discovered a nest of this species, evidently containing young, and secured the male bird. I noted the species also on upper Grandin River August 4, and saw a pair which had a nest on a cliff a few miles south of MacTavish Bay August 22. They were very solicitous when the nesting site was approached, evidently because the young had not yet flown. I noted a single bird still lingering in the vicinity of a nesting site on the shore of Great Bear Lake, east of Leith Point, August 28, and observed migrants at Fort Franklin September 21 and 28. I noted the species also on Bear River near Fort Norman September 30, and lastly on the Mackenzie above Gravel River October 6.

In the spring of 1904 I did not detect this species during migration, and noted it first a few miles below Fort Norman on June 16, when I saw a male bird flying about a cliff close to the shore. At Wolverine Rock I observed a nesting pair June 18. On the evening of June 25, as we were paddling down the Mackenzie a few miles below Fort Good Hope, I noticed a pair whose suspicious actions made me certain that a nest was hidden somewhere on the face of the sloping clay bank. Accordingly, we went ashore, and after a short search found it. It was merely a slight hollow on the brink of

a steep portion of the bank beneath a small white spruce, the fallen needles of which covered the ground and lined the nest. The female and the three eggs, which were about half incubated, were collected. While ascending the Mackenzie by steamer between the lower Ramparts and Sans Sault Rapid July 17 to 19, I observed several pairs along the high banks. Their loud cries and suspicious actions indicated that they had young broods. While ascending the Athabaska I noted the species near Boiler Rapid August 18.

MacFarlane found this species breeding in the country to the southward of Fort Anderson, and thinks it does not breed much north of that post.^a Eggs taken by him on Lockhart River June 5, 1866, are recorded by Bendire.^b Baird, Brewer, and Ridgway describe a specimen from Fort Resolution, and mention others from La Pierre House, Peel River, Fort Anderson, and Fort Good Hope.^c Russell took a female at Herschel Island August 16, 1894.^d Macoun records a specimen taken by Spreadborough at Edmonton, Alberta, May 15, 1897.^e Walker records specimens taken at Port Kennedy in 1859.^f

Falco columbarius Linn. Pigeon Hawk.

In 1901 we first noted this bird at Smith Landing, where we took a male June 15. I did not see the species again until July 15, when I landed on the north shore of Great Slave Lake, near the Northern Arm, where I saw a pair and found their nest, apparently a deserted crow's nest, which was in a white spruce 20 feet from the ground. It held five half-grown young, two of which were preserved. Their stomachs contained the remains of an unidentified species of sparrow. I saw another pigeon hawk, which evidently had a nest near by, on a wooded island 60 miles south of Fort Rae July 16, and shot a male at Trout Rock on the evening of the same day. A nest found here July 18 was similar in construction to the first one discovered, and contained four young, one of which was collected. On our return trip we saw single birds at Big Cascade Rapid, 16 miles above Fort McMurray, August 14; near La Biche River August 27; and 50 miles north of Edmonton September 2.

In 1903 we did not note the pigeon hawk until July 1, when we saw one at Fort Resolution. While ascending the Athabaska in the fall my brother and Cary saw several near Pelican Rapid August 24, and one near Swift Current Rapid August 27. During my trip northward from Fort Rae I saw it on Lake Marian July 30; noted it

^a Proc. U. S. Nat. Mus., XIV, p. 435, 1891.

^b Life Hist. N. A. Birds [I], p. 297, 1892.

^c History N. A. Birds, Land Birds, III, pp. 132-136, 1874.

^d Expl. in Far North, p. 262, 1898.

^e Cat. Canadian Birds, Part II, p. 254, 1903.

^f Proc. Roy. Soc. Dublin, III, p. 61, 1860.

rather commonly along Grandin River August 1 to 4; and collected one on the shore of Lake Hardisty on August 20. On Great Bear Lake I noted the species nearly every day at our camp east of Leith Point, August 29 to September 3, and collected two specimens, one of which had eaten a tree sparrow. While ascending the Mackenzie I saw a few between Fort Norman and Gravel River, October 2 and 3; and one, the last of the season, below Roche Trempe-l'eau, October 8.

In the spring of 1904 I first observed this species at Fort Simpson April 29, noting two, one of which I collected. I observed a few daily May 1 to 3, and occasionally saw others during the first half of the month. A specimen taken by J. W. Mills at Fort Providence April 27, 1905, has recently been received. The pigeon hawk breeds rather commonly throughout the region north to the limit of trees. Ross listed it as common in the Mackenzie River region north to La Pierre House, and as having been taken at Fort Simpson.^a Baird, Brewer, and Ridgway record specimens from Fort Resolution, Big Island, Fort Simpson, Fort Good Hope, and La Pierre House;^b and the bird catalogue of the National Museum shows that skins were received also from Lockhart River, Peel River, Fort Rae, and Fort Halkett. Bendire records eggs taken at Fort Resolution July 6, 1860, and at Fort Anderson in June, 1863.^c In the latter region MacFarlane found the species to range along Anderson River almost to its mouth.^d Russell records two specimens taken at Fort Rae May 5, 1894.^e Macoun records a nest taken by Spreadborough at Edmonton, Alberta, in May, 1897.^f

Falco columbarius richardsoni Ridgw. Richardson Merlin.

This species has not apparently been detected north of the Saskatchewan, in which region it was first found by Richardson, who, however, confounded it with *Falco aesalon*, a European species. Macoun records, on the authority of Raine, a set of eggs taken at Fort Saskatchewan, Alberta, May 17, 1899.^g

Falco sparverius Linn. American Sparrow Hawk.

This handsome little falcon occurs throughout the region north to Fort Rae and the lower Mackenzie, but apparently does not range to the northern border of the timber.

In 1901 this species was observed almost daily between Edmonton and Athabaska Landing, Alberta, April 29 to May 5. Single birds

^a Nat. Hist. Rev. II (second ser.), p. 276, 1862.

^b Hist. N. A. Birds, Land Birds, III, pp. 146, 152, 1874.

^c Life Hist. N. A. Birds [I], p. 302, 1892.

^d Proc. U. S. Nat. Mus., XIV, p. 435, 1891.

^e Expl. in Far North, p. 262, 1898.

^f Cat. Canadian Birds, Part II, p. 256, 1903.

^g Ibid., p. 258, 1903.

were seen near Fort McMurray May 14, and near the mouth of the Athabaska May 17. It was observed almost daily near Fort Chipewyan May 21 to 30, and was noted on Rocher River June 5, and at Smith Landing June 14. Several were seen on Smith Portage June 18, and one or more almost daily at Fort Smith June 19 to 28. A single bird was seen beside Slave River, 100 miles below Fort Smith, Mackenzie, June 30. While ascending the Athabaska we took a female at Boiler Rapid August 17.

In the spring of 1903 we first saw this species on May 13 a few miles north of Sturgeon River, Alberta.— We next noted it on the Athabaska below Stony Rapid May 26 and 27. We saw one on Rocher River June 8, and several on Smith Portage June 13, and below Fort Smith, Mackenzie, June 15. My brother and Cary noted the species as follows: Hay River, June 30; Fort Providence, July 6, 7, and 8; Nahanni Mountains, July 3, 16, 17, and 18; and Fort Wrigley, July 22. On their return trip they observed it at Cascade Rapid August 14; between Boiler and Grand Rapids August 17 to 20; at Athabaska Landing August 31; and near Lily Lake September 24.

In 1904 this species arrived at Fort Simpson on May 4, when I saw three individuals and took a male and female. The stomach of the male contained a red-backed vole (*Evotomys dawsoni*). On May 7 I took a pair, one of which had eaten a *Microtus drummondi*. During the remainder of May I frequently observed the species and collected several specimens. A male shot on May 13 had the iris dark hazel. While descending the Mackenzie I saw one near Gravel River June 9, and another near the site of old Fort Good Hope June 28. During my return trip I saw one at the Desmarais Islands, Great Slave Lake, July 30; and a few near Athabaska Landing September 2, and near Edmonton September 4.

Ross listed this species as occurring in the Mackenzie River region north to La Pierre House, though rather rare, and as having been collected at Fort Simpson.^a Mearns records a specimen from Fort Rae; ^b one from the same locality, perhaps the same specimen, taken with a set of eggs June 9, 1863, by L. Clarke, is still in the National Museum. The bird catalogue shows that skins were received also from Fort Resolution, Fort Simpson, and La Pierre House. The species was not observed by MacFarlane in the Anderson River region.

J. Alden Loring reported the species common at Edmonton September 7 to 26, 1894. In 1896 he found it all along the trail between Edmonton and Jasper House during the early summer; reported it common and breeding 15 miles south of Henry House July 3 to 21;

^a Nat. Hist. Rev., II (second ser.), p. 276, 1862.

^b Auk, IX, p. 262, 1892.

and noted it between Jasper House and Smoky River in the early autumn.

Pandion haliaëtus carolinensis (Gmel.). American Osprey.

The osprey occurs sparingly throughout the region north to Great Bear Lake and the lower Mackenzie. It is seldom observed along the larger rivers, probably because their muddy waters are unfavorable for fishing.

A pair was seen near Poplar Point, 90 miles below Fort McMurray, May 16, 1901. A nest on an island near by was probably the home of these birds. Single birds were observed at Fort Rae July 19, and on the Athabaska, near Big Mouth Brook, August 25.

In 1903 this species was first noted on the Mackenzie, near Fort Providence, on July 9 by my brother and Cary. On their return trip they saw single birds near Athabaska Landing on September 5 and 12. While I was crossing Great Slave Lake to Fort Rae several were seen among the Simpson Islands and the islands of the Northern Arm July 20 to 24, and a nest, apparently in use, was found on the former date. A single bird was seen on Great Bear Lake east of Manito Islands September 13.

In 1904 I saw the osprey but once, noting a single bird 15 miles below Fort Norman on June 16.

Richardson mentions the nesting of this bird on Bear Lake River,^a and states that Rae observed its arrival at Fort Confidence on May 17, 1849.^b Ross lists a specimen collected at Fort Good Hope;^c he states also that the species was common in the Mackenzie River region north to the Arctic coast.^d MacFarlane did not note it at Fort Anderson, but is confident that he observed it between Fort Good Hope and that point.^e The bird catalogue of the National Museum shows that skins were received from Fort Resolution, Fort Rae, and Fort Good Hope. Kennicott noted one at Fort Resolution May 7, 1860.^f Russell records a specimen taken at Fort Rae July 26, 1893.^g Seton records the species from the narrows of Great Slave Lake September 20, 1907.^h

J. Alden Loring reported seeing a pair in the mountains about 20 miles west of Henry House September 3, 1895. Their nest, built on a stub near a mountain stream, held a single young bird, apparently fully fledged. When the party returned a few days later the birds

^a Arctic Searching Expedition, I, p. 202, 1851.

^b *Ibid.*, II, p. 104, 1851.

^c *Can. Nat. and Geol.*, VI, p. 442, 1861.

^d *Nat. Hist. Rev.*, II (second ser.), p. 277, 1862.

^e *Proc. U. S. Nat. Mus.*, XIV, p. 436, 1891.

^f *Trans. Chicago Acad. Sci.*, I, p. 170, 1869.

^g *Expl. in Far North*, p. 262, 1898.

^h *Auk*, XXV, p. 71, 1908.

were still there. In 1896 he saw one on Miette River, near Henry House, July 23.

***Asio wilsonianus* (Less.).** Long-eared Owl.

On May 10, 1904, I secured a male in a thicket of mixed woods at Fort Simpson. The species was unknown to the inhabitants and is undoubtedly rare so far north. The stomach contents of my specimen comprised seven individuals of *Microtus drummondi* (two adults and five naked young), and one red-backed vole (*Evotomys dawsoni*).

Sharpe records a specimen taken by Ross at Fort Simpson;^a it is probably the same one previously recorded from that place by Ross, who gives the species as rare.^b An egg taken at Fort Simpson by Ross on May 1 (year not stated) is in the British Museum.^c MacFarlane, in a manuscript list, states that two eggs, together with the female parent, were taken by an Indian at Fort Providence April 14, 1885. The specimens were identified by J. J. Dalglish. Another female was obtained at Fond du Lac, Athabaska Lake, the same season. These seem to be the only previous instances of the capture of the species in the Mackenzie Valley.

Macoun states that Spreadborough found it not uncommon in the woods about Edmonton in May, 1897, and that he took a set of eggs there on May 15.^d J. Alden Loring took one and saw another at Edmonton September 11, 1894.

***Asio flammeus* (Pontoppidan).** Short-eared Owl.^e

This cosmopolitan species occurs in summer throughout the Athabaska-Mackenzie region north to the Arctic coast, and breeds in suitable places over this area.

Several individuals were seen on the road north of Edmonton on the afternoon of April 30, 1901. They were usually flying in pairs, and the males frequently swooped down toward their mates from a considerable height, holding their wings high above the back and uttering peculiar quavering cries. The species was next noted on the Quatre Fourches marsh, near Fort Chipewyan, May 24, when a single bird was observed. Another was seen on a semibarren island near the mouth of the Northern Arm of Great Slave Lake

^a Cat. Birds Brit. Mus., II, p. 230, 1875.

^b Nat. Hist. Rev., II (second ser.), p. 277, 1862.

^c Oates, Cat. Birds' Eggs Brit. Mus., II, p. 319, 1902.

^d Cat. Canadian Birds, Part II, pp. 264, 265, 1903.

^e Ross lists (Canadian Nat. and Geol., VI, p. 442, 1861) one specimen of *Scops asio* as having been taken at Fort Simpson. In his subsequent more extended article (Ibid., VII, pp. 137-155, 1862) he does not mention *Scops asio*, but adds to his first list two species of small owls, one of which probably he had previously incorrectly identified as a screech owl.

July 15. It was being vigorously assailed by barn swallows, which were nesting on the precipitous sides of the island.

In 1903 we saw several at Edmonton May 10, and while on our way to Athabaska Landing May 11 to 15 noted a number nearly every day. On their return trip in the fall my brother and Cary observed single birds near Athabaska Landing on September 2 and 20. During my trip northward from Fort Rae I saw one on Lake Faber on August 7. On Great Bear Lake I saw one near McVicar Bay September 9, and another 40 miles west of that place September 12.

In the spring of 1904 I first recorded the bird at Fort Simpson April 28, noting one. A pair, both of which had been eating meadow voles (*Microtus drummondi*), were collected May 5. Another specimen was taken May 12, and one bird was seen May 14. At Willow River, near Fort Providence, J. W. Mills collected a male on May 1. The series collected exhibits considerable variation in color.

Richardson describes a female bird, which contained eggs nearly ready for exclusion, killed at Fort Franklin May 20 [1826].^a King noted the species at Fort Reliance, at the eastern end of Great Slave Lake, in the spring of 1835.^b Ross recorded it as common in the Mackenzie River region, and as having been collected at Fort Simpson.^c MacFarlane found it fairly common in the Anderson River region, in both the wooded country and Barren Grounds;^d Bendire records eggs taken by MacFarlane near Fort Anderson June 30, 1865.^e The bird catalogue of the National Museum shows that skins were received from Fort Resolution, Fort Rae, Big Island, Fort Simpson, and Lesser Slave Lake. J. Alden Loring took a specimen at Edmonton September 18, 1894, this being the only one he noted there during the last three weeks of September.

Scotiaptex nebulosum (Forst.). Great Gray Owl.

Though apparently quite generally distributed throughout the wooded portions of the region, this species seems nowhere to be very common and is seldom observed.

One was seen by James MacKinlay near Liard River, to the southward of Fort Simpson, about the middle of November, 1903, and another by A. F. Camsell on the Liard-Mackenzie portage on February 26, 1904. On April 22, 1904, a fine adult female was taken in a steel trap which I had set on the summit of a pole. The species was next met with a short distance below the mouth of the Nahanni

^a Fauna Boreali-Americana, II, pp. 75, 76, 1831.

^b Narrative Journey to Arctic Ocean, II, p. 135, 1836.

^c Nat. Hist. Rev., II (second ser.), p. 277, 1862.

^d Proc. U. S. Nat. Mus., XIV, p. 436, 1891.

^e Life Hist. N. A. Birds [1], p. 335, 1892.

during my trip down the Mackenzie. While passing an extensive 'brulé' on the left bank during the afternoon of June 6 I noticed a large nest on a tree about a hundred yards up the side of the valley from the river. On a nearer approach a large gray head became visible over the edge of the nest, and I realized that I had discovered a nest of the great gray owl. Making a landing, I made my way through the tangled mass of fallen timber to the base of the tree and by a few raps with the ax induced the sitting bird to leave the nest. She darted with a rapid swooping flight toward the nearest woods, but as I desired her for a specimen, I shot her before she gained its shelter. The nest was about 50 feet up in a large dead and leaning spruce; and as I did not dare to climb it, I felled the tree to secure the young birds which I felt sure the nest contained. They proved to be two in number, evidently 2 or 3 weeks old, and were clothed with grayish down. In the nest were the partially eaten remains of three young rabbits about the size of red squirrels. The nest was a platform of sticks, nearly flat and practically without lining, and measured about 2 feet in diameter. Both this bird and the Fort Simpson specimen had deep straw-colored irises. A roughly mounted specimen was obtained from Père Ducôt, of Fort Good Hope, later in the season. Two eggs collected by Baptiste Bouvier from a nest in a tamarack near Fort Providence in April measure 59 by 49 and 57.8 by 47.4 mm. The set contained three eggs, one of which was broken. J. W. Mills collected an adult at Willow River, near Fort Providence, May 20, 1904.

Richardson first recorded the species, stating that it was common on the shores of Great Bear Lake, giving a description of a specimen killed there [probably at Fort Franklin], and mentioning a nest found May 23, evidently near the same locality.^a King noted the species at Fort Resolution in May, 1835.^b In the Anderson River country MacFarlane found but one nest during several seasons spent there. This was found July 19, 1862, near Lockhart River, on the route between Fort Anderson and Fort Good Hope.^c Baird, Brewer, and Ridgway record specimens from Fort Resolution, Big Island, and La Pierre House;^d and the bird catalogue in the National Museum shows that skins were received also from Fort Rae, Peel River, and Lockhart River. Russell records one taken at Fort Rae May 4, 1894.^e Macoun, on the authority of Raine, records eggs taken by Dippie in the Red Deer River district, Alberta, in the spring of 1896, and states

^a Fauna Boreali-Americana, II, pp. 77, 78, 1831.

^b Narrative Journey to Arctic Ocean, II, p. 196, 1836.

^c Proc. U. S. Nat. Mus., XIV, p. 436, 1891.

^d Hist. N. A. Birds, Land Birds, III, p. 33, 1874.

^e Expl. in Far North, p. 262, 1898.

on the same authority that it breeds at the mouth of the Mackenzie.^a In the summer of 1896 J. Alden Loring found a dead one in the Blueberry Hills, about 100 miles in a direct line west of Edmonton, May 29, and saw one at Whitemud Lake, about 35 miles farther west, on June 6. He killed another on Stony River, about 25 miles north of Jasper House, August 25. On October 20 he shot another at Henry House. The day being cloudy, the bird was hunting by daylight and was easily approached. Its stomach contained a number of shrews.

MacFarlane, in a manuscript list, records a nest containing two fresh eggs, taken, together with one of the parent birds, near Fort Chipewyan on April 20, 1880.

Glaux funerea richardsoni (Bonap.). Richardson Owl.

This fine owl is quite generally distributed throughout the wooded portion of the region in summer, but retires in winter from about the northern half of this area. It is usually rather rare and is seldom observed, though it is to a considerable extent diurnal in habits.

A pair of these owls was seen in heavy mixed woods beside the Athabaska, 75 miles below Fort McMurray, on the evening of May 15, 1901. I was attracted to them by their notes, which suggested those of the saw-whet owl, but were more varied. I obtained several glimpses of the birds as they darted back and forth among the summits of the lofty spruces in the deep twilight, but was unable to obtain one. The species was next met with at our camp on Slave River, 10 miles below the Peace, June 7, when a nest containing three nearly fledged young was discovered. It was in a deserted hole of a flicker, about 20 feet from the ground in a large balsam poplar stub, in deep woods. The young were collected. Neither of the old birds was seen about the nest, but during the night the female was taken in a trap placed on a pole near by for that purpose. The stomachs of the young birds contained the remains of white-footed mice (*Peromyscus arcticus*), meadow voles (*Microtus drummondi*), and red-backed voles (*Evotomys g. athabascæ*), and a matted layer an inch and a half in thickness, composed of the bones and hair of these species, filled the bottom of the cavity. Two of the young are males, the other, so much larger that it must have been older than the rest of the brood, is a female. They vary but little in coloration, being dark brown above, and without spots, excepting a few on the wings and tail; sides of head dusky brown; white on face confined to the region about gape and to a few feathers on forehead; breast and belly brown, mixed with dull white posteriorly. At our camp 25 miles below the mouth of the Peace, on June 12, my brother shot an adult

^a Cat. Canadian Birds, Part II, p. 271, 1903.

male in a dense thicket of small spruces. The species was not elsewhere detected during that season.

In the spring of 1903 this species was first noted about 20 miles south of Athabaska Landing on the evening of May 14. During my trip northward from Fort Rae to Great Bear Lake I saw single birds on Lake Hardisty August 18, and a few miles north of there on the following day. I saw one at Fort Franklin September 20, and one near the head of Bear River September 28, both during the middle of the day. The species was last seen on the Mackenzie, 10 miles above Gravel River, October 4, when a single bird was seen perched on a dead tree beside the river.

In a small collection recently received from J. W. Mills are two specimens, both males, taken at Fort Simpson February 18 and in April, 1905.

Under the name *Strix tengmalmi*, Richardson mentions two specimens of this owl taken in the Rocky Mountains near the source of Peace River.^a Ross listed it as being rather rare in the Mackenzie River region, where it wintered, and as having been collected at Fort Simpson.^b Eggs taken by Ross at Fort Simpson in 1861, after being several times recorded, are referred to by Bendire, as late as 1892, as follows: "The only genuine eggs of Richardson's Owl in the U. S. National Museum collection are three collected by Mr. Ross at Fort Simpson * * * on May 4, 1861."^c Baird, Brewer, and Ridgway record skins from Fort Resolution, Fort Rae, Big Island, and Fort Simpson.^d MacFarlane did not take the species in the Anderson River region, but thinks that he observed it in the country between Fort Good Hope and the Anderson.^e In some notes recently sent me he states that one was shot at Fond du Lac, Athabaska Lake, in May, 1885.

Glaux acadica (Gmel.). Saw-whet Owl.

We heard the notes of several of these birds a few miles north of Edmonton during the evening of May 30, 1901. On our return trip, while encamped on the Athabaska near Big Mouth Brook, on the night of August 26, we again heard the notes of this species several times. Macoun records specimens taken at Edmonton, Alberta, by Spreadborough.^f

^a Fauna Boreali-Americana, II, p. 96, 1831.

^b Nat. Hist. Rev., II (second ser.), p. 277, 1862.

^c Life Hist. N. A. Birds [I], p. 349, 1892.

^d Hist. N. A. Birds, Land Birds, III, p. 42, 1874.

^e Proc. U. S. Nat. Mus., XIV, p. 437, 1891.

^f Cat. Canadian Birds, Part II, p. 274, 1903.

Bubo virginianus subarcticus Hoy. Arctic Horned Owl.

This species occurs rather commonly in summer throughout the region north to the limit of trees. It is to some extent migratory, retiring in winter from the northern portion of its range, and then becoming much more abundant than in summer over the region southward from Great Slave Lake.

In the spring of 1901 the notes of great horned owls, probably this form, were heard near Vermilion Creek, 40 miles north of Edmonton, May 3; on the Athabaska 60 miles below Fort McMurray, May 15; and near Fort Chipewyan May 23. The species was next noted on Slave River about 100 miles below Fort Smith, July 1, when we saw a pair with four nearly grown young. The old birds immediately flew away, but two of the young, one of which is considerably lighter in color than the other, were obtained. While we were ascending the Athabaska we saw an adult near La Biche River August 27.

In 1903 the notes of this owl were heard 50 miles north of Edmonton on the night of May 13. One was seen sitting at the mouth of a cavity in a large balsam poplar 50 miles below Athabaska Landing May 17, and several were heard hooting near the outlet of Athabaska Lake June 8. The species was next noted by my brother and Cary on the mountain at the mouth of Nahanni River, where one was seen July 14, and the notes of one were heard on the night of July 17. On the return trip in the fall the species was heard nightly in the heavy spruce woods near Athabaska Landing September 4 to 15. During my trip northward from Fort Rae I saw one on Lake Faber on the evening of August 6. I heard the notes of great horned owls on Bear River September 29; and on the Mackenzie 20 miles below Gravel River October 3; near Roche Trempe-l'eau October 8; and 50 miles below Fort Simpson October 16. Great horned owls were common during the autumn and early winter at Fort Simpson, and a large series was taken by trapping. The greater number are referable to *B. v. subarcticus*. Most of these are very light colored, typical birds, but some are darker, inclining toward *saturatus*. Most of these birds probably were migrants, since the species was too abundant to be considered as represented only by residents, and, furthermore, the breeding birds taken are all referable to *B. subarcticus*. One taken November 21 had eaten a small shrew (*Sorex personatus*); one November 23, a red squirrel (*Sciurus hudsonicus*); one December 1, several meadow voles (*Microtus drummondi*), white-footed mice (*Peromyscus arcticus*), and shrews (*Sorex personatus*).

During January and February, 1904, I occasionally heard the notes of great horned owls, and I heard them frequently during March. On March 14 I saw a pair in the vicinity of a prospective nest in a



FIG. 1.—NEST AND EGGS OF ARCTIC GREAT HORNED OWL (*BUBO V. SUBARCTICUS*). FORT SIMPSON, APRIL 22, 1904.



FIG. 2.—CLUSTERED NESTS OF CLIFF SWALLOW (*PETROCHELIDON LUNIFRONS*) NEAR LAKE HARDISTY (NORTH OF FORT RAE), LATITUDE 65°

high Banksian pine on the hills southwest of the post. The place was again visited April 1 and the female found on the nest. It was left for further developments, but later in the day the tree was cut down by an Indian, and the nest and contents, two fresh eggs, destroyed. On April 17 I found another nest near the banks of the Liard, a few miles distant from the post. It was in the crotch of a large aspen poplar, 50 feet from the ground, and held a single egg. It was visited again on April 22, and the two eggs (see Pl. XXIII, fig. 1) and the male bird secured. The eggs measure, respectively, 54.2 by 47, and 53.4 by 45.7. This bird, like all those taken during the spring, was very light colored and typical of *subarcticus*, proving the resident bird to be of this form. Its stomach contained the fur of varying hares (*Lepus americanus*) and the remains of several large water beetles (*Dytiscus dauricus*). H. W. Jones took a fine light bird near Fort Providence April 30, which had eaten several similar beetles, and another which I trapped May 11 had taken seven beetles of the same species. One seen flying low over the river on the evening of May 16 was probably in pursuit of the same prey. On June 18, while descending the Mackenzie, I saw a very light-colored female with her brood of half-grown young in a nest on the face of the cliff at Wolverine Rock, 100 miles below Fort Norman. The old bird escaped, but I collected one of the young ones, all of which were very light colored. At Fort McPherson I heard the notes of a great horned owl on the evening of July 7, and saw one of the birds on the following day. While ascending the Mackenzie I heard one above Fort Norman July 18, and another near Nahanni River July 23. H. W. Jones writes me that great horned owls were very numerous at Fort Simpson during the autumn of 1904, but that they were scarce after the last of December.

Richardson described a specimen taken at Fort Chipewyan;^a thirty years later Ross recorded the species as wintering in the Mackenzie Valley north to the Arctic Circle, and as having been collected at Fort Simpson.^b Baird, Brewer, and Ridgway state that Ross found it abundant about Great Slave Lake, especially in the marshy country about Fort Resolution, where it preyed on shrews and voles.^c The bird catalogue of the National Museum shows that skins were received from Fort Good Hope, Fort Liard, Fort Halkett, Big Island, and Fort Resolution, one taken at the last place by Kennicott being still in the collection. Russell took one at Salt River, 16 miles below Fort Smith, June 28, 1893.^d

^a Fauna Boreali-Americana, II, p. 84, 1831.

^b Nat. Hist. Rev., II (second ser.), p. 277, 1862.

^c Hist. N. A. Birds, Land Birds, III, p. 66, 1874.

^d Expl. in Far North, p. 262, 1898.

In the summer of 1895 J. Alden Loring reported the species quite common in the country west of Edmonton. In 1896 he heard several along the route between Edmonton and Jasper House, and reported it not rare along the trail between Jasper House and Smoky River, and more frequently noted in the foothills than in the high mountains. The bird of western Alberta may not be typical *subarcticus*, but it seems best to include these notes under this heading, since a summer specimen from Edmonton is nearly typical of the present form.

Bubo virginianus saturatus Ridgway. Dusky Horned Owl.

Four specimens, all females, taken at Fort Simpson, November 25 to December 10, 1903, are doubtfully referred to this race. They undoubtedly were migrants, very probably from the region of the upper Liard. The contrast in color between these specimens and the lighter specimens of *B. v. subarcticus*, taken at the same time, is very noticeable. The stomach of one taken November 28 contained remains of a varying hare (*Lepus americanus*), and voles (*Microtus drummondi*); another taken November 30 had eaten portions of a hare.

Nyctea nyctea (Linn.). Snowy Owl.

This circumpolar species ranges throughout the region now under review. Its summer home is mainly north of the tree limit. It begins to move southward about the time of the first heavy snows, and usually is common over the southern portion of the region during the winter, when it preys chiefly on varying hares.

In the autumn of 1903, while ascending the Mackenzie, I saw the first snowy owl at the mouth of Blackwater River October 7, and observed one or two nearly every day until I reached Fort Simpson, October 20. The birds were usually observed at the mouth of streams, where the broad gravel bars, dotted with the trunks and stumps of drift logs, seemed to attract them. At Fort Simpson I found the species common during the latter part of November, and especially so in December, when most of my specimens were taken. I secured them by means of steel traps, set on the upturned roots of drift logs which had become grounded on the batture near the post. This place was a favorite resort of snowy owls, and to a less extent of great horned owls, and any perch above the general level was sure to be utilized, this habit making their capture easy. While the great horned owls when caught were invariably found perched upright on the stump, the snowy owls were always hanging head downward. In my series of eighteen specimens the difference in coloration is found to be sexual, the dark barring in only one male equaling in extent the same markings of the lightest female. The dark bars on the sides of the breast in the darkest females measure over

5 millimeters in width, nearly equaling in extent the white spaces. In the lightest males the same markings measure only about 2 millimeters in width.

On January 1, 1904, I noted six individuals in sight at one time, but during the remainder of the month seldom observed the species at Fort Simpson. None were observed during a three days' snowshoe trip down the Mackenzie about the middle of January. Mr. Thomas Anderson, however, while on his way to Fort Liard early in the month, observed a number on Lake Brochet, 20 miles southwest of Fort Simpson. They were feeding upon the varying hares (*Lepus americanus*) that ventured from the shelter of the woods. On his return late in January he noted several at the same place. During February I occasionally observed the birds and took the last one on February 29. The stomachs of those collected almost invariably contained the remains of varying hares, and I often saw signs on the snow where owls had pursued and captured these animals. The only sound I heard the birds utter was a tremulous scream, sometimes emitted when they were perching, but usually when on the wing. At Fort Norman the species was reported by Mr. C. Harding to have been common during the winter, but at Fort Good Hope I was informed that it is rarely seen.

In a letter received from H. W. Jones he informs me that snowy owls were numerous at Fort Simpson during the autumn of 1904, but were not noticed after the last of December.

The snowy owl was first reported from the islands of the Polar Sea by Edward Sabine, who states, referring particularly to Melville Island, that several pairs were seen during the summer months, and that a large white bird seen by a sailor in February was probably of this species.^a Swainson and Richardson describe a specimen killed at Great Bear Lake in May, 1826.^b King records one shot near McLeod Bay, Great Slave Lake, September 14, 1833.^c During the voyage of the *Investigator* Armstrong noted the first one near Princess Royal Islands, Prince of Wales Strait, about May 10, 1851; ^d he saw the species at Prince Alfred Cape, Banks Land, September 13, 1851; ^e and again at Mercy Bay, Banks Land, March 1, 1852.^f J. C. Ross recorded the snowy owl from Port Bowen, where it was rare.^g He later recorded it from Victoria Harbor, where it bred, and

^a Suppl. to Appendix Parry's First Voyage, pp. cxviii, cxciv, 1824.

^b Fauna Boreali-Americana, II, p. 89, 1831.

^c Narrative Journey to Arctic Ocean, I, p. 125, 1836.

^d Narrative Discovery Northwest Passage, p. 321, 1857.

^e Ibid., p. 434, 1857.

^f Ibid., p. 504, 1857.

^g Parry's Third Voyage, Appendix, p. 97, 1826.

where a few remained in winter.^a M'Clintock recorded specimens taken in January and August, 1859, at Port Kennedy.^b Belcher notes one observed on June 2, 1853, on the north side of Grinnell Peninsula, in about latitude 77° N., longitude 95° W.^c Doctor Rae reported the species as occurring along the coast of Victoria Land in the summer of 1851.^d Ross listed it as occurring in the Mackenzie River region, and as wintering, but as being rare.^e Specimens were received by the Smithsonian Institution from Fort Resolution and Big Island. Baird, Brewer, and Ridgway state that the species had been shot in February at Fort Norman.^f It was reported by MacFarlane as not plentiful in the Anderson River region.^g J. B. Tyrrell reports seeing a few birds of this species while exploring the country between Athabaska Lake and Churchill River in the summer of 1892.^h Macoun records sets of eggs taken at Herschel Island by Mr. Young, on the authority of Raine; and a specimen collected at Great Bear Lake by Max Bell.ⁱ Hanbury noted one near Ogden Bay, on the Arctic coast, May 18, 1902.^j Seton records the white owl from Clinton-Colden Lake.^k

***Surnia ulula caparoch* (Müll.). American Hawk Owl.**

This day owl occurs throughout the wooded portion of the region and probably breeds throughout this area. It begins to move southward from the northern part of its range in early autumn and returns in early spring. Though rather conspicuous on account of its diurnal habits, it is seldom seen in numbers except during migrations, when it is sometimes fairly common.

During the season of 1901 we noted this bird but once—about 100 miles below Fort Smith July 1, when we saw one pursuing a red-tailed hawk high above the forest. It soon abandoned the chase and returned to the woods.

In 1903 we first noted this species below Limestone Point, on lower Slave River, June 17, when one was shot from a spruce beside the river. It had in its talons part of a young varying hare. While on their return trip Alfred E. Preble and Merritt Cary observed three hawk owls near Lily Lake, Alberta, on September 24, a dark, foggy day. During my trip northward from Fort Rae I noted this species

^a Appendix to Ross's Second Voyage, p. xxv, 1835.

^b Voyage of the *Fox*, pp. 200, 296, 1860.

^c Last of Arctic Voyages, I, p. 295, 1855.

^d Journ. Royal Geog. Soc. for 1852, p. 89, 1852.

^e Nat. Hist. Rev., II (second ser.), p. 277, 1862.

^f Hist. N. A. Birds, Land Birds, III, p. 72, 1874.

^g Proc. U. S. Nat. Mus., XIV, p. 437, 1891.

^h Ann. Rept. Can. Geol. Surv., VIII (new ser.), p. 14D, 1896.

ⁱ Cat. Canadian Birds, Part II, p. 284, 1903.

^j Sport and Travel in Northland of Canada, p. 147, 1904.

^k Auk, XXV, p. 71, 1908.

on two occasions, taking a bird of the year near Sarahk Lake August 6, and noting one on Lake Hardisty August 19. While ascending the Mackenzie I saw one at Roche Trempe-l'eau October 9. It had in its talons the remains of a ruffed grouse, freshly killed and partly eaten, which it seemed to carry without difficulty. At Fort Simpson on October 24 I took a female bird, the last one observed that season.

During the coldest months of the winter this bird was not observed, and it was next seen at Fort Simpson on March 28, 1904, when I collected a female. This bird swooped upon a flock of redpolls, but failed to secure one, and alighted for an instant on the summit of a small dead tree. I observed single birds on April 5, 14, and 21, securing the last-mentioned individual. A bird seen May 19 dropped a freshly killed meadow mouse (*Microtus drummondi*) when started from its perch. While descending the Mackenzie I saw two a short distance below Fort Norman June 16, and on my return trip observed one at Wrigley Harbor, Desmarais Islands, July 30.

Two specimens, both females, taken by J. W. Mills at Fort Simpson October 9, 1904, and February 13, 1905, respectively, have been recently received.

Richardson first recorded this species from the region, mentioning several killed at Great Bear and Great Slave lakes;^a King noted it on Back River, at the cascades above the mouth of Baillie River, September 11, 1834;^b Thomas Simpson states that it was taken at Fort Confidence during the winter of 1837-38.^c In 1862 Ross recorded it as common in the Mackenzie River region north to the Arctic coast, as wintering in the region, and as having been taken at Fort Simpson.^d MacFarlane speaks of it as not uncommon in the Anderson River region, where a number of nests were discovered.^e Baird, Brewer, and Ridgway state that Ross had received eggs of this species from La Pierre House and Salt River, and also describe an egg from Fort Simpson.^f Bendire records nests containing eggs on April 28 and May 2, and one containing young on June 20, 1863, all discovered by MacFarlane in the Anderson River region, also an egg taken by the same collector at Fort Providence April 14, 1885, showing that the bird breeds rather early.^g MacFarlane's manuscript catalogue records also a female taken with six eggs at Fort Anderson on May 24, 1863. The bird catalogue of the National Museum records skins received from Fort Resolution, Fort Rae, Big Island, Fort

^a Fauna Borèali-Americana, II, p. 94, 1831.

^b Narrative Journey to Arctic Ocean, II, p. 79, 1836.

^c Narrative of Discoveries on North Coast of America, p. 216, 1843.

^d Nat. Hist. Rev., II (second ser.), p. 277, 1862.

^e Proc. U. S. Nat. Mus., XIV, p. 437, 1891.

^f Hist. N. A. Birds, Land Birds, III, pp. 77, 78, 1874

^g Life Hist. N. A. Birds [I], p. 394, 1892.

Simpson, Fort Liard, Fort Good Hope, Peel River, La Pierre House, and Anderson River; one from Fort Anderson, taken May 5, 1863, and labeled as having been collected with five eggs, is still in the collection. Russell records one taken at Fort Rae October 2, 1893.^a Macoun records one taken at Jasper House, Alberta, June 14, 1908, by Spreadborough.^b

In a manuscript list MacFarlane records eggs taken at Fort Providence, on April 14, 1885, and near Fond du Lac, Athabaska Lake, in May, 1885.

At Edmonton J. Alden Loring obtained one which had been shot on September 19, 1894. In 1905 he took specimens on the Jasper House trail about 35 miles west of Lake Ste. Anne August 13, and at the crossing of McLeod River August 16 and 18. In 1896 he reported the species common all along the route between Jasper House and Smoky River in the early autumn, and took a male at Henry House on October 20.

Ceryle alcyon (Linn.). Belted Kingfisher.

The kingfisher occurs in summer over most of the region now under consideration. It follows the Mackenzie and Anderson rivers to their mouths, but apparently is absent from the more elevated country between Great Slave and Great Bear lakes, and from the main area of the Barren Grounds. Within its range it is usually fairly abundant wherever there are suitable banks for nesting.

In 1901 one was noted at Athabaska Landing May 5, and another about 40 miles below the Landing on May 7. Between Fort McMurray and Athabaska Lake the species was seen daily May 15 to 17. None were noted during our stay in the vicinity of Fort Chipewyan, probably because of the absence of banks suitable for nesting, and the species was next noted 10 miles below the mouth of the Peace, where a pair or two were seen on June 11. While descending Slave River between Fort Smith and Great Slave Lake June 29 to July 4, we observed it daily and took a male 50 miles below Fort Smith June 30. This bird was attempting to swallow an eel-pout (*Lota maculosa*) 7 inches in length, which it had just captured. While ascending the Athabaska we noted the species at Fort McMurray August 10, below Grand Rapid August 20, and near La Biche River August 27.

In 1903 we first noted the kingfisher at Sandy Creek, 20 miles south of Athabaska Landing, where we saw one May 14. While descending the Athabaska we saw several between Athabaska Landing and Pelican Rapid May 17 and 18, one at Grand Rapid May 23, one at Little Buffalo River May 26, and several on the lower part of

^a Expl. in Far North, p. 262, 1898.

^b Cat. Canadian Birds, Part II, p. 288, 1903.

the Athabaska May 30 and 31. We noted it on Smith Portage June 14, and found it common on Slave River between Fort Smith and Limestone Point June 15 and 16. My brother and Cary noted it at Fort Providence July 8, Fort Simpson July 10, near the mouth of Nahanni River July 11, and near Fort Wrigley July 19, 20, and 22. On their return trip they observed the bird above Fort Simpson July 25, near Fort Rae July 28, and at Athabaska Landing, where they saw single birds on September 2 and 3. In early June, 1904, I observed the bird at several points on the Mackenzie north to near Fort Norman.

The kingfisher was first recorded from this region by Richardson, who described a specimen killed on Slave River.^a In the summer of 1848 the same naturalist observed it below Harrison Island, near the mouth of the Mackenzie.^b In 1862 Ross recorded it as occurring commonly in the Mackenzie River region north to Peel River, and as having been taken at Fort Simpson.^c MacFarlane noted it on several occasions on Anderson River, and received skins, probably obtained on the lower Anderson, from the Eskimo.^d The bird catalogue of the National Museum records specimens received from Big Island, Fort Simpson, Fort Halkett, Fort McPherson, and Fort Anderson. Macoun states that Spreadborough found it abundant on the upper Athabaska in 1898, and that J. M. Macoun, in the summer of 1888, found it common along the Lesser Slave and Athabaska rivers, between Lesser Slave Lake and Fort McMurray, and along the Clearwater and the route to Isle à la Crosse.^e

J. Alden Loring saw one at Edmonton September 13, 1894, and one at Jasper House in the early autumn of 1895, and reported the species rare 15 miles south of Henry House July 3 to 21, 1896. H. W. Jones observed the species near Fort Providence May 7, 1905.

Dryobates villosus leucomelas (Bodd.). Northern Hairy Woodpecker.

The hairy woodpecker is of regular occurrence north to the region of Great Slave Lake and Fort Simpson and perhaps farther, since it is rather rare and may have been overlooked. It retires from the northern part of its habitat in severe winters, but may remain during mild seasons.

In 1901 this bird was first noted on the lower Athabaska near Poplar Point, 90 miles below Fort McMurray, May 16, one being seen. A pair was seen and the male taken at Smith Landing June 18, and one was noted the same day on Smith Portage. Single birds

^a Fauna Boreali-Americana, II, p. 340, 1831.

^b Arctic Searching Expedition, I, p. 231, 1851.

^c Nat. Hist. Rev., II (second ser.), p. 278, 1862.

^d Proc. U. S. Nat. Mus., XIV, p. 437, 1891.

^e Cat. Canadian Birds, Part II, pp. 295, 296, 1903.

were afterwards seen on Lower Slave River July 3, and on the Athabaska, below Grand Rapid, August 20.

In 1903 it was first observed near Sturgeon River May 13. While we were descending the Athabaska single birds were seen near Pelican Rapid May 19, and near Poplar Point May 30 and 31. One was seen on Rocher River June 8, one on Smith Portage June 13, and one on the lower Slave June 18; a specimen was taken at Fort Resolution June 22. My brother and Cary noted the species at Fort Providence July 4, 6, and 7, taking one specimen on July 4. On their return trip they recorded the species as follows: Fort McMurray, August 8, several; Boiler Rapid, August 17, 2; Brulé Rapid, August 18, 1; Brulé Rapid to Athabaska Landing, August 18 to 31, common; near Athabaska Landing, September 3 to 15, common. During my trip northward from Fort Rae I saw one near Lake Hardisty on August 19. During the early part of the winter I observed the bird but once at Fort Simpson, taking a female on November 5.

In the spring of 1904 I first observed the species at Fort Simpson on April 5, noting one drumming on a dead spruce, and I took a pair in poplar woods on May 19. During my trip down the Mackenzie I saw a pair near the mouth of Nahanni River June 5. On my return journey I saw one below Athabaska Landing, Alberta, September 1. A male, taken at Fort Simpson November 5, 1904, has recently been received from J. W. Mills.

Ross recorded *Picus villosus*, referring to the present form, as occurring commonly in the Mackenzie River region north to Fort Simpson, and as wintering.^a The bird catalogue of the National Museum shows that skins were received from Fort Resolution, Big Island, Fort Simpson, Fort Liard, and Fort Halkett. Specimens taken at Fort Liard February 28, 1869; at Fort Simpson December 29, 1860; and on Liard River September 28, probably in the same year, are still in the collection, and confirm the statement of Ross that the bird winters in this region, though probably it does so only in mild seasons. MacFarlane, in a list recently sent me, states that eggs of this species were taken at Fort Providence by Reid on May 6, 1885.

In the summer of 1896 J. Alden Loring found this form common on the route from Edmonton to Jasper House, and took a specimen on Grand Cache River, 70 miles north of Jasper House, on September 4, and another near the junction of Grand Cache and Smoky rivers on September 22.

Dryobates pubescens nelsoni Oberh. Nelson Downy Woodpecker.

During the season of 1901 this bird was noted only in a few localities, though it probably occurs throughout the region traversed. It was first seen at our camp 10 miles below Peace River, where speci-

^a Nat. Hist. Rev., II (second ser.), p. 277, 1862.

mens were taken June 7, 8, and 10. The species was next noted at Smith Portage June 18; several were seen and one was taken at Fort Smith June 20.

In 1903 we noted it on the lower Athabaska May 31 and June 1. My brother and Cary saw it at Fort Providence July 7, and at Fort McMurray August 11. While ascending the Mackenzie I saw one a short distance below Nahanni River October 13. At Fort Simpson I took single birds November 24 and December 3.

In the spring of 1904 I did not detect this bird, but H. W. Jones took one at Willow River, near Fort Providence, May 7.

Under the name *Picus pubescens*, Ross recorded it as being not rare in the Mackenzie River region north to Fort Liard, and as wintering.^a A specimen in the National Museum, taken at Fort Resolution October 1, 1862, by J. Lockhart, has been referred by Oberholser to this form,^b and the catalogue of the birds in that collection records another specimen from Fort Liard. Macoun states that J. M. Macoun noted a few along the Athabaska, and reported it rare between Methye Lake and Isle à la Crosse, in the summer of 1888.^c

In the summer of 1896, while on his way to Jasper House, J. Alden Loring reported seeing several in the valleys of the foothills about 80 miles east of the Rocky Mountains.

Picoides arcticus (Swains.). Arctic Three-toed Woodpecker.

The black-backed three-toed woodpecker is of regular occurrence in the region north at least to about latitude 63° on the Mackenzie, but is the less common of the two species of *Picoides*.

During the season of 1901 it was noted but once—a male being taken on the Athabaska about 25 miles below Athabaska Landing, August 28.

In 1903 Alfred E. Preble and Merritt Cary saw one about 20 miles above Fort Wrigley July 19. On their outward trip they observed one at House River August 22, and collected a pair on an island above Athabaska Landing September 14. During the same season I saw the species but once, taking a male at Fort Simpson October 24.

In 1904 I observed single birds at Fort Simpson on March 8, 22, and 28, taking specimens on the last two dates. While descending the Mackenzie I saw one near Fort Wrigley June 7, and on my return trip observed one in a pine forest near Lily Lake, Alberta, September 3.

Two specimens, taken at Fort Simpson by J. W. Mills on October 15, 1904, and March 12, 1905, respectively, have been received by the Biological Survey.

^a Nat. Hist. Rev., II (second ser.), p. 277, 1862.

^b Proc. U. S. Nat. Mus., XVIII, p. 549, 1896.

^c Cat. Canadian Birds, Part II, p. 304, 1903.

This bird was first described by Swainson from a male "killed near the sources of the Athabaska River."^a It was recorded by King from Fort Reliance, at the eastern end of Great Slave Lake, where it occurred in winter.^b Ross listed it as rare in the Mackenzie River district north to Fort Simpson, where it had been collected, and as wintering in the region.^c Bendire records specimens from Fort Rae, Fort Providence, and Fort Chipewyan;^d and the Smithsonian Institution received it also from Fort Resolution. Bangs has recorded a specimen from Red Deer, Alberta.^e Macoun states that J. M. Macoun took a specimen at Athabaska Landing May 25, 1888, and found it common on Methye Portage and between Methye Lake and Isle à la Crosse during the same summer.^f J. Alden Loring collected a male at Henry House October 4, 1895, and another specimen at Sulphur Prairie, about 70 miles north of Jasper House, September 6, 1896.

Picoides americanus fasciatus Baird. Banded-backed Three-toed Woodpecker.

This bird is of regular and fairly common occurrence throughout the wooded portion of the region now under review. It breeds through this area, but retires from the northern half during the colder months, at least in severe seasons. Most of the specimens from the Athabaska and Mackenzie region are plainly referable to the form characterized by Baird from specimens collected at Fort Simpson.^g There seems to be much individual variation in this form, and the specimens available are not sufficient to determine the exact ranges of this race and of *Picoides a. dorsalis*.

In 1901 we took a female specimen on Slave River near the mouth of the Peace, June 6, and another at Fort Smith, June 26. They are in worn breeding plumage.

On May 14, 1903, we first noted this bird near Sandy Creek, Alberta, where we saw two. My brother and Cary took a male near Athabaska Landing, September 14. This specimen possesses some of the characters of *dorsalis*, but is intermediate, and may be referred to *fasciatus*. During my trip northward from Fort Rae to Great Bear Lake I noted the bird but once, taking one on Lake Hardisty, August 19. On Great Bear Lake I first noted it near Leith Point on September 9, when I shot a male, and I took a female near Manito Islands, September 14. While encamped at Fort Franklin I noted the species several times, and took specimens, including both sexes.

^a Fauna Boreali-Americana, II, p. 313, 1831.

^b Narrative Journey to Arctic Ocean, I, p. 166, 1836.

^c Nat. Hist. Rev., II (second ser.), p. 277, 1862.

^d Life Hist. N. A. Birds [II], p. 74, 1896. (Dated 1895, published 1896.)

^e Auk, XVII, p. 130, 1900.

^f Cat. Canadian Birds, Part II, p. 306, 1903.

^g Cooper's Ornithology of Calif., I, pp. 385, 286, 1870.

on September 18, 19, 20, and 27. While ascending the Mackenzie I saw one near the mouth of the Blackwater, October 6. At Fort Simpson I collected a number during the latter part of October, November, and the early part of December, noting the species last on December 5.

In 1904 I failed to observe this bird at Fort Simpson during January, February, and March, and first noted it April 1, when I found three individuals in a tract of burnt woods and heard their spring drumming. It was a continuous tattoo, somewhat resembling that of *Dryobates*, but becoming very faint at the end. A male and a female were collected. Another individual was seen April 6. I failed to observe any during my trip down the Mackenzie, but saw one at Grand Rapid on August 23, during my return trip. J. W. Mills took a male at Fort Simpson, March 18, 1905.

Richardson, under the name *Picus tridactylus*, first recorded this species from the region, describing a male killed near the sources of the Athabaska.^a Ross listed it as *Picoides hirsutus*, stating that it was found in the Mackenzie River district north to Fort Good Hope, that it wintered in the region, and that it had been collected at Fort Simpson.^b MacFarlane found it near Fort Anderson, where he discovered nests on June 5 and 21, 1864.^c The bird catalogue of the National Museum records specimens from Fort Chipewyan, Fort Resolution, Fort Rae, Big Island, Fort Simpson, Fort Liard, Fort Halkett, Fort Good Hope, and Fort Anderson. The following are still in that collection: Two from Fort Liard, March, and February 23, 1860, A. McKenzie; two from Fort Anderson, one June 3, 1864, the other not dated, but probably taken at the same time; two from Fort Liard without exact dates; and two from Fort Simpson, one taken December 12 [1859], by Kennicott, and the other (the type of *P. a. fasciatus*) September 2, 1861, by Ross. Most of these specimens, as well as one from Red Deer, Alberta, have been recorded by Bangs.^d Hargitt records a specimen from Great Bear Lake.^e

During his trips to the Rocky Mountains in western Alberta in 1895 and 1896, J. Alden Loring found this woodpecker fairly common and collected a number of specimens. In 1895 he took one at Henry House October 4. In 1896 he took a pair 15 miles south of Henry House on July 13. Their nest was in a dry spruce 4 feet from the ground, on a mountain, about 500 feet below timber line. Other specimens were taken on Stony River, a short distance north of Jasper House, August 25; in Grand Cache valley, Smoky River, about 120

^a Fauna Boreali-Americana, II, p. 312, 1831.

^b Nat. Hist. Rev., II (second ser.), p. 277, 1862.

^c Proc. U. S. Nat. Mus., XIV, p. 438, 1891.

^d Auk, XVII, p. 132, 1900.

^e Cat. Birds Brit. Mus., XVIII, p. 281, 1890.

miles north of Jasper House, September 19 and 20; on the Smoky River trail, between Muskeg Creek and Baptiste River, south of Smoky River, September 30; at Jasper House in the early part of October; and in the mountains 15 miles west of Henry House, October 12. These specimens vary considerably, some of the fall specimens, which have recently assumed the winter plumage, having more white on the back than others; but I would refer them all to the same form, to which, according to the ruling of the American Ornithologists' Union, the name *fasciatus* is applicable.

Sphyrapicus varius (Linn.). Yellow-bellied Sapsucker.

This handsome woodpecker occurs in summer north at least to Great Slave Lake and the Fort Simpson region. It is one of the commonest woodpeckers during the breeding season, when it is readily detected by its characteristic notes and drumming. Strictly migratory, it leaves in early fall and does not return until April or May.

In 1901 numbers were seen or heard daily along the road between Sturgeon River and Athabaska Landing May 3 to 5. While we were descending the Athabaska, May 6 to 17, the bird was noted nearly every day, and a pair was taken near Fort Chipewyan June 2. At our camp on Slave River 10 miles below the Peace, one was taken June 7 and another was seen June 11. The species was next noted on Smith Portage June 18, when a nest containing young was found in a live aspen poplar, and a female was taken at Fort Smith June 24. Single birds were afterwards noted on Slave River, 100 miles below Fort Smith, July 2; near the mouth of the Slave July 3; and at Fort Resolution July 5.

In 1903 we first saw the bird at Edmonton May 8, noting a pair; and we observed the species daily on the way to Athabaska Landing May 11 to 15, taking one 50 miles north of Edmonton on May 14. While descending the Athabaska, May 16 to June 2, we noted the bird nearly every day, and we took a specimen at Grand Rapid May 22. We noted it on Rocher River June 8, and near Smith Landing June 10; and found it common at the latter place and on Smith Portage June 12 and 13. We found it common also along Slave River between Fort Smith and Fort Resolution, and observed it daily June 15 to 19. While ascending the Athabaska in the fall my brother and Cary noted the species on August 10 at Fort McMurray, where they saw a pair with fledged young, and on August 18 at Brulé Rapid, where they observed a female with her 3 young ones. They found the species common between the latter place and Athabaska Landing and in that vicinity up to September 15.

In the spring of 1904 I first heard the characteristic broken tattoo of this species at Fort Simpson on May 11, and following up the sound found a male among a group of tall balsam poplars, evidently

a favorite nesting place. I saw another on May 12, and 4 on May 14. During the remainder of the month I frequently observed the species. At Willow River, near Fort Providence, J. W. Mills and H. W. Jones collected a series of specimens during the same month, taking the first on May 12, and noting the first female on May 17. On June 2 and 3, while descending the Mackenzie by canoe, I found the bird common along its banks between Fort Simpson and Nahanni River, and I again noted it near the latter place on June 5. On my return trip I observed it on Smith Portage August 4, and found both old and young common at Fort McMurray August 11 to 14, and 25 miles above Pelican Portage August 28.

A specimen taken at Fort Rae some years ago is in the museum at Fort Simpson. Several specimens, taken by Mills and Jones near Fort Providence May 13 to 19, 1905, have been received by the Biological Survey.

Ross recorded this species as common in the Mackenzie River region north to Fort Simpson, and as having been taken at that post.^a About the same time many were sent to the Smithsonian Institution by various officers of the Hudson's Bay Company. The following specimens, representing both sexes, are still in the collection: Two from Fort Simpson, May 21, 1860, and June, 1861, Ross; and one from each of the following localities, the dates not given—Nahanni Mountains, 100 miles northwest of Fort Simpson; Fort Rae; Fort Resolution; and Big Island. Macoun states that J. M. Macoun, in the summer of 1888, found this species common along the Lesser Slave and Athabaska rivers between Lesser Slave Lake and Fort McMurray, and along the Clearwater, and that Spreadborough noted its arrival at Edmonton on May 3 [probably in 1897].^b

In 1896 J. Alden Loring reported yellow-bellied woodpeckers common along the trail between Edmonton and the foothills, but did not observe any after entering the mountains.

Phlœotomus pileatus abieticola (Bangs). Northern Pileated Woodpecker.

This woodpecker inhabits the heavy forests along the Athabaska and Slave rivers, and in the vicinity of the Rocky Mountains ranges as far north at least as Liard River.

In the spring of 1901 I heard the unmistakable notes of this bird below Pelican River May 9, and again below Little Red River May 15, while we were descending the Athabaska. William Gullion, one of my canoeemen, who knew the bird well, saw one near our camp at

^a Nat. Hist. Rev., II (second ser.), p. 278, 1862.

^b Cat. Canadian Birds, Part II, p. 311, 1903.

Fort Smith late in June, and on our return trip I heard one on the Athabaska near Big Mouth Brook August 27.

In 1903 we noted this species May 30 near Poplar Point on the lower Athabaska, where we heard its loud and characteristic notes in the dense spruce forest. On their return trip Alfred E. Preble and Merritt Cary heard one near Brulé Rapid August 19, and saw another in poplar woods near Vermilion Creek, Alberta, September 23.

In 1904 I noted this species on but one occasion, observing a single bird on the Athabaska 20 miles below Athabaska Landing September 1.

Richardson described a specimen killed near the Rocky Mountains, presumably by Drummond, and says:

This great woodpecker is resident all the year in the interior of the fur countries up to the sixty-second and sixty-third parallels, rarely appearing near Hudson's Bay, but frequenting the gloomiest recesses of the forests that skirt the Rocky Mountains.^a

Ross records it as occurring in the Mackenzie River region north to Fort Liard, but as rare.^b Bendire records specimens from Fort Liard and Big Island.^c Macoun states that J. M. Macoun found the bird rare on the Clearwater River in the summer of 1888.^d

Colaptes auratus luteus Bangs. Northern Flicker.

This widely distributed woodpecker occurs abundantly north to Great Slave Lake and the upper Mackenzie, and less commonly northward to the limit of trees. It is replaced along the eastern base of the Rocky Mountains in Alberta by the form *Colaptes c. collaris*, whose range it overlaps to some extent.

In 1901 we saw this species daily between Edmonton and Athabaska Landing, April 29 to May 5. For two or three days after we left Edmonton it was less abundant than the red-shafted flicker, but the relative number of *C. a. luteus* increased as we approached Athabaska Landing. Near Sturgeon River, on May 1, we saw a pair excavating a nesting cavity. While we were descending the Athabaska we noted the species at Brulé Rapid May 11 and 12, and on the lower part of the river May 15 and 16. While encamped at various places near Fort Chipewyan, May 18 to June 5, we found it common and collected several specimens. We noted the species on Rocher River June 5, and at our camp on Slave River, 10 miles below the mouth of the Peace, we observed it daily, June 7 to 10, finding a nest containing fresh eggs on the former date. We found it

^a Fauna Boreali-Americana, II, p. 304, 1831.

^b Nat. Hist. Rev., II (second ser.), p. 278, 1862.

^c Life Hist. N. A. Birds [II], p. 103, 1896.

^d Cat. Canadian Birds, Part II, p. 311, 1903.

common at Smith Landing June 13 to 17, at Fort Smith June 19 to 29, and on Slave River between Fort Smith and Fort Resolution June 29 to July 4. At Fort Resolution my brother often saw the bird during July, and while crossing Great Slave Lake I observed a brood of young just from the nest on an island near the mouth of the Northern Arm on July 15. I took an immature bird at Fort Rae July 26, and noted other individuals there on July 27 and 29. On our return trip we noted the bird at Smith Portage August 5, above Pelican Rapid August 24, and near La Biche River August 27, and saw several at Athabaska Landing August 30 and 31.

In 1903 we first noted the species at Edmonton May 8, when we saw several individuals, one of which was excavating a nesting cavity. It was common and was observed nearly every day on the road to Athabaska Landing May 11 to 15. Along the Athabaska and Slave rivers also it was common and was noted almost daily. A nest containing eggs was found near Smith Landing June 13. The bird was seen only once at Fort Resolution—on June 22. On the Mackenzie my brother and Cary noted the species at Fort Providence July 4, 6, 7, and 8, taking one on the last date; at Fort Simpson July 10; Nahanni Mountains July 13 (one taken), 14, 16, 17, and 18; and at Fort Wrigley July 22. While ascending the Athabaska they frequently observed the species between Red River and Grand Rapid August 6 to 20, and in the vicinity of Athabaska Landing during the first half of September. During my trip northward from Fort Rae I noted the bird on lower Grandin River August 1. The number of nesting holes seen along the southern shore of Great Bear Lake showed that this species must be a fairly common breeder there, but the birds had evidently migrated before my arrival. The only one seen was taken near McVicar Bay September 10. It was in company with a large flock of robins and was very fat.

In the spring of 1904 this bird arrived at Fort Simpson on May 4, when two were observed. On May 6 two more were seen, and a few were observed daily until May 10, when the species became common. During the remainder of the month it was frequently observed and several specimens were taken. At Willow River, near Fort Providence, J. W. Mills took a male May 13, but did not record the date of arrival. While descending the Mackenzie in June I found it rather common between Fort Simpson and Nahanni River June 2 and 3, and again noted it near the latter place on June 6. North of this point the species seems to be uncommon along the Mackenzie, as I saw it but twice. I took one at Fort Good Hope June 20, and saw another at Fort McPherson July 8. On my return trip I noted it on the lower Slave August 2; on Smith Portage August 4; near Fort McMurray August 10 and 14; and near Quito or Calling River

August 31. I found it common on the Athabaska near La Biche River on the morning of September 1, and between Athabaska Landing and Edmonton September 2 and 4.

King observed the flicker at Fort Reliance, Great Slave Lake, May 2, 1834, noting a common feeding habit as follows: "At that time its crop was full of ants, collected from the loose bark and stems of decayed pines." He saw it also at Fort Resolution on May 24 of the next year.^a Richardson noted the bird on Bear Lake River in the summer of 1848.^b Ross recorded it as common in the Mackenzie River region north to Peel River, and as having been collected at Fort Simpson.^c MacFarlane considered it by no means scarce in the valley of the Anderson.^d In a letter to Baird he mentions a nest which contained eleven eggs, found near Fort Anderson [on June 16, 1863]. Baird, Brewer, and Ridgway state that it was found breeding at Fort Resolution, Fort Rae, Fort Simpson, and Fort Anderson; ^e in addition to specimens from these localities, the bird catalogue of the National Museum shows that skins were received from Big Island, Fort Halkett, Fort Norman, Fort Good Hope, and Peel River. Eggs were collected at Lesser Slave Lake by Strachan Jones in 1868.

In 1896 J. Alden Loring found a pair nesting at Whitemud, on McLeod River, 135 miles directly west of Edmonton, early in June; reported it breeding, but not common, 15 miles south of Henry House, July 3 to 21; and found it common on the trail between Jasper House and Smoky River in August and September. In a male taken by him at Banff, Alberta, August 29, 1894, the yellow of wings and tail is very deep, and a few red feathers border the black cheek patches, indicating an approach toward *C. c. collaris*.

Colaptes cafer collaris (Vigors). Red-shafted Flicker.

This form occurs in western Alberta, extending northward for an undetermined distance, and occurring together with *C. luteus* in migration, and in the breeding season, over the western portion of this area, where it gradually replaces the eastern form.

In 1901 this bird was common about Edmonton, and during the first two or three days of our journey to Athabaska Landing, April 29 to May 5, but the relative proportion of flickers of this form decreased rapidly, and during the last day we saw none, nor did we note it after leaving Athabaska Landing. While traveling over the same ground in 1903 we saw none, owing probably to the late date.

^a Narrative Journey to Arctic Ocean, II, p. 200, 1836.

^b Arctic Searching Expedition, I, p. 202, 1851.

^c Nat. Hist. Rev., II (second ser.), p. 278, 1862.

^d Proc. U. S. Nat. Mus., XIV, p. 438, 1891.

^e Hist. N. A. Birds, Land Birds, II, p. 576, 1874.

Russell reports seeing a red-shafted flicker at Fort Chipewyan May 21, 1893.^a This was probably only a straggler.

In the summer of 1896 J. Alden Loring noted it on the trail between Edmonton and Jasper House, but it was less common than *C. a. luteus*; he saw several 15 miles south of Henry House July 3 to 21, and observed several 'hybrids' on the trail between Jasper House and Smoky River in the early autumn.

Chordeiles virginianus (Gmel.). Nighthawk.

The nighthawk is of regular occurrence in the Mackenzie Valley north to the region of Fort Good Hope. It is a late arrival in spring and moves southward again in August. In 1901 the species was first noted on the evening of May 23 at Fort Chipewyan and was again seen on the following day. A specimen was taken near Fort Chipewyan June 1 and another 10 miles below Peace River June 7. The bird was noted also 25 miles below Peace River June 13; at Smith Landing, where it was common, June 13 to 17, and at Fort Smith June 26. One was seen at Fort Resolution, July 5, and the species was noted by my brother at the same place on July 14, 17, and 23. It was last noted late in the afternoon of August 12 at Fort McMurray, where a large flock was seen flying southward just over the tree tops.

In 1903 we first observed this bird at Fort McMurray on the evening of May 28. After this the bird was common, and we noted it nearly every evening, usually in numbers, on our way to Fort Chipewyan. We noted it on Rocher River June 8, near the mouth of Peace River June 9, and at Smith Landing June 11 and 12. My brother and Cary noted one at Fort Providence July 3, and a pair at Fort Wrigley July 22.

In 1904 the first nighthawk was seen on June 7 at Fort Wrigley, and on June 9 I observed three near the mouth of Blackwater River. The most northerly one was seen at Fort Good Hope, June 23. On my return trip I saw several near the mouth of Nahanni River, July 25, and a few on Slave River, a short distance below Fort Smith, August 3.

Under the name *Caprimulgus americanus*, Edward Sabine says: "A female of this species was found on Melville Island, lying dead on the ground about a quarter of a mile from the sea."^b This individual was, of course, a straggler. Richardson noted the species from Great Bear Lake, where it generally made its first appearance about the last day of May.^c Ross recorded a specimen taken at La Pierre House,^d and reported it as rather rare in the Mackenzie River region

^a Expl. in Far North, p. 264, 1898.

^b Suppl. to Appendix Parry's First Voyage, p. cxcv, 1824.

^c Fauna Boreali-Americana, II, p. 338, 1831.

^d Can. Nat. and Geol., VI, p. 442, 1861.

north to that post, and as having been taken at Fort Simpson.^a Bendire records a skin obtained near Fort Good Hope,^b and the bird catalogue of the National Museum shows that specimens were received also from Fort Resolution and Fort Simpson. MacFarlane, probably referring to the Anderson River region, states that a few straggling birds have been observed in the far north. He mentions a nest found in the Clearwater Valley late in June, 1873.^c Russell took a specimen at Fort Chipewyan, June 12, 1893, and reported it not uncommon.^d Macoun states that in the summer of 1888, J. M. Macoun observed this species along the Athabaska from the mouth of Lesser Slave River to the Clearwater, as well as on Methye Portage, and between Methye Lake and Isle à la Crosse.^e

J. Alden Loring reported the species common on the trail between Edmonton and Jasper House in the summer of 1896.

Chætura pelagica (Linn.). Chimney Swift.

The chimney swift has not been reported farther north than Edmonton, Alberta, where Macoun states that Spreadborough saw two individuals on May 17, 1897.^f

Aeronautes melanoleucus (Baird). White-throated Swift.

J. Alden Loring reported seeing a single bird of this species 15 miles south of Henry House about July 2, 1896. This is probably near the northern limit of its range.

Trochilus colubris (Linn.). Ruby-throated Hummingbird.

Macoun, concerning this species, says: "I have noticed the humming bird as far north as lat. 59°, in the vicinity of Lake Athabaska."^g

Richardson states: "*Trochilus colubris* * * * ranges, in summer, to the fifty-seventh parallel, perhaps even still farther north. We obtained specimens on the plains of the Saskatchewan, and Mr. Drummond found one of its nests near the sources of the Elk [Athabaska] River."^h

While the Saskatchewan bird is undoubtedly properly identified, the nest found by Drummond almost certainly belonged to the rufous hummingbird.

^a Nat. Hist. Rev., II (second ser.), p. 278, 1862.

^b Life Hist. N. A. Birds [II], p. 163, 1896.

^c Proc. U. S. Nat. Mus., XIV, p. 438, 1891.

^d Expl. in Far North, p. 264, 1898.

^e Cat. Canadian Birds, Part II, p. 326, 1903.

^f Ibid., p. 330, 1903.

^g Manitoba and Great North-West, p. 359, 1881.

^h Fauna Boreali-Americana, II, p. 323, 1831.

Selasphorus rufus (Gmel.). Rufous Hummingbird.

Alexander Mackenzie, in June, 1793, while on the extreme southern headwaters of Peace River, just before crossing the divide to the source of the Fraser, saw a hummingbird which was almost certainly of this species. He speaks of it as the only hummingbird seen by him in the Northwest.^a

J. Alden Loring reported seeing several hummingbirds at his camp 15 miles south of Henry House, July 3 to 21, 1896. The species was not identified, but since *S. rufus* is a common breeder at Banff, Alberta,^b and other points in that general region, these observations, as well as Drummond's note already mentioned, probably refer to the present species.

Tyrannus tyrannus (Linn.). Kingbird.

The kingbird is of regular occurrence north to the region of Great Slave Lake. In 1901 we first saw it on an island near the outlet of Athabaska Lake June 1, noting a single bird. On the next day we saw several and collected two at the same place, and on June 3 secured another, all of which proved to be females. We noted no others until July 5, when we saw a single bird at Fort Resolution, and I observed another at Fort Rae July 19. While we were ascending the Athabaska, we saw several below Big Mouth Brook, 65 miles below Athabaska Landing, August 26, and others between there and La Biche River on August 27.

In 1903 we first noted this bird at Fort Chipewyan June 4, and we saw several near the outlet of the lake on June 5. We next observed it near the mouth of Slave River June 19. My brother and Cary saw one at Hay River June 30, and on their return trip observed two at Crooked Rapid, Athabaska River, August 15, and two at Grand Rapid August 20. I observed the species at Fort Resolution on July 10 and 15.

In the spring of 1904 I saw a kingbird at Fort Simpson on June 1. I did not again note the species until I reached Fort McMurray on my return trip. Here I observed one or two on August 11, and I found the bird rather common at Grand Rapid August 22 and 23.

Ross considered this species rare in the Mackenzie River region north to Fort Simpson, where it had been collected.^c Eggs taken at Lesser Slave Lake in 1868 were received by the Smithsonian Institution from Strachan Jones. Loring reported seeing one individual at Banff, Alberta, August 30, 1894. Macoun states that during the

^a Voyages to Frozen and Pacific Oceans, p. 216, 1801.

^b Macoun, Cat. Canadian Birds, Part II, p. 334, 1903.

^c Nat. Hist. Rev., II (second ser.), p. 278, 1862.

season of 1897 Spreadborough first observed it at Edmonton on May 17, and found a nest on June 10; and that J. M. Macoun [in the summer of 1888] saw one at Grand Rapid, and a few at Methye Portage.^a

Sayornis phœbe (Lath.). Phœbe.

In the spring of 1901 we saw a pair at the bridge spanning Vermilion Creek, 42 miles north of Edmonton, May 2 and 3. We next met with the species near Fort Chipewyan May 29, when we saw a pair and took a specimen, and we collected another 10 miles below Peace River on June 10. We next noticed it on Slave River, 25 miles below Fort Smith, June 30, when we discovered a nest containing nearly fledged young on the face of a steep bank. We observed the species on lower Slave River July 3, and I saw one along the limestone ridge at Fort Rae on July 20, and collected an immature female near the post July 27.

In 1903 we first saw this species at Edmonton May 9, and we found it common between Sturgeon River and Athabaska Landing May 13 to 15. While descending the Athabaska we saw the species 60 miles below Athabaska Landing May 18 and near Little Buffalo River May 26. We next noted it at Smith Landing June 12, and found it common June 18 and 19 on the lower part of Slave River, where many were nesting beneath the overhanging clay banks. During my trip northward from Fort Rae I found it rather common along Grandin River August 1 to 4, discovering a nest with nearly fledged young on the latter date, and took a bird of the year near Lake St. Croix August 14.

In the spring of 1904 this bird was first noted at Fort Simpson May 14, three being observed. Others were seen May 16, and the species was common May 19, when a pair was taken. It was next seen a few miles below Fort Simpson on June 2. On my return trip several were observed at Fort McMurray August 11.

Ross first recorded this flycatcher from the Mackenzie River region, considering it rare north to Fort Simpson, where he had taken it.^b Bendire, in 1896, summarized its northern and western limits of distribution as follows:

Longitude 100° (west of Greenwich) marks about the western limits of its breeding range in the United States, but in the Northwest Territory it reaches west to nearly 122° at Fort Simpson, on the Mackenzie River, in latitude 62° 12' N., where Mr. B. R. Ross, of the Hudson's Bay Company, obtained a female, No. 22613, in May, 1861, which is now in the United States National Museum collection. This point, as far as yet known, marks both the western and northernmost limits of its range. Its nests and eggs have also been taken on Lesser Slave Lake, southern Athabaska, by Mr. S. Jones; and near Fort Rae, Great Slave Lake, by Mr. R. MacFarlane; it has also been obtained by Mr.

^a Catalogue Canadian Birds, Part II, p. 338, 1903.

^b Nat. Hist. Rev., II (second ser.), p. 278, 1862.

James Lockhart, at Fort Resolution; and Mr. A. McKay found the phœbe common about Pelican Narrows, Keewatin, in June, 1891, sending several sets of eggs from there to the United States National Museum collection.^a

Russell took a specimen May 20, 1893, at Fort Chipewyan, where he found the species abundant at the time of his arrival, May 18.^b Macoun states that Spreadborough first observed it April 19, 1897, at Edmonton, Alberta, and found a nest there on May 7. In 1888 J. M. Macoun found it the commonest bird along the Athabaska between Athabaska Landing and Lesser Slave River. Eggs found June 1 had been incubated about a week. It was noted by him also on the Clearwater, on Methye Portage, and between Methye Lake and Isle à la Crosse.^c Seton records this species from the narrows of Great Slave Lake, where he observed it in the summer of 1907.^d

Sayornis saya (Bonap.). Say Phœbe.

This species occurs sparingly in the Athabaska Valley and along the Mackenzie north at least to the region of Fort Simpson, and probably to its mouth. In 1901 we saw two individuals on a hillside near Athabaska Landing May 5, and while descending the Athabaska noted single birds near Pelican Rapid May 9, above Fort McMurray May 14, and a short distance below that point May 15.

In 1903 we saw several at Edmonton, Alberta, May 9 and 10, and on the way to Athabaska Landing noted it daily between Edmonton and Sandy Creek May 12 to 14, and collected one on the latter date. We last observed it on the Athabaska 60 miles below Athabaska Landing May 18.

In the spring of 1904 I saw the first one at Fort Simpson on May 4. I next noted it May 13, collecting a male, and saw others May 21, 25, and 28, noting one or two on each date. After leaving Fort Simpson I did not again note the bird until July 7, when I saw one perched on one of the buildings at Fort McPherson.

Ross first recorded this species from the Mackenzie River region, considering it as rare north to Fort Simpson, where he had collected it.^e A specimen (No. 27172) taken by him at Fort Simpson in July, 1861, is still in the National Museum.

Nuttallornis borealis (Swains.). Olive-sided Flycatcher.

This boreal flycatcher occurs generally, though not commonly, throughout the region north at least to the upper Mackenzie. In

^a Life Hist. N. A. Birds [II], p. 272, 1896. (Pelican Narrows, the locality here referred to, is not in Keewatin, but is the Hudson's Bay Company post on Pelican Lake, eastern Saskatchewan, about 90 miles north of Cumberland House.)

^b Expl. in Far North, p. 264, 1898.

^c Cat. Canadian Birds, Part II, p. 344, 1903.

^d Auk, XXV, p. 71, 1908.

^e Nat. Hist. Rev., II (second ser.), p. 278, 1862.

1901 we collected a female at Point la Brie, near Fort Chipewyan, on May 29, and saw another individual near the outlet of Athabaska Lake on June 2.

In 1903 we first noted this species at Fort Chipewyan June 4, and saw a pair and took a specimen near the outlet of the lake June 5. We next saw it on Slave River, between Fort Smith and Fort Resolution, noting it daily June 16 to 19, and we observed a single bird at Fort Resolution June 22. On their return trip Alfred E. Preble and Merritt Cary observed the species at Fort McMurray August 11 and 12, and at Boiler Rapid August 17.

In 1904 I saw one in the mountains near the mouth of Nahanni River on June 4, and another, the last one observed that season, near Fort Wrigley June 7.

This bird was first recorded from the Mackenzie River region by Ross, who considered it rare north to Fort Simpson, where it had been collected.^a A male (No. 19441) taken at Fort Resolution June 20, 1860, by Kennicott, has been several times recorded, and is still in the National Museum collection. Macoun records that one was taken on the Athabaska, near Grand Rapid, in June, 1888, by J. M. Macoun.^b In 1896 J. Alden Loring reported the species common along the trail between Edmonton and Jasper House in the early summer and frequently noted it in the valleys 15 miles south of Henry House July 3 to 21.

Myiochanes richardsoni (Swains.). Western Wood Pewee.

This species, originally described from the Saskatchewan, was observed at various points along our route north to the vicinity of Fort Simpson, though we failed to secure specimens.

In the spring of 1903 we first observed this bird in a large tract of pine forest a few miles south of Sandy Creek, Alberta, where we saw four individuals on May 14. We noted another among the tall spruce woods on the lower Slave River on June 19. My brother and Cary noted one at Fort Providence July 6, and another on Liard River, 5 miles above its mouth, on July 25. While at Fort McMurray, August 8 to 10, on their return trip, they saw six individuals, but were unable to secure specimens. The birds evidently departed for the south on the night of August 10, as no more were seen or heard during the following two days that they remained there.

J. Alden Loring reported the species common along the trail between Edmonton and the mountains in the early summer of 1896, and found a nest near Whitemud Lake, 135 miles west of Edmonton, on June 7. He took a specimen at Banff, Alberta, late in August, 1894.

^a Nat. Hist. Rev., II (second ser.), p. 278, 1862.

^b Cat. Canadian Birds, Part II, p. 347, 1903.

Empidonax flaviventris Baird. Yellow-bellied Flycatcher.

In 1901 we took one in low mixed woods near the outlet of Athabaska Lake on June 3, and another at Smith Landing on June 16, both of which proved to be males. The species was not elsewhere noted, and these seem to be the only records from the region.

Empidonax trailli alnorum Brewst. Alder Flycatcher.

This flycatcher occurs abundantly over nearly the entire wooded part of the region, following the Mackenzie to its mouth and being the only representative of the genus on the lower part of that stream. In 1901 we noted the alder flycatcher at our camp 10 miles below Peace River on June 11, and on the following day we again heard its notes 25 miles below the Peace. We found it rather common at Smith Landing, June 13 to 16, and took two males on June 15. The birds usually perched on small dead trees standing among lower shrubbery, and, though easily seen and heard, were extremely wary, diving into the thickets at the slightest cause for alarm. We saw the bird at Fort Smith June 22, my brother noted it at Fort Resolution July 25, and I took one at Fort Rae July 29.

In the spring of 1903 we first observed the bird on the lower Athabaska, about 20 miles above the delta, on the morning of June 1, when several were seen and heard. We noted it also near the outlet of Athabaska Lake June 5, on Rocher River June 9, and at Smith Landing June 11. On Slave River, between Fort Smith and Fort Resolution, June 15 to 19, we found the bird abundant, and were constantly greeted by its characteristic energetic note. My brother and Cary observed it at Hay River June 30 and July 1, at Fort Providence July 4 and 6, and near the mouth of Nahanni River July 11 and 12. They noted several on Mount Tha-on'-tha at various altitudes up to 2,000 feet July 13 to 18, and took one on the former date. They reported it common near Fort Wrigley July 20 to 22. On their return trip they noted it above Fort Simpson July 25, at Fort Rae July 28, and at Fort McMurray August 10. After the division of the party I observed it frequently at Fort Resolution during the latter part of June and the first half of July. On July 10 I took a nest containing four fresh eggs, securing also the female. The nest was in an alder bush 3 feet from the ground on the lake shore near the edge of the post clearing.

In the spring of 1904 this species evidently had not arrived when I left Fort Simpson June 1, and was first observed at Fort Norman, where I saw several daily in the willow thickets June 12 to 14, taking one on June 13. It was next noted a few miles below Fort Norman June 16, and it was common in a broad stretch of low country bordering the Mackenzie at the Long View, between Bear Rock and Sans

Sault Rapid, where many were heard as we paddled along during the early morning hours of June 18. It was noted also near Sans Sault Rapid June 19. At Fort Good Hope it was rather common in the willow and alder thickets June 21 to 24, and several specimens, including both sexes, were taken. After leaving this place I noted it below Fort Good Hope June 25, and found it rather common on the lower Peel July 1. At Fort McPherson I noted it nearly every day during the early part of July, and took a nest, together with the female parent, on July 8. The nest was built in a low bush and contained four fresh eggs. It is rather bulky, being 4 inches in diameter by 3 inches high, and is rather loosely constructed of coarse grass and some white cottony substance, and lined with fine grass. While ascending the Mackenzie on my return trip I saw an individual at Birch Island, about 90 miles below Fort Wrigley, July 21.

All specimens from this region being referable to the eastern race (*E. t. alnorum*), early references to *pusillus* and *trailli* are assumed to refer to this form. Richardson recorded *Tyrannula pusilla* from Fort Simpson.^a This species was afterwards taken at that place by Ross, who considered it rare.^b Under the name *Empidonax pusillus trailli*, then applied to the eastern form, Bendire records eggs taken, together with the parent birds, at Fort Resolution.^c A skin from the latter place, collected June 30, 1865, and one from Fort Simpson, taken in June, 1861, are still in the National Museum. A male taken by Loring on the Jasper House trail, about 100 miles west of Edmonton, May 30, 1896, also agrees with specimens from the type locality of *E. t. alnorum*. Macoun states that J. M. Macoun took one and saw others at [the mouth of] Lesser Slave River May 23, 1888, and that Spreadborough first noted it at Edmonton May 26, 1897, and found it common by June 2.^d

Empidonax minimus Baird. Least Flycatcher.

This diminutive flycatcher is extremely abundant in the Athabaska Valley and extends northward on the Mackenzie at least to the vicinity of Fort Norman.

In the spring of 1901 the least flycatcher was first seen at Point La Brie, near Fort Chipewyan, May 27, and was again noted May 29. Two were taken at our camp near the outlet of Athabaska Lake, June 1. The species was common 10 miles below Peace River, June 7 to 11, and several nests were found. One collected June 10 contained four eggs in which incubation had begun. At Smith Landing it was found to be common June 13 to 18, several being taken, and it was

^a Ann. and Mag. Nat. Hist., XI, p. 484, 1843.

^b Nat. Hist. Rev., II (second ser.), p. 278, 1862.

^c Life Hist. N. A. Birds [II], p. 310, 1896.

^d Cat. Canadian Birds, Part II, 354, 1903.

noted at Fort Smith, June 23 and 24. It was seen by my brother at Fort Resolution on July 5, 6, and 27, and at Fort Rae by myself on the last date. A single bird was shot and examined at Athabaska Landing, August 30.

In the spring of 1903, the bird was first observed at Grand Rapid, May 22, one being collected. It was noted at the same place, May 23, and below Little Buffalo River, May 26. It was common along the Athabaska between Fort McMurray and Athabaska Lake, and numbers were noted nearly every day, May 29 to June 1. On the latter date one was seen beginning to build a nest. The species was noted at Fort Chipewyan, June 4; on Rocher River, June 9; at Smith Landing, June 11; and on Smith Portage, June 13. Along Slave River, between Fort Smith and Fort Resolution, it was common and was noted daily. At Fort Resolution we frequently observed it during the latter part of June. My brother and Cary noted it at Hay River June 30 and July 1, collecting one on the latter date; at Fort Providence nearly every day, July 3 to 8, taking one on the former date; and at Fort Simpson July 10. On their return trip they noted the species a short distance above Fort Simpson July 25, and found it abundant at Fort McMurray, August 8 to 10, when it had apparently already begun its southward migration. After the division of the party I frequently noted it at Fort Resolution up to July 10, and during my trip northward from Fort Rae saw a deserted nest on lower Grandin River, August 2, and one of the birds on upper Grandin River, August 4.

In 1904 I secured the first one of the season at Fort Simpson on May 24. The species was common at Fort Norman and was noted daily June 11 to 15, one being taken on the former date. A pair was observed building on June 13. The bird was noted a few miles below Fort Norman, June 16, but was not observed farther north. On my return trip one was seen at Fort McMurray, August 11. A male specimen was taken at Fort Simpson on May 26, 1905, by J. W. Mills.

The least flycatcher was first recorded from the Mackenzie River region by Ross, who gives it as common north to Fort Simpson, where it had been collected.^a Baird, Brewer, and Ridgway state that it was found breeding at Fort Resolution.^b The bird catalogue of the National Museum records also skins received from Fort Rae and Peace River, and from the same source the following dates have been copied, probably representing approximately the time of the bird's arrival; Fort Resolution, May 26, 1860; Fort Simpson, May 22, 24, 1860; several are also recorded as taken at Fort Simpson, May

^a Nat. Hist. Rev., II (second ser.), p. 278, 1862.

^b Hist. N. A. Birds, Land Birds, II, p. 374, 1874.

24, 1861. Several skins, including the earliest dated one from Fort Simpson, are still in the collection. Skins and eggs were received also from Lesser Slave Lake from Strachan Jones in 1868. Russell took specimens at Fort Chipewyan, May 26 and 30, 1893, and reports it as common.^a Macoun states that Spreadborough first noted it at Edmonton, Alberta, on May 12, 1897.^b J. Alden Loring took a female 12 miles west of Ste. Anne, Alberta, June 12, 1896.

Empidonax hammondi (Xantus). Hammond Flycatcher.

Concerning this species Baird, Brewer, and Ridgway say:

A number of nests and eggs sent, with the parent birds, from Lesser Slave Lake, by Mr. Strachan Jones, show that its eggs are unspotted creamy-white, like those of *E. minimus* and *E. obscurus*.^c

This is apparently the only authentic published record of this species for the region,^d though the bird catalogue of the National Museum records a specimen (No. 61211) collected by Jones at the same place.

Otocoris alpestris hoyti Bishop. Hoyt Horned Lark.

This form of horned lark occurs in migration throughout the wooded region. It probably does not breed south of the Barren Grounds, unless possibly on the semibarren summits of the mountains. During four summers' work in the north I have never found this bird south of the Barren Grounds during June or July, and the specimens taken at Fort Simpson and other points late in May showed no indication of breeding soon.

We found it common at the delta of the Athabaska May 17, 1901, and while collecting on the marsh at the mouth of the Quatre Fourches, near the same place, May 24, saw a number and took a pair.

In the spring of 1903 we first observed this species a short distance north of Sturgeon River, May 13, noting about a dozen birds and taking one specimen. Similar flocks were seen on May 14 and 15, northward to Athabaska Landing. While on their return trip Alfred E. Preble and Merritt Cary found the birds common at Athabaska Landing, where they were feeding in company with Lapland longspurs, September 19 to 21.

In 1904 the first horned larks referable to *hoyti* were taken at Fort Simpson on May 10. A large series, comprising specimens taken

^a Expl. in Far North, p. 264, 1898.

^b Catalogue Canadian Birds, Part II, p. 356, 1903.

^c Hist. N. A. Birds, Land Birds, II, p. 384, 1874.

^d Brewer's record of a set of eggs of *Empidonax hammondi* from Anderson River (Proc. U. S. Nat. Mus., II, p. 1, 1879), and MacFarlane's consequent inclusion of the species in his list of Arctic birds, is probably based on an error.

May 17, 18 (first females), 20, and 30, was secured from the large flocks which paused here on their northward migration.

Horned larks, undoubtedly of this form, have been observed on two occasions on the Arctic islands, but the bird is rare there. J. C. Ross recorded three seen near Felix Harbor, Boothia;^a and Walker observed one at Port Kennedy in July, 1859, during M'Clintock's expedition.^b Richardson observed the species on its breeding grounds on the Arctic coast near Liverpool Bay, August 4, 1848, when young birds were seen running about.^c Under the name *Eremophila cornuta*, Ross recorded a specimen from Fort Simpson.^d MacFarlane found nests on the Barren Grounds and on the coast of Franklin Bay, and received eggs from the Eskimo, presumably from the lower Anderson or from Liverpool Bay.^e Bendire gives the earliest breeding record for the lower Anderson as June 14, but nearly all the nests taken by MacFarlane were found during the first week in July.^f Specimens from Big Island, Franklin Bay, and the Arctic coast east of Fort Anderson are referred by Oberholser to this form;^g and the bird catalogue of the National Museum shows that horned larks, also undoubtedly referable to the present form, were received from Fort Resolution, Fort Rae, and Fort Good Hope. Under the name *Otocoris a. leucoloema*, Russell records five specimens taken at Fort Chipewyan May 20 to 25, 1893.^h Some of these have been examined by Ridgway and prove referable to *hoyti*. Macoun records eggs, undoubtedly belonging to this form, taken by Bishop Lofthouse on Artillery Lake, June 9, 1900.ⁱ Hubert Darrell informs me that he observed horned larks near the base of Kent Peninsula on June 1, 1902.

Otocoris alpestris arcticola Oberholser. Alaskan Horned Lark.

In the spring of 1904 the first horned larks observed at Fort Simpson were males taken on April 28 and 29, which prove referable to this form. They were seen only in small numbers at first. Other males were taken on May 9 and 14. Among the large series of horned larks taken later in May are two females (May 18 and 30), which are also best referred to *arcticola*, though somewhat inclining toward *hoyti*.

^a Appendix to Ross's Second Voyage, p. xxvi, 1835.

^b Proc. Roy. Soc. Dublin, III, p. 62, 1860.

^c Arctic Searching Expedition, I, p. 251, 1851.

^d Can. Nat. and Geol., VI, p. 442, 1861.

^e Proc. U. S. Nat. Mus., XIV, p. 438, 1891.

^f Life Hist. N. A. Birds [II], p. 333, 1896.

^g Proc. U. S. Nat. Mus., XXIV, pp. 812, 813, June, 1902.

^h Expl. in Far North, p. 264, 1898.

ⁱ Cat. Canadian Birds, Part II, p. 364, 1903.

Pica pica hudsonia (Sab.). American Magpie.

While we were descending the Athabaska in 1901 some of the voyagers remarked on the absence of magpies, stating that a few were usually noticed along the river about Fort McMurray. Two specimens (Nos. 61215 and 61216), received from Strachan Jones, and recorded with a collection from Lesser Slave Lake, were probably taken at this place. Richardson says: "The American magpie has not been seen to the north of the River of the Mountains, and is rare even there."^a

Cyanocitta cristata (Linn.). Blue Jay.

This jay is of regular occurrence along the Athabaska, which seems to be its northern limit. It was first noted near the mouth of Little Red River on May 15, 1901, a single bird being seen. The species was not again noted until we were ascending the Athabaska on our return, when we saw small companies near Big Cascade Rapid, August 13, and between Grand Rapid and Pelican Rapid, August 22 and 23.

While on their outward trip in 1903, Alfred E. Preble and Merritt Cary heard the notes of several at Fort McMurray on August 11.

In 1904, while ascending the Athabaska on my return trip, I saw and heard several near Pelican Rapid, August 25.

Macoun says:

Not rare around Athabasca Landing, May 22, 1888, and up the Athabasca to Lesser Slave River; one specimen was taken three miles up the Clearwater River from Fort McMurray in latitude 56° 30'; said to be quite common about Isle à la Crosse Lake and to winter there (J. M. Macoun). One observed June 8, 1897, at Edmonton, Alta., eating a young bird; the only one seen (Spreadborough).^b

Perisoreus canadensis (Linn.). Canada Jay.

The 'whisky jack' is common and generally distributed throughout the wooded region. It is one of the few winterers, but its scarcity during the more severe months indicates that it is to some extent migratory.

In 1901 we first noted the Canada jay in the groves of Banksian pine between Vermilion Creek and Towatinnow River, where it was common May 3 and 4. While descending the Athabaska we saw the species several times between Grand Rapid and Little Red River, May 11 to 15. We saw several in the willow thickets on the Quatre Fourches marsh, May 24, several on a wooded island near the outlet of Athabaska Lake, June 2, and noted the species on Rocher River, June 5. We collected a pair in worn breeding plumage, with molting tail feathers, together with a young bird, at the mouth of Peace River,

^a Arctic Searching Expedition, I, p. 179, 1851.

^b Cat. Canadian Birds, Part II, p. 374, 1903.

June 6. At our camps 10 and 25 miles below Peace River we found the species common, June 7 to 13, and collected adult birds at the former place on June 7 and 9. We noted the species several times at Fort Smith, June 19 to 28, and while descending Slave River to Great Slave Lake noted it at a point about 100 miles below Fort Smith on July 2. While crossing Great Slave Lake to Fort Rae I saw many on the north shore of the lake and among the islands of the Northern Arm, July 15 to 18, and my brother often observed it at Fort Resolution during July. At Fort Rae I found the species abundant, July 19 to 29, and on July 23 collected several immature birds which were molting from the juvenal to the winter plumage.

In 1903 we saw a pair, accompanied by young not long from the nest, at Edmonton on May 8. A young one just flying was taken 50 miles north of Edmonton, May 14. Along Athabaska and Slave rivers the bird was common and was noted nearly every day. I occasionally saw it at Fort Resolution during the latter part of June and the first part of July, and my brother and Cary frequently saw it during their trip between Hay River and Fort Wrigley, July 1 to 20. On their return trip they often observed it at their camps, especially while ascending the Athabaska. They last noted it near Lily Lake, September 24. While crossing Great Slave Lake to Fort Rae, after the division of the party, I saw this jay at Gros Cape, July 23, and at Fort Rae, July 27. Throughout the lake region between Fort Rae and Great Bear Lake I found it common, and noted it almost daily during August. During my voyage along the south shore of Great Bear Lake, August 27 to September 17, I found it abundant, and collected several at my camp east of Leith Point and at Fort Franklin. During September the jays fed largely on the berries of *Empetrum nigrum*, and some individuals were badly stained about the head and breast with its purple juice. I frequently observed the species while ascending the Mackenzie in October. During the latter part of October and during November I found it rather common at Fort Simpson, but did not observe it during December.

In January and February, 1904, unusually cold months; this bird was seldom observed at Fort Simpson, but during March it became common and was seen nearly every time I visited the woods. On March 24 I observed birds apparently mating, but I was unsuccessful in attempts to locate the nests. I frequently observed the species during April and occasionally during May. While voyaging down the Mackenzie in June I seldom observed the species, but noted a pair with young not long from the nest near Wolverine Rock, 100 miles below Fort Norman, June 18. I saw several on Peel River, near Fort McPherson, July 16, and while ascending the Mackenzie noted the species near the mouth of Nahanni River, July 24. I saw

a few on Smith Portage, August 4, and on the Athabaska near House River, August 24, and noted it daily between Athabaska Landing and Edmonton, September 2 to 4.

During Franklin's first journey to the Arctic Sea, the Canada jay was observed at Fort Enterprise, and was noted as one of the four birds which still remained there at the end of October, 1820.^a In the following spring some young birds made their appearance about the house on June 11.^b On Franklin's second northern journey it was noted at Fort Franklin, Great Bear Lake, about the last of October, 1825,^c and was seen by Richardson on the lower Coppermine late in the following summer.^d A young bird taken at Fort Franklin, May 26, 1826, was the basis of the name *Garrulus brachyrhynchus*.^e King noted the species at Fort Reliance, at the eastern end of Great Slave Lake, in the winter of 1833-34; ^f and Simpson recorded it from Fort Confidence, Great Bear Lake, in the winter of 1837-38.^g Ross recorded the bird as being abundant in the Mackenzie River region north to La Pierre House, as wintering, and as having been taken at Fort Simpson.^h In the Anderson River region, MacFarlane found the species tolerably numerous throughout the wooded country, and obtained its eggs. A nest found May 11, 1863, contained two young birds a few days old and a fresh egg. Another nest contained four eggs, the contents of which were in different stages of development.ⁱ In notes sent to the Smithsonian, he speaks of seeing the species at the crossing of Horton River, near the head of Franklin Bay, during one of his summer trips. The bird catalogue of the National Museum shows that skins were received from Fort Rae, Big Island, Fort Simpson, Fort Liard, and Fort Anderson; and Strachan Jones sent both skins and eggs from Lesser Slave Lake. Eggs collected, together with the female parent, at Pelican Narrows, eastern Saskatchewan, by H. MacKay in March, 1891, were received by the National Museum through MacFarlane.^j In a manuscript list recently sent me, he records a nest containing five fresh eggs, found at Green Lake, Saskatchewan, March 28, 1880, by W. S. Simpson. Another nest containing four eggs, which were advanced in incubation, was discovered at Fort Providence on April 15, 1885. A set of eggs taken by G. A. Ball at Athabaska Landing, Alberta,

^a Narrative Journey to Polar Sea, p. 247, 1823.

^b Ibid., p. 315, 1823.

^c Narrative Second Expedition to Polar Sea, p. 60, 1828.

^d Ibid., p. 271, 1828.

^e Fauna Boreali-Americana, II, p. 297, 1831.

^f Narrative Journey to Arctic Ocean, I, p. 166, 1836.

^g Narrative Discoveries on North Coast of America, p. 216, 1843.

^h Nat. Hist. Rev., II (second ser.), p. 283, 1862.

ⁱ Proc. U. S. Nat. Mus., XIV, p. 439, 1891.

^j Life Hist. N. A. Birds [II], p. 388, 1896.

March 25, 1902, is in the collection of the National Museum. In a letter received from James MacKinlay in the spring of 1905, he reports that a nest containing eggs was found in a muskeg near the Athabaska, 30 miles below Athabaska Landing, March 22, 1905. The nest was in a willow bush, at a height which allowed a person standing beside it to view its contents.

Late in August, 1894, J. Alden Loring reported seeing several at Banff, Alberta, taking one on August 28, and he saw several at Edmonton, September 7 to 26. In the early autumn of 1895 he found it common along the trail between Edmonton and Jasper House. In 1896 also it was abundant along the same trail during the early summer. He took young birds 12 miles west of Ste. Anne, Alberta, May 27, and about 120 miles west of Edmonton, May 29. The tail feathers of these specimens are fully grown. He found the species common in the mountains near Henry House in July, and all along the trail between Jasper House and Smoky River in the early autumn, collecting several at Grand Cache, about 120 miles north of Jasper House, September 25. These are in fresh fall plumage, and are slightly darker than spring specimens.

***Corvus corax principalis* Ridgw.** Northern Raven.

The raven, almost universally called 'crow' in the north, occurs throughout the region the year round, though less commonly during the more severe months. It has been known to brave out the long Arctic night as far north as latitude 73°.

In 1901 we saw one at Grand Rapid, May 10; another below Fort McMurray, May 15; and several near Fort Chipewyan, May 18 to June 5. We next noted the species on Slave River 50 miles below Fort Smith, June 30, when we saw a family of old and young, and collected one. We noted several near the mouth of Slave River, July 4, and several on islands in the Northern Arm of Great Slave Lake, July 16 and 17. While we were ascending the Athabaska on our return trip we saw a number between Pelican Rapid and Big Mouth Brook, August 25 and 26.

In 1903 we occasionally saw the raven along the Athabaska, noted it a few times on Rocher River, and found it common along Slave River, noting numbers nearly every day between Fort Smith and Fort Resolution. My brother and Cary found it common at Hay River and along the Mackenzie as far down as Fort Wrigley. On their return trip they noted it at Brulé Rapid, August 19; at House River, August 22; and 50 miles south of Athabaska Landing, September 23. I saw a few among the Simpson Islands and on the Northern Arm of Great Slave Lake in July, and noted a few deserted nests on cliffs. During my trip northward from Fort Rae I noted the raven on Grandin River, August 1, 3, and 4, and on Lake Mazenod, August 6. North of

the height of land I noted it nearly every day on the various lakes traversed during the remainder of the month. The species was common also along the southern shore of Great Bear Lake and on Bear River during September, and a few were seen nearly every day as we ascended the Mackenzie to Fort Simpson, October 2 to 20. At Fort Simpson I found it fairly common during October and November, and occasionally observed one or two during December.

During January and February, 1904, one or two were occasionally observed, and the species became fairly common during March. On March 28, a warm, still day, I saw a flock of 10 high in the air, soaring about in intersecting circles. During April and May I noted the species nearly every day. A pair was observed carrying nesting material on April 8, but I was unable to locate the nesting site. While descending the Mackenzie I noted the species near Nahanni River, June 4, and near Fort Wrigley, June 7, and a nest in a cavity on the face of a cliff containing well-grown young attracted my attention at Roche Trempe-l'eau, June 8. On June 10, a short distance above Fort Norman, I saw a brood of young which had recently left the nest, and observed similar broods, usually accompanied by their parents, below Fort Norman, June 16, and at Wolverine Rock, June 18. On June 12, near Fort Norman, I saw a pair, which evidently had a nest on the south side of Bear Rock. I saw a few on the lower Mackenzie, June 28, and on the lower Peel, July 1. On my return trip I noticed the species below Fort Norman, July 20; near Pelican Rapid, Athabaska River, August 25; 25 miles above Pelican Portage, August 28; and near Swift Current Rapid, August 29.

Edward Sabine recorded the raven from Melville Island, where several pairs were seen;^a and Fisher noted its arrival at the same place, May 15, 1820.^b J. C. Ross states that a pair remained at Port Bowen throughout the winter of 1824–25.^c John Ross noted one at Felix Harbor on October 22, 1829, and states that two arrived there on March 18, 1830.^d M'Clintock observed a few at Port Kennedy in early November, 1858.^e McCormick noted the bird at Beechey Island on November 23, 1852, and June 21, 1853.^f On Franklin's first journey the raven was noted about the last of October, 1820, as one of the four birds which still remained about Fort Enterprise;^g in the following spring young appeared around the post about June

^a Suppl. to Appendix Parry's First Voyage, p. cxiv, 1824.

^b Journal Voyage of Discovery, p. 191, 1821.

^c Parry's Third Voyage, Appendix, p. 97, 1826.

^d Narrative Ross's Second Voyage, pp. 206, 295, 1835.

^e Voyage of the *Fox*, p. 188, 1860.

^f McCormick's Voyages, II, pp. 62, 81, 1884.

^g Narrative Journey to Polar Sea, p. 247, 1823.

11.^a On Franklin's second northern journey the bird was noted at Fort Franklin about the last of October, 1825.^b Simpson noted its presence at Fort Confidence in the winter of 1837-38.^c Armstrong relates that a pair of ravens passed the winter of 1850-51, in spite of the weeks of darkness, near the winter quarters of the *Investigator*, in Prince of Wales Strait. They were several times seen during the winter, but toward spring one of the birds disappeared, probably having been killed by some animal.^d He mentions also seeing a raven near Prince Alfred Cape, Banks Land, September 10, 1851.^e During the voyage of the *Enterprise*, Collinson noted two ravens November 13, 1852, at Cambridge Bay, Victoria Land.^f Ross recorded the species as being abundant in the Mackenzie River region north to the Arctic coast, as wintering, and as having been taken at Fort Simpson.^g MacFarlane found it abundant on Anderson and Lockhart rivers, and discovered a number of nests, usually built in trees. In February and March, 1865, a raven became semidomesticated at Fort Anderson.^h Baird, Brewer, and Ridgway state that the species was obtained at Fort Resolution, Fort Rae, Big Island, and Fort Simpson;ⁱ a specimen was received also from Fort Liard. Russell took the species at Fort Smith and Fort Rae, finding it a rare winter resident at the latter place, and observed it on the Arctic coast between the mouth of the Mackenzie and Herschel Island.^j Macoun records 5 eggs taken on Artillery Lake, May 24, 1900, by C. Fairchild;^k and J. W. Tyrrell mentions a nest of young found at the same place on May 26.^l

In the early autumn of 1895, J. Alden Loring saw several pairs in the Rocky Mountains of western Alberta. During the summer of 1896, he saw several in the foothills of the Rockies in the same region. He observed the species also in the mountains between Jasper House and Smoky River in the early autumn, and about the middle of October saw two individuals above timberline in the mountains west of Henry House.

^a Narrative Journey to Polar Sea, p. 315, 1823.

^b Narrative Second Expedition to Polar Sea, p. 60, 1828.

^c Narrative Discoveries on North Coast of America, p. 216, 1843.

^d Narrative Discovery Northwest Passage, p. 290, 1857.

^e *Ibid.*, p. 427, 1857.

^f Journal of H. M. S. *Enterprise*, p. 247, 1889.

^g Nat. Hist. Rev., II (second ser.), p. 283, 1862.

^h Proc. U. S. Nat. Mus., XIV, p. 439, 1891.

ⁱ Hist. N. A. Birds, Land Birds, II, p. 236, 1874.

^j Expl. in Far North, p. 265, 1898.

^k Cat. Canadian Birds, Part II, p. 385, 1903.

^l Ann. Rept. Dept. Interior (Canada) for 1900-1901, p. 137, 1902.

Corvus brachyrhynchos C. L. Brehm. Crow.

This bird, called 'barking crow' in the north, occurs rather commonly throughout the region north to Great Slave Lake. It is very common in the vicinity of Fort Providence, which is near its northern limit, but seldom reaches Fort Simpson.^a

In the spring of 1901, the crow was noted almost daily between Edmonton and Athabaska Landing, April 29 to May 5, and was seen on the Athabaska near Fort McMurray, May 15, and at its mouth, May 17. It was noted almost daily near Fort Chipewyan, May 18 to June 5; and was seen on Rocher River, June 5; at the mouth of Peace River, June 6; and 25 miles below the Peace, June 12 and 13. At Fort Resolution my brother noted it almost daily, July 5 to 22; and I saw a number among the islands of the Northern Arm of Great Slave Lake, July 15 to 18.

In 1903 we first saw the bird at Edmonton, May 10, and we found it common on the way to Athabaska Landing, May 11 to 15. We next observed it on the lower Athabaska, May 31, and we saw a few at Fort Chipewyan, June 3 and 4. The species was common on Rocher River, June 6 to 8. A noisy flock of about fifty, probably merely a temporary gathering for some social or predatory purpose, was seen June 6, and several nests apparently just finished were found in high willow bushes, June 8. The bird was noted near the mouth of the Peace, June 9, and on lower Slave River, June 19, and was occasionally noted at Fort Resolution during the latter part of June. My brother and Cary found it common at Hay River, June 30 and July 1, and saw a few daily at Fort Providence, July 4 to 8. While traversing the Northern Arm between Gros Cape and Fort Rae, July 23 to 26, I saw a few daily. On my trip northward I last noted it on Grandin River, August 1 and 5.

In 1904 I did not see the crow at Fort Simpson, though it is said to reach that point occasionally. J. W. Mills reported it common at Willow River, near Fort Providence, April 25, and on May 12 found a nest containing two eggs, which he afterwards collected. On my return trip I found the bird common about Fort Providence and the Desmarais Islands, July 29, and saw several at Fort Chipewyan August 7.

Specimens were received by the Smithsonian Institution from Fort Rae and Big Island. McConnell states that the species arrived at Fort Providence April 20, 1888.^b Macoun states that J. M. Macoun [in

^a MacFarlane's record of the nesting of this species in the Anderson River region (Proc. U. S. Nat. Mus., XIV, p. 439, 1891), is doubtless a case of misidentification. Eggs taken near Fort Anderson, May 5, 1866, referred by him to *C. americanus* and now in the U. S. National Museum, have been examined recently and prove to be those of the raven.

^b Ann. Rept. Can. Geol. Surv., IV (new ser.), p. 160D, 1891.

1888] saw a few between Red Deer and Athabaska Landing, Alberta, and found the species very numerous near Methye Portage and at Isle à la Crosse.^a J. Alden Loring reported two seen at Edmonton, September 10, 1894. Observations made at Lac du Brochet Post, Reindeer Lake, from 1874 to 1889, show that the date of arrival of this bird ranged from April 6 to April 28, the average date being April 16. The detailed dates appear in a table given on page 22. Similar dates for Fort Chipewyan are given in tabular form on page 23. H. W. Jones reports seeing the bird on the Mackenzie above Fort Simpson, April 22, 1905.

Nucifraga columbiana (Wils.). Clark Nutcracker.

J. Alden Loring noted this species near Banff, Alberta, August 30, 1894, and in the autumn of 1895 saw two small flocks near Jasper House. As the bird ranges to Alaska, it is doubtless a regular inhabitant of the Rocky Mountains in western Alberta and north-eastern British Columbia.

Molothrus ater (Bodd.). Cowbird.

This bird, usually called 'buffalo-bird' in Alberta and the Peace River Valley, where it is common, occurs northward at least to Fort Simpson.

In the spring of 1903 we first observed the cowbird near Sturgeon River, May 12, noting three, and we found it common between there and Athabaska Landing, May 13 to 15. We saw a few at Grand Rapid, May 22 and 24, and at Little Buffalo River, May 26. We next saw the bird at Fort Resolution, June 22, when two or three were observed about the post buildings, and two specimens were taken.

In the spring of 1904, at Fort Simpson, I saw the first one on May 14, and three more on May 20. The latter were closely attending the herd of cattle in a field near the post. They were the last seen that season. J. W. Mills collected a female specimen at Fort Providence, May 18, 1905. H. W. Jones reports the bird common at Hay River in the spring of 1907.

Ross listed the species as very rare in the Mackenzie River region north to Fort Simpson, where he had collected it.^b I find in the catalogue of the birds in the National Museum the records of a specimen (No. 22803) taken by Ross at Fort Simpson, May 27, 1861, and of one from Peace River. These specimens seem to have disappeared, and evidently the records have been ignored or overlooked. Bendire records eggs taken by Strachan Jones at Lesser Slave Lake

^a Cat. Canadian Birds, Part II, p. 387, 1903.

^b Nat. Hist. Rev., II (second ser), p. 282, 1862.

in 1868.^a J. Alden Loring reported this species as rather common in the valleys in the vicinity of Henry House in July, 1896.

Xanthocephalus xanthocephalus (Bonap.). Yellow-headed Blackbird.

This blackbird is an inhabitant of the prairie sloughs, and is only locally found north of the plains. While I was collecting on the Quatre Fourches marsh, near Fort Chipewyan, May 24, 1901, a small company of these birds flew past, and I shot a male in rather dull plumage. The species was not elsewhere noted.

Ross reported having observed this bird on one occasion at Fort Simpson.^b Eggs are recorded in the catalogue of the National Museum as having been received from Strachan Jones from Lesser Slave Lake, but they are not mentioned by Bendire. A skin recorded by him as coming from Du Brochet, Reindeer Lake,^c is entered in the catalogue of birds as from Pelican Narrows [on Pelican Lake, eastern Saskatchewan], which is probably the correct locality. Russell reports seeing one at Fort Chipewyan in the summer of 1893.^d H. W. Jones reports a female taken at Hay River, Great Slave Lake.

Agelaius phœniceus arctolegus Oberholser. Northern Redwing.

Agelaius phœniceus arctolegus Oberholser, Auk, XXIV, p. 332, July, 1907.
(Type from Fort Simpson, Mackenzie.)

The redwing blackbird breeds abundantly in suitable places throughout the region north to Great Slave Lake and the upper Mackenzie and less commonly to the northward of these points. In the summer of 1901 flocks containing hundreds were seen a few miles north of Edmonton, April 30 and May 1. A few were noted near Athabaska Landing, May 5; many at the mouth of the Athabaska, May 17; and a number on the Quatre Fourches marsh, May 24. In a small marsh near the outlet of Athabaska Lake, near which we camped June 1 to 4, the species was common and a male was taken June 4. It was abundant in the swamps bordering Rocher River, and one was collected there June 5. At a point about 25 miles below the mouth of Peace River the species was common in a small marsh near the Slave, June 12 and 13; several specimens were collected here on June 13, and nests found on the same date contained young a few days old. On Smith Portage the bird was common June 18, and it was seen daily at Fort Smith, June 19 to 28, a pair being taken June 21. It was noted near Fort Resolution, July 6 and 9. Several were seen at Fort Rae, July 29, and an immature male was taken. On our return trip we saw numbers near Sturgeon River, September 3.

^a Life Hist. N. A. Birds [II], p. 435, 1896.

^b Nat. Hist. Rev., II (second ser.), p. 282, 1862.

^c Life Hist. N. A. Birds [II], p. 447, 1896.

^d Expl. in Far North, p. 265, 1898.

In the spring of 1903 we first observed this bird a few miles north of Edmonton, May 11. It was then common, and we observed it in numbers daily to May 15, while on our way to Athabaska Landing. It was next seen on the lower Athabaska, where we found it common May 31 and June 1; and it was common also on Rocher River, June 6 to 8. It was next noted on Slave River below Fort Smith, June 15. Great numbers breed in the marshes in the delta of Slave River, but the species was seldom seen in the immediate vicinity of Fort Resolution until July 15, when a number of old and young birds were observed. Great numbers of old and young were seen at the delta when I passed there on July 17. On their return trip in the fall Alfred E. Preble and Merritt Cary noted a few at Fort McMurray, August 10, and found the species common and migrating at the same place on August 11. During my trip northward from Fort Rae, I observed the species on Grandin River, August 1 and 4, and on Lake Faber, August 7, noting a number on each occasion.

In the spring of 1904 the arrival of the redwing was noted at Willow River, near Fort Providence, on May 9, by H. W. Jones. He took a male May 14, and saw the first females on May 22. At Fort Simpson I noted the first one May 16, saw another May 17, and found the species common May 18, when a specimen was taken. The species was noted nearly every day during the remainder of the month, females first appearing on May 26, when the type of *arctolegus* was taken. On my return trip I saw a few migrants on the Athabaska near the mouth of La Biche River on the morning of September 1.

King recorded the redwing blackbird from Methye Portage.^a Ross listed it as common in the Mackenzie River region north to Fort Norman, and as having been collected at Fort Simpson.^b In addition to skins from the latter locality, the bird catalogue of the National Museum records specimens from Fort Resolution, Big Island, Fort Rae, Fort Liard, and Lesser Slave Lake, all undoubtedly belonging to the present form. Specimens from the first two localities are still in the collection. At Fort Resolution, in 1860, Kennicott first noted redwings on May 14.^c Macoun records eggs taken by Spreadborough at Edmonton, Alberta, May 27, 1897.^d

In July, 1896, J. Alden Loring found redwings, undoubtedly of this form, common in the vicinity of Henry House. Hubert Darrell informs me that he saw redwing blackbirds on the divide between the Coppermine and the head of Dease River early in August, 1902. MacFarlane, in notes recently received, records a female taken at Fond du Lac, Athabaska Lake.

^a Narrative Journey to Arctic Ocean, II, p. 216, 1836.

^b Nat. Hist. Rev., II (second ser.), p. 282, 1862.

^c Trans. Chicago Acad. Sci., I, p. 170, 1869.

^d Cat. Canadian Birds, Part II, p. 400, 1903.

Sturnella neglecta Aud. Western Meadowlark.

This bird is common on the plains of Alberta, and apparently has not been previously recorded to the northward of the Saskatchewan watershed. It was common in the fields between Edmonton and Sturgeon River, May 1, 1901, and a few were seen in a 'prairie' 50 miles north of Edmonton, May 3.

In the spring of 1903 we observed this bird at Edmonton, May 10 to 12, noting several daily, and while on our way to Athabaska Landing saw one near Sandy Creek, May 14, and another near Athabaska Landing, May 15.

On the morning of May 20, 1904, I secured a fine male in a field back of the post buildings at Fort Simpson, Mackenzie. When shown the specimen, one of the ladies reported seeing two others on the same morning. The species had never been seen before at that place by any of the inhabitants.

Euphagus carolinus (Müll.). Rusty Blackbird.

This abundant and widely distributed blackbird breeds commonly throughout the region north to the limit of trees. It is the earliest blackbird to arrive in spring, and in autumn many of the birds, now in rusty garb, delay their departure for the south until forced to leave by the severity of the climate and the scarcity of food.

In 1901 this bird was first noted on Loon Island, 50 miles north of Fort Resolution, July 11, when a few were seen and a female was collected. A few were seen at Fort Rae, July 26 to 29, and while we were ascending the Athabaska a number were observed a few miles above Fort McMurray on August 12.

In 1903 we first detected this bird on the lower Athabaska, June 1, noting several, and next observed it on the lower Slave, June 18. My brother and Cary saw a few individuals at Fort Providence, July 6 and 7, and took three specimens on the former date. On their return trip they found the species migrating commonly at Athabaska Landing, August 31 to September 4. After the division of the party I noted the species at Fort Rae, July 28, and while on my trip northward from Fort Rae observed it on Grandin River, August 1 to 4, and saw a small flock on Lake Hardisty, August 17, taking two specimens. I noted it also on the route between there and MacTavish Bay on August 20 and 23. While traveling along the southern shore of Great Bear Lake I saw a few daily at our camp east of Leith Point, August 29 to September 3, taking one on the latter date; noted a few 40 miles west of McVicar Bay September 13, and near Manito Islands, September 15; and observed it several times at Fort Franklin, September 17 to 23, taking two specimens, which proved to be very fat. I next observed the species on the Mackenzie, where I noted a few nearly every day between Fort Norman and a point about 50

miles below Fort Simpson, October 1 to 16. They were generally seen seeking for food along the icy margin of the river, and the last one noted was found dead on the bank.

In the spring of 1904 the first male of this species was taken at Willow River, near Fort Providence, on May 2, by J. W. Mills, and the first female on May 3. During the next few days the species became common, and several specimens were taken by Messrs. Mills and Jones. At Fort Simpson I first observed it on May 4, noting two. On May 10 I saw three, and I noted it also on May 14 and 15, but the species was not common until May 16. During the remainder of the month it was seen occasionally. During my trip down the Mackenzie I found it breeding abundantly about some marshy ponds on Manito Island, near Fort Good Hope, June 23, taking several, and also saw it near that post, June 24. While ascending the Peel, July 1, I saw a flock near the mouth of the river. During my return trip I found it common at Fort Chipewyan August 7, and noted a few near Quito River August 30. Specimens were taken by J. W. Mills at Fort Providence on May 7 and 8, 1905, and the bird was first noted there on April 29.

Richardson states that this species arrives at Great Bear Lake by May 3, and describes one taken at Fort Franklin, May 15, 1826.^a King took it at Fort Reliance, where, in the autumn of 1833, a flock of about 30 remained feeding on the offal from the fishery until December.^b Richardson noted the species in flocks in the delta of the Mackenzie below Harrison Island in the summer of 1848.^c Ross reported it as common in the Mackenzie River region, and as having been collected at Fort Simpson.^d MacFarlane found it fairly abundant throughout the wooded country in the Anderson River region, and found many nests.^e Baird, Brewer, and Ridgway record it from Fort Simpson, Fort Rae, Anderson River, and Peel River; ^f and skins were received also from Fort Resolution and Big Island. Skins recorded in the catalogue of the birds in the National Museum, taken at Fort Simpson, May 5 and 7, 1861, probably represent about the earliest arrivals. Macoun states that Spreadborough found this bird abundant in the spring of 1897 at Edmonton, where, on June 10, he found a nest with young; and that J. M. Macoun found it abundant between Methye Portage and Isle à la Crosse in the summer of 1888.^g Hubert Darrell tells me that he saw

^a *Fauna Boreali-Americana*, II, pp. 286, 287, 1831.

^b *Narrative Journey to Arctic Ocean*, II, p. 279, 1836.

^c *Arctic Searching Expedition*, I, p. 231, 1851.

^d *Nat. Hist. Rev.*, II (second ser.), p. 282, 1862.

^e *Proc. U. S. Nat. Mus.*, XIV, p. 440, 1891.

^f *Hist. N. A. Birds, Land Birds*, II, pp. 205, 206, 1874.

^g *Cat. Canadian Birds, Part II*, pp. 407, 408, 1903.

blackbirds, undoubtedly of this species, near the head of Dease River, on the divide between the Coppermine and Great Bear Lake, early in August, 1902.

Euphagus cyanocephalus (Wagl.). Brewer Blackbird.

This species appears not to occur, at least on our route, north of Athabaska Landing, Alberta, where it is common.^a

In 1901 we found it occurring in large flocks along the route between Edmonton and Athabaska Landing, April 29 to May 5. After leaving the latter point we did not note the bird until we again arrived there on August 30, when we observed numbers about the buildings. We found it common also near Sturgeon River on September 3.

In the spring of 1903 we first noted it at Edmonton, May 8, when we saw a few, and found it abundant between there and Athabaska Landing, May 11 to 15. On their return trip Alfred E. Preble and Merritt Cary noted one at Athabaska Landing, September 16, and found it fairly common in the open country between that place and Edmonton, September 16 to 21. They found it abundant also between Edmonton and Calgary on September 28.

In 1904 I found it very common along the road between Athabaska Landing and Edmonton, September 2 to 4.

In September, 1894, J. Alden Loring observed immense flocks feeding in every grainfield near Edmonton. In 1896 he found them common along the Jasper House trail in the early part of the summer, and noted several small flocks near the junction of Grand Cache and Smoky rivers late in September.

Macoun records eggs taken by Spreadborough at Edmonton, Alberta, May 22, 1897.^b

Quiscalus quiscula æneus Ridgw. Bronzed Grackle.

The bronzed grackle occurs abundantly in certain marshy localities, notably the deltas of the larger rivers, north to Great Slave Lake.

In 1901 we found this bird common a few miles north of Edmonton, May 1. We next noted the species in the Quatre Fourches marsh, May 24, observing a number. We found it abundant in the swamps bordering Rocher River on June 5, and also 25 miles below Peace River, June 12 and 13, where we took a male. We next observed it on Smith Portage, June 18, and saw numbers daily at Fort Smith, June 19 to 28. Here we took a young bird just from the nest on June 19, and during our stay collected several adults. We saw a few on Slave River below Fort Smith, June 30 and July 1, and at Fort

^a Russell records one taken at Fort Chipewyan, May 23, 1893 (Expl. in Far North, p. 266, 1898). The reputed specimen has been examined and proves referable to *Quiscalus q. æneus*.

^b Cat. Canadian Birds, Part II, p. 411, 1903.

Resolution, July 9 and 11. On our return trip we observed a number on Smith Portage, August 5.

In 1903 we first noted the bronzed grackle at Edmonton on May 10, when we saw four individuals, and we observed it daily between Edmonton and Sandy Creek, Alberta, May 11 to 14. We next met with it on the lower Athabaska June 1; found it common on Rocher River, June 6 to 8; and noted it near the mouth of the Peace on June 9. We observed a few near the mouth of Slave River, June 19, and at Fort Resolution, June 20 and 21. I did not again see the species at Fort Resolution, but found it common near Stone Island on July 18, when I noted the species for the last time that season.

In the spring of 1904 the arrival of this species was noted by H. W. Jones at Willow River, near Fort Providence, on May 2, and males were collected there on May 4 and 10. On my return trip I saw the bird on Smith Portage, noting a number on August 4.

Ross recorded this species, under the name *Quiscalus versicolor*, as being rare in the Mackenzie River region north to Fort Simpson, where he took it.^a The bird catalogue of the National Museum records specimens from Fort Resolution, Big Island, and Fort Simpson, the one taken at the latter place May 3, 1861, probably representing about the earliest arrival of the species. Both skins and eggs, collected by Strachan Jones probably in 1868, were received also from Lesser Slave Lake. Bendire records eggs taken by Lockhart at Fort Resolution as early as May 17, 1863.^b Macoun records eggs taken by Spreadborough at Edmonton, Alberta, May 31, 1897.^c

Hesperiphona vespertina (Coop.). Evening Grosbeak.

A flock of four was seen at Grand Rapid, Athabaska River, May 21, 1903. The birds were feeding among the willows and alders near the head of the island and a fine male was taken. At the report of the pistol the remaining birds flew wildly toward the foot of the rapid, and could not again be found. Alfred E. Preble and Merritt Cary, while on their return trip, collected an immature male on the Athabaska a few miles above Athabaska Landing, September 4.

J. Alden Loring reported seeing a pair at St. Albert, Alberta, May 25, 1896, and observed four individuals near Spotted Lake, on the Jasper House trail about 50 miles west of Edmonton, on November 3 of the same year.

Bonaparte records two specimens "shot early in the spring on the Athepescow Lake near the Rocky Mountains."^d Later he figured and described one of these specimens, this time giving the locality as

^a Nat. Hist. Rev., II (second ser.), p. 283, 1862.

^b Life Hist. N. A. Birds [II], p. 502, 1896.

^c Cat. Canadian Birds, Part II, p. 413, 1903.

^d Zool. Journ., III, p. 49, 1827.

"Athabasca Lake."^a These specimens, which formed the basis of the earliest published records of the species, with the exception of the original description, he found in the collection of Mr. Leadbeater.^b Richardson, evidently referring to the same record, states that the species "frequents the * * * eastern declivity of the Rocky Mountains, in latitude 56°."^c Concerning the species Macoun says:

Not uncommon at Edmonton, Alberta, between April 16th and May 14th, 1897, when they disappeared. Two specimens were seen on the trail between Lesser Slave Lake and Peace River Landing, Atha., in June, and a pair with young just able to fly at Dunvegan, latitude 56°, July 26, 1903. (Spreadborough.)

He records also three specimens taken at Edmonton, Alberta, May 14, 1898.^d

Pinicola enucleator leucura (Müll.). Eastern Pine Grosbeak.

Pine grosbeaks occur throughout the greater part of the wooded region in summer, but in winter mainly withdraw from at least its northern half, and become very abundant southward.

A male taken on a large lake a few miles south of MacTavish Bay, on August 23, 1903, and another taken on the south shore of Great Bear Lake a few miles east of Manito Islands, on September 14, prove referable to the eastern race. In each case only a single bird was seen.

King recorded pine grosbeaks, probably referable to this race, from Fort Reliance, Great Slave Lake, and from Artillery Lake.^e Specimens from Fort Rae and Fort Resolution, recorded in the bird catalogue of the National Museum, were also probably of this form.

Pinicola enucleator montana Ridgw. Rocky Mountain Pine Grosbeak.

Macoun mentions that two were seen by Spreadborough on a mountain on the north side of Miette River, near Jasper House, August 29, 1898.^f

J. Alden Loring saw several pine grosbeaks in the mountains between Jasper House and Smoky River, Alberta, in the late summer of 1896, which probably were referable to this form.

Pinicola enucleator alascensis Ridgw. Alaska Pine Grosbeak.

During our investigations in this region, the first pine grosbeaks referable to this form were seen at Fort Franklin, September 20, 1903, when two specimens were taken from a small flock which was feeding on the seeds of dwarf birch (*Betula nana*) near the shore of the lake.

^a Am. Orn., II, pl. 15, fig. 1, desc. pp. 76, 78, 1828.

^b Regarding probable source of these specimens, see p. 61.

^c Fauna Boreali-Americana, II, p. 269, 1831.

^d Cat. Canadian Birds, Part III, p. 416, 1904.

^e Narrative Journey to Arctic Ocean, I, p. 149, 1836.

^f Cat. Canadian Birds, Part III, p. 418, 1904.

While we were ascending the Mackenzie a large flock was seen near Gravel River on October 5, and many other flocks, proceeding leisurely southward along the river and feeding as they traveled, were seen between that place and Blackwater River, October 6 and 7; near Roche Trempe-l'eau, October 9; and near Fort Wrigley, October 11 and 12. The last migrating flock was noted about 40 miles below Fort Simpson on October 17. During the early part of the winter the birds were noted only once at Fort Simpson. This was on December 2, when I found a small flock feeding on the seeds of *Alnus alnobetula*, and secured individuals representing both sexes. These specimens, as well as those from Fort Franklin, prove on comparison to be nearly typical of the Alaskan form.

In 1904 I saw the bird but once, noting a single bird at Fort Simpson on April 2. It was flying northward along the valley.

The following records of the occurrence of pine grosbeaks are placed under the present form in accordance with the evidence derived from my specimens. Ross recorded *P. canadensis* as having been collected at Fort Simpson.^a MacFarlane mentions a nest found in the spring of 1861, 60 miles south of Fort Anderson.^b Sharpe records specimens from Bear Lake (probably from near Fort Franklin) and Fort Simpson.^c The bird catalogue in the National Museum records specimens from Big Island, Fort Simpson, and Fort Liard.

J. Alden Loring frequently saw pine grosbeaks during his return trip from the mountains to Edmonton, Alberta, in the autumn of 1896. As these birds were probably migrants from the north, I have referred the note to this form.

Carpodacus purpureus (Gmel.). Purple Finch.

The purple finch is a fairly common breeder in the Athabaska and lower Peace River valleys. Purple finches were seen several times between Edmonton and Athabaska Landing, April 29 to May 5, 1901. Several were observed on the Athabaska below Little Cascade Rapid on the morning of May 14, and the species was noted near the mouth of the river on May 17. A pair was seen and the female taken at our camp on Slave River 10 miles below the Peace on June 10.

In the spring of 1903 we first observed the purple finch near Edmonton, May 11, noting one; and we saw a flock 50 miles north of Edmonton on May 14, taking one specimen. We noted the bird also near Fort McMurray, May 28. On their return trip, Alfred E. Preble and Merritt Cary observed 4 individuals, collecting an immature male, in the poplar woods at Fort McMurray, August 11.

^a Nat. Hist. Rev., II (second ser.), p. 281, 1862.

^b Proc. U. S. Nat. Mus., XIV, p. 440, 1891.

^c Cat. Birds Brit. Mus., XII, p. 462, 1888.

Russell collected a specimen at Fort Chipewyan, June 5, 1893.^a Macoun says, on the authority of Spreadborough:

This species arrived at Edmonton, Alta., on May 3rd, 1897, and soon commenced to nest in the tall trees; observed one at Lake Ste. Anne, 60 miles from Edmonton, Alta., June 8, 1898; a few were observed from the mouth of Lesser Slave River to Peace River Landing, Atha., in Lat. 56° 15', June, 1903.

Quoting from the notes of J. M. Macoun, he says:

Not rare at Athabasca Landing and up the Athabasca to Lesser Slave River; a few birds at Fort McMurray, but none seen up the Clearwater River, Lat. 56°; not rare but local between Methye Portage and Isle à la Crosse, Sask.

He also records specimens from Edmonton and Peace River Landing, Alberta.^b

J. Alden Loring took a male on the Blueberry Hills, on the Jasper House trail about 100 miles west of Edmonton, May 29, 1896.

Loxia curvirostra minor (Brehm). American Crossbill.

In 1903 I first detected this species at Fort Franklin, September 22, noting a small flock, and saw a large flock at the same place on September 25. The species probably occurs throughout the wooded part of the region.

MacFarlane reported seeing several birds, supposed to be this species, at Fort Anderson, on June 20, 1862, but failed to obtain specimens.^c Baird, Brewer, and Ridgway recorded a specimen from Fort Rae.^d Macoun reports that in the summer of 1888, J. M. Macoun saw a pair at Methye Portage, and found the species common on Methye River and not rare on the way thence to Isle à la Crosse.^e

Loxia leucoptera Gmel. White-winged Crossbill.

The white-winged crossbill apparently occurs throughout the region north to the limit of trees, but usually is not common. In 1901 a male in perfect plumage was taken by Alfred E. Preble at our camp near the outlet of Athabaska Lake, June 2, and I saw a small flock near Fort Rae, July 20.

In 1903 the white-winged crossbill was first noted by my brother and Cary on the mountains near the mouth of the Nahanni River, when flocks containing about 25 individuals were observed, July 14, 15, and 17, and one containing about 100 individuals on July 18. An adult male was taken July 17. On their return trip they saw three individuals at Fort McMurray, August 10; four at Swift

^a Expl. in Far North, p. 266, 1898.

^b Cat. Canadian Birds, Part III, pp. 423, 424, 1904.

^c Proc. U. S. Nat. Mus., XIV, p. 440, 1891.

^d Hist. N. A. Birds, Land Birds, I, p. 485, 1874.

^e Cat. Canadian Birds, Part III, p. 427, 1904.

Current Rapid, August 27; and a flock at Athabaska Landing, August 31. At their camp on the Athabaska above the latter point, September 5 to 15, they saw the bird daily, and took a pair on September 7. During the same autumn I saw a flock of about a dozen at Fort Simpson on October 24. They were feeding on the seeds of the white spruce. I did not note the species during the winter, and in the spring of 1904 first saw it on March 17, when I found a small flock among some white spruces near the post, and secured a male.

King met with the white-winged crossbill at Fort Reliance in the winter of 1833-34.^a Ross listed it as occurring in the Mackenzie River region north to Fort Good Hope, as wintering, and as having been collected at Fort Simpson.^b MacFarlane took a male and female on Anderson River, and was informed by the Indians that the species was frequently seen in the wooded country south of Fort Anderson.^c Specimens from Fort Resolution, Big Island, and Fort Simpson are in the National Museum, and the bird catalogue records one from Fort Rae. Macoun, on the authority of J. M. Macoun, states that [in 1888] the species was common on Methye River, and that a few were seen between there and Isle à la Crosse, and that Spreadborough saw several on McLeod River, west of Edmonton, June 19, 1898.^d J. Alden Loring took a male at Henry House, Alberta, October 4, 1895, and reported the bird common.

Leucosticte tephrocotis Swains. Gray-crowned *Leucosticte*.

In the museum of the Hudson's Bay Company at Fort Simpson I found a specimen of this species, taken some years ago at Fort Resolution. Macoun states that Spreadborough observed it above timberline on all the mountains ascended about the sources of the Athabaska in the summer of 1898.^e I find no other records for the species within the area now under review, but it probably occurs regularly along the Rocky Mountains well to the northward. Though it undoubtedly breeds only in the mountains, in migration it extends its wanderings over the northern plains several hundred miles to the eastward of their bases.

Acanthis hornemanni exilipes (Coues). Hoary Redpoll.

These sociable little birds breed commonly along the northern border of the region, and on the approach of cold weather move southward in large flocks, usually in association with the common redpoll.

^a Narrative Journey to Arctic Ocean, I, p. 166, 1836.

^b Nat. Hist. Rev., II (second ser.), p. 281, 1862.

^c Proc. U. S. Nat. Mus., XIV, p. 440, 1891.

^d Cat. Canadian Birds, Part III, p. 430, 1904.

^e Ibid., p. 434, 1904.

In 1903 I first observed the species at Fort Franklin, where it appeared in large flocks on September 19. With these birds were associated smaller numbers of the common redpoll. They fed principally on the seeds of the dwarf birches (*Betula nana*) which grow abundantly on the low ground near the lake. A number of specimens were taken on this and succeeding dates. From this time the species was common, and flocks were seen nearly every day along Bear and Mackenzie rivers until October 20, when I reached Fort Simpson. Here also I found it common during the remainder of the autumn and collected a large series of specimens.

In 1904 at Fort Simpson I observed the species only a few times during January and February. It became more common in March, and was abundant during the early part of April, and during this time a number of specimens were added to my series. It was occasionally seen up to May 10, when an adult female was taken from a small flock. This was the last date recorded. During the winter it fed largely on the seeds of the canoe birch (*Betula papyrifera*), and alders (*Alnus incana* and *alnobetula*).

Coues described this bird from specimens taken by Ross at Fort Simpson.^a Ross, under the name *Aegiothus canescens*, recorded it as common in the Mackenzie River region north to La Pierre House, and as wintering in the region.^b MacFarlane reported it common on Anderson River, where it nested in low bushes.^c The following specimens are still in the National Museum: One from Fort Anderson, taken with nest and eggs, May 30, 1862; two from Fort Simpson, April 28 and February 14; one from Fort Good Hope, February 14; one from Arctic coast east of Fort Anderson; two from Fort Rae; and one from Fort Liard. The catalogue of the birds in that collection records also skins from La Pierre House and Peel River.

Acanthis linaria (Linn.). Redpoll.

This hardy species breeds throughout most of the wooded part of the region. In 1901 we saw a number at Fort Chipewyan May 23, and collected one. We did not again note the species until we reached Fort Resolution, where I saw a few individuals July 6, and where Alfred E. Preble noted it almost daily July 12 to 22. I found it common on Loon Island, 50 miles north of Fort Resolution, July 11 to 14, taking a specimen on the former date. At Fort Rae I saw it almost daily, July 19 to 29.

In 1903 we first noted this redpoll at Edmonton, May 8, when we observed one in a high poplar singing a beautiful warbling song. I next observed it at Fort Rae, where several flocks were noted, July

^a Proc. Acad. Nat. Sci. Phila., XIV, p. 385, 1861.

^b Nat. Hist. Rev., II (second ser.), p. 281, 1862.

^c Proc. U. S. Nat. Mus., XIV, p. 440, 1891.

29. During my trip northward from Fort Rae I observed it on Grandin River, August 4; Lake Faber, August 7; and on a small lake north of Lake St. Croix on August 13. I saw a pair and took a specimen at our camp east of Leith Point, Great Bear Lake, August 29, and again noted the species at the same place, August 31 and September 6, taking one on the latter date. I saw a number 40 miles west of McVicar Bay, September 12, and between there and Fort Franklin, September 13, 14, and 17. At Fort Franklin I frequently noted it, September 18 to 27, usually associated with large flocks of the hoary redpoll, and collected several. I observed a few occasionally as we ascended the Mackenzie to Fort Simpson. At this place I found the species fairly common during the autumn and early winter, though less so than *A. h. exilipes*.

During the first three months of 1904 I seldom observed this redpoll, but it became common during April. Young birds just from the nest were taken May 24, and an adult male near the same place May 25. H. W. Jones found a nest containing one egg at Big Point, on the upper Mackenzie, near the Little Lake, on April 24, and took nearly fledged young from a nest at Willow River, near Fort Providence, on May 18. During a trip down the Mackenzie in June I detected this species only at Fort Norman, where I saw several and took one on June 14.

Under the name *Linaria minor*, Richardson describes a specimen taken May 20, 1826, at Fort Franklin.^a King noted it at Fort Reliance, Great Slave Lake, in the winter of 1833-34.^b Ross reported the species abundant in the Mackenzie River region north to Fort Good Hope.^c MacFarlane found it abundant on Anderson River.^d Coues recorded specimens from Fort Resolution and Fort Simpson.^e Sharpe lists several specimens from Fort Simpson, and one from Great Bear Lake.^f Specimens from Fort Resolution, Fort Simpson, Fort Rae, Fort Anderson, Peel River, and Great Bear Lake are in the National Museum. Macoun reports that the species was seen by J. M. Macoun [in 1888] on Clearwater River and Methye Portage; and lists a specimen taken at Edmonton, April 19, 1898. He also states, on the authority of Raine, that nests were found at the delta of the Mackenzie on June 20, 1890, by Mr. Stringer.^g

J. Alden Loring reported this species in large flocks in the mountains west of Henry House, Alberta, October 12 to 20, 1896.

^a Fauna Boreali-Americana, II, p. 267, 1831.

^b Narrative Journey to Arctic Ocean, I, p. 166, 1836.

^c Nat. Hist. Rev., II (second ser.), p. 281, 1862.

^d Proc. U. S. Nat. Mus., XIV, p. 440, 1891.

^e Proc. Acad. Nat. Sci. Phila., XIV, p. 381, 1861.

^f Cat. Birds Brit. Mus., XII, p. 249, 1888.

^g Cat. Canadian Birds, Part III, pp. 439, 440, 1904.

***Acanthis linaria holbælli* (Brehm). Holbæll Redpoll.**

A female collected at Herschel Island, July 16, 1894, by Frank Russell, and recorded by him under the name *Acanthis linaria*^a has been identified by Mr. Ridgway as *holbælli*. The bird was collected with a nest and three eggs.

***Spinus pinus* (Wils.). Pine Siskin.**

The pine siskin is rather common over the southern part of the Athabaska region, and occurs in smaller numbers north to the region of Great Slave Lake. In 1901 we observed it but once, noting a small flock near Vermilion Creek, 42 miles north of Edmonton, on September 3.

In 1903 my brother and Cary observed small numbers of siskins at Fort Providence, July 6, 7, and 8; near the mouth of Nahanni River, July 11; and near Willow Lake River, 20 miles south of Fort Wrigley, July 19, noting five on the latter occasion. On their return trip they found the bird common on the Athabaska above Fort McMurray. At the latter place they saw three, taking one specimen on August 11. A large flock, apparently migrating, was seen at Boiler Rapid on August 17, and other flocks were observed almost daily between that point and Athabaska Landing, August 18 to 31. The birds were abundant near Athabaska Landing, September 5 to 15, and in a grove of Banksian pines 50 miles south of that point, September 23.

J. Alden Loring reported the pine siskin as common near Banff, Alberta, during the last week of August, 1894, and in the mountains near Jasper House and Henry House, in the autumn of 1895.

Macoun gives it as common on Methye Portage [in 1888], on the authority of J. M. Macoun; and as having been observed in the foothills of the Rocky Mountains north to Edmonton in 1897, and between there and Peace River Landing in the summer of 1903, by Spreadborough.^b

***Plectrophenax nivalis* (Linn.). Snowflake.**

This Arctic species, usually called snowbird in the north, breeds in great numbers in certain parts of the Barren Grounds and on the islands of the Arctic Sea. With the appearance of snow it begins to move southward in large flocks, lingering in favorable feeding places until well into the winter, but ultimately entirely withdrawing from the region north of Athabaska Lake at least. It is one of the earliest arrivals in spring, but on account of the Arctic character of its chosen breeding grounds, which are not ready for occupancy until

^a Expl. in Far North, p. 266, 1898.

^b Cat. Canadian Birds, Part III, p. 446, 1904.

well into summer, it sometimes lingers a thousand miles from its summer home until quite late.

In 1901 we saw a few at Edmonton on April 30, and observed numbers, associated with immense flocks of Lapland longspurs, between Edmonton and Sturgeon River, May 1. While descending the Athabaska, we saw a few at Pelican River, May 9, and near Fort McMurray, May 14. They were usually observed on the ice, which lay in immense heaps on the banks. A few still lingered at the delta of the Athabaska on May 17, and two females were collected there. The species was not again noted.

In the spring of 1903 we saw a few scattering individuals at Edmonton, May 10. We saw upward of 150 birds a few miles north of there on May 11, and found the species abundant near Sturgeon River on May 12, taking a pair. This was the last spring date recorded. In the autumn it was first observed on the Mackenzie a few miles above Fort Norman, October 2, numbers being seen on this and the succeeding day. It was noted also near Gravel River, October 6, and near Roche Trempe-l'eau, October 8 and 9. From this time large flocks were seen daily until October 16, when the drifting ice in the river marked the departure of the bulk of the smaller migrants. The snow-buntings, while migrating, flew southward along the river banks, occasionally settling in a body for a few minutes to feed on the seeds of various weeds and grasses, and then suddenly taking flight again. At Fort Simpson the species was rather common during November, and a few were seen in December, the last being observed on December 17.

In the spring of 1904 the snow-bunting arrived at Fort Simpson March 30, three being noted on that date. About a dozen were seen April 1, and upward of 100 on April 2. From this date the species was abundant. Females were first seen April 13, formed about one-sixth of the flocks on April 14, and on April 15 were as abundant as the males. By April 23 the males had disappeared and females were getting scarce—they were last noted April 27. A good series, comprising both fall and spring specimens of both sexes, was secured at Fort Simpson. At Willow River, near Fort Providence, Mills and Jones took a number of specimens between April 30 and May 8, and informed me that the species was last seen there about May 10. The circumstance of their remaining at Willow River later than at Fort Simpson may be explained by the fact that at the former locality there are muddy marshes, which seem to offer peculiar attractions to snow-buntings in spring.

In the spring of 1905, as I learn from H. W. Jones, this bird arrived at Fort Simpson on March 4, having been absent since early in December.

Edward Sabine reported this species to be very numerous on the North Georgia Islands, where it was observed during Parry's first voyage.^a Fisher, in his narrative of the same voyage, mentions that several large flocks passed the ships, then lying off Melville Island, on September 2, 1819, evidently commencing their autumnal migration.^b During the following season he first noted the species May 15.^c Franklin reported the species from Fort Enterprise, and mentions it as one of the four birds which still remained in the vicinity at the end of October, 1820.^d He reported it present also at Fort Franklin in the latter part of October, 1825;^e during the following summer, Richardson noted it breeding on Atkinson Island, near Hutchinson Bay, in July;^f and on July 22, on the shores of Franklin Bay, found a nest containing young.^g Parry recorded a few seen in the spring of 1825 near Port Bowen.^h John Ross, in 1831, observed the first snow-buntings near Felix Harbor on April 17; the birds were abundant by May 29, and had young ready to fly on July 24.ⁱ Walker recorded the bird from Port Kennedy, where it arrived on May 20, 1859, and nested.^j McCormick records the species from Beechey Island, and other points in Wellington Channel.^k King noted the species at Clinton-Colden Lake in June, 1834.^l Richardson reported its arrival in small flocks at Fort Confidence, Great Bear Lake, on April 20, 1849.^m During the voyage of the *Investigator*, Armstrong noted a few off the coast of Baring Land, east of Nelson Head, September 7, 1850.ⁿ At the wintering place of the ship, in Prince of Wales Strait near Princess Royal Islands, during the following spring, the species was first noted April 27;^o and in 1852 it was first seen at Mercy Bay, Banks Land, on April 20.^p During the same season Collinson noted the arrival of the bird at Walker Bay, Prince Albert Land, on April 12.^q Hooper noted its arrival at

^a Suppl. to Appendix Parry's First Voyage, p. cxciv, 1824.

^b Journal Voyage of Discovery, p. 109, 1821.

^c Ibid., p. 191, 1821.

^d Narrative Journey to Polar Sea, p. 247, 1823.

^e Narrative Second Expedition to Polar Sea, p. 60, 1828.

^f Ibid., p. 217, 1828.

^g Ibid., p. 235, 1828.

^h Journal Third Voyage, p. 82, 1826.

ⁱ Narrative Ross's Second Voyage, pp. 511, 538, 582, 1835.

^j Proc. Roy. Soc. Dublin, III, p. 62, 1860.

^k McCormick's Voyages, II, p. 84 and elsewhere, 1884.

^l Narrative Journey to Arctic Ocean, I, p. 239, 1836.

^m Arctic Searching Expedition, II, p. 104, 1851.

ⁿ Narrative Discovery Northwest Passage, p. 213, 1857.

^o Ibid., p. 314, 1857.

^p Ibid., p. 513, 1857.

^q Journal H. M. S. *Enterprise*, p. 184, 1889.

Fort Franklin, Great Bear Lake, on April 24, 1850.^a B. R. Ross recorded the bird as abundant in the Mackenzie River region, and as having been collected at Fort Simpson.^b MacFarlane took a nest containing 5 eggs on the shores of Franklin Bay, July 8, 1864; ^c in notes sent to Professor Baird he states that for a period in the spring and autumn of each season the species was very numerous along the Anderson, and that it was first seen at Fort Anderson on April 22, 1865, and at Fort Good Hope on April 14 of the previous year. Russell took specimens at Fort Rae, October 5 to 13, 1893, and at Herschel Island, July 16 to 18, 1894, reporting it common at the latter station throughout the summer.^d Specimens from Fort Resolution, Big Island, Fort Simpson, and Franklin Bay are in the National Museum, and the bird catalogue shows that skins were received also from Fort Rae, Fort Liard, and Fort Halkett. Macoun reports that three were seen on McLeod River, west of Edmonton, October 2, and hundreds on the shores of Lake Ste. Anne, October 12, 1898, on the authority of Spreadborough. On the authority of Raine he records a nest built in a hole under the eaves of a house at Herschel Island, June 25, 1901; another nest built on the ground at the side of a hummock, and containing eggs, was found at the same place June 18.^e Hanbury, during his trip through the Barren Grounds in the spring of 1902, noted the first snow-bunting on May 5, a short distance south of Ogden Bay.^f Seton records old birds with young of the year on Clinton-Colden Lake August 11, 1907.^g

The spring and fall dates of arrival of this bird at Fort Chipewyan, during a series of years, appear in a table on page 23.

Calcarius lapponicus (Linn.). Lapland Longspur.

This wide-ranging species occurs at some season throughout the region now under review, and breeds on the Barren Grounds. The Mackenzie seems to be near the line dividing the typical form and its western subspecies, *C. l. alascensis*. In a region like this, from which only a few scattered records and specimens are at hand, it is of course impossible to assign all records with certainty. As nearly as can be decided from present information, however, the line dividing the two forms in migration passes northward west of Athabaska Lake through the western part of Great Slave Lake, and thence northward between the Mackenzie and Great Bear Lake to the coast.

^a Ten Months among the Tents of the Tuski, p. 325, 1853.

^b Nat. Hist. Rev., II (second ser.), p. 281, 1892.

^c Proc. U. S. Nat. Mus., XIV, p. 441, 1891.

^d Expl. in Far North, p. 266, 1898.

^e Cat. Canadian Birds, Part III, pp. 449, 450, 1904.

^f Sport and Travel in Northland of Canada, p. 135, 1904.

^g Auk, XXV, p. 72, 1908.

The records have been divided in accordance with this view, most of them falling under *C. lapponicus*. Two intermediate specimens from Fort Resolution, taken by Kennicott, are nearer to *alascensis*, but it is probable that a large series from there would prove mainly referable to *C. lapponicus*.

On May 1, 1901, we saw immense flocks of Lapland longspurs in the fields between Edmonton and Sturgeon River. We found the species common at the mouth of the Athabaska, May 17, and took 3 specimens. I found a few still lingering on the Quatre Fourches marsh, May 23, and took a pair. The specimens collected are in full breeding plumage and are referable to *C. lapponicus*.

In the spring of 1903 we first observed this bird at Edmonton, May 10, noting about 75 individuals. We saw a large flock a few miles to the northward on May 11, and found the species common between there and Sandy Creek, May 12 to 14, taking a male on May 12. The species was next noted on the shore of Great Bear Lake near Leith Point, August 29, when a few were seen and one was taken. A few more were seen and another collected near the same place on September 3. The species was last observed at Fort Franklin, September 21, when one was shot on the 'barrens' near the lake. The specimens taken on Great Bear Lake are referable to the typical form. On their return trip in the fall Alfred E. Preble and Merritt Cary found the species migrating abundantly at Athabaska Landing, September 1 to 21, and along the road to Edmonton, September 21 to 26.

In the spring of 1904 this species made its appearance at Fort Simpson, April 25. Nine out of the series of 34 specimens of Lapland longspurs taken at this place prove referable to this form. Of these, three were collected April 25 and 28, thus being from the earliest flocks, and the remaining six between May 11 and 17.

Under the name *Plectrophanes lapponica*, Richardson described a specimen killed May 20 at Fort Franklin, where the species was said to arrive in the beginning of May.^a During his third northern journey he observed numbers of young birds on the Arctic coast west of Liverpool bay in the summer of 1848.^b J. C. Ross recorded the Lapland longspur from Port Bowen, where it arrived later and left earlier than the snow-bunting.^c John Ross reported it from near Felix Harbor, where it had eggs July 12, 1831.^d Walker noted its arrival at Port Kennedy on May 20, 1859, and stated that it breeds there.^e MacFarlane found the bird breeding abundantly in the

^a Fauna Boreali-Americana, II, p. 249, 1831.

^b Arctic Searching Expedition, I, p. 251, 1851.

^c Parry's Third Voyage, Appendix, p. 97, 1826.

^d Narrative Ross's Second Voyage, p. 580, 1835.

^e Proc. Roy. Soc. Dublin, III, p. 62, 1860.

Barren Grounds east of Anderson River and on the shores of Franklin Bay;^a Baird, Brewer, and Ridgway describe eggs from that region.^b In notes sent to the Smithsonian Institution MacFarlane states that the species arrived at Fort Anderson on May 27, 1865. Sharpe records specimens from Franklin Bay and Fort Anderson.^c The bird catalogue of the National Museum shows that skins were received from Fort Anderson and Fort Rae.

J. Alden Loring reported longspurs common at Edmonton, Alberta, in September, 1894, and specimens taken by him there are referable to *C. lapponicus*. Hubert Darrell informs me that while traveling along the Arctic coast in 1902 he first saw longspurs near the base of Kent Peninsula on June 1.

Calcarius lapponicus alascensis Ridgw. Alaska Longspur.

Of the series of thirty-three specimens of Lapland longspurs taken at Fort Simpson in the spring of 1904, twenty-four are referable to this form. Most of the earlier birds taken, including most of those collected April 25, were of this form; it far outnumbered the other during the first three weeks of May, and one individual was taken as late as May 27. The mixed flocks arrived on April 25, the birds were common by May 1, and were last noted June 1. They frequented the fields near the post, occasionally, when disturbed, settling in trees or on fences, but after making a few long circuitous flights usually alighting on the ground in the same field, sometimes near the place from which they had been startled. They were tame and were surprisingly inconspicuous when motionless on the ground, especially if it had been burned over.

A large series of longspurs, including adults and young, taken by Frank Russell at Herschel Island, July 13 to August 13, 1894,^d and now in the collection of the University of Iowa, has been examined, and all of them prove referable to *C. l. alascensis*.

Specimens recorded in the bird catalogue of the National Museum from Fort Liard, Big Island, Fort Simpson, and Fort Good Hope may best be referred to this form.

Calcarius pictus (Swains.). Painted Longspur.

This showy longspur passes northward through the Mackenzie Valley in May, breeds abundantly in certain sections of the Barren Grounds, and moves southward again in September.

In 1903 I noted this bird only near our camp on Great Bear Lake to the eastward of Leith Point, where I observed two or three indi-

^a Proc. U. S. Nat. Mus., XIV, p. 441, 1891.

^b Hist. N. A. Birds, Land Birds, I, p. 516, 1874.

^c Cat. Birds Brit. Mus., XII, p. 583, 1888.

^d Expl. in Far North, p. 267, 1898.

viduals August 29. My attention was first attracted to them by their characteristic notes, several sharp 'chips' uttered in quick succession. They were shy and none were secured.

In the spring of 1904 I noted the arrival of this species at Fort Simpson on May 18, when I collected a single male. On May 20 I found a flock of about 25 in the fields back of the post, and secured 10 specimens, including both sexes. When disturbed, the birds flew in a loose flock, not nearly so fast as the Lapland longspurs, and usually only a short distance. When feeding they were very difficult to detect. Their characteristic note was heard only a few times. The species was last seen May 21, when a pair was collected. A specimen taken some years ago at Fort Rae was in the museum at Fort Simpson.

Ross recorded this species from Fort Simpson;^a specimens taken by him at that place May 21 to 25, 1860, and May 25, 1862, as well as a pair taken by Kennicott at Fort Good Hope, May 31, 1862, and a female, with nest and five eggs, from Fort Anderson, are still in the National Museum. The catalogue shows that skins were received also from Fort Resolution, Fort Anderson, and Anderson River. In the latter region MacFarlane found it breeding abundantly.^b In notes sent to the Smithsonian Institution he states that it arrived at Fort Anderson on May 27, 1865. From the notes of Spreadborough, Macoun records that a few were seen at Egg Lake, Peace River (latitude 56°), August 30, and others at Lesser Slave Lake, September 5, 1903. On the authority of Raine, he states that the species breeds abundantly on the Caribou Hills, 80 miles south of the Arctic coast, to the west of the Mackenzie Delta, where I. O. Stringer found several nests in June, 1897.^c Reed records eggs taken at Herschel Island, June 10, 1901, by the same collector.^d Seton has recently recorded the painted longspur from Aylmer Lake, where one was seen August 13, 1907.^e

Rhynchophanes mccowni (Lawr.). McCown Longspur.

This longspur is an abundant inhabitant of the northern plains, and reaches only the southern part of the region now under consideration.

^a Nat. Hist. Rev., II (second ser.), p. 281, 1862.

^b Proc. U. S. Nat. Mus., XIV, p. 441, 1891. Coues (Birds of the Northwest, p. 121, 1874) mentions eggs from Great Slave Lake, but there is evidently some mistake in connection with them. The only egg in the U. S. National Museum alleged to be from that region is No. 7415, one of two labeled as taken by J. Lockhart at Fort Resolution, but entered in the catalogue by Baird as "*Plectrophanes pictus?*" It is thus probably incorrectly identified, and in all probability the bird does not breed south of the Barren Grounds.

^c Cat. Canadian Birds, Part III, p. 456, 1904.

^d N. A. Birds' Eggs, p. 252, 1904.

^e Auk, XXV, p. 72, 1908.

On May 14, 1903, a male was secured by Merritt Cary on the road near Sandy Creek, Alberta, 20 miles south of Athabaska Landing.

Macoun, on the authority of Spreadborough, records that one was seen on the shore of an island in Lesser Slave Lake on May 31, 1903.^a

Poocetes gramineus confinis Baird. Western Vesper Sparrow.

The vesper sparrow, here represented by the western subspecies, ranges over the semiprairie country of the upper Athabaska and Peace River regions north at least to Fort Smith.^b In 1901 it was common and was seen daily at Edmonton and between that point and Athabaska Landing, April 29 to May 5. Several were observed on the island at Grand Rapid, May 10. It was not again noted until we reached Fort Smith, where one or two were seen June 21. While I was collecting on the prairie-like tracts a few miles west of Fort Smith, June 24, several were seen and heard and a male was collected. The species was next observed when we reached Athabaska Landing on our return trip. Here we found it common August 30 and 31, and we observed it almost daily between that point and Edmonton, August 31 to September 3.

In 1903 we first observed this bird at Edmonton May 10, when the species was rather common in some extensive fields near the river. Along our route to Athabaska Landing, May 11 to 15, we found it common.

In 1904 I met with the vesper sparrow only along the road between Athabaska Landing and Sandy Creek, Alberta, where it was common September 2.

Eggs of the vesper sparrow taken at Lesser Slave Lake by Strachan Jones, probably in 1868, were received by the Smithsonian Institution, and presumably are still in the collection. A skin taken by J. Alden Loring at Edmonton, Alberta, September 9, 1894, is in the collection of the Biological Survey.

Macoun states, on the authority of Spreadborough, that this bird was common along the trail on all the dry grass land from Edmonton to Jasper House in 1898; also common [in 1903] on all the small prairies throughout the Peace River country between latitude 55° and 57°.^c

Passerculus sandwichensis alaudinus Bonap. Western Savanna Sparrow.

This is one of the most abundant sparrows in summer throughout the region north at least to the limit of trees. In 1901 several were

^a Cat. Canadian Birds, Part III, p. 460, 1904.

^b MacFarlane's record of the breeding of the vesper sparrow in the Fort Anderson region (Proc. U. S. Nat. Mus., XIV, p. 441, 1891) was, as he suspects, founded on a case of misidentification, the species being *Anthus rubescens*, which see.

^c Cat. Canadian Birds, Part III, p. 462, 1904.

seen and one was collected at Fort Chipewyan on May 23. The species was common at Fort Resolution and was seen daily, July 5 to 8. At Fort Rae it was noted July 24, and one was taken July 29.

In the spring of 1903 we first observed this species at Edmonton on May 10, noting about 25 individuals. We next detected it on lower Slave River, June 19. It was abundant at Fort Resolution, and was noted daily during the latter part of June, several being collected. My brother and Cary noted it at Hay River on June 30, and daily at Fort Providence, July 2 to 8, and on the latter date observed young just able to fly. I observed it daily at Fort Resolution during the first half of July; noted it near Stone Island July 18; and found it common at Fort Rae, July 26 to 29, and on Lake Marian, July 30. I took an immature bird on Lake St. Croix, August 10, and last saw the species on Lake Hardisty, August 17, taking one specimen.

In the spring of 1904 J. W. Mills and H. W. Jones collected a small series of savanna sparrows at Willow River, near Fort Providence, in May, taking the first one on May 12. At Fort Simpson I first observed it May 17, taking one. I found it rather common May 21 and during the remainder of the month noted it nearly every day, and collected a small series. While descending the Mackenzie, I noted a few at Fort Norman, June 12, and at Fort McPherson, July 14. On my return trip I saw several a short distance north of Edmonton, September 4. J. W. Mills took males at Fort Providence, May 14, 1905.

Under the name *Passerculus savanna*, Ross gave this bird as abundant about Great Slave Lake, and as having been taken at Fort Simpson.^a MacFarlane found it abundant in the Anderson River region, and discovered a large number of nests.^b The bird catalogue of the National Museum records skins from Fort Rae, Big Island, Fort Simpson, Fort Good Hope, Fort Liard, and Great Bear Lake. Russell took specimens at Herschel Island in the summer of 1894.^c Macoun records specimens of this form from Edmonton, Alberta, and Peace River Landing; as well as eggs from Edmonton, taken on May 27 and June 3, 1897.^d

J. Alden Loring took one of these sparrows at Banff, Alberta, August 29, 1894, and several at Edmonton during September of the same year, finding them common. In the summer of 1896 he found the species common on the trail between Edmonton and Jasper House, and during the early autumn of the same year observed it frequently between Jasper House and Smoky River.

^a Nat. Hist. Rev., II (second ser.), p. 281, 1862.

^b Proc. U. S. Nat. Mus., XIV, p. 442, 1891.

^c Expl. in Far North, p. 267, 1898.

^d Cat. Canadian Birds, Part III, p. 470, 1904.

***Ammodramus lecontei* (Aud.).** Leconte Sparrow.

While collecting on the Quatre Fourches marsh, near Fort Chipewyan, May 24, 1901, I flushed several of these sparrows from the rank growth of grass which covered the drier portions. They flew with a weak, quivering flight, going but a short distance and usually pitching into the withered grass. A faint twittering song, usually given while the bird was on the wing, but occasionally delivered from the summit of a grass stem, was the only sound I heard from them. Two specimens, a male and a female in fresh breeding plumage, were secured.

In the summer of 1903 this sparrow was found to be fairly common in the marsh at Hay River, where my brother and Cary noted it daily, June 29 to July 1, taking two specimens. The males were singing and undoubtedly the species was breeding, but no nests could be found. While ascending the Athabaska on their return trip they saw two individuals in rank grass near Brulé Rapid, August 18. Another was seen in a similar place near House River on August 22.

In 1904 I saw the species only once—noting one on some low ground, 10 miles north of Edmonton, September 4.

An immature bird was taken by J. Alden Loring at Edmonton, September 16, 1894, and is now in the Biological Survey collection. Macoun records specimens taken at Edmonton in May and June, 1897.^a

***Ammodramus nelsoni* (Allen).** Nelson Sparrow.

In 1901 we noted this bird at but one locality—a small meadow surrounded by woods, near the banks of Slave River, about 25 miles below the mouth of the Peace, where we took a male on June 12. Several others were seen at the same time in the dense tangle of withered grass.

On May 13, 1903, we observed a marsh sparrow, apparently of this species, about some small sloughs near Sturgeon River. The species was next seen in the extensive marsh at the mouth of Hay River, where my brother and Cary collected 3 specimens June 30. The males delivered their simple songs, consisting of "a short preliminary note, quite sharp, followed by a husky or broken note of much longer duration," from the tops of the low bushes. While ascending the Athabaska on their return trip the boys saw one in a patch of rank grass bordering the river near Brulé Rapid, August 18. During the preparation of this report I have examined a specimen taken by Spreadborough at Peace River Landing, Alberta, June 26, 1903.

^a Cat. Canadian Birds, Part III, p. 474, 1904. (On page 733 Macoun states that his records for both Edmonton and Peace River Landing refer to the Nelson sparrow. These specimens, however, have been examined by the Biological Survey, and while the specimens from Peace River Landing are *A. nelsoni*, one taken at Edmonton, May 26, 1897, proves referable to *A. lecontei*.)

Chondestes grammacus strigatus Swains. Western Lark Sparrow.

A lark sparrow referred to this race was seen in a dooryard at Fort McMurray, August 12, 1904. Before I could secure the bird it flew into an adjoining field, but careful search failed to disclose it.

Zonotrichia querula (Nutt.). Harris Sparrow.

This handsome species, sometimes called the hooded sparrow, passes northward in spring through the eastern part of the region in considerable numbers, to return, accompanied by its young, in the autumn. Its breeding ground was long a matter of conjecture. On our trip to Hudson Bay in 1900, we found it abundant late in July in the thickets of stunted spruce at Fort Churchill, accompanied by barely fledged young and manifestly on its breeding ground; during the present investigation we found old and young common along the southern shore of Great Bear Lake, in a habitat precisely similar to its chosen nesting ground on Hudson Bay. All indications therefore point to the conclusion that its principal breeding grounds are in the strip of stunted timber extending for 800 miles between Hudson Bay and Great Bear Lake, along the northern border of the transcontinental forest. In the region thus indicated, which has been visited in summer by so few naturalists that the species may easily have been overlooked, there is ample room for the hordes that pass northward each spring through the northern portion of the Mississippi Valley and the adjoining parts of Canada.^a

In 1901 we noted the hooded sparrow but once—near Fort Chipewyan on the morning of May 23, when several were observed among a large company of migrating sparrows.

During my trip northward from Fort Rae, in 1903, I first observed this species a few miles south of MacTavish Bay, August 23, noting several and securing one. I next noted it on the southern shore of Great Bear Lake just west of MacTavish Bay, on August 27. Both old and young, associated in small loose flocks, were common among the stunted spruces of this exposed shore, which afforded a habitat almost precisely similar to that frequented by the species on Hudson Bay during the breeding season. Numbers were observed daily in this vicinity up to September 7, the species being especially common at our camp east of Leith Point, where I took nearly a dozen specimens between August 27 and September 7. After several cold nights early in September the species became less common, but was seen in small numbers near McVicar Bay, September 10; 40 miles west of there, September 13; and near Manito Islands, September 14. It was next noted at Fort Franklin, September 26, when a single bird,

^a Since the above was written a nest of this species (the first well-authenticated one yet reported) has been found by E. T. Seton at the tree limit on Artillery Lake. (*Auk*, XXV, p. 72, 1908.)

the last one of the season, was seen and taken. During their return trip in the fall Alfred E. Preble and Merritt Cary saw one near Athabaska Landing, Alberta, September 14; another at the same place, September 21; and three in a willow thicket near Lily Lake, September 24.

Seton records the hooded sparrow as nesting abundantly from the islands in the eastern part of Great Slave Lake to the last woods on Artillery Lake. At the latter locality he found a nest containing three young nearly ready to fly on August 5, 1907.^a

H. W. Jones took a male, the only one observed, at Willow River, near Fort Providence, on May 24, 1904. He also reports the species from Hay River, where a large flock was observed to linger about from May 26 to June 15, when they disappeared.

Zonotrichia leucophrys (Forst.). White-crowned Sparrow.

A specimen in the collection of the National Museum (No. 19725, male), taken at Fort Resolution, June 14, 1860, by Kennicott, seems referable to typical *Z. leucophrys*. It is probable that the birds of eastern Mackenzie and Saskatchewan are mainly referable to this form.

Zonotrichia leucophrys gambeli (Nutt.). Intermediate Sparrow.

This is the common form of white-crowned sparrow throughout the Mackenzie and Anderson River valleys. It is especially abundant and familiar at all the trading posts north of Great Slave Lake, chanting its simple song at all hours from the palings of the stockades and rearing its young in the post clearings. It arrives early in May and remains in autumn until forced to depart by the severity of the weather. According to Ross, the Crees call this sparrow "*Wah-sipis-chan-tillee, tillie*"—that is, "little river murmuring *tillee, tillie*."

In the spring of 1901 we observed a few white-crowned sparrows of this form on the road about 60 miles north of Edmonton, May 4. We next noted the species at Fort Resolution, where I found it common July 5 to 8, and where Alfred E. Preble observed it almost daily during the remainder of the month. While crossing from Fort Resolution to Fort Rae, July 9 to 18, I found it rather common on the islands in Great Slave Lake, and collected a pair on Loon Island, July 12. A nest found on the north shore of the lake near the mouth of the Northern Arm, July 15, held eggs just hatching. At Fort Rae I observed the bird daily, July 19 to 29.

In the spring of 1903 we first observed this species at Edmonton, May 8, noting a single bird. A few more were seen May 10, and the species was observed nearly every day during our trip to Athabaska

^a Auk, XXV, p. 72, 1908.

Landing, May 11 to 15, and along the Athabaska between the Landing and Grand Rapid. It was noted also at Grand Rapid, May 22, and a short distance above Fort McMurray, May 28. A male, apparently breeding, was taken at Smith Landing, June 11. The species was next observed at Fort Resolution, where it was found to be abundant on June 20, and was noted daily during the remainder of June. During their trip to the Mackenzie my brother and Cary observed it daily at Fort Providence, July 2 to 8, noting fledged young, the first of the season, on the former date. They noted the species also near the mouth of Nahanni River, July 12, and at Fort Simpson, July 24. After the division of the party I noted the bird daily at Fort Resolution up to the time I left there, July 17. I first saw fledged young on July 11, and found a nest containing three fresh eggs, undoubtedly a second clutch, on July 15. The nest was placed in a tuft of short grass beside a much frequented path in the field in front of the post. While crossing Great Slave Lake I observed the bird near Stone Island, July 18, and nearly every day among the islands between there and Fort Rae, where it was a common species. During my trip northward from Fort Rae I noted it on Grandin River, August 5 and 6; Sarahk Lake, August 7; Lake Faber, August 8; Lake Rae, August 9; Lake St. Croix, August 10 and 12; and Lake Hardisty, August 18. The species was still fairly common when I reached the southern shore of Great Bear Lake, and was noted in considerable numbers to the eastward of Leith Point, August 28, and at our camp near there on August 29 and 30 and on September 2, 3, and 5. Several cold nights in succession after the last date, when ice formed for the first time, seemed to help the birds to a decision respecting migration, and none were seen afterwards.

In the spring of 1904 this species was first noted near Fort Providence by H. W. Jones on May 9, when he took a male. Another was collected by J. W. Mills, May 11. At Fort Simpson I first observed it May 20, and found it common during the remainder of the month. During my voyage down the Mackenzie in June I frequently observed it, finding it especially common in the vicinity of the posts. I found a nest with four eggs at the lower Ramparts, June 30, and first saw fledged young at Fort McPherson on July 6. On my return trip I noted the bird at Fort Good Hope, July 19; at Birch Island, July 21; and at the Desmarais Islands, July 30. Specimens were collected at Willow River near Fort Providence, Fort Simpson, Fort Norman, Fort Good Hope, and Fort McPherson.

Under the name *Fringilla leucophrys*, Richardson described a specimen referable to this form from Fort Franklin, giving a figure of the head; ^a later he recorded a specimen, presumably of the present

^a Fauna Boreali-Americana, II, pp. 255, 256, 1831.

form, from Fort Simpson.^a Ross listed *Z. gambeli* as abundant in the Mackenzie River region north to La Pierre House.^b MacFarlane found it breeding in great numbers in the wooded parts of the Anderson River region, recording it under the name of *Z. l. intermedia*.^c In notes sent to the Smithsonian he states that the birds were numerous at Fort Anderson, May 28, 1865. Skins from Fort Resolution, Fort Rae, lower Anderson River, and Peel River [Fort McPherson], the latter taken July 15, 1892, by Miss Elizabeth Taylor, are in the National Museum. The catalogue of the birds shows that skins were received also from Big Island; Fort Simpson (May 22, 1860; May 20, 1861); Fort Liard; Fort Norman; Fort Good Hope; Great Bear Lake; and La Pierre House (May 25, 1863). Macoun states on the authority of Spreadborough that this bird was common from Prairie Creek (on the Jasper House trail west of Edmonton) to Henry House, Alberta, in the summer of 1898.^d

J. Alden Loring reported this form common at Edmonton, Alberta, September 7 to 26, 1894, collecting one specimen.

Zonotrichia coronata (Pall.). Golden-crowned Sparrow.

In the early autumn of 1896 J. Alden Loring found the golden-crowned sparrow frequenting willow thickets near water on the route between Jasper House and Smoky River, and took a specimen near the head of Grand Cache River, August 31. The species probably occurs in that region only during migration.

Zonotrichia albicollis (Gmel.). White-throated Sparrow.

This widely distributed species occurs in summer throughout the region north to Great Slave Lake and along the Mackenzie to Fort Good Hope, but apparently is absent or rare in the more elevated country to the northward of Fort Rae.

In 1901 a few white-throated sparrows were seen near Sturgeon River, 25 miles north of Edmonton, May 1, and the species was noted a short distance below Athabaska Landing, May 6. It was common also and was noted daily along the Athabaska between Cascade Rapid and Athabaska Lake, May 13 to 17. It was several times noted near Fort Chipewyan, May 23 to June 5, and was seen 10 miles below the Peace, June 10; at Smith Landing, June 14; on Smith Portage, June 18; at Fort Smith, June 20; 60 miles below Fort Smith, June 30; and on lower Slave River, July 2 and 3. At Fort Resolution it was noted by myself, July 5, 7, and 8, and almost

^a Ann. and Mag. Nat. Hist., XI, p. 484, 1843.

^b Nat. Hist. Rev., II (second ser.), p. 281, 1862.

^c Proc. U. S. Nat. Mus., XIV, p. 442, 1891.

^d Cat. Canadian Birds, Part III, p. 480, 1904.

daily by Alfred E. Preble, July 12 to 27. On the return trip it was seen near Pelican Rapid, August 24, and near Vermilion Creek, 42 miles north of Edmonton, September 3. A female taken at Fort Chipewyan on May 23 has the throat-patch grayish, concolor with the upper part of the chest, the feathers of the throat tipped with dusky, and a conspicuous dusky spot on the center of chest. Two other specimens, both females, taken respectively on lower Slave River, July 2, and at Fort Resolution, July 5, are similar, but the throats are not so dark and the chest spots are less conspicuous.

In the spring of 1903 we first observed the white-throat near Sturgeon River, May 13, noting upward of 25 individuals, and found it common between there and Athabaska Landing, May 14 and 15. While descending the Athabaska we noted the species below Pelican Rapid, May 19; at Grand Rapid, May 21 and 22; and nearly every day along the Athabaska between Little Buffalo River and Athabaska Lake, May 26 to June 1. We observed it also at Fort Chipewyan, June 3; on Rocher River, June 6; and at Fort Smith, June 14. Along Slave River, between Fort Smith and Fort Resolution, we found the species common, noting numbers nearly every day. It was common also at Fort Resolution during the latter part of June, and several specimens were taken. During their trip to the Mackenzie my brother and Cary noted the species at Hay River, June 28 to July 1, and daily at Fort Providence, July 5 to 8. Several were observed also at Fort Simpson, July 10, and at the mouth of the Nahanni River, July 11. On July 13 and 17 they heard a few singing on the Nahanni Mountains at about 500 feet altitude. On their return to the mouth of Nahanni River, July 19, they found the species common there, as it was also between there and Fort Wrigley, July 19 and 20. On their return trip in the fall they found the bird abundant on the Athabaska between Fort McMurray and La Biche River, August 8 to 29; near Athabaska Landing, August 31 to September 21; and along the road to Edmonton, September 21 to 26.

In the spring of 1904 I first observed this bird at Fort Simpson on May 16, taking one. I next saw it May 17, and found it common on May 18 and during the remainder of the month. During my trip down the Mackenzie I noted it daily in small numbers at Fort Norman, June 11 to 15, taking a nest with four eggs on the latter date. The nest was placed on the ground in a thicket of willows and alders, and was composed outwardly of coarse grass, strips of bark, and moss (some of which had earth adhering to the roots), and was lined with fine grass and hair. Below this point the bird became much rarer, but was noted near Sans Sault Rapid June 19, and at Fort Good Hope June 21. It was last recorded a short distance above the lower Ramparts on June 29, when I heard its song. On my return trip I saw the bird at Little Red River, August 9; at Fort McMur-

ray, August 11 to 13; and daily between Athabaska Landing and Edmonton, September 1 to 4.

Richardson, under the name *Fringilla pennsylvanica*, mentions a nest found at Great Bear Lake;^a he later recorded the species under the same name from Fort Simpson.^b During the period of ornithological activity following the visit of Robert Kennicott to the MacKenzie Valley, specimens were sent to the Smithsonian Institution from Fort Resolution, Buffalo River, Fort Rae, Fort Simpson, Fort Norman, Fort Good Hope, and Lesser Slave Lake, eggs accompanying the specimens from the last locality. Eggs taken at the trading post on Pelican Lake, eastern Saskatchewan, in June, 1891, by H. MacKay, were received by the National Museum. Skins from Fort Resolution, Fort Rae, and Fort Simpson are still in the collection.

Macoun, on the authority of J. M. Macoun, states that in 1888 the white-throated sparrow was first seen on May 7, near Calgary, and was common thence to Edmonton and Athabaska Landing, along the Athabaska from Lesser Slave River to the Clearwater, along that river to Methye Portage, and from there to Isle à la Crosse. He also states, from the notes of Spreadborough, that it was first seen at Edmonton May 6, 1897; was noted from Edmonton westward to Pembina River in June, 1898; and was abundant from Lesser Slave Lake to Peace River Landing in June, 1903.^c

J. Alden Loring found this sparrow abundant at Edmonton, September 7 to 26, 1894, taking a specimen September 19. In the early autumn of 1895 he reported it common in the mountains in western Alberta. He reported it breeding commonly in the high mountains near Henry House, July 3 to 21, 1896.

Spizella monticola (Gmel.). Tree Sparrow.

Tree sparrows, including the eastern and western forms, occur at some season of the year over the entire region north to the extreme limit of trees. They breed only in the Hudsonian zone, the region of more or less stunted timber which terminates to the northward the great transcontinental coniferous forest.

In 1901 I first saw this bird on an island in the Northern Arm of Great Slave Lake 45 miles southeast of Fort Rae, July 16, when I collected an adult male and a young bird not long from the nest. Later in the day I found it rather common at Trout Rock, 25 miles south of Fort Rae, and collected an adult female. Comparison shows that these specimens are referable to *S. monticola*.

During my trip northward from Fort Rae in 1903 I found this form rather common on Lake St. Croix, August 10, and observed it

^a Fauna Boreali-Americana, II, p. 256, 1831.

^b Ann. and Mag. Nat. Hist., XI, p. 484, 1843.

^c Cat. Canadian Birds, Part III, p. 486, 1904.

almost daily on the way to Great Bear Lake between that date and August 27. It was abundant and a number were taken at our camp on the shore of Great Bear Lake east of Leith Point during the last days of August, but after the frosty nights of the opening days of September it became much less common. As we approached the eastern end of the lake, however, and entered a milder region, the birds again became conspicuous and were seen daily. One taken from a large flock near the outlet of Great Bear Lake, September 16, still retained traces of the juvenal plumage on the chest and throat. A few were seen nearly every day during my stay at Fort Franklin, September 18 to 27, and several specimens were taken.

In the series collected at Fort Simpson in May, 1904, and mainly referable to *S. m. ochracea*, are two specimens, taken respectively May 7 and 10, which must be referred to *S. monticola*. Four specimens taken at Willow River, near Fort Providence, May 7 and 8, and comprising a majority of the series collected there, are referable to *S. monticola*. These two points, therefore, seem to lie on opposite sides of the line dividing the two forms during migration.

Seton records this species as nesting abundantly from the eastern end of Great Slave Lake to the limit of the forest toward the northeast in the summer of 1907.^a

Spizella monticola ochracea Brewst. Western Tree Sparrow.

In the spring of 1903 we first noted this form near Sturgeon River May 12, when we saw several birds and collected two. We next observed it at Grand Rapid, May 22, noting several and collecting one. The next birds referred to this form were observed at Fort Norman on the Mackenzie, when I reached that stream from Great Bear Lake on October 1. Here the birds were abundant and evidently were migrating southward along the valley of the Mackenzie from their breeding grounds about its mouth. Numbers were observed a few miles above Fort Norman, October 2 and 3. At this date the species was becoming less conspicuous, but a few birds were noted above Gravel River, October 6; near Roche Trempe-l'eau, October 8 and 9, near Fort Wrigley, October 10 and 11; and between there and Nahanni River, October 13 to 15. The species was last seen 50 miles below Fort Simpson on October 16. On their return trip in the fall Alfred E. Preble and Merritt Cary first observed it at Athabaska Landing, September 20, and found it rather common between there and Lily Lake September 22 to 24.

At Fort Simpson in the spring of 1904 I saw a single tree sparrow on April 30, and the birds arrived in numbers May 7. Of six specimens taken on this date, five prove to be referable to the present form; another was taken May 10. The birds were noted nearly

^a Auk, XXV, p. 72, 1908.

every day up to May 17, when the species was recorded for the last time. It was next seen at Fort McPherson, where it was breeding, early in July. Here I collected adults on July 4 and 7. Two specimens taken by H. W. Jones at Willow River, near Fort Providence, May 6 and 9, are also referable to this form. J. W. Mills took a female at Willow River on April 30, and males on May 1, 1905.

Throughout most of the Mackenzie Valley, the Anderson River country, and westward, this is the prevailing form. MacFarlane found it very abundant in the Anderson River region, where he discovered a large number of nests, recording it under the name *S. monticola*.^a In notes sent to the Smithsonian he states that it was tolerably numerous at Fort Anderson on May 28, 1865. Specimens referable to *ochracea* from the following localities are in the National Museum, all being labeled as having been collected with eggs: Three females, Fort Anderson, June 2, 5, and 11, 1862; one from the Anderson River region "near Barren Grounds," June 20; one from La Pierre House, June, 1862. Another taken at Fort Simpson, May 15, 1860, was apparently a migrant. Macoun states, on the authority of Spreadborough, that it was rare at Edmonton, Alberta, in April, 1897, the bulk of the migration having passed; common from the crossing of McLeod River, October 6, 1898, to Edmonton; a few observed at Lesser Slave Lake, and one at Peace River Landing, in June, 1903.^b On the authority of Raine, he records a nest and five eggs found by C. E. Whittaker, June 18, 1900, at Peel River; a nest with five eggs found on the foothills of the Black Mountains (west of the Mackenzie delta) by Stringer, June 13, 1899; and another from the same region taken on June 8 of the same year. The nests were placed on the ground and were built of dried grass and lined with feathers.^c

Spizella passerina arizonæ Coues. Western Chipping Sparrow.

The familiar chipping sparrow, here represented by the western subspecies, occurs in summer in the Mackenzie Valley north to Fort Good Hope, but is rare in the northern portion of its range. In the more elevated country to the eastward of the Mackenzie it is rare or absent north of Great Slave Lake.

In 1901 we first noted this bird at Fort Chipewyan on May 21, and saw it nearly every day in the vicinity of that post until June 5, collecting several specimens. After leaving the vicinity of Fort Chipewyan we did not again note the bird until we reached Fort Smith, where we found it common June 20 to 28, and took several. A nest found June 25 contained four slightly incubated eggs. While

^a Proc. U. S. Nat. Mus., XIV, p. 442, 1891.

^b Cat. Canadian Birds, Part III, p. 489, 1904.

^c *Ibid.*, p. 490, 1904.

descending Slave River to Great Slave Lake, June 30 to July 2, we noted a number. I saw the species at Fort Resolution, June 6, 7, and 8, and Alfred E. Preble noted several July 9 to 12. While crossing Great Slave Lake I saw it on Stone Island, July 10, and found it rather common on Loon Island, 50 miles north of Fort Resolution, July 11 to 14, taking one specimen on July 12. I saw a few at Fort Rae, July 20 to 29, collecting one on the latter date, and on our return trip noted the species at Smith Landing, August 6.

In the spring of 1903 this bird was first noted at Grand Rapid, May 22. It was next observed at Fort Chipewyan, June 3 and 4, and one was seen building on the former date. Several were seen near the outlet of Athabaska Lake, June 5; on Rocher River, June 8; and at Smith Landing, June 11. The first nest with eggs was found on Smith Portage, June 13. The species was noted also at Fort Smith, June 14; on the river below there, June 15; and below Limestone Point, June 17. Several birds were seen at Fort Resolution, June 22 and 23. At Fort Providence my brother and Cary found the species common, July 2 to 8, observing numbers daily. They noted it also at Fort Simpson, July 10, and found it common on Mount Tha-on'-tha, July 13 to 18, where it was breeding in dwarfed spruce (*Picea canadensis*) and mountain alder (*Alnus alnobetula*). At an altitude of about 1,500 feet, on July 13, they noted a pair with young about to leave the nest. On their return trip, on the Athabaska near House River, they saw two, August 22, one of which they collected.

In the spring of 1904 this sparrow arrived at Fort Simpson in considerable numbers on May 18, and was common during the remainder of the month. During my trip down the Mackenzie I noted it on but two occasions, finding migrants common on an island below Fort Wrigley, June 8, and taking a breeding pair in a shrubby tract at Fort Good Hope, June 21. On my return trip I saw the species at Fort Simpson, July 27; at Smith Landing, August 5; at Fort Chipewyan, August 7; and near Edmonton, September 4.

Richardson first recorded this bird as *Fringilla socialis* from Fort Simpson.^a The catalogue of the National Museum records specimens from Fort Resolution, Fort Rae, Fort Simpson (May 23, 1860; May 24, 1861), Fort Liard, and Fort Good Hope; and these localities, with the exception of the last, are now represented in the collection. Macoun includes the following records, which undoubtedly refer to the western form, under *S. socialis*. On the authority of Spreadborough, he gives it as a common [summer] resident at Edmonton, as seen at the crossing of McLeod River, June 19, and as common at Jasper Lake, July 2, 1898; also common from Lesser Slave Lake to

^aAnn. and Mag. Nat. Hist., XI, p. 484, 1843.

Peace River Landing in June, 1903. On the authority of J. M. Macoun, he states that [in 1888] it was abundant along the trail between Edmonton and Athabaska Landing, but was rather rare on the Athabaska, and was common up the Clearwater and between Methye Portage and Isle à la Crosse.^a

J. Alden Loring reported seeing large flocks at Banff, Alberta, August 25 to September 1, 1894, and took two specimens there on August 28.

Spizella pallida (Swains.). Clay-colored Sparrow.

This species, originally described from the Saskatchewan, ranges northward to Great Slave Lake, as was first ascertained by Kennicott, occupying mainly prairie-like tracts and brushy clearings.

In 1903 we first observed the clay-colored sparrow 20 miles north of Edmonton, May 12, noting some half a dozen individuals and collecting a male in song. As we traveled northward toward Athabaska Landing we found the species common to the northward of Sturgeon River on May 13, and observed one near Sandy Creek, May 14. We next observed the species on June 22 and 23 at Fort Resolution, where we saw several individuals in the shrubby field to the rear of the post buildings, and collected adults of both sexes.

This bird was first recorded from the Mackenzie Valley by Ross, who gave it as occurring north to Fort Resolution.^b A specimen taken at that post by Kennicott, June 18, 1860, and another taken at the same place by Lockhart, June 9, 1863, "with nest and four eggs," are in the National Museum. A specimen, together with eggs, is catalogued as having been received from Strachan Jones, from Lesser Slave Lake, in 1868, but the skin at least has disappeared. Macoun says, on the authority of Spreadborough:^c

First seen at Edmonton, Alta., May 31st [1897]; found a number of nests, all on the ground at the roots of a little clump of willows; none of the nests were more than four inches above the ground, and were made of dry grass lined with horse hair; eggs from two to five in a set; * * * common in all the open country from Lesser Slave Lake to Peace River Landing, Lat. 56° 15' in June, 1903; common from Edmonton to Pembina River in June, 1898.

He records also specimens taken at Edmonton in May, 1897, and Peace River Landing in June, 1903, and eggs taken at Edmonton, May 31 and June 1, 1897. Russell has recorded two alleged specimens from Fort Rae,^d but they prove on examination to have been incorrectly identified.

^a Cat. Canadian Birds, Part III, p. 492, 1904.

^b Nat. Hist. Rev., II (second ser.), p. 282, 1862.

^c Cat. Canadian Birds, Part III, pp. 495, 497, 1904.

^d Expl. in Far North, p. 267, 1898.

Spizella breweri Cass. Brewer Sparrow.

In the early autumn of 1896 J. Alden Loring observed this species along the streams in the 'prairies' between Jasper House and Smoky River, and took a male in Smoky Valley, 50 miles north of Jasper House, August 26. This specimen (No. 155779) is now in the Biological Survey collection.

Junco hyemalis (Linn.). Slate-colored Junco.

This common species, sometimes called 'tomtit' in the North, is the sole representative of its genus throughout most of the wooded parts of the Athabaska-Mackenzie country. Over this vast region it is a common summer resident, being one of the earliest of the smaller migrants to arrive in spring and a rather late lingerer in autumn.

In the spring of 1901 we saw numbers daily between Edmonton and Athabaska Landing, April 29 to May 5, and noted the species near Poplar Point on the lower Athabaska, May 16. In the vicinity of Fort Chipewyan we found it common May 19 to June 5, and collected several specimens. After leaving Fort Chipewyan we found it common all along our route as far north as Fort Rae. We noted the first nest, which contained four apparently fresh eggs, 10 miles below the mouth of Peace River, June 10. At Smith Landing, in a partially cleared tract near the river, we found several nests containing young, June 12 to 18. At Fort Smith, where the species was abundant, we first observed fully fledged young June 25. We noted the bird almost daily along Slave River between Fort Smith and Fort Resolution, June 29 to July 4, and saw it on July 5 at the latter point, where Alfred E. Preble also observed it almost daily during the latter half of July. I saw it nearly every day at Fort Rae, July 19 to 29, and on our return trip noted it at Athabaska Landing, August 30, and near Vermilion Creek, September 3.

In the spring of 1903 we found this bird common at Edmonton, May 8 to 11, and daily saw a few between Sturgeon River and Athabaska Landing, Alberta, May 13 to 15. While descending the Athabaska, May 16 to June 2, we observed the bird nearly every day, noting a pair building at Grand Rapid on May 23. It was next observed at Smith Landing, June 11. It was common below Fort Smith, June 15, and one or two were seen above Limestone Point, June 17. A nest found on June 26, at Fort Resolution, where the bird was not common, contained eggs about to hatch. The junco was noted by my brother and Cary on several occasions at Fort Providence, July 3 to 7. It was rather common on the Nahanni Mountains, July 13 to 18, where a nest with four eggs was found July 17, and it was noted at the mouth of Willow Lake River, 20 miles south of Fort Wrigley, July 19. On their return trip the

boys noted several at Crooked Rapid, August 16, and found the species common at Grand Rapid, August 21, and in the vicinity of Athabaska Landing, September 1 to 20.

During my trip northward from Fort Rae in August of the same year, I noted the species on Grandin River, August 4 and 5; Lake Faber, August 8; and Lake Rae, August 9. Migrants were very common on the small lakes north of Lake St. Croix, August 14 and 15, and on Lake Hardisty, August 19. A few were seen at our camp east of Leith Point, August 31 and September 1, and at Fort Franklin, September 19 and 27, one being taken on the latter date. The species was still common near the mouth of Bear River, September 30; at Fort Norman, October 1; and between there and Gravel River, October 2 and 3. A few were seen between Fort Wrigley and Nahanni River, October 13 and 15, and the species was noted for the last time about 50 miles below Fort Simpson on October 16.

In 1904 I first noted this bird at Fort Simpson on May 2, when a single individual in full song was taken. It was next seen May 6, when I found several in company with fox sparrows in low woods, and the species was common from this time. It was first seen at Willow River, near Fort Providence, on May 6, and several specimens were taken there by Messrs. Mills and Jones between that date and May 14. H. W. Jones also took a nest containing four eggs at Fort Simpson on June 5. It was built on the steep side of the river bank, and was quite bulky, the outer portion being constructed of fine twigs, strips of bark, and feathers. This foundation inclosed a cup-shaped nest of dry grass, thickly lined with gray dog's hair. During my trip down the Mackenzie in June I saw a few at Fort Norman, June 11 and 12, and noted it daily at Fort Good Hope, June 21 to 24. On my return trip I observed it near Mountain Rapid, on the Athabaska, on August 16.

J. W. Mills took a female at Willow River, May 7, 1905. H. W. Jones observed the species at the same place on May 1, and at Fort Simpson on November 18 of the same year.

Richardson recorded this species from Fort Simpson.^a Ross listed it as occurring in the Mackenzie River region north to Fort Good Hope.^b MacFarlane found it in the Anderson River region, where it nested throughout the wooded country.^c Specimens from the following localities are in the National Museum: Fort Resolution, Peel River (with four eggs), Fort Rae (June 4, 1862, taken with four eggs), Fort Simpson (May 4, 1860), and Fort Smith. Skins were received also from Big Island, and eggs from Lesser

^a Ann. and Mag. Nat. Hist., XI, p. 484, 1843.

^b Nat. Hist. Rev., II (second ser.), p. 232, 1862.

^c Proc. U. S. Nat. Mus., XIV, p. 443, 1891.

Slave Lake. Macoun, on the authority of Spreadborough, gives it as a common species at Edmonton and south in the foothills to Crow Nest Pass, as common from Edmonton to Yellowhead Pass in June, 1898, and as abundant from the mouth of Lesser Slave River to Peace River Landing in June, 1903. On the authority of J. M. Macoun, he stated that it was common [in 1888] between Edmonton and Athabaska Landing and up the Athabaska to Lesser Slave River, rare down the Athabaska to Fort McMurray, and common on Methye Portage and from there to Isle à la Crosse.^a Seton gives it as occurring in 1907 on Great Slave Lake east to its eastern end.^b

J. Alden Loring reported the species common at Edmonton, Alberta, September 7 to 26, 1894, and took specimens September 23 and 26. In the early summer of 1896, he found it common all along the trail to the westward of Edmonton, taking specimens 25 miles northwest of Edmonton, May 25, and at Ste. Anne, May 27. He also took a specimen at the head of Grand Cache River, August 31. A specimen taken at Baillie Island, May 22, 1901, has been identified by Dr. A. K. Fisher of the Biological Survey.

***Junco hyemalis connectens* Coues. Shufeldt Junco.**

The form designated as above by the American Ornithologists' Union is called by Mr. Ridgway *Junco oregonus shufeldti*, and *connectens* is considered by him a hybrid between *Junco hyemalis* and *Junco oregonus shufeldti*.

Specimens referred to *J. o. shufeldti* by Mr. Ridgway were taken by J. Alden Loring in 1896 at the following localities: Fifteen miles south of Henry House, where he reported it breeding commonly close to timber line, July 3 to 21, and took a specimen July 13; Smoky River Valley, 50 miles north of Jasper House, two specimens, August 27; and the foothills of the Rocky Mountains, 25 miles northeast of Jasper House, one specimen, October 5. Another specimen (No. 157815), taken on the Jasper House trail 40 miles west of Edmonton, on May 30, 1896, was referred by Ridgway to '*connectens*.'

Macoun, on the authority of Spreadborough, gives this form as occurring in the Rocky Mountains south of Yellowhead Pass in July, 1898; he records also two specimens taken at Edmonton, Alberta, in May, 1897.^c

***Junco hyemalis montanus* Ridgw. Montana Junco.**

This species, according to Ridgway, breeds in western Alberta, and specimens identified by him and now in the Biological Survey collection were taken by J. Alden Loring at the following localities:

^a Cat. Canadian Birds, Part III, p. 501, 1904.

^b Auk, XXV, p. 72, 1908.

^c Cat. Canadian Birds, Part III, pp. 504, 505, 1904.

Edmonton, September 17 and 22, 1894; Grand Cache River, August 31 and September 4, 1896; and the foothills of the Rocky Mountains, 25 miles northeast of Jasper House, October 5, 1896.

Melospiza melodia (Wils.). Song Sparrow.

This widely distributed species occurs throughout the region north to Great Slave Lake, but is rather rare in the northern part of its range.

In 1901 it was common about Edmonton and on the road to Athabaska Landing, April 29 to May 5; and was observed at Grand Rapid, May 10 and 11; at Brulé Rapid, May 12; and near the mouth of the Athabaska, May 17. Several were seen near Fort Chipewyan, May 23 to June 1, and a male was taken on May 24. The species was noted also near the outlet of Athabaska Lake, June 5, and 10 miles below the mouth of Peace River, June 12. At Fort Smith several were heard singing on the morning of June 19, and at Fort Rae I collected a male, the only one observed there, on July 29.

In the spring of 1903 we found it common at Edmonton, May 8 to 10, and between there and Athabaska Landing, May 11 to 15. It was common and was noted nearly every day as we descended the Athabaska, May 16 to June 2. Two specimens were taken at Grand Rapid, May 22. The species was next noted at Fort Chipewyan, June 3 and 4, and at Fort Smith, June 14. It was last seen at Fort Resolution, where a pair were observed by Cary in the shrubby field back of the post building, June 22. On their return trip Alfred E. Preble and Merritt Cary noted 3 near Brulé Rapid, August 18, and found it common on the Athabaska between House River and Athabaska Landing, August 22 to September 2.

In 1904 I did not see this sparrow until I reached Fort McMurray on my return trip; here I saw several on August 11 and 14. I noted the species also near Cascade Rapid, August 16, and found it rather common between La Biche River and Sandy Creek on September 1 and 2.

Ross recorded a specimen of *Melospiza gouldii*, probably referring to this species, from Big Island.^a Eggs collected at the post on Pelican Lake, eastern Saskatchewan, in June, 1891, by H. MacKay, were received by the National Museum. Macoun, on the authority of J. M. Macoun, states that [in 1888] it was common on the Clearwater, on Methye Lake, and in places south to Isle à la Crosse. He states also that Spreadborough first observed it at Edmonton, Alberta [probably in 1897], on April 20, and found nests May 26 and 27; and found it common from Edmonton to the crossing of McLeod River in June, 1898, and from the mouth of Lesser Slave River to

^a Can. Nat. and Geol., VI, p. 443, 1861.

Peace River Landing in June, 1903. He records also specimens from Edmonton and Peace River Landing, Alberta.^a

While collecting at Edmonton, Alberta, in the early autumn of 1894, J. Alden Loring found the bird fairly common, and took specimens on September 11, 17, and 18. In the early summer of 1896 he reported it uncommon on the Jasper House trail, taking a specimen about 25 miles northwest of Edmonton, May 25. In the early autumn of the same year he found it rare and difficult to obtain along the trail between Jasper House and Smoky River.

Melospiza lincolni (Aud.). Lincoln Sparrow.

This is the common song sparrow of the region. In 1901 it was first noted near Poplar Point, on the lower Athabaska, where a male in full song was observed May 16. A female was taken at Fort Chipewyan, May 23. The species was next noted at Fort Smith, where numbers were seen, June 19 to 28, and three specimens were collected. It was noted at Fort Resolution, July 5 and 9, and at Yellowknife Bay, on the Northern Arm of Great Slave Lake, on July 16. At Trout Rock a nest containing four eggs was collected, together with the female parent, July 17. It was placed on the ground in a patch of thick grass near water. At Fort Rae the bird was noted almost daily, July 19 to 29, and several specimens, including young not long from the nest, were taken July 23 and 25. On our return trip a few individuals were seen on the Athabaska, above Pelican Portage, August 25.

On May 13, 1903, we first observed this bird a few miles north of Sturgeon River. We next noted it 50 miles below Athabaska Landing, May 17, and observed it at Grand Rapid, May 21 and 22. We did not again note it until June 17, when one was seen near Limestone Point, on the lower Slave. We found it very common at Fort Resolution during the latter part of June. During their trip to the Mackenzie my brother and Cary noted it at Hay River, June 29, and the following day found a nest containing five heavily incubated eggs. The male bird was shot just after being flushed from the eggs, showing that it assists in incubation. A few others were noted at Fort Providence, July 6 and 7; at the mouth of Willow Lake River, June 19; and at Fort Wrigley, June 21 and 22. On their return trip they noted an adult and two fledged young on the Athabaska, below Red River, on August 6, and found it common along the river from Brulé Rapid to Athabaska Landing, August 18 to September 13, and near the latter place up to September 23. They noted it also near Lily Lake, September 24. During my trip northward from Fort Rae, after the division of the party, I observed this sparrow on Grandin

^a Cat. Canadian Birds, Part III, pp. 507-509, 1904.

River, August 4 and 5; on Lake Faber, August 8; and on Lake Hardisty, August 16.

In the spring of 1904 I saw the first one at Fort Simpson on May 16. The species was next seen May 19, on which date it was common, and was noted nearly every day during the remainder of the month. Several specimens were taken near Fort Providence, May 18 to 21, by Mills and Jones. While descending the Mackenzie I noted it nearly every day at Fort Norman, June 11 to 15, and took one at Fort Good Hope, June 21. On my return trip I saw it near the mouth of Nahanni River, July 25; found it common at Fort McMurray, August 11 to 14; and saw several between La Biche River and Athabaska Landing, September 1. H. W. Jones observed the species near Fort Providence, May 14, 1905.

This bird was first recorded from the Mackenzie River region by Ross, who listed it as not rare north to Fort Simpson and as having been collected at that post.^a Two skins from Fort Rae, labeled as having been taken with eggs, and one from Fort Resolution, are now in the National Museum; and the bird catalogue shows that specimens were received also from Big Island, Fort Simpson, and Lesser Slave Lake, the skin from the latter locality being accompanied by eggs. Eggs taken at Pelican Lake, eastern Saskatchewan, in June, 1891, were received through MacFarlane. Macoun, on the authority of Spreadborough, states that this bird was first seen at Edmonton on May 5, 1897, and a nest found June 1; that it was observed everywhere from Edmonton to Yellowhead Pass in June, 1898; and was abundant from Edmonton to Lesser Slave Lake and Peace River Landing in 1903.^b

J. Alden Loring collected a specimen at Edmonton, September 8, 1894, and in the early summer of 1896 reported the species abundant along streams on the Jasper House trail, taking one 25 miles northwest of Edmonton, May 25.

Melospiza georgiana (Lath.). Swamp Sparrow.

In 1901 the swamp sparrow was first noted at Fort Chipewyan, May 23, when several were seen and one was taken. A nest found near the outlet of Athabaska Lake, June 4, was built in a tussock at the margin of a marsh, and contained five eggs. An immature bird, apparently not long from the nest, was taken at Trout Rock, July 18, and another at Fort Rae, July 23.

In 1903 we first detected the swamp sparrow at Fort Resolution, June 23, when a nest containing young a day or two old was found in a swamp near the post. During my trip northward from Fort

^a Nat. Hist. Rev., II (second ser.), p. 282, 1862.

^b Cat. Canadian Birds, Part III, p. 513, 1904.

Rae, I noted the species on Grandin River, August 2. My brother and Cary observed two at Hay River on June 30, and took a male, the only one seen, in a swamp at Fort Providence, July 7. On their return trip they saw several near Brulé Rapid, August 18; took an immature male near Grand Rapid, August 21; and observed a number near House River, August 22. They also found it common near Athabaska Landing, September 3 to 5.

In 1904 I saw the bird only at Fort Norman, where I took a male on June 11. It was in a muskeg back of the post and was the only one seen. This constitutes the most northern record for the species in this region.

A skin taken by Kennicott at Fort Simpson, September 17, 1860, is in the National Museum. J. Alden Loring reported the species common at Edmonton, September 7 to 26, 1894, and took four specimens. Macoun, on the authority of Spreadborough, states that it was observed everywhere in the marshes from Lesser Slave Lake to Peace River Landing in June, 1903.^a

Passerella iliaca (Merr.). Fox Sparrow.

This beautiful species, perhaps the handsomest of the sparrows, breeds throughout the wooded region. It is one of the earliest of the sparrows to arrive in spring, and its sweet song may be heard from the alder and willow thickets from the time of the bird's coming, though often a late snowstorm whitens its haunts.

In the spring of 1901 it was first noted on Smith Portage, where Alfred E. Preble heard its song on June 18. A male was taken at Fort Smith, June 23. On the morning of July 9, shortly after leaving Fort Resolution to cross Great Slave Lake, I heard its song near the mouth of Slave River. I found it common at Fort Rae, July 19 to 29, and collected specimens, including immature birds, on July 20 and 23.

In the spring of 1903 we first observed the fox sparrow at Grand Rapid, where it was common and in full song May 21 to 23. It was also common on the lower Athabaska, May 30 to June 2. It was next observed on Slave River, 45 miles below Fort Smith, where several were seen and heard on June 15 and 16. At Fort Providence my brother and Cary noted an adult bird carrying food on July 4, and collected a young one on July 6. On their return trip they noted several, both old and young, at Fort McMurray, August 8 to 10; and two at Brulé Rapid, August 18. During my trip northward from Fort Rae I observed it on Sarahk Lake, noting several there on August 7.

In 1904 I first saw this sparrow at Fort Simpson on May 6, noting three. It was common May 7 and for a few days afterwards, and its

^a Cat. Canadian Birds, Part III, p. 516, 1904.

sweet song, first heard on May 8, was conspicuous in the early morning chorus. It was seldom seen at this place during the latter part of the month. At Willow River, near Fort Providence, J. W. Mills took one on May 4. While descending the Mackenzie I noted it, usually in willow thickets on the islands, near the mouth of Nahanni River, June 3; at Fort Norman, June 11 to 15; 10 miles below Fort Norman, June 16; near Sans Sault Rapid, June 19, and at the Ramparts, June 20. At Fort Good Hope the bird was rather common July 21 to 24. A nest found June 23 contained three eggs almost ready to hatch. It was built on dry ground on the border of a swamp and outwardly was composed of grass, moss, and strips of bark, and was lined with fine grass and dog's hair. On the lower Mackenzie and Peel rivers I frequently saw the bird June 25 to July 1, and it was common at Fort McPherson, July 2 to 16. A number of specimens were taken. On my return trip I saw the bird at Fort McMurray on August 11.

Richardson gave a description of a female killed at Great Bear Lake, June 7, 1826;^a and later recorded a specimen from Fort Simpson.^b Ross listed the species as common in the Mackenzie River region north to La Pierre House.^c MacFarlane found it tolerably common on Anderson River, and also found a few nests on Swan River in the Barren Grounds east of Fort Anderson.^d Baird, Brewer, and Ridgway note its occurrence at Fort Resolution, Fort Simpson, Fort Good Hope, Peel River, La Pierre House, Anderson River, and Fort Anderson, and skins from nearly all these localities, some labeled as accompanied by eggs, are now in the National Museum. Eggs taken at Lesser Slave Lake were sent to the Smithsonian Institution by Strachan Jones. The following dates, copied from the bird catalogue, probably represent the approximate dates of arrival of the species at these localities: Fort Simpson, May 6, 1860; May 5, 1861; La Pierre House, May 20, 1863.

Macoun speaks of the bird as follows:

Saw one April 19, 1897, at Edmonton, Alta.; saw individuals up to June 1; a few pairs doubtless breed here; observed two individuals near Edmonton June 7, 1898; common from Lesser Slave River to Peace River Landing, lat. 56° 15', June, 1903. (Spreadborough.) Not rare at Fort McMurray, at the confluence of the Clearwater River and the Athabaska, lat. 56° 40'; one bird and nest seen at Methye Portage; eggs not hatched July 18, 1888. (J. M. Macoun.)

He also records, on the authority of Raine, nests found by C. E. Whittaker at Peel River June 10, 1900, and at the same place by I. O. Stringer June 1, 1898.^e Seton records the fox sparrow from the limit

^a Fauna Boreali-Americana, II, p. 258, 1831.

^b Ann. and Mag. Nat. Hist., XI, p. 484, 1843.

^c Nat. Hist. Rev., II (second ser.), p. 282, 1862.

^d Proc. U. S. Nat. Mus., XIV, p. 443, 1891.

^e Cat. Canadian Birds, Part III, pp. 518, 519, 1904.

of trees on Artillery Lake, where one was noted August 5, 1907, and from the eastern end of Great Slave Lake September 11.^a

Passerella iliaca schistacea Baird. Slate-colored Sparrow.

Macoun records a specimen taken at Edmonton, Alberta, May 5, 1897, by Spreadborough.^b

Pipilo maculatus arcticus (Swains.). Arctic Towhee.

Macoun, on the authority of Raine, records two sets of four eggs, taken at Fort Saskatchewan, Alberta, June 12, 1898. The nests were constructed of roots and grass and placed in low shrubs a few inches above the ground.^c

Zamelodia ludoviciana (Linn.). Rose-breasted Grosbeak.

This beautiful grosbeak, until a few years ago unknown to the northwestward of the lower Saskatchewan, is now ascertained to occur regularly in the upper Saskatchewan and the lower Athabaska. Peace, and Slave river valleys.

Early on the morning of June 8, 1901, while encamped near the banks of Slave River, 10 miles below the mouth of the Peace, I was surprised to hear the beautiful song of this bird from the top of a tall poplar near our tent. A short search revealed the singer, which immediately flew off into the forest and could not be found. A few hours later another bird was discovered and shot in a poplar grove near camp. During the next few days the species was found to be fairly common in the vicinity, and a nest was found on June 10. It was placed about 12 feet above the water in a clump of willows growing in a flooded swamp, and was collected, together with the parent birds. The nest was of the usual type and contained four fresh eggs. On the following day another male was taken in the vicinity. After we left this place we did not again note the species until we were descending lower Slave River, July 2, when a male was seen at a point about 100 miles below Fort Smith.

In the spring of 1903 we first observed the rose-breasted grosbeak about 30 miles below Fort McMurray on the morning of May 29, when we awoke to find it common among the willows and poplars, now bursting into leaf. During this and the two following days we were seldom out of hearing of the rich voice of this beautiful bird. The last were seen at a point about 25 miles above the mouth of the river, where the poplar woods gave way to low willows, which are not to the liking of the bird. On their return trip Alfred E. Preble and Merritt Cary noted one at Grand Rapid on August 20.

^a Auk, XXV, p. 73, 1908.

^b Cat. Canadian Birds, Part III, p. 522, 1904.

^c Ibid., p. 524, 1904.

In 1904 I noted this species only at Fort McMurray, where I saw several in poplar woods on August 12. To some of the voyagers on the Athabaska it is known as the 'cannibal bird,' and they believe that it eats smaller birds. Since our discovery of the bird on the Athabaska and Slave rivers, Macoun has published notes of its occurrence still farther west, as follows:

First seen at Edmonton, Alta., May 15, 1897; found a nest [May 29] in an alder bush about 10 feet from the ground, nest a very slight affair, in fact, I could see the eggs quite through it; it was just a few sticks placed in the fork of a bush. Eggs three; the male was sitting on the eggs; common in the poplar woods from Edmonton to the McLeod River [in 1898]; common from Lesser Slave Lake to Peace River Landing, Lat. 56° 15', June, 1903. (Spreadborough.) Common from Lesser Slave River down the Athabasca River to Fort McMurray, Lat. 56° 40'; not rare up the Clearwater River to Methye Portage [1888]. (J. M. Macoun.)

He also records specimens from Peace River Landing and Edmonton, and eggs from the latter place.^a

Passerina amœna (Say). Lazuli Bunting.

A male was taken by Alfred E. Preble and Merritt Cary at Fort Providence on July 4, 1903. It was singing from a young spruce in a dry muskeg near the post, and was the only one observed. The bird apparently is not known to occur regularly nearer to this place than southern British Columbia.

Piranga ludoviciana (Wils.). Louisiana Tanager.

This mountain-loving tanager is a regular summer resident of the Athabaska, Slave, and upper Mackenzie valleys. Many of the inhabitants are much surprised to learn that the local fauna includes such a bird—to them appearing of almost tropical brilliance; others have described it to me, and know its song.

In the season of 1901 this tanager was first noted at our camp near Point La Brie, 12 miles northeast of Fort Chipewyan, May 26, when we secured a female. A few days later, while encamped on an island near the outlet of Athabaska Lake, we found the bird to be rather common, and took several specimens of both sexes, June 1 to 4. Other individuals were seen at the mouth of Peace River, June 6, and about 25 miles below that point, June 13. The species was not again noted until we were descending lower Slave River, when we found the remains of one in the stomach of a young duck hawk killed 25 miles below Fort Smith, June 30, and saw several individuals at points about 75 and 100 miles below Fort Smith, July 1 and 2.

^a Cat. Canadian Birds, Part III, pp. 528, 530, 1904.

On May 14, 1903, we first observed this bird near Sandy Creek, 20 miles south of Athabaska Landing, Alberta, noting a male in full song in a grove of Banksian pines. Another male was taken at Grand Rapid, May 21, and others were seen between Grand Rapid and Cascade Rapid, where the species was common. It was noted daily in numbers along the Athabaska between Red River and the Athabaska delta May 29 to 31. A few were seen on Rocher River, June 6, and on Slave River above Smith Landing, June 10, and the species was rather common along Slave River between Fort Smith and a point about 90 miles below there, June 15 and 16. It was next observed near the mouth of Nahanni River, the most northerly point where the species has been detected. Here my brother and Cary saw a pair on July 11, the male singing, and heard two males July 19. On their return trip they saw several on the Athabaska 40 miles below Red River, August 6, and a few at Fort McMurray, August 11 and 12, taking one on the latter date.

In 1904, while on my return trip, I saw several at Fort McMurray, August 11 and 12, and collected one on the former date.

Baird, Brewer, and Ridgway note the occurrence of this bird at Fort Liard.^a The bird catalogue of the National Museum records two specimens taken there in the spring of 1868, by W. J. McLean; one (No. 35602), from Fort Halkett, British Columbia, taken by William Brass; and another (No. 19541, male), from Fort Simpson, taken May 31, 1860, by B. R. Ross. Russell records a specimen taken at Fort Chipewyan, June 28, 1893.^b Macoun's notes from Alberta on this species are as follows:

Abundant at Athabasca Landing, 90 miles north of Edmonton, and up the Athabasca to Lesser Slave River. A few were seen down the Athabasca to Fort McMurray, lat. 56° 40'. (J. M. Macoun [1888].) Common from the mouth of Lesser Slave River to Peace River Landing, lat. 56° 15', in June, 1903; first seen May 8th, 1897, at Edmonton, Alta.; after this date they became common and soon began to breed; common from Edmonton to Yellowhead Pass in June, 1898 [Spreadborough].

He also records specimens from Edmonton and Athabaska Landing, Alberta.^c

J. Alden Loring reported seeing a pair near Henry House, and took a specimen, presumably one of the same birds, at that place September 10, 1895. In the early summer of 1896, while on his way from Edmonton to the Rocky Mountains, he saw several on the Jasper House trail, and also noted a number 15 miles south of Henry House in July, and collected a specimen there July 15.

^a Hist. N. A. Birds, Land Birds, I, p. 438, 1874.

^b Expl. in Far North, p. 268, 1898.

^c Cat. Canadian Birds, Part III, pp. 534, 535, 1904.

Progne subis (Linn.). Purple Martin.

The only reliable record of this species in any part of the Mackenzie region which I find is that of Macoun, who says, on the authority of Spreadborough:

Observed two at the crossing of the McLeod River, [west] of Edmonton, June 19, 1898. * * * Observed several in the dead woods north of Peace River, near White Mud River, lat. 56° 20' in June, 1903.^a

Richardson's record of its occurrence at Great Bear Lake is probably an error.^b

Petrochelidon lunifrons (Say). Cliff Swallow.

This sociable species is a common summer resident throughout the region north nearly to the Arctic coast, nesting on the faces of cliffs and clay banks, and beneath the eaves of the buildings of the trading posts.

In the spring of 1901 we first noted the cliff swallow at Fort Chipewyan, where a number were seen on May 31. We next observed it on June 11, 10 miles below Peace River, where a large colony was nesting on the left bank of the river. During the first 100 miles of our journey along Slave River, below Fort Smith, we frequently observed the species, June 29 to July 1, and collected a specimen on the latter date. The nests were often built on the face of a clay bank amid the nesting holes of a colony of bank swallows, and the two species seemed to be on the best of terms. When we ascended the Athabaska in August, deserted nests were frequently seen, but with the exception of a pair which were still lingering about a nesting site near Pelican Rapid on August 24, we observed none of the birds.

In the spring of 1903 cliff swallows were first observed 30 miles below Fort McMurray on the morning of May 29, when a few were seen. A number were noted at Smith Landing, June 12, and at Fort Smith, June 14, and they were common along Slave River between there and Limestone Point, June 15 to 17. The species was observed at Fort Providence by my brother and Cary, July 2 to 8, where several pairs had nests on one of the post buildings; and it was noted also between there and Fort Simpson, July 9, and at the latter place, July 10. On their return trip it was observed at Fort Simpson, July 24, and at Fort McMurray, August 12. During my trip northward

^a Cat. Canadian Birds, Part III, p. 538, 1904.

^b "It makes its first appearance on Great Bear Lake on the 17th of May, at which time the snow still partially covers the ground, and the rivers and lakes are fast bound in ice." (Fauna Boreali-Americana, II, p. 335, 1831.) Twenty years later he speaks of it thus: "On the Winipeg it [the bank swallow] was accompanied by the purple swift (*Progne purpurea*), whose northern limit we did not ascertain." (Arctic Searching Expedition, I, p. 229, 1851.)

from Fort Rae in August I saw the deserted nests of a colony on a rock in the channel north of Lake Hardisty. (See Pl. XXIII, fig. 2.)

In 1904 I first saw cliff swallows on my arrival at Fort Norman on June 10, when I found a breeding colony, with nests nearly finished, established under the eaves and gables of the main dwelling house. Here I collected several specimens and was informed that the birds had arrived about June 1. While traveling down the Mackenzie, I noted the species at Wolverine Rock, June 18, and at the Ramparts, June 20. Both of these localities offer ideal nesting sites and the birds were building by hundreds. At Fort Good Hope, at the lower end of the Ramparts, a few were nesting under the eaves, thus showing their preference for the haunts of man, though natural nesting sites were close at hand. After leaving Fort Good Hope I saw a few a short distance below that post, June 25, and others near the site of old Fort Good Hope, June 28. During my return trip I found the birds common in the vicinity of the Ramparts, July 19.

This widely-distributed species, at that time undescribed, was first observed in this region during the summer of 1820 on Franklin's first northern journey, and later, under the name *Hirundo lunifrons*, is referred to by Richardson as follows:

It was seen in great numbers by Sir John Franklin's party on the journey from Cumberland House to Fort Enterprise, and on the banks of Point Lake, in latitude 65°, where its earliest arrival was noted in the following year to be the 12th of June.^a

During his second northern journey Franklin observed the bird at Fort Chipewyan in the summer of 1825, and refers to the occurrence as follows:

Fort Chipewyan was this summer visited, for the first time, by a large flight of swallows, resembling the house martins of England. They came in a body on the 25th of June, and immediately began to construct their earthy nests under the ledge of the south front of the house.^b

He also states that in 1827 they arrived at the same place on May 12.^c Richardson states that clusters of nests of this species were of frequent occurrence on the rocky cliffs of the Barren Grounds, and were not uncommon along the whole course of the Slave and Mackenzie rivers, and referring to its nesting at Fort Chipewyan, says:

This, as far as I could learn, is the first instance of this species of swallow placing itself under the protection of man within the widely extended lands north of the Great Lakes.^d

The nesting of the species on the banks of the Coppermine is also recorded by Richardson, who mentions that Doctor Rae found the birds at the mouth of Kendall River on May 28, 1849, when the nests

^a Fauna Boreali-Americana, II, p. 331, 1831.

^b Narrative Second Expedition to Polar Sea, p. 8, 1828.

^c Ibid., p. 307, 1828.

^d Fauna Boreali-Americana, II, p. 331, 1831.

had been constructed but the eggs not yet laid.^a Ross listed the species as common in the Mackenzie River region north to Rat River, and as having been taken at Fort Simpson.^b MacFarlane refers to the bird as follows:

In 1856, about one hundred and sixty nests of these Swallows were, for the first time, built under the eaves of the three principal buildings of Fort Good Hope, Mackenzie River, but as many of the young were destroyed by Indian boys, only one hundred nests were constructed at the same place the following season. In 1866 a bird of this species was observed closely examining the eaves of the houses at Fort Anderson, but * * * it flew away and never returned. They, however, breed in large numbers along the banks of the Lockhart and Anderson rivers, whence several examples were obtained.^c

Baird records specimens from Fort Resolution, Big Island, and Fort Good Hope.^d Macoun, on the authority of Spreadborough, states that this species was first seen at Edmonton, May 13, 1897; a few were nesting on the cut banks of the rivers between Edmonton and the [upper] Athabaska in June, 1898; very abundant along Peace River in 1903.^e Seton records the cliff swallow as nesting in great colonies on the cliffs of Artillery Lake in 1907.^f

Hirundo erythrogastra Bodd. Barn Swallow.

The barn swallow occurs throughout the region north to Great Bear Lake and the lower Mackenzie, but is somewhat local in distribution and seldom is abundant. In its choice of nesting sites it seems about equally partial to cliffs and buildings, but from the scarcity of the latter probably the majority nest in the natural manner.

In 1901 this bird was not noted until we reached Fort Resolution, where a few individuals were seen daily, July 5 to 9. While crossing Great Slave Lake to Fort Rae I found a small colony nesting on the precipitous sides of a rocky island near the mouth of the Northern Arm, July 15, and collected a nest containing five eggs, and a female bird. The birds were rather wild, even while we were in close proximity to their nests. The nest taken was built on a small projecting shelf on the perpendicular face of the cliff about 12 feet above the water, and is composed outwardly of mud mixed with a little moss, lined with a layer of dry grass, and with a thick inner lining of feathers of a species of gull (*Larus*), and of the scaup duck (*Marila marila*). A single bird was seen near Fort Rae July 21.

In the summer of 1903 we first observed the barn swallow at Fort Resolution, noting a few there June 22 and 23. During my trip

^a Arctic Searching Expedition, II, p. 244, 1851.

^b Nat. Hist. Rev., II (second ser.), p. 280, 1862.

^c Proc. U. S. Nat. Mus., XIV, p. 443, 1891.

^d Rev. Am. Birds, p. 290, May, 1865.

^e Cat. Canadian Birds, Part III, p. 540, 1904.

^f Auk, XXV, p. 73, 1908.

across Great Slave Lake to Fort Rae I noted a number, July 24, nesting on the same cliff where I found them in 1901, and I saw a nest in an unfinished Indian cabin about 40 miles south of Trout Rock on the same date. During my trip northward from Fort Rae I found the species rather common along lower Grandin River, August 1 to 3, evidently nesting on the cliffs which in places border the stream. Several were seen also about some Indian houses on Lake Faber, August 7.

In 1904 I noted the species only near the mouth of Nahanni River, where I saw two on June 3.

Franklin noted the arrival of the barn swallow at Fort Chipewyan, May 20, 1827.^a Richardson's observations furnish an early instance of the readiness of the bird to avail itself of artificial nesting sites, even in the far north. He says:

In the fur countries, where the habitations of man are few and far between, it inhabits caves, particularly in the limestone rocks; and it also frequents the outhouses at the trading posts. When Fort Franklin was erected, on the shores of Great Bear Lake, in the autumn of 1825, we found many of its nests in the ruins of a house that had been abandoned for more than ten years. Toward the end of the following May the birds themselves made their appearance, and immediately commenced a survey of the different buildings; but the storehouses having been repaired, without any reference to the poor swallows, they found no entrance; and after lingering about their old haunts for a week, they flew off in search of other quarters. At Fort Chipewyan, lat. 57°, the Barn Swallows have regularly about the 15th of May, for a number of years, taken possession of their nests of mud and straw, constructed within an outhouse, and we observed numbers of them in the same month at [old] Fort Good Hope (in lat. 67½°), the most northerly post in America.^b

Baird recorded specimens, which are still in the National Museum, from Fort Rae;^c and the bird catalogue records one from Fort Simpson. Macoun states that Spreadborough found this bird common from Edmonton to Yellowhead Pass in June, 1898, and observed two at the head of Lesser Slave Lake in June, 1903.^d Seton observed the bird about cliffs near the north shore of Great Slave Lake near longitude 112° 20' in the summer of 1907.^e

A nest which contained six eggs, collected by J. Lockhart at Gros Cape, Great Slave Lake (near the spot where we found the bird nesting), in June, 1864, is in the National Museum. It is very similar in construction to the nest taken by us, and has the appearance of having been built on the face of a cliff.

^a Narrative Second Expedition to Polar Sea, p. 307, 1828.

^b Fauna Boreali-Americana, II, pp. 329, 330, 1831.

^c Rev. Am. Birds, p. 296, May, 1835.

^d Cat. Canadian Birds, Part III, p. 543, 1904.

^e Auk, XXV, p. 73, 1908.

Iridoprocne bicolor (Vieill.). Tree Swallow.

This swallow has been detected as far north as Great Bear Lake and Fort Norman, but is rare at that latitude, though common locally in the southern part of the region. In 1901 we saw a few individuals flying about a small pond near Sturgeon River on May 1, and next observed a number of the species 30 miles south of Athabaska Landing, May 4; while we were descending the Athabaska, about 50 miles below Athabaska Landing, May 7, a small company flew past in the midst of a driving snow squall. We afterwards noted the species near the delta of the Athabaska, May 17; at the mouth of Peace River, June 5; and 25 miles below that point, June 13. At Fort Smith we saw a few and took specimens on June 24, after which date the species was not seen.

In the spring of 1903 we noted the tree swallow at Edmonton, May 8 and 10, and we saw several daily between Sturgeon River and Athabaska Landing, May 13 to 15. While descending the Athabaska we observed it between Little Buffalo River and Stony Rapid, May 26; 30 miles below Fort McMurray, May 29; and on the lower Athabaska, May 31. We noted a few on Rocher River, June 8; near Smith Landing, June 10; and at Fort Resolution, June 20 and 26.

On May 11, 1904, H. W. Jones saw one at Willow River, near Fort Providence. Females were collected at the same place by Mills and Jones on May 20. At Fort Simpson I saw the first one on May 19, and noted single birds on May 23, 24, and 25. I did not observe it farther north. H. W. Jones, in letter, reports the species near Fort Providence, May 7, 1905.

Richardson stated that this species breeds at Fort Norman.^a Ross listed it as rare in the Mackenzie River region north to Fort Good Hope.^b Baird recorded specimens from Big Island and Fort Simpson.^c Kennicott noted it at Fort Resolution, May 12, 1860.^d Both skins and eggs were sent to the Smithsonian Institution from Lesser Slave Lake by Strachan Jones. Russell records four specimens taken at Fort Chipewyan, May 20, 1893.^e Macoun gives the following notes:

Observed from the mouth of Lesser Slave River to Peace River Landing, Lat. 56° 15', June, 1903; first seen at Edmonton, Alta., April 30th, 1897, breeding in trees late in May. * * * Seen from Edmonton to Jasper House, breeding in holes in trees in June, 1898. (Spreadborough.) * * * A few specimens were seen between Athabaska Landing and Lesser Slave River; and a few indi-

^a Arctic Searching Expedition, I, p. 200, 1851.

^b Nat. Hist. Rev., II (second ser.), p. 280, 1862.

^c Rev. Am. Birds, p. 298, May, 1865.

^d Trans. Chicago Acad. Sci., I, p. 170, 1869.

^e Expl. in Far North, p. 268, 1898.

viduals at north end of Methye Portage; about half a dozen birds on Isle à la Crosse Lake [1888]. (J. M. Macoun.)^a

Tachycineta thalassina lepida Mearns. Western Violet-green Swallow.

In notes on migration sent to the Biological Survey from Red Deer, Alberta, by F. L. Farley, this species is noted as arriving May 18, 1892, and May 7, 1893.

Macoun states that Spreadborough observed a few at Henry House, Athabaska Pass, in July, 1898.^b

Riparia riparia (Linn.). Bank Swallow.

Countless thousands of bank swallows breed in the region now under review, mainly along the courses of the larger rivers, where the clay banks afford ideal nesting sites. As the traveler passes colony after colony of busy swarms, whose nesting burrows dot the faces of the numerous cut banks, he can not fail to be impressed by their prodigious numbers.

In 1901 this bird was first noted on Slave River 10 miles below the Peace, where large numbers were breeding, June 9 to 11. We saw a few at Fort Smith, June 19, and while descending Slave River to Great Slave Lake found the species abundant from Fort Smith nearly to the lake, June 29 to July 3.

In the spring of 1903 we first observed the bank swallow at Edmonton, May 8, noting several individuals. We did not again detect the species until we reached Fort Smith, and we found it abundant along the river between there and Fort Resolution, June 15 to 19. My brother and Cary found it abundant also along the Mackenzie between Fort Providence and Fort Wrigley in July, evidently incubating during the early part of the month. On their return trip they saw two at Fort McMurray on August 10.

In 1904 this species arrived at Fort Simpson May 26, when I saw about half a dozen and took one. I did not note it again until May 31. While descending the Mackenzie I found it abundant near Nahanni River, June 3; between Blackwater River and Fort Norman, June 9 and 10; and between Wolverine Rock and Fort Good Hope, June 18 to 20. At Fort McPherson I noted a few on July 11, 14, 15, and 16. On my return trip I noted it near the site of old Fort Good Hope, July 18; near Wolverine Rock, July 20; and near Birch Island, July 21.

Edward Sabine states that swallows were seen during the excursion across Melville Island in June, 1820;^c Fisher, who observed the birds referred to, mentions that they were seen about some sandstone cliffs near Liddon Gulf on June 12, and refers to them as

^a Cat. Canadian Birds, Part III, pp. 547, 548, 1904.

^b *Ibid.*, p. 550, 1904.

^c Suppl. to Appendix Parry's First Voyage, p. ccx, 1824.

bank swallows, his identification probably being correct.^a Richardson observed thousands fluttering about the entrances of their burrows in the river banks near the mouth of the Mackenzie, July 4 [1826], and judged that they had arrived at least a fortnight previously.^b MacFarlane found the species nesting in considerable numbers on Anderson River.^c Baird recorded specimens from Big Island, Fort Good Hope, and Fort Simpson,^d and a specimen from the last locality is still in the National Museum; the catalogue of the collection shows that skins were received also from Fort Resolution and Fort Anderson. Macoun states that Spreadborough noted its arrival at Edmonton, Alberta, May 8, 1897, and found it common from Lesser Slave Lake to Peace River Landing in June, 1903.^e

***Bombycilla garrula* (Linn.).** Bohemian Waxwing.

Although this beautiful and widely distributed bird was detected nearly a century ago in the region now under consideration, which probably comprises its principal breeding ground in America, its nesting habits are still very imperfectly known.

In 1901 we first noted the waxwing 50 miles below Fort Smith, June 30, noting a single bird. On the morning of July 2, we saw a number about 100 miles below Fort Smith. They were very restless, flying back and forth between the summits of the lofty spruces, and disappeared before I was able to obtain specimens. The sight of these birds recalled to my guide the fact that he had seen a flock at Fort Smith, while we were encamped there late in June. I saw a single bird at Fort Rae on July 23.

On June 11, 1903, we saw a flock of about a dozen at Smith Landing. The species was next observed on the mountains near the mouth of Nahanni River, where my brother and Cary noted a few on July 15, 16, and 18. While traveling along the southern shore of Great Bear Lake I saw a flock of about 15 on the afternoon of September 8. They were busily feeding among the branches of white spruces, but becoming suddenly alarmed they arose in a body and disappeared before I could observe their habits or secure specimens. The species is said to occur occasionally at Fort Simpson, but during my residence there I saw none.

This species, common to Europe and America, was first detected on this continent in the region now under consideration, being observed about the same time at two widely separated points. Bonaparte figured and described a female taken March 20, 1825 [probably

^a Journal Voyage of Discovery, p. 221, 1821.

^b Fauna Boreali-Americana, II, p. 334, 1831.

^c Proc. U. S. Nat. Mus., XIV, p. 443, 1891.

^d Rev. Am. Birds, p. 319, May, 1865.

^e Cat. Canadian Birds, Part III, p. 552, 1904.

a mistake for 1826], on the "Athabasca River, near the Rocky Mountains." ^a Richardson, referring in part to the same circumstance, says:

This elegant bird has only lately been detected in America, having been discovered, in the spring of 1826, near the sources of the Athabasca, or Elk River, by Mr. Drummond, and by myself the same season at Great Bear Lake, in latitude 65°. Specimens, procured at the former place, and transmitted to England by the servants of the Hudson's Bay Company, were communicated by Mr. Leadbeater to the Prince of Musignano, who has introduced the species into his great work on the birds of the United States. * * * It appears in flocks at Great Bear Lake about the 24th of May, when the spring thaw has exposed the berries of the alpine arbutus, marsh vaccinium, &c.

He gives also a description of a male taken at Great Bear Lake. ^b King speaks of the bird as abundant at Fort Reliance in the spring of 1834. ^c Ross records the species as having been taken at Fort Simpson and at Fort Liard in February, and states that he had been informed by Mr. John Hope, a missionary residing at Fort Franklin, Great Bear Lake, that it nests in considerable numbers in that vicinity. ^d Baird records specimens from Fort Rae, Big Island, Fort Halkett, Great Bear Lake, and Fort Anderson, and an egg taken on Anderson River. ^e This egg, together with the skin of the parent (No. 27307), and a specimen from Fort Simpson, are still in the National Museum. MacFarlane, in notes sent to the Smithsonian, mentions a flock seen at Fort Anderson on May 27, 1865. Macoun states that Spreadborough saw three near the summit of the Rocky Mountains, in the Athabaska Pass, July 11, 1898. ^f

J. Alden Loring reported that a flock was seen at Henry House in the autumn of 1895. In 1896 he noted several small flocks on the trail between Smoky River and Jasper House in the early autumn, and reported seeing large flocks almost daily along the trail between Jasper House and Edmonton during the latter part of October and the early part of November. He took a specimen at Henry House October 12; two 15 miles west of that place, October 19; and three at Jasper House, October 23. H. W. Jones reports taking this species at Hay River, Great Slave Lake.

Bombycilla cedrorum Vieill. Cedar Waxwing.

The cedar waxwing occurs regularly in the Athabaska and Peace River valleys, and sparingly as far north as the upper Mackenzie. In 1901 it was observed only at Grand Rapid, where a number were seen August 21.

^a American Ornithology, III, pp. 14, 15, pl. 16, fig. 2, 1828.

^b Fauna Boreali-Americana, II, pp. 237, 238, 1831.

^c Narrative Journey to Arctic Ocean, II, p. 279, 1836.

^d Nat. Hist. Rev., II (second ser.), p. 280, 1862.

^e Rev. Am. Birds, p. 407, May, 1866.

^f Cat. Canadian Birds, Part III, p. 557, 1904.

In the spring of 1903 it was first observed near Sandy Creek, where a flock of about 15 was seen in a grove of Banksian pines, May 14. It was next noted near the mouth of Willow Lake River, where on July 19 my brother and Cary observed a flock of 10 fly-catching in a burnt tract. On their return trip they found the species rather common on the Athabaska above Fort McMurray. The birds usually frequented the brulés on the slopes of the valley, often flying over the river in pursuit of insects. The species was noted as follows: Fort McMurray, August 8 to 12, common; Mountain to Cascade rapids, August 14, common; Crooked Rapid to Boiler Rapid, August 16 and 17, rather common; Swift Current Rapid, August 28, 25 individuals; Athabaska Landing, September 2 to 11, common.

In 1904 I saw the cedar waxwing only while ascending the Athabaska on my return trip, noting several above Little Buffalo River, August 20, and finding it common at Grand Rapid, August 23.

Previous to our investigations in the region, the cedar waxwing apparently had not been recorded north of central Alberta. Both skins and eggs were received by the Smithsonian from Lesser Slave Lake, where they were taken in 1868 by Strachan Jones. Macoun states that J. M. Macoun [in 1888] found the bird common on upper Clearwater River, on Methye Portage, and in places between Methye Lake and Isle à la Crosse; and that Spreadborough found it common from Edmonton to Athabaska Pass in June, 1898, and along Peace River in latitude 56° in July, 1903.^a

In the early autumn of 1895 J. Alden Loring found the species common all along the route from Edmonton to the mountains, and reported that he saw two individuals at Henry House. He states that in 1896 he found it common along the same route during the early summer, and that it was common and breeding 15 miles south of Henry House, July 3 to 21.

Lanius borealis Vieill. Northern Shrike.

Though breeding throughout the wooded region, this species was seldom observed during our journeys. In 1901 it was noted but once, a single bird being seen at the border of a small marsh near Slave River, 25 miles below the Peace, June 12.

In the summer of 1903 I saw one on the island at Grand Rapid on May 23. The species was next observed by us at the mouth of McVicar Bay, Great Bear Lake, September 10, when I took two specimens, an adult male and a female of the year. I saw another in close pursuit of a badly frightened robin at Fort Franklin, September 25. While ascending the Mackenzie I observed single birds 10 miles above Fort Norman, October 2; 10 miles below Blackwater

^a Cat. Canadian Birds, Part III, p. 561, 1904.

River, October 6; and below Roche Trempe-l'eau, October 8. After reaching Fort Simpson I saw the bird but once, noting one on November 5.

In 1904 I saw one at Fort Simpson on April 16. Two specimens in the museum at that place were taken some years ago at Fort Rae.

Ross recorded the northern shrike as not rare in the Mackenzie River region north to Fort Good Hope, and as having been taken at Fort Simpson. MacFarlane found it breeding in the Anderson River country, and obtained a nest containing six eggs at Fort Anderson, June 11, 1863, and another on Anderson River to the northward of the post.^a Baird recorded specimens from Fort Resolution, Fort Rae, Fort Simpson, Peel River, and Fort Liard.^b Seton records the species from Fort Reliance.^c

In the autumn of 1896, J. Alden Loring observed several individuals of this species near Baptiste River, between Jasper House and Smoky River. The stomach of one killed there September 30 was filled with blueberries. He saw several also on the trail between Jasper House and Edmonton later in the autumn.

Lanius ludovicianus excubitorides (Swains.). White-rumped Shrike.

Spreadborough observed a pair at Edmonton, Alberta, May 18, 1897, engaged in building a nest.^d The species seems to be rather common on the plains of the lower Saskatchewan, from which region it was first described.

Vireosylva olivacea (Linn.). Red-eyed Vireo.

This persistent songster is a common summer inhabitant throughout the region north to Great Slave Lake and the upper Mackenzie, and during June and July its cheerful strain continually greets the traveler as he journeys along the streams.

In 1901 we first noted this vireo at our camp near Point La Brie, 12 miles northeast of Fort Chipewyan, May 27, and collected a pair at the same place May 29. We found it common near the outlet of Athabaska Lake, June 1 to 4, and saw or heard it almost daily along our route between that point and Fort Smith, June 5 to 18. We saw a few at Fort Smith, June 19 to 28, and collected a specimen June 25. While we were descending lower Slave River, we noted it at points just below Fort Smith, June 29; 75 miles below, July 1; and near the mouth of the river, July 4. I observed it at Fort Resolution, July 7 and 8, and Alfred E. Preble noted it there on July 22. While we were ascending the Athabaska we heard one singing a short distance below Grand Rapid on August 20.

^a Proc. U. S. Nat. Mus., XIV, p. 444, 1891.

^b Rev. Am. Birds, p. 442, June, 1866.

^c Auk, XXV, p. 73, 1908.

^d Cat. Canadian Birds, Part III, p. 569, 1904.

In the spring of 1903 we first observed it at Poplar Point, on the lower Athabaska, on May 30. We again noted it near the mouth of the river, June 1, and saw several at Fort Chipewyan, June 4. The species was abundant from this time on, and we observed it daily along Rocher and Slave rivers until June 19, when we reached Fort Resolution. Here it was common also and we saw or heard it nearly every day during the latter part of June. My brother and Cary noted it almost daily at Fort Providence, July 2 to 8, and observed it at Fort Simpson on July 10. They observed it also on the Nahanni Mountains, July 12 to 14, and near the mouth of Willow Lake River, July 19. On their return trip they heard one at Red River, August 6, and found the species common between Brulé Rapid and Grand Rapid, August 18 to 21, taking a specimen on the latter date. After the division of the party I frequently heard it at Fort Resolution, and it was still in full song when I left there, on July 17.

In 1904 I first saw the species on an island 8 miles below Fort Wrigley on the morning of June 8, when several birds were observed, evidently new arrivals. I did not note the species farther north, and next saw it on July 24, while on my return trip, noting several near Nahanni River. It was rather common at Fort McMurray on August 12.

This species was first recorded from the region by Richardson, who listed a specimen from Fort Simpson.^a Baird recorded skins from Fort Resolution and Fort Simpson;^b and eggs have been taken at the same posts.^c Specimens of the bird and its eggs were sent to the Smithsonian Institution from Lesser Slave Lake by Strachan Jones in 1868. Russell took the species at Fort Chipewyan in June, 1893.^d Macoun states that [in 1888] J. M. Macoun found this bird common on the Athabaska between Grand Rapid and Fort McMurray, as well as on the Clearwater, and between Methye Lake and Isle à la Crosse. At Edmonton, in 1897, Spreadborough first noted it May 13, and found a nest with eggs on June 3. In 1898 he found it common between Edmonton and Athabaska Pass, and in June, 1903, between Lesser Slave Lake and Peace River Landing.^e MacFarlane, in a manuscript list, states that a female was shot by Mr. Reid near Fort Providence, May 15, 1880, and identified by J. J. Dalgleish.

Vireosylva philadelphica Cass. Philadelphia Vireo.

In 1901 this rare species was noted at Fort Chipewyan, May 23, when a male was shot from a mixed flock of small migrating birds.

^a Ann. and Mag. Nat. Hist., XI, p. 484, 1843.

^b Rev. Am. Birds, p. 335, May, 1866.

^c Hist. N. A. Birds, Land Birds, I, p. 364, 1874.

^d Expl. in Far North, p. 268, 1898.

^e Cat. Canadian Birds, Part III, p. 571, 1904.

The species was not again seen until we were ascending the Athabaska on August 14, when a male was taken in dense woods near Big Cascade Rapid. It was evidently a bird of the year.

On August 18, 1903, in a ravine near Brulé Rapid, Merritt Cary saw a single bird of this species. He had a good view of it, and is positive of its identity.

The only previous record in the Athabaska region is that of Russell, who took a male at Fort Chipewyan, June 6, 1893.^a Macoun records 3 specimens taken by Spreadborough at Edmonton, Alberta, in May and June, 1897.^b

Vireosylva gilva swainsoni Baird. Western Warbling Vireo.

In 1901 the warbling vireo was first met with at our camp on Slave River, 10 miles below the Peace, where it was found to be rather common, and where three specimens were taken June 7 to 10. It was afterwards noted at Smith Landing, June 15 and 17.

In the summer of 1903 we first observed this species at Grand Rapid, May 25. We noted it also below Little Buffalo River, May 26; at Cascade Rapid, where it was rather common, May 28; and on the lower Athabaska, May 31 and June 1. We next saw it near Smith Landing, June 10, and found it abundant on Smith Portage and at Fort Smith, June 12, 13, and 14. While descending Slave River between Fort Smith and Fort Resolution, we noted numbers on June 15, 17, and 19, and we observed one at Fort Resolution, June 24. During their trip to the Mackenzie, my brother and Cary saw a pair or two almost daily at Fort Providence, July 3 to 6; noted it on the Nahanni Mountains on July 15, 17, and 18; and heard one at Fort Wrigley, July 22. On their return trip they heard its song at Fort McMurray, August 10.

In 1904 I noted this bird only once, near the mouth of Nahanni River, June 3.

The warbling vireo was first recorded from the Mackenzie River region by Ross, who took it at Fort Simpson.^c Several specimens from that place have been recorded by different authors, and one taken there May 22, 1860, is still in the National Museum. J. Alden Loring took a specimen at Banff, Alberta, in August, 1894. Macoun states that Spreadborough first noted it at Edmonton, where it breeds, on May 8, 1897; observed it in poplar woods from Edmonton to McLeod River in June, 1898; and found it common from Lesser Slave Lake to Peace River Landing in June, 1903. He records four specimens from Edmonton.^d

^a Expl. in Far North, p. 268, 1898.

^b Cat. Canadian Birds, Part III, p. 574, 1904.

^c Nat. Hist. Rev., II (second ser.), p. 281, 1862.

^d Cat. Canadian Birds, Part III, pp. 575, 576, 1904.

The specimens from Slave River and Fort Simpson are somewhat intermediate between the eastern and western forms, but on the whole are referable to *swainsoni*.

Lanivireo solitarius (Wils.). Blue-headed Vireo.

The solitary vireo is fairly abundant throughout the region north to the vicinity of Fort Simpson, and usually is the earliest of its tribe to arrive in spring. In 1901 we first noted it May 23, at Fort Chipewyan, taking a female specimen. Another specimen was collected near the mouth of Peace River on June 6. The last one noted was heard singing on the banks of Slave River a few miles below Fort Smith, June 29.

In the spring of 1903 we first observed this vireo 50 miles north of Edmonton, where we took a male on the morning of May 14, and we noted it on the Athabaska 40 miles below Athabaska Landing, May 17. We next observed it on Slave River 40 miles below Fort Smith, June 15, and saw one a few miles farther north on the following day. My brother and Cary saw one in a swamp at Fort Providence, July 6, and on their return trip heard the song of one at Athabaska Landing, September 4.

In the spring of 1904 the solitary vireo arrived at Fort Simpson on May 22, when I observed 3 individuals in full song. I did not see any more at Fort Simpson during May, but while descending the Mackenzie observed one near the mouth of Nahanni River, June 6. H. W. Jones collected one at Willow River, near Fort Providence, May 25. The same observer reported the species at Fort Simpson, May 26, 1905.

Baird recorded a specimen taken by Ross at Fort Simpson.^a Macoun, on the authority of Spreadborough, states that it was first seen at Edmonton, Alberta, May 11, 1897, and was common by May 21; and that it was common from Lesser Slave Lake to Peace River Landing in June, 1903.^b

Mniotilta varia (Linn.). Black and White Warbler.

This warbler, which was ascertained many years ago to reach Fort Simpson, is common over most of the region north to that point, and during our last trip was taken at Fort Norman. In 1901 a male was seen beside the Athabaska 15 miles below Fort McMurray on the morning of May 15. The species was elsewhere noted during that season only at Smith Landing, where a male and a female were taken on June 15 and 17.

In the spring of 1903 this warbler was first observed at Grand Rapid, May 22, a single bird being noted. A few were seen at Cas-

^a Rev. Am. Birds, p. 348, May, 1866.

^b Cat. Canadian Birds, Part III, p. 577, 1904.

cade Rapid on the morning of May 28, and others 30 miles below Fort McMurray on May 29. The species was rather common on the lower Athabaska, May 31 to June 1, and during our northward journey was last detected on Rocher River, June 8. On their return trip in the fall Alfred E. Preble and Merritt Cary noted one near Swift Current Rapid, August 28; and took a male on the Athabaska above Athabaska Landing on September 10.

In the spring of 1904 H. W. Jones saw the first one near Fort Providence, May 16, and Jones and Mills took males on May 18 and 20. At Fort Simpson I saw the first one May 22, took a pair on May 23, and noted a few May 24, 26, and 27. During my trip down the Mackenzie I met with it only at Fort Norman, collecting one on June 14. On my return trip I saw one at Fort McMurray August 12. In 1905 Jones observed it near Fort Providence on May 19.

A number of specimens of this species were collected at Fort Simpson by Kennicott and Ross, and one taken at that place by the latter, May 28, 1861, is recorded by Baird.^a The catalogue of the birds in the National Museum records a specimen (No. 61203) taken by Strachan Jones at Lesser Slave Lake. Russell records one taken at Fort Chipewyan May 26, 1893.^b Macoun states that Spreadborough first noted the species at Edmonton on May 6, 1897, and saw one individual at Peace River Landing in June, 1903.^c

Helminthophila rubricapilla (Wils.). Nashville Warbler.

Richardson figured and described a specimen obtained at Cumberland House May 15, 1827.^d Ross gave the species as rare north to Fort Resolution, implying its occurrence at that point.^e Though there is some probability of error in the latter record, the species probably occurs regularly in the southeastern part of our region.

Helminthophila celata (Say). Orange-crowned Warbler.

In 1901 this bird was first seen at Fort Chipewyan on May 23. A female was taken at our camp near Point La Brie, May 27, and a male near Fort Chipewyan, June 1. The species was next seen at Fort Resolution, where a nest containing eggs advanced in incubation was taken, together with the female, on July 9. The nest was placed among thick grass on a sloping bank, and was composed outwardly of grass and *Equisetum* stems, with a layer of finer grass and with an inner lining of hair.

In the spring of 1903 the orange-crowned warbler was first observed on the lower Athabaska, where it was rather common on the

^a Rev. Am. Birds, p. 168, May, 1866.

^b Expl. in Far North, p. 268, 1898.

^c Cat. Canadian Birds, Part III, p. 581, 1904.

^d Fauna Boreali-Americana, II, p. 220, 1831.

^e Nat. Hist. Rev., II (second ser.), p. 279, 1862.

morning of May 31. It was next noted at Smith Landing, June 11; was rather common on Smith Portage, June 13; and was observed on the lower Slave, June 19. A specimen was taken at Fort Resolution, June 22, and several individuals were observed there on June 24. My brother and Cary heard a few in poplar woods at Fort Providence, July 7 and 8, and saw numbers in alder thickets on the upper slopes of the Nahanni Mountains on July 15. On their return trip they saw several birds at Fort McMurray, August 9 and 10, and near Quito River, August 28. During my trip northward from Fort Rae, after the division of the party, I saw one on Lake Hardisty, August 16.

In the spring of 1904 I noted the first individuals at Fort Simpson on May 21, taking two females. I saw a single bird at Fort Norman, June 12; and on my return trip saw one near the mouth of Nahanni River, July 24.

Baird recorded specimens from Fort Simpson and Fort Resolution, the latter taken May 22, 1860, by Kennicott.^a Baird, Brewer, and Ridgway describe nests and eggs from Great Slave Lake, and state that the species was found breeding near Fort Resolution, and at Fort Rae and Fort Anderson.^b In the latter region MacFarlane considered it one of the rarest of the warblers, but found several nests.^c Macoun, on the authority of Raine, records a nest found at Peel River, June 18, 1900, by C. E. Whittaker; and under the name *H. c. lutescens*, records specimens taken at Edmonton.^d

J. Alden Loring reported this species common in poplars along streams in the mountains north of Jasper House in August, 1896, "until a severe snowstorm in the latter part of August sent them all south." He took a specimen, now in the Biological Survey collection, at the head of Grand Cache River, Alberta, on August 31.

The breeding birds of western Alberta are referable to the form described as *Vermivora c. orestera*.^e The typical form, however, occurs in the same region in migration.

Helminthophila peregrina (Wils.). Tennessee Warbler.

This species breeds abundantly throughout the region north to Great Slave Lake and the upper Mackenzie. In 1901 it was first detected near Fort Chipewyan, where a specimen was taken June 1. Another was shot on a wooded island near the outlet of Athabaska Lake, June 2, and others were collected 10 miles below Peace River, June 10, and at Smith Landing, June 17. At Fort Smith the species

^a Rev. Am. Birds, p. 177, April, 1865.

^b Hist. N. A. Birds, Land Birds, I, p. 204, 1874.

^c Proc. U. S. Nat. Mus., XIV, p. 444, 1891.

^d Cat. Canadian Birds, Part III, pp. 587, 588, 1904.

^e Oberholser, Auk, XXII, p. 243, 1905.

was common June 19 to 28, being noted almost daily, usually in scattering woods of poplar and Banksian pines.

Nests containing eggs were found by Alfred E. Preble on June 20 and 27, the eggs, five in number, being fresh in each instance. The first nest was embedded in the moss at the foot of a clump of dead willows near the edge of a dense spruce forest. It was rather slightly built of dead grass with a lining of the same material, and was protected from above by the overhanging bases of the willows, and by the strips of bark which had fallen from them, so that the nest could be seen only from the side. The second nest was more bulky, was composed outwardly of shreds of bark, coarse grass, and *Equisetum* stems, and was lined with fine grass. It was placed on the ground beneath a small fallen tree, in a clearing which had been swept by fire a year or two previously. The set collected on June 20 (No. 29619, National Museum) may be described as follows: Ground color pure white, sparingly marked with small spots of raw umber, cinnamon, dark ecru-drab, and lavender, the latter color in most cases underlying the other markings. The spots are thickest at the larger end, where they usually form a broad and irregular band. These eggs measure as follows: 17.5 by 13; 17 by 12.8; 16.6 by 12.4; 16.8 by 12.2; 17.2 by 12.4. The other set (No. 29618), taken June 27, is noticeably different in coloration. In three of the eggs the ground color is pure white, heavily spotted, principally about the larger end, where the spots form a distinct ring, with burnt umber, fawn, lavender, and a few specks of black. In the two remaining eggs the ground color is creamy-white, almost completely obscured by very fine specks of brown, and with larger spots of fawn scattered here and there, and spots of burnt umber, fawn, and lavender, together with a few black specks, covering the larger ends. The eggs in this set average slightly shorter and relatively broader than the others, and measure: 15.6 by 12.6; 16.2 by 12.8; 16.2 by 12.2; 16.2 by 12.2; 16.4 by 12.8.

Later in the same season the Tennessee warbler was noted at Fort Resolution, July 9, and I took newly fledged young at Fort Rae, July 19 and 27.

In the spring of 1903 we first noted this species at Cascade Rapid on the morning of May 28, finding it abundant and in full song. We next observed it on the lower Athabaska, where it was common, May 30 to June 1. It was common on Rocher River, June 6 to 8; at the mouth of Peace River, June 9; at Smith Landing and on Smith Portage, June 11 to 13; and on Slave River between Fort Smith and Fort Resolution, June 15 to 19. At Fort Resolution it was frequently noted during the latter part of June.

During the forenoon of June 25, an extremely windy day, we observed a remarkable movement of these warblers. They came from the northward, flying over the point of land on which the fort

is built in loose flocks of from 10 to 20 individuals. After passing the point, they either struck out directly across the bay or skirted the shore, in either case having to face a strong southeast wind. Some paused a few moments among the low bushes on the point, but the slightest alarm started them off. The flight lasted over two hours, and, during this time, upward of 300 birds were seen from our camp. Two specimens, a male and a female, were collected. The ovaries of the female contained eggs only slightly developed.

During their trip to the Mackenzie my brother and Cary found this species rather common. They noted a number at Hay River, June 30 and July 1, and several daily at Fort Providence, July 2 to 8. They observed the species at Fort Simpson, July 10; found it common about the base of the Nahanni Mountains, July 13; and observed one on Mount Tha-on'-tha, at an altitude of about 1,500 feet, on July 16. On their return trip they noted three individuals near Brulé Rapid, August 18, taking a young male, and saw several at Grand Rapid, August 20. I observed one on an island about 50 miles northeast of Fort Resolution, on July 21, while crossing Great Slave Lake, and noted another on lower Grandin River, on August 2.

In 1904 I saw the first individuals of this warbler near the mouth of Nahanni River June 3. Two days later I took one at the base of the Nahanni Mountains near the same place. I found migrants common on an island in the Mackenzie 8 miles below Fort Wrigley, on the morning of June 8, and collected a pair. I did not see the species farther north, and on my return trip noted it only at Fort McMurray, where I took one August 12.

In a collection recently received are three specimens, including both sexes, taken at Fort Simpson, May 23, 1905, by J. W. Mills.

This species was first reported from the region by Richardson, who listed a specimen from Fort Simpson.^a Baird recorded specimens from Fort Resolution, Fort Rae, and Fort Simpson.^b In the collection of the National Museum are two specimens from Fort Simpson, taken, respectively, May 30, 1860, and May 26, 1862; and one from Fort Smith, taken July 1, 1892, by Miss Elizabeth Taylor. Another, taken by the same collector, June 9, 1892, at Grand Rapid, Athabaska River, is recorded in the catalogue. Russell took four specimens at Fort Chipewyan, May 30 to June 6, 1893.^c Macoun notes this bird as follows:

Common in willow thickets from the mouth of [Lesser] Slave River to Peace River Landing, lat. 56° 15', in June, 1903; first seen on May 22, 1897, at Edmonton, Alta., * * * Common from Edmonton to the Athabasca Pass in

^a Ann. and Mag. Nat. Hist., XI, p. 484, 1843.

^b Rev. Am. Birds, p. 179, April, 1865 (date of No. 22627 [Fort Simpson, May 9, 1861], should read May 29).

^c Expl. in Far North, p. 268, 1898.

willow thickets in low grounds and along streams in June, 1898. * * * (Spreadborough.) One of the most abundant birds between Athabasca Landing and Lesser Slave River; first noted May 30; common down the Athabasca River to Fort McMurray, lat. 56° 40'; common up the Clearwater River and at the north end of Methye Portage; common between Methye Lake and Isle à la Crosse Lake; last seen August 10. (J. M. Macoun [1888].)^a

Seton records the species from near the eastern end of Great Slave Lake, where one was seen July 28, 1907.^b

J. Alden Loring took a female at Banff, Alberta, August 27, 1894, and a male on the Blueberry Hills, on the Jasper House trail about 100 miles west of Edmonton, May 27, 1896. MacFarlane, in a manuscript list, records a specimen taken near Fort Providence, May 18, 1885.

Dendroica tigrina (Gmel.). Cape May Warbler.

During our investigations we detected this species at but two localities, taking a female at Point La Brie, near Fort Chipewyan, May 29, 1901, and a male beside Slave River 50 miles below Fort Smith, on June 30 of the same year. In a small collection recently received is a fine male, taken by H. W. Jones at Fort Simpson, May 23, 1905, extending the known range of the species to the upper Mackenzie. The only previous record from the region seems to be that of Russell, who took a male, the only example observed, at Fort Chipewyan, May 31, 1893.^c

Dendroica æstiva (Gmel.). Yellow Warbler.

The familiar yellow warbler breeds in suitable places over the entire region north to the limit of the forest. In 1901 it was first noted on the lower Athabaska, May 17, when a single bird was seen in the willows bordering the river. A number were seen in willow thickets near Fort Chipewyan, May 24, and one was taken near there June 1. It was next noted at Fort Smith, where it was seen almost daily, June 19 to 28, but was not common. A nest containing nearly fledged young was found in a low bush June 22, and an adult male was taken June 26. At Fort Resolution the species was observed by myself on July 6 and 9, and by Alfred E. Preble on July 10 and 14. Old and young birds were several times seen at Fort Rae, July 19 to 29, and 2 specimens were taken there on July 29. While we were ascending the Athabaska, several were seen at Big Cascade Rapid.

In the spring of 1903 we first observed this common warbler a few miles above Pelican Rapid, May 18. We next noted it 50 miles below Fort McMurray, May 29, and found it common on the lower Athabaska, May 30 to June 1. We saw it frequently also at Fort Chi-

^a Cat. Canadian Birds, Part III, p. 590, 1904.

^b Auk, XXV, p. 73, 1908.

^c Expl. in Far North, p. 269, 1898.

wyan, June 3 and 4; on Rocher River, June 6 to 8; and near the mouth of the Peace, June 9. We next noted it at Fort Resolution, where we observed several June 24. During their trip to the Mackenzie my brother and Cary found it common, seeing several on Hay River, June 28 to July 1, and noting it daily at Fort Providence, July 2 to 8. They noted it also between Fort Providence and Fort Simpson, July 9, and found it abundant at the latter place July 10, observing young just from the nest. Near the mouth of Nahanni River they saw it on July 13, and they heard it at Fort Wrigley, July 21. On their return trip they saw a female at Brulé Rapid, August 18. While crossing Great Slave Lake I noted the species 40 miles south of Trout Rock, July 24. During my trip northward from Fort Rae I noted a few along Grandin River, August 1 to 5, and recorded the species for the last time on Lake St. Croix, August 10, observing a flock of about twenty, evidently migrating.

In the spring of 1904 the yellow warbler was first seen on May 20, at Willow River, near Fort Providence, where a series of specimens, including both sexes, was collected by Mills and Jones. At Fort Simpson I observed it first on May 21, and collected others on May 23 and 24. I saw the first females on May 25, when the species had become common, and noted it nearly every day up to June 1. While descending the Mackenzie to Fort Norman I found it common in willow thickets near the mouth of Nahanni River, June 3; and 8 miles below Fort Wrigley, June 8. It was abundant at Fort Norman, June 11 to 15, and several pairs had nearly completed their nests on June 13. After I left this place it was next noted 75 miles below Fort Norman, June 18. At Fort Good Hope it was seen on several occasions during my stay, June 21 to 24, and one was seen 100 miles below there June 27. I found it common at Fort McPherson during the first half of July, noting it nearly every day. A nest taken July 3 held eggs slightly incubated. On my return trip I saw the species at Fort Simpson on July 27. J. W. Mills took specimens at Fort Simpson on May 23, 1905, and reported it as arriving on May 19.

King observed the yellow warbler at Fort Resolution about the middle of May, 1835.^a Richardson noted its arrival at Fort Franklin late in May, 1849.^b Ross listed it as abundant in the Mackenzie River region north to La Pierre House, and as having been taken at Fort Simpson.^c In the Anderson River region, MacFarlane found it very abundant throughout the wooded country.^d Baird recorded specimens from Fort Resolution, Fort Rae, Fort Simpson,

^a Narrative Journey to Arctic Ocean, II, p. 196, 1836.

^b Arctic Searching Expedition, II, p. 108, 1851.

^c Nat. Hist. Rev., II (second ser.), p. 280, 1862.

^d Proc. U. S. Nat. Mus., XIV, p. 444, 1891.

Fort Good Hope, and Fort Anderson.^a In addition both skins and eggs were received by the Smithsonian Institution from Lesser Slave Lake; and eggs from the Hudson's Bay Company post on Pelican Lake, eastern Saskatchewan, taken in June, 1891, were received through MacFarlane. Several individuals from the upper Mackenzie Valley, and 2 taken near the mouth of the Athabaska, June 20, 1892, by Miss Elizabeth Taylor, are in the National collection. Russell took several specimens May 24 to June 6, 1893, at Fort Chipewyan, and states that the species arrived on the former date.^b Macoun states that Spreadborough first noted this bird on May 12, 1897, at Edmonton; found it abundant between that place and Athabaska Pass in June, 1898; and observed it from the mouth of Lesser Slave River to Peace River Landing in June, 1903.^c

The earliest dates recorded in the catalogue of the birds in the National Museum are as follows: Fort Resolution, May 26, 1860; Fort Simpson, May 29, 1860; May 26, 1861. They probably represent approximately the dates of arrival.

Dendroica coronata (Linn.). Myrtle Warbler.

This hardy warbler is a fairly common summer resident north to the tree limit and is the earliest warbler to arrive in spring.

In 1901 we saw one in a thicket about 40 miles south of Athabaska Landing, May 4. We next noted the species at Fort Chipewyan, May 21, when specimens of both sexes were taken, and again on May 24. I took a male at Fort Resolution, July 6, and saw several at Fort Rae, July 27, collecting two birds of the year.

In the spring of 1903 we first observed the myrtle warbler at Edmonton, May 8, noting a single male. We saw 2 individuals near Sturgeon River, May 12, and found the species common between there and Athabaska Landing, May 13 to 15. While descending the Athabaska we noted it near Swift Current, May 17; between there and Grand Rapid, May 18 and 19; below Little Buffalo River, May 26; and on the lower part of the river, where it was rather common, May 31. It was noted near the outlet of Athabaska Lake, June 5, and was next observed on Slave River below Fort Smith, where it was rather common, June 16 to 19. While ascending the Athabaska on their return trip Alfred E. Preble and Merritt Cary saw 4 individuals, collecting 2, 50 miles above Pelican Rapid, August 27, and found it rather common near Athabaska Landing, September 4 to 15. During my trip northward from Fort Rae, I noted a flock of migrants near Lake St. Croix, August 14, taking a specimen, and also observed the species on Lake Hardisty, August 18, and a few

^a Rev. Am. Birds, p. 196, April, 1865.

^b Expl. in Far North, p. 269, 1898.

^c Cat. Canadian Birds, Part III, p. 594, 1904

miles south of MacTavish Bay, August 22. While ascending the Mackenzie in the autumn I saw a single bird a short distance above Nahanni River, October 15. It made a short flight past the canoe and returned to the woods.

In the spring of 1904 J. W. Mills noted the first yellowrump at Willow River, near Fort Providence, on May 2. It was next seen there May 3, and was common by May 7. Females were first seen May 12, and both sexes were common up to about May 17, after which date the species was less often observed. A series of specimens was collected by Mills and Jones. At Fort Simpson I first saw it May 7, next on May 9, and found it common May 10. The females first arrived on May 13, when the species had become abundant. It was seldom observed during the latter part of the month. During my trip down the Mackenzie I saw it but twice, taking specimens on Manito Island, near Fort Good Hope, June 23, and at Fort McPherson, July 3.

Ross recorded this warbler as occurring in the Mackenzie River region north to La Pierre House, and as having been taken at Fort Simpson.^a Baird recorded specimens from Fort Rae, Fort Simpson, Fort Good Hope (May 25), La Pierre House, and Anderson River.^b In the latter region it was not numerous, and it occasionally nested on the ground.^c Russell took specimens at Fort Chipewyan, May 24 to 30, 1893.^d Macoun states that Spreadborough observed two at the upper crossing of the Lobstick, about 90 miles directly west of Edmonton, Alberta, where the birds were breeding, on June 17, 1898; and that large flocks were observed at Henry House on September 2 of the same year.^e Seton records the bird from the tree limit on Artillery Lake, where a flock was observed on September 3, 1907.^f

Dendroica auduboni (Townsend). Audubon Warbler.

In 1894 J. Alden Loring reported this species common in flocks at Banff, Alberta, August 25 to September 1, and shot a male (which was not preserved) at Edmonton on September 11. In 1896 he found it common and probably breeding 15 miles south of Henry House, July 3 to 21, and later in the summer frequently observed it in the mountains and foothills between Jasper House and Smoky River. After the latter part of August, when a severe snowstorm occurred, but few were noted.

^a Nat. Hist. Rev., II (second ser.), p. 279, 1862.

^b Rev. Am. Birds, p. 188, April, 1865.

^c Proc. U. S. Nat. Mus., XIV, p. 444, 1891.

^d Expl. in Far North, p. 269, 1898.

^e Cat. Canadian Birds, Part III, p. 602, 1904.

^f Auk, XXV, p. 73, 1908.

Dendroica magnolia (Wils.). Magnolia Warbler.

The magnolia warbler is a rather common summer resident north to Great Slave Lake and the upper Mackenzie. In 1901 a male was taken at Fort Chipewyan, May 23. During the same season it was elsewhere detected only on the Athabaska about 10 miles above Pelican Portage, where one was shot August 25, but was not preserved.

In 1903 this warbler was first noted at Grand Rapid, May 22, when a single one was seen. Another was seen at Cascade Rapid on the morning of May 28, and the species was rather common on the lower Athabaska, May 30 and 31. During their trip to the Mackenzie my brother and Cary found it rather common, noting numbers nearly every day at Fort Providence, July 3 to 8, and at Fort Simpson, July 10. A number, including nearly fledged young, were seen daily on the lower slopes of Mount Tha-on'-tha, July 13 to 15, and the species was common also on the mountain between 1,200 and 2,000 feet altitude on the latter date. Old and young individuals were seen near the base of the mountain, July 17 and 18, and one was noted near the mouth of Nahanni River, July 19. Several specimens, including old and young, were taken at Fort Providence and on the Nahanni Mountains. On their return trip up the Athabaska my brother and Cary saw a female near Brulé Rapid, August 18.

In 1904 I saw the first one at Fort Simpson on May 31. I did not observe the species farther north, and on my return trip noted it only at Cascade Rapid, where I saw one August 16.

This pretty species was first recorded from the region by Richardson, who listed a specimen from Fort Simpson; ^a he afterwards noted its arrival at Fort Franklin late in May, 1849. ^b Baird recorded the bird from Fort Resolution and Fort Simpson. ^c Eggs were collected at Lesser Slave Lake by Strachan Jones in 1868 and sent to the Smithsonian Institution. The earliest date recorded in the bird catalogue of the National Museum for Fort Simpson is May 23, 1860. Macoun states that Spreadborough observed only two at Edmonton—on May 22 and 25, 1897. ^d

Dendroica castanea (Wils.). Bay-breasted Warbler.

In 1901 we detected this species but once, taking a male in mixed woods at our camp near Point La Brie, 12 miles northeast of Fort Chipewyan, May 28.

On August 21, 1904, while ascending the Athabaska, Merritt Cary shot a female at Grand Rapid. It was in a migrating flock of blackpolls and redstarts. These records seem to comprise the sum

^a Ann. and Mag. Nat. Hist., XI, p. 484, 1843.

^b Arctic Searching Expedition, II, p. 108, 1851.

^c Rev. Am. Birds, p. 206, April, 1865.

^d Cat. Canadian Birds, Part III, p. 609, 1904.

of our knowledge regarding the distribution of this warbler in the region.

Dendroica atricapilla Landbeck. Black-poll Warbler.

The black-poll occurs in summer throughout the region north to the very edge of the wooded country. It arrives on its breeding grounds late in May, and some individuals are on their way south again in late July, molting, as they travel, into the olivaceous plumage common to old and young in autumn.

In 1901 this bird was first seen at Fort Chipewyan, May 23, when a female was collected. It was next detected at Trout Rock, where it was observed July 16. It was common at Fort Rae, being noted almost daily, July 19 to 29. Birds of the year taken July 19, 23, and 29 are in the spotted juvenal plumage, but with the yellowish-green of the fall plumage appearing on the back, throat, chest, and sides; the change was about half completed in most of the specimens. An adult male taken July 26 also is molting, the yellowish-green forming a patch on each side of the breast.

In the spring of 1903 we first observed black-polls below Poplar Point, on the lower Athabaska, on May 30. We found it common near the mouth of Peace River, June 9, and at Smith Landing, June 12. My brother and Cary noted the species almost daily at Fort Providence, July 2 to 7, collecting several, including old and young. On their return trip they found it common at Grand Rapid, August 21. While crossing Great Slave Lake to Fort Rae I observed it near Gros Cape, July 23, and 40 miles south of Trout Rock, July 24. While voyaging northward from Fort Rae I noted the species on Grandin River, August 1 and 5, and took specimens in the transition from the breeding to the autumnal plumage near Lake St. Croix, August 14, when the species was abundant. It was last seen on the shore of Great Bear Lake, east of Leith Point, where a single bird was noted on August 29.

In the spring of 1904 Mills and Jones took a series of specimens near Fort Providence, noting the species first on May 18, and finding it common during the next few days. At Fort Simpson I failed to detect it until May 23. I noted it next on an island in the Mackenzie 8 miles below Fort Wrigley on the morning of June 8, when migrants were common. I saw a few individuals at Fort McPherson on July 2, 4, and 7. On my return trip I noted a few migrants near Little Red River on August 9. J. W. Mills collected a male at Fort Providence on May 19, 1905.

Ross recorded this bird as common in the Mackenzie River region north to La Pierre House.^a MacFarlane found it rather plentiful on Anderson River, where in a few cases nests were found on the ground.^b

^a Nat. Hist. Rev., II (second ser.), p. 279, 1862.

^b Proc. U. S. Nat. Mus., XIV, p. 444, 1891.

The specimens sent by him to the Smithsonian include sets of eggs taken at Rendezvous Lake, June 28, 1864, and on the lower Anderson in June, 1865. Baird recorded specimens from Fort Resolution, Fort Rae, Big Island, Fort Simpson, Fort Good Hope, Fort Anderson, and Peel River.^a Sharpe lists skins from Fort Good Hope and Great Bear Lake.^b The earliest date for Fort Simpson recorded in the catalogue of the birds in the National Museum collection is May 22. Macoun states that J. M. Macoun saw two or three on the Athabaska near Lesser Slave River [in 1888], and that Spreadborough saw one at the upper crossing of Lobstick Creek, west of Edmonton, in June, 1898.^c Seton notes the species from Artillery Lake, where a female was seen feeding young on August 5, 1907.^d

J. Alden Loring took a specimen at Edmonton, September 25, 1894.

***Dendroica virens* (Gmel.).** Black-throated Green Warbler.

This bird was found by us only on a wooded island near the outlet of Athabaska Lake, where we encamped during the first few days of June, 1901. Here we saw several in dense spruce woods June 3, collecting a pair, and also saw one June 4. The males were in full song, and the birds were evidently located on their breeding grounds.

Among his records for this warbler, Macoun says:

First seen at Edmonton, Alta., May 15, 1897; common in spruce woods by May 22; breeding in the woods; one pair seen at Peace River Landing in latitude 56° 15', in June, 1903. (Spreadborough.)^e

***Dendroica townsendi* (Townsend).** Townsend Warbler.

This western species probably occurs regularly as a migrant in western Alberta. A male, evidently a bird of the year, was taken by J. Alden Loring at Banff, August 28, 1894.

***Dendroica palmarum* (Gmel.).** Palm Warbler.

This warbler has been taken at a number of points north to the upper Mackenzie. In 1901 I saw one or two in a mixed flock of small migrants at Fort Chipewyan, May 23. We noted it elsewhere at but one place—on Slave River about 125 miles below Fort Smith—where I took a pair in scattering woods at the edge of a marsh, July 2.

In the summer of 1903 Alfred E. Preble and Merritt Cary found this species rather common at Fort Providence, noting two on July 6, six on July 7, and two July 8. At this place they took a number of

^a Rev. Am. Birds, p. 193, April, 1865.

^b Cat. Birds Brit. Mus., X, p. 327, 1885.

^c Cat. Canadian Birds, Part III, p. 617, 1904.

^d Auk, XXV, p. 73, 1908.

^e Cat. Canadian Birds, Part III, p. 620, 1904.

specimens in young spruces in a dry muskeg near the post on July 6 and 7. The song, consisting of several weak notes, was heard on several occasions, but usually a sharp 'chip' was the only note.

In 1904 I saw two individuals in a mixed flock of small migrants near Stony Creek, Alberta, on September 3.

Richardson, under the name *Sylvicola petechia*, first recorded this bird from the region, listing a specimen from Fort Simpson.^a Baird recorded specimens from the same place, and from Fort Resolution,^b where its nest was discovered by Kennicott.

Seiurus aurocapillus. (Linn.). Oven-bird.

The oven-bird occurs in suitable places in the Athabaska and Slave River valleys north at least to Great Slave Lake. Since it has been taken at Fort Yukon^c and other points on Yukon River, it should occur also on the upper Mackenzie, but we failed to detect it there, and I find no records.

In 1901 the oven-bird was first noted near Point La Brie, near Fort Chipewyan, May 29, when a male in full song was secured. It was next noted at our camp on Slave River, 10 miles below the Peace, where we found the species to be fairly common in a tract of poplar woods, June 8 to 10, and on the latter date secured a specimen. Contrary to their usual habits, the birds were extremely shy, and the one taken was secured with difficulty. The species was noted also as we were descending Slave River about 50 miles below Fort Smith, where several were heard singing, June 30.

In the spring of 1903 we first observed this bird at Cascade Rapid, May 28. We noted it next on Rocher River, June 6. Its presence, usually heralded by its loud familiar song, was frequently noted as we paddled down Slave River between Fort Smith and Fort Resolution, June 15 to 19, and several were heard and seen at the latter place on June 22 and 23. While ascending the Athabaska on their return trip Alfred E. Preble and Merritt Cary observed two, collecting one, in poplar woods at Fort McMurray, August 10. Another was seen at House River on August 22.

In 1904 I noted this bird only near Little Red River, where I saw one on August 9.

The egg catalogue of the National Museum shows that eggs, taken by Strachan Jones, were received from Lesser Slave Lake in 1868. Macoun, from the notes of Spreadborough, states that the oven-bird was first seen at Edmonton May 14, 1897, was common by May 22, and had finished building but not yet laid its eggs on June 3; it was common from Edmonton to the crossing of McLeod River in June,

^a Ann. and Mag. Nat. Hist., XI, p. 484, 1843.

^b Rev. Am. Birds, p. 208, April, 1865.

^c Trans. Chicago Acad. Sci., I, p. 278, 1869.

1898; and abundant from the mouth of Lesser Slave River to Peace River Landing in June, 1903. J. M. Macoun in 1888 noted it along the Athabaska between the Landing and Lesser Slave River about the last of May. Later in the season he saw a few at Fort McMurray and at the north end of Methye Portage.^a

Seiurus noveboracensis notabilis Ridgw. Grinnell Water-thrush.

The water-thrush breeds rather commonly throughout the Athabaska-Mackenzie region north nearly to the limit of trees. Swamp-loving birds like the water-thrushes can not fail to find congenial homes in this region of marsh and muskeg, and their sprightly songs are often heard as the traveler floats down its waterways.

In 1901 we first noted the water-thrush on the Athabaska, near the mouth of Little Red River, May 15, where its song was several times heard in the thickets bordering the river. During the two following days, while traveling on the river to Athabaska Lake, we heard the species every little while. We did not note it at Fort Chipewyan, but while encamped on a wooded island near the outlet of Athabaska Lake, June 1 to 4, we heard the bird daily in a swampy thicket, and took a male on June 4. We noted it also on Rocher River, June 5; at the mouth of Peace River, June 6; 10 miles below that point, June 8; and at Smith Landing, June 15. We next noted it on the banks of Slave River, 25 miles below Fort Smith, June 30, and farther down the river on July 1 and 2. At Fort Rae I saw one or two on July 26, and took one July 27.

In 1903 we first noted this species, a single individual, at Grand Rapid, May 22. We next noted it below Little Buffalo River, May 26, found it common at Cascade Rapid on the morning of May 28, and observed numbers nearly every day between there and the mouth of the Athabaska up to June 1. We observed the species at Fort Chipewyan, June 3, and near the outlet of Athabaska Lake, June 5, and found it common on Rocher River, June 6 to 8. Along Slave River, between Fort Smith and Fort Resolution, June 15 to 19, we found it abundant, and we noted it at the latter place on June 22 and 23. During their trip to the Mackenzie, my brother and Cary saw it at Hay River, June 30 and July 1; at Fort Providence, July 2, 4, and 5; and at Fort Simpson, July 10. On their return trip they observed it at Fort McMurray, August 11. While on my way to Fort Rae from Fort Resolution, after the division of the party, I noted it at the delta of the Slave, July 17; and while following the canoe route north of Fort Rae I noted one on Lake St. Croix, August 13, and another, still in song, on a large lake a few miles south of MacTavish Bay, August 22. This was the last one of the season.

^a Catalogue Canadian Birds, Part III, p. 626, 1904.

In the spring of 1904 I first saw the water-thrush at Fort Simpson on May 14, noted it next on May 17, and found it common May 18. It was in full song from the time of its arrival, and was noted nearly every day during the remainder of May. Several specimens were collected at Fort Simpson late in May by myself, and males were taken at Willow River, near Fort Providence, by J. W. Mills on May 17 and 22. During my trip down the Mackenzie I noted the species between Fort Simpson and Nahanni River, June 2 and 3; near Fort Wrigley, June 7; near Sans Sault Rapid, June 19; below Fort Good Hope, June 25 and 26; and at Fort McPherson, July 4 and 7, collecting one on July 4. While ascending the Athabaska on my return trip I saw one near Grand Rapid on August 22.

Ross recorded *Seiurus noveboracensis* as common in the Mackenzie River region north to La Pierre House.^a Baird reported specimens from Fort Rae, Fort Simpson, Fort Norman, and Peel River;^b and the catalogue of the birds in the National Museum records skins from Fort Resolution, Big Island, and La Pierre House. One from the latter locality, a female taken with nest and five eggs; an adult male from Fort Simpson, taken May 22, 1860; and a young one, just from the nest, taken at the same locality, August 10, 1860, are still in the collection. Russell took specimens at Fort Chipewyan, May 24 and 26, 1893.^c Macoun records one seen at Edmonton, May 15, 1897, by Spreadborough, who also found it common from the mouth of Lesser Slave River to Peace River Landing in June, 1903.^d

Oporornis philadelphia (Wils.). Mourning Warbler.

On August 12, 1904, while collecting in deep poplar woods on a large island near Fort McMurray I shot an immature male of this species. It was taken in mixed undergrowth and was the only one observed.

Oporornis tolmiei (Townsend). Tolmie Warbler.

Macoun, on the authority of Spreadborough, notes this species as follows:

First seen at Edmonton, Alta., June 3, 1897, not common, found chiefly along the high banks back of the river where there is plenty of dead brush, they breed here without doubt; observed from Lesser Slave Lake to Peace River Landing in June, 1903.

He also records a specimen taken at Edmonton, Alberta, June 4, 1897.^e

^a Nat. Hist. Rev., II (second ser.), p. 279, 1862.

^b Rev. Am. Birds, p. 216, April, 1865.

^c Expl. in Far North, p. 269, 1898.

^d Cat. Canadian Birds, Part III, p. 631, 1904.

^e Ibid., pp. 636, 637, 1904.

Geothlypis trichas occidentalis (Brewst.). Western Yellow-throat.

This bird seems to be of regular occurrence in suitable places north to Athabaska Lake and the Peace River Valley. In 1901, on my return trip, I saw several individuals, evidently a family party, in a thicket of young growth near Vermilion Creek, 42 miles north of Edmonton, on September 3.

On June 1, 1903, Merritt Cary observed a singing male in a marsh bordering Athabaska River a few miles above its mouth.

In the early summer of 1896, J. Alden Loring reported seeing several yellow-throats in the grassy margins of water-courses on the Jasper House trail west of Edmonton.

Macoun, on the authority of Spreadborough, states that this bird was "first seen at Edmonton, Alta., May 27, 1897, common and nesting in the willows by June 1st; common from Edmonton to the summit of the Rocky Mountains in Yellowhead Pass in July, 1898, breeding in willow thickets on the borders of marshes; common from Lesser Slave Lake to Peace River Landing, Lat. 56° 15', in June, 1903." He records also 3 specimens taken at Edmonton in May, 1897.^a

Wilsonia pusilla (Wils.). Wilson Warbler.

The black-capped warbler apparently occurs throughout the region north to the tree limit. A dearth of specimens from the region makes it difficult to formulate the ranges of the eastern form and its subspecies *pileolata*, but the bird breeding over most of this area seems to be referable to the typical form, while the slight amount of evidence at hand indicates that the bird of the lower Mackenzie is *pileolata*.

In 1901 I saw a single individual at Fort Chipewyan on May 23. I next noted the species a short distance below Grand Rapid, August 20, when I saw one in a thicket beside the river.

In 1903 we observed numbers on the lower Athabaska on May 31 and June 1. In the autumn, while ascending the Athabaska on their return trip, Alfred E. Preble and Merritt Cary observed the species as follows: Fort McMurray, August 8 to 11, several seen and one secured; Brulé Rapid, August 18, one male seen; House River, August 22, one taken; Pelican Portage, August 25, several seen.

In 1904 I took a female, the first one observed, on a willow-covered island below the mouth of Nahanni River, June 6. I also noted it near Fort Wrigley, June 7, and 8 miles below there, June 8. At Fort Norman on June 11 I saw several, collecting a male. I observed several at Fort McPherson, July 14. During my return trip I took a specimen at Fort McMurray, August 11.

^a Cat. Canadian Birds, Part III, p. 639, 1904.

Baird recorded a specimen from La Pierre House;^a and Sharpe, one from Fort Simpson.^b Macoun, on the authority of J. M. Macoun, states that a pair was seen at Fort McMurray, and that the species was common on Methye Portage, and between there and Isle à la Crosse [in 1888]. Spreadborough first saw it at Edmonton, Alberta, on May 29, 1897.^c Seton records this warbler from the northern edge of the forest on Artillery Lake, where I collected a specimen on September 5, 1907.^d

A specimen in the National Museum, taken at Fort Anderson, July 10, 1864, is pronounced by H. C. Oberholser to be referable to *Wilsonia pusilla pileolata*.

Wilsonia canadensis (Linn.). Canadian Warbler.

This warbler is now ascertained to be a regular inhabitant of the lower Athabaska Valley north at least to the mouth of the Clearwater.

In 1901 the Canadian warbler was detected only on the Athabaska a short distance below Grand Rapid on August 20, when I shot a male in a thicket bordering the river.

While ascending the Athabaska in the fall of 1903, Alfred E. Preble and Merritt Cary found the species common at Fort McMurray, August 8 to 11, and took a male on August 10. Both adults and young were present and the males were still in song. They frequented the heavy undergrowth of the poplar woods and were shy and difficult to approach. Several were afterwards observed in the hillside ravines between Grand Rapid and Pelican Portage, August 20 to 25.

In 1904 I observed the species only at Fort McMurray, where I took one on August 11, and saw another August 12.

Macoun records a specimen taken at Edmonton, Alberta, May 29, 1897, by Spreadborough.^e

Setophaga ruticilla (Linn.). Redstart.

The redstart is a rather common summer inhabitant of the Athabaska and Mackenzie valleys north at least to Fort Norman. In 1901 it was first noted at Fort Chipewyan on May 23, when a male was taken, and next on June 1, when a female was collected at the same place. It was found to be rather common at our camp 10 miles below Peace River, June 8 to 10, and a nest containing five fresh eggs was taken on the latter date. The nest was about 6 feet up in a clump

^a Rev. Am. Birds, p. 241, May, 1865.

^b Cat. Birds Brit. Mus., X, p. 436, 1885.

^c Cat. Canadian Birds, Part III, p. 643, 1904.

^d Auk, XXV, p. 73, 1908.

^e Cat. Canadian Birds, Part III, p. 647, 1904.

of willows growing in a flooded swamp. In the same clump, 6 feet higher up, was the nest of a rose-breasted grosbeak. Several redstarts were seen and 2 specimens were taken at Smith Landing, June 15 and 17, and a pair was seen at Fort Resolution, July 6.

In the spring of 1903 we first observed this bird on the Athabaska a few miles above Poplar Point, May 30. We next noted it on Rocher River, June 6, and also at Fort Resolution, June 23. My brother and Cary found it rather common at Fort Providence, July 2 to 8, noting several nearly every day; saw two on the way to Fort Simpson, July 9; and found it abundant at that place, July 10. They noted a few also near the mouth of Nahanni River on July 11 and 12, and one on the Nahanni Mountains, July 17. On their return trip they found it common at Grand Rapid, August 21, and at Quito or Calling River on August 28, the last date recorded.

In the spring of 1904 I first observed the redstart at Fort Simpson on May 25, noting two, and saw a few May 26 and 28. During my trip down the Mackenzie I saw one near the mouth of Nahanni River, June 3. At Fort Norman I took a male, the only one observed, on June 13. This was as far north as I detected the bird. On my return trip I saw a few at Fort McMurray on August 11, 12, and 14. J. W. Mills took specimens at Fort Simpson, May 26, 1905, and Jones reports it there on May 22.

This bird was first recorded from the region by Richardson, who listed a specimen from Fort Simpson.^a Ross recorded it as common in the Mackenzie River region north to Fort Good Hope.^b Baird recorded skins from Fort Resolution and Fort Simpson;^c and the bird catalogue of the National Museum shows that specimens were received also from Fort Liard and Lesser Slave Lake, accompanied in the latter case by eggs. The earliest dates recorded in the catalogue are as follows: Fort Simpson, May 20, 1860; May 28, 1861; Fort Resolution, May 23, 1860. Skins from the last two localities are still in the collection. Macoun states that this species was first seen by Spreadborough at Edmonton, Alberta, May 29, 1897, and was common by June 1; it was common in willow thickets from Edmonton to Athabaska Pass in June, 1898; and in thick woods from the head of Lesser Slave Lake to Peace River Landing in June, 1903. J. M. Macoun saw a pair at the mouth of La Biche River in the summer of 1888. Macoun records specimens also from Edmonton and Peace River Landing.^d

In the early summer of 1896, J. Alden Loring noted several during the first part of his trip along the trail between Edmonton and Jasper House.

^a Ann. and Mag. Nat. Hist., XI, p. 484, 1843.

^b Nat. Hist. Rev., II (second ser.), p. 280, 1862.

^c Rev. Am. Birds, p. 256, May, 1865.

^d Cat. Canadian Birds, Part III, pp. 649, 651, 1904.

Anthus rubescens (Tunstall). American Pipit.

This species occurs rather commonly throughout the wooded part of the region in migration, and breeds on the Barren Grounds and the higher parts of the mountains. In 1901 we observed it only during the autumnal migration, finding it common about the fields at Athabaska Landing on August 30, when we collected a specimen, and noting a number on the road near Vermilion Creek on September 3.

In 1903 a flock of about 30 was observed at Edmonton, May 10; several individuals near Sandy Creek, May 14; and one or two near Pelican Rapid, May 18. The species was next observed by my brother and Cary at Fort Providence, where a female, whose ovaries contained small eggs, was taken on July 3. On their return trip in the fall they noted large flocks migrating at Athabaska Landing, September 3 to 10. The last were seen about September 14. During the same autumn I first noted it on the shore of Great Bear Lake east of Leith Point, where I saw one August 28. I noted a small flock at my camp near the same place, September 5, and while ascending the Mackenzie saw a single individual near Gravel River, October 5.

In the spring of 1904 the pipit arrived at Fort Simpson on May 14, when I noted about 10 individuals. It was next seen May 16, when it was common, and was noted daily up to May 21, the last date recorded. The birds frequented the fields about the post, associating largely with the Lapland longspurs and horned larks. Several specimens, all of which proved to be females, were taken. The species was next observed along the road between Athabaska Landing and Lily Lake, Alberta, where it was abundant September 2 and 3.

King obtained this species at Fort Reliance in May, 1834.^a Sharpe records specimens from Fort Simpson, taken in May and September.^b The catalogue of the birds in the National Museum shows that specimens were received from Fort Rae, Fort Anderson,^c Fort Simpson, and Fort Good Hope, skins from the last two localities being still in the collection. Russell took the species at Fort Chipewyan, May 20, 1893.^d Spreadborough, as stated by Macoun, first observed it at Edmonton, April 27, 1897, noting about 20. The birds were common there up to May 10, when they disappeared. He saw one

^a Narrative Journey to Arctic Ocean, II, p. 283, 1836.

^b Cat. Birds Brit. Mus., X, p. 598, 1885.

^c Two female specimens taken with eggs near Rendezvous Lake, June 25 and 26, 1864 (the latter being referred to as *Pooœtes gramineus* by MacFarlane, Proc. U. S. Nat. Mus., XIV, p. 441, 1891), were identified as *Anthus ludovicianus* by Baird, who inserted this name in MacFarlane's field catalogue, and entered the specimens in the Museum register as Nos. 43247 and 43248.

^d Expl. in Far North, p. 269, 1898.

in the Athabaska Pass, September 29, 1898.^a Seton records the pipit from Clinton-Colden Lake.^b

J. Alden Loring reported it common at Edmonton, September 7 to 26, 1894, taking two specimens on September 9. In 1896 he found it common above timber line in the mountains 15 miles south of Henry House, Alberta, July 3 to 21; and in the early autumn reported it common in the valleys between Jasper House and Smoky River, taking two specimens on Sulphur Prairie, Grand Cache River, about 70 miles north of Jasper House, on September 12.

Cinclus mexicanus unicolor Bonap. Northern Dipper. Water Ouzel.

This species was first recorded from the region by Bonaparte, who described a specimen in the collection of Mr. Leadbeater, said to have come from Athabaska Lake.^c Concerning the source of this specimen, Richardson says:

Three specimens of this bird were procured by Mr. Drummond near the sources of the Athabaska River, on the eastern declivity of the Rocky Mountains, * * * Several specimens, obtained at the same locality and at the same time with Mr. Drummond's, came into Mr. Leadbeater's hands through the Hudson's Bay Company, one of which has been described and figured by the Prince of Musignano in his splendid American Ornithology.^d

It is highly probable, therefore, that in this, as in several other cases, Bonaparte was either misinformed regarding the locality of the specimens, or applied the name 'Athabaska Lake,' which he sometimes qualified by the clause "near the Rocky Mountains,"^e to some lake near the source of Athabaska River.^f

Mr. Ridgway has recently revived the name *Cinclus unicolor*,^g provisionally applied by Bonaparte to this specimen, so that the correct location of the type locality becomes highly important.

Two specimens of this bird, taken by William Brass at Fort Halkett, British Columbia, on the upper Liard River, December 10, and 'December', 1862, and now in the National Museum, were recorded by Baird.^h

J. Alden Loring, in the autumn of 1895, saw an individual of this species in the mountains west of Henry House, and observed three in the same general region in the autumn of 1896. In the late summer of the same year he saw several along streams in the high mountains between Jasper House and Smoky River.

^a Cat. Canadian Birds, Part III, p. 654, 1904.

^b Auk, XXV, p. 73, 1908.

^c American Ornithology, III, pl. 16, fig. 1, 1828.

^d Fauna Boreali-Americana, II, p. 173, 1831.

^e Zool. Journ., III, pp. 49, 52, 1827.

^f See note regarding source of Leadbeater's specimens, p. 61.

^g Bull. U. S. Nat. Mus., 50, Part III, p. 679, 1904. (" *Cinclus unicolor* Bonaparte, Zool. Journ., III, 1827, 52.")

^h Rev. Am. Birds, p. 60, June, 1864.

Dumetella carolinensis (Linn.). Catbird.

The catbird has not been found north of the Saskatchewan Valley. Macoun, on the authority of Spreadborough, says:

First seen at Edmonton, Alta., May 25, 1897, heard a number of them singing next day, they soon became common and began to breed; common from Edmonton north [should be west] to the McLeod River in June, 1898.

He also records a specimen taken at Edmonton, May 25, 1897.^a

Salpinctes obsoletus (Say). Rock Wren.

In the early autumn of 1895, J. Alden Loring observed a rock wren at Jasper House, Alberta. Macoun, on the authority of Spreadborough, records one seen at Prairie Creek [near Jasper House], June 29, 1898.^b

Troglodytes aedon parkmani Aud. Western House Wren.

The house wren is apparently a regular breeder on the Athabaska and lower Peace, and has been detected once on the upper Mackenzie.

Noted but once in 1901, a single individual being seen in a thicket near Athabaska Landing, August 30. The deserted nest of one was seen in a shed at Edmonton.

Merritt Cary took a male at Fort McMurray, August 10, 1903, in the dense undergrowth near some abandoned cabins. He was informed by Bishop Young that a pair nested in one of the outbuildings at Fort Vermilion, Peace River, some years ago.

On the morning of May 20, 1904, while collecting at Fort Simpson, I saw a house wren in a brushy tract near the post clearing, but failed to secure it. This is the only instance known of its occurrence at this place. During my return trip, I saw two about a deserted cabin in the deep woods at Fort McMurray on August 12.

Under the name *Troglodytes aedon*, Richardson described a male taken "near the sources of the Elk River" [Athabaska], by Mr. Drummond.^c Eggs taken at Lesser Slave Lake in 1868 by Strachan Jones were received by the Smithsonian Institution. Macoun, on the authority of Spreadborough, states that the species was first seen at Edmonton, Alberta, May 6, 1897; nests with eggs were found, June 8 and 11; observed from Edmonton to Athabaska Pass in June, 1898; common from the mouth of Lesser Slave River to Peace River Landing in June, 1903; nesting in holes in trees and in the sandstone cliffs and cut banks of Peace River; specimens of the birds and eggs are recorded from Edmonton, Alberta.^d

J. Alden Loring took a specimen at Edmonton, September 11, 1894.

^a Cat. Canadian Birds, Part III, p. 662, 1904.

^b Ibid., p. 665, 1904.

^c Fauna Boreali-Americana, II, p. 317, 1831.

^d Cat. Canadian Birds, Part III, pp. 669, 670, 1904.

Nannus hiemalis (Vieill.). Winter Wren.

The winter wren seems to be of regular occurrence in the Athabaska—and probably in the Peace River—valleys. One was observed in a thicket beside the Athabaska a short distance below Grand Rapid, August 20, 1901.

While ascending the Athabaska in the fall of 1903 Alfred E. Preble and Merritt Cary saw one near House River, August 22, and collected one near Athabaska Landing, September 14. It proves referable to the typical form.

J. Alden Loring reported seeing single birds at Jasper House and Henry House in the early autumn of 1895. It is probable that they belonged to the western race, *N. h. pacificus*.

Spreadborough, according to Macoun, who refers the record to the western form, found the winter wren common in thick spruce woods from Lesser Slave Lake to Peace River Landing in June, 1903.^a

Telmatodytes palustris iliacus Ridgw. Prairie Marsh Wren.

Under the name *Troglodytes palustris*, Richardson described a male from the "southern sources of the Elk River," one of several taken by Drummond in that region.^b The catalogue of the birds in the National Museum records 2 specimens collected by Strachan Jones at Lesser Slave Lake in 1868, and eggs were also received from the same locality.

J. Alden Loring reported that two pairs were seen at Edmonton, September 16, 1894, and a specimen taken by him at that time has been recorded under the name *Cistothorus palustris plesius* by Oberholser.^c According to Macoun, Spreadborough observed a number at Edmonton, Alberta, May 10, 1897. The species was common by May 13, and had eggs about the last of the month. A pair was observed breeding at Peace River Landing, July 1, 1903. Specimens from Edmonton and Peace River Landing are recorded.^d

Certhia familiaris montana Ridgw. Rocky Mountain Creeper.

While on their return trip in the fall of 1903 Alfred E. Preble and Merritt Cary observed a brown creeper, probably referable to the present form, in a grove of *Pinus divaricata* 20 miles south of Athabaska Landing, September 22.

Sitta carolinensis aculeata Cass. Slender-billed Nuthatch.

While ascending the Athabaska in the autumn of 1903 Alfred E. Preble and Merritt Cary observed a white-bellied nuthatch, probably referable to the western form, near Swift Current Rapid, August 28.

^a Cat. Canadian Birds, Part III, p. 672, 1904.

^b Fauna Boreali-Americana, II, p. 320, 1831.

^c Auk, XIV, p. 193, 1897.

^d Cat. Canadian Birds, Part III, pp. 677, 678, 1904.

Sitta canadensis Linn. Red-breasted Nuthatch.

This nuthatch is a fairly common inhabitant, probably in summer only, north to the region of Fort Simpson. In 1901 we first noted it on the Athabaska a short distance below Athabaska Landing, May 6. We next observed it near the outlet of Athabaska Lake, June 2 and 3, taking a male on the former date. We saw another bird in spruce woods 25 miles below Peace River, June 13, and heard the familiar notes of the species beside Slave River 50 miles below Fort Smith on June 30.

During the spring of 1903 we observed the Canada nuthatch but twice—above Pelican Rapid, May 18, and below Poplar Point, May 30. While ascending the Athabaska in the fall Alfred E. Preble and Merritt Cary found the species abundant along the river between Brulé Rapid and La Biche River, August 18 to 29, and near Athabaska Landing, September 1 to 21. They observed it also 50 miles south of Athabaska Landing on September 23.

In 1904 I saw this species only at Fort Simpson. It was first noted April 17, when I saw two in mixed woods of poplar and spruce on a ridge near Liard River, several miles south of the post. On April 22, when I made another trip to the same locality, I again observed a few in the same woods.

J. Alden Loring reported several observed during the last week of August, 1894, at Banff, Alberta, and took a male on August 31. In the early autumn of 1895, he found the species common in the mountains in the vicinity of Jasper House; he reported it quite common during the early autumn of 1896 in the mountains and foothills between Jasper House and Smoky River.

Macoun, from the notes of J. M. Macoun taken in 1888, states that this species was "not rare between Athabasca Landing and Lesser Slave River; first seen May 29th; not rare on the Clearwater River up to Methye Portage." On the authority of Spreadborough, he states that the species was rather common in the spruce woods at Edmonton, June 12, 1897, when a nest with young was found; common from Edmonton to Athabaska Pass in June, 1898; not common in the Peace River country, very few seen during the season of 1903. A specimen taken at Edmonton, April 29, 1897, is recorded.^a

Penthestes atricapillus septentrionalis (Harris). Long-tailed Chickadee.

The familiar black-capped chickadee of the east is represented in the Athabaska and Mackenzie valleys by this closely related form, which is a rather common breeder throughout the wooded portion of the region. During the more severe months it withdraws from the

^a Cat. Canadian Birds, Part III, pp. 683, 685, 1904.

more northern parts of its range, but moves northward again with the first return of mild weather.

On May 1, 1901, we first saw this chickadee near Edmonton, and on May 4 saw it 60 miles north of that point. While descending the Athabaska we observed the species near Brulé Rapid, May 12 and 13, and near Little Red River May 15. We noted it also at Fort Chipewyan, May 19, and 25 miles below Peace River June 13. At Fort Smith, on June 23, we observed a small company, including young birds, and evidently a family party, and collected three specimens. While we were ascending the Athabaska the species was observed at Big Cascade Rapid August 14, below Grand Rapid August 20, 10 miles below Pelican Rapid August 25, and at Athabaska Landing, where several individuals were observed, and one was taken, on August 30.

In the spring of 1903 we first observed this chickadee at Edmonton, where we saw a few on May 8, 10, and 12. During the trip to Athabaska Landing, May 11 to 15, we noted a few daily, and near Sandy Creek, May 14, saw one excavating a nesting hole. While descending the Athabaska we noted the species near Stony Rapid, May 26; near Fort McMurray, May 28; and daily between there and Athabaska Lake, May 29 to June 1. We noted it also near the mouth of Peace River June 9. It was next observed by my brother and Cary at Fort Simpson July 10, two individuals being seen. On their return trip in the fall they found it rather common on the Athabaska, noting it at Fort McMurray August 10, at Cascade Rapid August 14, and between Brulé Rapid and La Biche River August 18 to 29. The bird was abundant also near Athabaska Landing, and between there and Edmonton, during September. During my trip northward from Fort Rae I noted the bird a few miles south of MacTavish Bay, August 22, and while traveling along the south shore of Great Bear Lake I noted a few 40 miles west of McVicar Bay, September 12, and observed small bands at Fort Franklin on September 18, 22, and 27. After my arrival at Fort Simpson I saw and collected single birds on November 17 and December 3.

The species was not observed during the colder part of the winter at Fort Simpson, and in the spring of 1904 was first seen on April 12, two being observed. It was next noted April 17, and became common toward the end of the month. A pair was taken at Willow River, near Fort Providence, on May 1 by H. W. Jones. During my return trip up the Mackenzie I saw one below the mouth of Nahanni River July 23.

Baird recorded specimens from Fort Simpson (October 19, 1859, and April 23, 1860), and Fort Liard (January 12, 1860);^a two skins from Fort Simpson are still in the National Museum. Russell took

^a Rev. Am. Birds, p. 80, July, 1864.

a specimen at Fort Chipewyan May 30, 1893.^a Macoun, on the authority of J. M. Macoun, notes the occurrence of this bird at Athabaska Landing, at Fort McMurray, on Clearwater River, and between Methye Lake and Isle à la Crosse; and, on the authority of Spreadborough, between Edmonton and Athabaska Pass, and between Lesser Slave Lake and Peace River Landing.^b

J. Alden Loring reported it common at Edmonton September 7 to 26, 1894, and took a series of specimens. In 1895 he found it common in the foothills of the mountains west of Edmonton. In 1896 he observed it frequently along the trail west of Edmonton, taking one 25 miles northwest of that place May 26; and found it breeding commonly in the mountains and valleys 15 miles south of Henry House July 3 to 21; he observed it frequently on the route between Jasper House and Smoky River in the late summer and early autumn, and took two specimens at the head of Muskeg Creek, a tributary of Smoky River, August 29; two on Grand Cache River September 2; and several in Grand Cache Valley September 24. He reported it common also in the mountains west of Henry House October 12 to 20.

Penthestes gambeli (Ridgw.). Mountain Chickadee.

On July 28, 1896, J. Alden Loring took an immature bird in Smoky Valley, 50 miles north of Jasper House, and on October 18 collected a female, one of a pair, 15 miles west of Henry House.

Macoun states that Spreadborough observed two on a mountain north of Little Miette River, Athabaska Pass, in 1898.^c

Penthestes cinctus alascensis (Prazak). Siberian Chickadee.

The first example of this bird known to have been procured in America was a female with seven eggs taken by MacFarlane at Fort Anderson June 1, 1864. The fact was first recorded by Turner,^d and later by Nelson.^e MacFarlane also refers to it as follows:

On June 1, 1864, a nest of this species, containing seven eggs, was found near Fort Anderson, in a hole in a dry spruce stump, at a height of about 6 feet from the ground. It was composed of a moderate quantity of hare or rabbit fur, intermixed with a sprinkling of dried moss. The female parent was snared on the nest, but the male was not seen. The contents of the nest were tolerably fresh.^f

The eggs are still in the National Museum, but I am unable to find the skin of the parent bird.

^a Expl. in Far North, p. 270, 1898.

^b Cat. Canadian Birds, Part III, p. 688, 1904.

^c Cat. Canadian Birds, Part III, p. 690, 1904.

^d Contributions Nat. Hist. Alaska, p. 182, 1886.

^e Rept. Nat. Hist. Collections in Alaska, p. 212, 1888.

^f Proc. U. S. Nat. Mus., XIV, p. 445, 1891.

***Penthestes hudsonicus* (Forster).** Hudsonian Chickadee.

The Hudsonian chickadee occurs throughout the region north to the limit of trees. It is a more hardy species than the black-cap, but like it is partially migratory.

In 1901 it was first seen at Fort Chipewyan May 21, when a female was taken, and it was noted also near the same place on May 28. A pair was taken on a heavily wooded island near the outlet of Athabaska Lake June 2, and on the following day a nest containing four young and two eggs on the point of hatching was found near the same place. A male was taken at the mouth of Peace River June 6, and the species was observed 25 miles below that point on June 12. It was noted also at Athabaska Landing August 30.

During the summer of 1903 this chickadee was first noted on Mount Tha-on'-tha, where my brother and Cary observed a few daily, July 13 to 17, at various points between the base and 2,000 feet altitude, and noted young birds on July 14. They saw it also at Fort Simpson July 24. Several specimens, including young of the year, were taken. While on their return trip they noted three near Swift Current Rapid August 28, and a few near Athabaska Landing September 3, 4, and 14. During my trip northward from Fort Rae I took a pair from a small band on Lake Hardisty August 18, and while traveling along the south shore of Great Bear Lake observed a small flock east of Manito Islands on September 14. After my arrival at Fort Simpson in the autumn I observed the species on but one occasion, on November 28, noting several, one of which was secured.

During the colder part of the winter the Hudsonian chickadee was not seen, and in the spring of 1904 it was first noted on March 12, one being taken. It was several times observed during the latter part of March, and became rather common during the early part of April, when several were collected. During my trip down the Mackenzie I noted several, taking a female on Manito Island, near Fort Good Hope, on June 23.

A specimen taken at Fort Simpson January 6, 1905, has been received from J. W. Mills, and H. W. Jones writes me that the species was common about that post throughout the winter.

Ross recorded *Parus hudsonicus* as occurring in the Mackenzie River region north to Fort Simpson, and as wintering;^a and Baird listed specimens from Big Island, Fort Rae, Fort Simpson, and Fort Liard.^b Specimens from Fort Rae, taken on October 30 and December 13, 1862, and from Fort Simpson, taken by Kennicott on October 19 and December 19 [1859], are still in the National Museum. Macoun states that J. M. Macoun [in 1888] found the species common

^a Can. Nat. and Geol., VII, p. 146, 1862.

^b Rev. Am. Birds, p. 83, August, 1864.

on the upper Clearwater, on Methye Portage, and between there and Isle à la Crosse; and that Spreadborough took it at Edmonton in May, 1897, found it common at Jasper House in June, 1898, and observed one at Bear Creek, Peace River, latitude 56°, in August, 1903.^a Seton records this species from the islands near the north shore of Great Slave Lake, about longitude 112°. ^b

During the last week of August, 1894, J. Alden Loring reported this bird common at Banff, Alberta, and took two specimens. In the autumn of 1895 he found it common in the Jasper House region, collecting two specimens at Henry House October 14. In 1896 he reported it common on the Jasper House trail from Blueberry Hills westward in the early summer, and on the trail between Jasper House and Smoky River in the late summer and early autumn. In the latter region he found it associated with *Penthestes a. septentrionalis* and *Penthestes gambeli*. He found it common also in the mountains west of Henry House October 12 to 20, in company with *P. a. septentrionalis*. During that season he took three specimens in Smoky Valley, 50 miles north of Jasper House, on August 26, and two at the head of Grand Cache River, about 60 miles north of Jasper House, on August 31.

Regulus satrapa Licht. Golden-crowned Kinglet.

In 1901 we noted this species but once—at our camp near Point La Brie, 12 miles northeast of Fort Chipewyan, where we took a male on May 27.

During the summer of 1903 we observed it but once—noting one on the Athabaska 40 miles below Athabaska Landing, May 17.

Macoun states, on the authority of Spreadborough, that this kinglet was common in spruce woods from Jasper House to the summit of the Rocky Mountains in June, 1898.^c

Regulus calendula (Linn.). Ruby-crowned Kinglet.

This diminutive songster is a common breeder nearly throughout the wooded region.

In 1901 it was first noted near Vermilion Creek, 42 miles north of Edmonton, May 3, and its song was heard at various points between there and Athabaska Landing, May 4 and 5. It was next observed at Poplar Point on the lower Athabaska, May 16. While we were collecting at our various camps near Fort Chipewyan, May 19 to June 4, the bird was seen or heard nearly every day. It was next observed near Fort Smith, June 24, and was noted on the banks of the Slave 75 miles below Fort Smith, July 1. At Fort Resolution

^a Cat. Canadian Birds, Part III, p. 692, 1904.

^b Auk, XXV, p. 73, 1908.

^c Cat. Canadian Birds, Part III, p. 697, 1904.

I saw it on July 6, and Alfred E. Preble noted it July 19. While ascending the Athabaska I saw it below Grand Rapid, August 20, and 10 miles below Pelican Rapid, August 25.

During the spring of 1903 we first observed this species on the Athabaska 30 miles below Fort McMurray on the morning of May 29, and we noted it near Poplar Point on May 30. We heard its song also near the outlet of Athabaska Lake, June 5; on lower Slave River, June 19; and at Fort Resolution, June 20 and 22. During their trip on the Mackenzie my brother and Cary heard its song at Fort Providence, July 5 and 6, and observed a few on the Nahanni Mountains, July 13 to 18, noting fledged young on these dates. On their return trip they noted the species near Brulé Rapid, August 18; saw several near Swift Current Rapid, August 28; and found it common near Athabaska Landing, September 5 to 15. While on my way to Great Bear Lake from Fort Rae, I observed the species on upper Grandin River, August 5, noting a female attending fledged young.

In the spring of 1904 this kinglet was first noted at Willow River by H. W. Jones on May 2, and several specimens, including both sexes, were taken May 2 to 14 by Mills and Jones. At Fort Simpson it was first observed on May 7, when I noted three individuals. Several others were seen on May 10 and 22. While descending the Mackenzie I saw and heard the bird about 100 miles below Fort Good Hope on June 26. During my return trip I noted it at Fort McMurray August 12.

Baird recorded specimens from Fort Resolution;^a one of these, taken on May 17, 1860, is still in the National Museum. Kennicott mentions one taken at Fort Resolution May 7, 1860.^b MacFarlane did not meet with it on Anderson River, but both Indians and Eskimo, when shown a specimen brought from Fort Good Hope, assured him that they had seen the species.^c Russell took specimens at Fort Chipewyan, May 30 and June 9, 1893, and heard its song at Big Slavey Point, on the north shore of Great Slave Lake, near the Northern Arm, on May 13, 1894, when the ground was still covered with snow.^d According to Macoun, J. M. Macoun found it common at the south end of Methye Portage in 1888; and Spreadborough first saw it at Edmonton, May 4, 1897; found it common along the trail to Athabaska Pass in June, 1898; and in the summer of 1903 found it common from the mouth of Lesser Slave River to Peace River Landing.^e J. Alden Loring took a specimen at Edmonton, September 26, 1894.

^a Rev. Am. Birds, p. 66, July, 1864.

^b Trans. Chicago Acad. Sci., I, p. 171, 1869.

^c Proc. U. S. Nat. Mus., XIV, p. 445, 1891.

^d Expl. in Far North, p. 270, 1898.

^e Cat. Canadian Birds, Part III, pp. 699, 700, 1904.

Myadestes townsendi (Aud.). Townsend Solitaire.

This bird, new to the Mackenzie region, was first observed by Alfred E. Preble and Merritt Cary on the base of Mount Tha-on'-tha, at the mouth of Nahanni River, July 13, when a male was taken. A pair with young was noted at the same place, July 14, and a few others were seen higher up on the mountain on July 15, 16, and 17. Their clear bell-like notes were heard on the mountain every morning, and the singer could often be seen on the topmost twig of a towering spruce on the mountain side high above the camp. A pair of adults and a young one, which was full grown but still in the spotted plumage, were collected.

This species probably regularly breeds in the Rocky Mountains of western Alberta. On July 15, 1896, J. Alden Loring took an immature bird, now in the Biological Survey collection, in the mountains 15 miles south of Henry House.

Macoun, on the authority of Spreadborough, states that this species was seen everywhere in the mountains about the Athabaska Pass in 1898. He records also eggs taken by Spreadborough in the Yellowhead Pass July 13, 1898.^a

Hylocichla fuscescens salicicola Ridgw. Willow Thrush.

Macoun notes this bird as follows:

First seen at Edmonton, Alta., May 11th, 1897; June 11th, found a nest on the ground containing two eggs; * * * common from Lesser Slave Lake to Peace River Landing, lat. 56° 15' in June, 1903; observed from Edmonton to Athabasca Pass, in June, 1898. (Spreadborough.)

He records also specimens of both the birds and eggs taken at Edmonton in May and June, 1897 and 1898, by the same collector.^b Six specimens, comprising both sexes, taken at Edmonton, May 11 to June 14, 1897, by Spreadborough, have been examined during the preparation of this report.

Hylocichla aliciaë (Baird). Gray-cheeked Thrush.

The gray-cheeked thrush breeds from about the region of Great Slave Lake north to the tree limit, but is less abundant than the olive-back. In 1901 specimens were taken at Fort Chipewyan on May 22 and 23. A thrush thought to be this species was seen on Loon Island, 50 miles north of Fort Resolution, July 12. At Fort Rae it was noted nearly every day, July 19 to 29, and specimens, including young in the spotted plumage, were taken on July 23 and 25.

In the spring of 1903 we first observed the gray-cheeked thrush near Pelican River, May 19, noting only one or two individuals. The species was not again detected until July 20, when I saw one

^a Cat. Canadian Birds, Part III, pp. 702, 704, 1904.

^b Cat. Canadian Birds, Part III, pp. 706, 707, 1904.

on the Simpson Islands, 40 miles northeast of Fort Resolution. On their return trip in the fall Alfred E. Preble and Merritt Cary saw two individuals, collecting one, near Athabaska Landing, September 12, and observed another 50 miles south of Athabaska Landing September 23. During my trip northward from Fort Rae I noted this species on Lake Hardisty August 16, 18, and 19, and a few miles south of MacTavish Bay August 24.

In the spring of 1904 J. W. Mills took a specimen at Willow River, near Fort Providence, on May 17. I did not note it at Fort Simpson and first saw it at Sans Sault Rapid June 19, when I collected a female.

Baird recorded specimens from Fort Simpson, La Pierre House, and Fort Anderson.^a A specimen from Fort Simpson, September 10, 1860; one from Fort Anderson, taken with eggs in June, 1864; and one from Fort Good Hope, May 31 [1862], are now in the National Museum. In the Anderson River region MacFarlane found the species very abundant, both in the wooded country and in situations where no trees grew, some nests being necessarily placed on the ground, contrary to the usual habit. One nest was found on the banks of Wilmot Horton River.^b In notes sent to the Smithsonian he recorded the species as tolerably numerous at Fort Anderson on May 28, 1865. Macoun, on the authority of Raine, records several sets of eggs taken by Messrs. Stringer and Young near the mouth of the Mackenzie.^c Seton records the species from Fort Reliance and the south end of Artillery Lake.^d

Hylocichla ustulata swainsoni (Cab.). Olive-backed Thrush.

This thrush is abundant over the wooded country, where during the short Arctic summer its song is heard nearly throughout the entire twenty-four hours. In 1901 it was first noted at Fort Chipewyan, May 24, and was seen or heard almost daily until June 4, during our stay in the vicinity. After leaving Fort Chipewyan we everywhere found it common and heard its song almost continually day and night. We noted it daily between Athabaska Lake and Fort Smith, June 5 to 18, and found the first nest, containing four eggs, 10 miles below Peace River, on June 10. The species was common at Fort Smith, where we noted it almost daily, June 19 to 29, and took a nest containing three eggs on June 21. We noted numbers on Slave River, June 29 to July 2, and saw and heard several on July 6 at Fort Resolution, where Alfred E. Preble also noted the bird July 10, 11, and 22. I took a specimen at Fort Rae July 20, but did not hear its song after leaving Fort Resolution.

^a Rev. Am. Birds, p. 23, June, 1864.

^b Proc. U. S. Nat. Mus., XIV, p. 445, 1891.

^c Cat. Canadian Birds, Part III, p. 709, 1904.

^d Auk, XXV, p. 73, 1908.

In the spring of 1903 this thrush was first observed 30 miles below Athabaska Landing on the morning of May 17. It was next seen a short distance above Grand Rapid, May 20, several being noted. One of these pioneers, rendered tame by the cold, ransacked the overhanging bank for spiders within a few feet of our noonday campfire. The first song was heard at Fort McMurray on the evening of May 28. The species was common along the Athabaska between there and its mouth, May 29 to June 1, and thence to Fort Resolution, being seen or heard almost daily. It was common also at Fort Resolution during the latter part of June. During their trip to the Mackenzie my brother and Cary found the species common, noting it at Hay River, June 30 and July 1, and observing numbers at Fort Providence almost daily until June 8. They found it common also at Fort Simpson, July 10, and near the base of the Nahanni Mountains, July 11 to 19. On their return trip they found it common along the Athabaska above Fort McMurray during the latter part of August, and near Athabaska Landing, September 4 to 14. Several specimens were taken by them at Fort Providence and on the Athabaska.

In the spring of 1904 I first noted the olive-back at Fort Simpson, May 31, taking a male. The song was first heard June 1. While descending the Mackenzie I found the bird common and in full song between Fort Simpson and Nahanni River, June 2 and 3. I noted it daily near the mouth of Nahanni River, June 4 and 5, and between there and Fort Norman, June 6 to 10. I found it common and noted it almost daily at Fort Norman, June 11 to 15; along the Mackenzie to Fort Good Hope, June 16 to 20; at Fort Good Hope, June 21 to 24; and between there and Fort McPherson, June 25 to 30. At Fort McPherson I saw it only once, on July 2. During my return trip I noted the species at Fort McMurray on August 13 and 14.

This thrush was first recorded from the region, under the name *Merula wilsoni*, by Richardson, who listed a specimen from Fort Simpson.^a Ross recorded it as occurring in the Mackenzie River region north to La Pierre House.^b Baird listed specimens from Fort Resolution, Big Island, Fort Simpson, and Fort Good Hope.^c Skins from Fort Resolution and Fort Simpson are still in the National Museum, and the catalogue shows that specimens were received also from Fort Rae, Peel River, and Lesser Slave Lake, eggs accompanying the skins from the last-named locality. The earliest date recorded for Fort Simpson is May 24. Eggs, accompanied by the female parent, taken at Pelican Lake, eastern Saskatchewan, in June, 1891, by H. MacKay, were received by the National Museum. Macoun,

^a Ann. and Mag. Nat. Hist., XI, p. 484, 1843.

^b Nat. Hist. Rev., II (second ser.), p. 279, 1862.

^c Rev. Am. Birds, p. 21, June, 1864.

from the notes of Spreadborough, states that this species was first seen at Edmonton, May 8, 1897, was common from Edmonton to Athabaska Pass in June, 1898, and was abundant from the mouth of Lesser Slave River to Peace River Landing in June, 1903.^a

J. Alden Loring reported several seen at Banff, Alberta, during the last week in August, 1894, and took a male on August 29.

Hylocichla guttata (Pallas). Alaska Hermit Thrush.

J. Alden Loring took a hermit thrush referable to this species near the head of Grand Cache River, about 60 miles north of Jasper House, August 31, 1896. The species is probably a regular migrant through western Alberta.

Hylocichla guttata pallasi (Cab.). Eastern Hermit Thrush.

The common hermit thrush occurs in summer throughout the region north at least to the vicinity of Fort Simpson. It is mainly an inhabitant of sparsely wooded ridges and pine barrens, and because of this preference is more local and less abundant than its congeners, though in favored places it is fairly common. It is the earliest of all the thrushes to arrive and the latest to depart.

In 1901 the beautiful song of this bird first greeted us from a grove of mixed woods near Sturgeon River, 25 miles north of Edmonton, on May 1, and during the remainder of our journey to Athabaska Landing, May 2 to 5, the bird was frequently seen and heard, usually toward evening. Its song was heard at our camp near Brulé Rapid, May 11 and 12, and as we floated down the river below that point on May 13. During our stay in the vicinity of Fort Chipewyan the bird was noted almost daily after May 20, and one was taken on May 29. Its song was heard 10 miles below Peace River, June 8 and 9. At Smith Landing we did not detect the bird itself, but a nest in which young had apparently been raised was seen on June 14. At Fort Smith we saw or heard the bird daily, June 19 to 29, and took a young one just from the nest on June 27. We last noted the species on Slave River 100 miles below Fort Smith, July 2.

In the spring of 1903 we first observed the hermit thrush a few miles north of Sturgeon River on May 13, noting several, and again near Athabaska Landing on May 15. While descending the Athabaska we noted it 30 miles below Athabaska Landing, May 17, and heard several on the lower river during the last few days of May. A specimen was taken at Smith Landing, June 11, and the bird was found to be quite common on Smith Portage, June 12, and along the Slave below Fort Smith, June 15 and 16. My brother and Cary noted several daily at Fort Providence, July 6 to 8, taking 2 speci-

^a Cat. Canadian Birds, Part III, p. 711, 1904.

mens on the former date, and found it common at Fort Simpson, July 10, and at the mouth of Nahanni River, July 11. On their return trip they saw two at Grand Rapid, August 21, taking one, and another near House River, August 22. Near Athabaska Landing they noted it September 5 and 14. While I was ascending the Mackenzie during the same autumn I saw a hermit thrush a short distance above Nahanni River on October 15.

In the spring of 1904 I first observed the hermit at Fort Simpson on May 10, noting three. I saw it next on May 11, and found it rather common on May 12, when the birds were in full song. During the remainder of the month the bird was often seen and the songs of several could be heard from the post almost any evening. While descending the Mackenzie I noted the species below Fort Simpson June 2, and near the base of Nahanni Mountains June 5. On my return trip I saw it a few miles above Pelican Portage August 27, and near Lily Lake, on the Edmonton road, September 3.

Baird recorded specimens from Fort Resolution, Fort Rae, Fort Simpson, and Peel River.^a A female, taken with four eggs at Fort Resolution June 30, 1863, by J. Lockhart, is still in the National Museum. A set of eggs also, taken by H. MacKay at Pelican Lake, eastern Saskatchewan, in June, 1891, was received. Macoun, from the notes of J. M. Macoun made in 1888, notes the occurrence of this bird along the Athabaska between Lesser Slave River and Fort McMurray. on the Clearwater River, at Methye Portage, and thence to Isle à la Crosse. He records it also, on the authority of Spreadborough, from Edmonton, where it was first seen May 3, 1897, and from White Mud River, Peace River Valley, where it was observed in June, 1903.^b

J. Alden Loring took a female in Grand Cache Valley, about 120 miles north of Jasper House, September 22, 1896. This specimen agrees with *H. g. pallasi* both in color and measurements, and was probably migrating from some point to the northward.

Planesticus migratorius (Linn.). Robin.

The robin is a common and quite generally distributed species throughout the timbered portion of the region. Around the trading posts and missions, the only settlements, it often builds its nest on the beams of outbuildings or on the timbers of the surrounding fences. Though thus showing its preference for the haunts of man it seems well satisfied in the wilderness and breeds abundantly to the very edge of the timbered country, and even seeks isolated wooded areas within the confines of the Barren Grounds. Up to the region of Great Slave Lake two broods are usually reared, but to the northward of that point a single brood probably is the rule. It is one of

^a Rev. Am. Birds, p. 15, June, 1864.

^b Cat. Canadian Birds, Part III, p. 716, 1904.

the earliest of the strictly migratory birds to arrive in the spring, and in autumn delays its departure until severe weather and scarcity of food force it southward.

In 1901 the robin was common at Edmonton and between there and Athabaska Landing April 29 to May 5. It was noted below Athabaska Landing May 6, and was found to be common on the lower Athabaska May 15 to 17. It was occasionally seen in the vicinity of Fort Chipewyan May 19 to June 4, and was noted 10 miles below Peace River June 10, and 25 miles below, June 13, when one was taken. It was rather common at Smith Landing, where we noted it daily June 14 to 17 and took a specimen on June 15. At Fort Smith we found it more common than at any other point visited, and noted numbers daily June 19 to 28. On June 21 I found three nests containing eggs, undoubtedly representing second broods, since many young birds were then on the wing. We noted the species daily July 2 to 4 on lower Slave River, and July 5 to 9 at Fort Resolution, where Alfred E. Preble also observed it several times during the latter part of July. I saw a few on the north shore of Great Slave Lake near the mouth of the Northern Arm July 15, and one between Trout Rock and Fort Rae on July 18. At Fort Rae I noted the bird almost daily July 19 to 29, and took an immature bird on July 27. On our return trip we saw a few at Smith Landing August 6, and above La Biche River August 28.

In the spring of 1903 we found robins abundant at Edmonton, Alberta, on our arrival there May 8, and found a nest containing 4 eggs on May 10. We found it common also during our trip to Athabaska Landing May 11 to 15. We observed it at Grand Rapid May 22 and 24, occasionally saw it along the Athabaska between the latter point and its mouth, and found it rather common along Rocher and Slave rivers to Fort Resolution. At this post we noted it as an abundant and familiar species during the latter part of June. During their trip to the Mackenzie my brother and Cary observed a number at Hay River June 28 and July 1, found it abundant at Fort Providence July 2 to 8, and noted it near the mouth of Nahanni River July 12. On their return trip in the fall they noted it migrating abundantly near Athabaska Landing September 1 to 14, and saw a few 50 miles south of Athabaska Landing September 23. After the division of the party I frequently noted it at Fort Resolution during the first half of July, and while crossing Great Slave Lake saw one near Trout Rock July 26. While following the canoe route northward from Fort Rae to Great Bear Lake I found this bird rather common. I noted it along Grandin River August 1 to 6, on Lake Faber August 7, on Lake Rae August 8, to the north of Lake St. Croix August 15, and at various points between there and MacTavish Bay, where it was common August 27. Several flocks were seen at

our camp on the shore of Great Bear Lake east of Leith Point September 3, and one specimen was taken. A few birds were seen at the same place on September 4, and a very large flock on September 5. The birds were then feeding on the juicy crowberries which grow in profusion there. Many deserted nests proved the species to be a fairly common breeder along this semibarren shore. As we voyaged westward a few individuals were seen near McVicar Bay September 10, and 40 miles west of there September 12. At Fort Franklin a few were observed on September 19, 22, and 25, and while we were ascending the Mackenzie two individuals were observed at Roche Trempe-l'eau on the evening of October 9.

In the spring of 1904 the robin was first observed at Willow River, near Fort Providence, on May 2, and several specimens were collected during May by Mills and Jones. The first female was taken May 10. At Fort Simpson it was first seen May 4, when I noted five individuals, and a few were observed nearly every day afterwards. It was abundant by May 13, when females were first observed. The first eggs were seen May 28, in a nest built beneath the eaves of an outbuilding. During my trip down the Mackenzie in June I found the bird present in small numbers at all the posts, and frequently noted it along the river. During my return trip I noted it at Smith Landing, August 5; at Fort McMurray, August 14; near Pelican Portage, August 27; and between Athabaska Landing and Lily Lake, September 2 and 3.

In 1905, H. W. Jones observed this species at Willow River, near Fort Providence, on April 29, and at Fort Simpson on November 17.

Franklin, during his first overland journey to the Polar Sea, noted the arrival of this bird at Fort Enterprise on May 14, 1821.^a In the narrative of his second expedition, he records its arrival at Fort Chipewyan on May 7, 1827;^b Richardson states that it arrived the same year at Fort Franklin on May 20.^c Ross recorded the bird as occurring in the Mackenzie River region north to La Pierre House, and as having been taken at Fort Simpson.^d MacFarlane intimates that it was common on Anderson River, and states that a few were met with also on the banks of Swan and Wilmot Horton rivers, on the Barren Grounds.^e The bird catalogue of the National Museum shows that skins were received from Fort Smith, Slave River, Fort Resolution, Fort Rae, Fort Simpson, Fort Good Hope, Peel River, and Fort Anderson, and that eggs were received from

^a Narrative Journey to Polar Sea, p. 301, 1823.

^b Narrative Second Expedition to Polar Sea, p. 307, 1828.

^c Fauna Boreali-Americana, II, p. 176, 1831.

^d Nat. Hist. Rev., II (second ser.), p. 279, 1862.

^e Proc. U. S. Nat. Mus., XIV, p. 445, 1891.

Lesser Slave Lake. R. G. McConnell noted the arrival of the bird at Fort Simpson on May 4, 1888.^a J. W. Tyrrell records a robin seen on White Island, Great Slave Lake, east of Fort Resolution, April 27, 1900.^b Later in the same season the bird was noted in the isolated strip of wooded country bordering the Thelon or Ark-i-linik River, northeast of Great Slave Lake.^c Hanbury observed robins in the lowest woods on the Coppermine, near the mouth of Kendall River, July 30, 1902.^d Macoun records this bird from Edmonton, where it was first seen April 16, 1897, and from several other points in Alberta.^e

J. Alden Loring reported large flocks seen at Edmonton, September 7 to 26, 1894, and took a very dark, richly colored male on September 25. He found it common also along the Jasper House trail west of Edmonton, in the early summer of 1896.

The spring dates of arrival of the robin at Fort Chipewyan, for several years, are given in a table on page 23.

Ixoreus naevius meruloides (Swains.). Northern Varied Thrush.

Late on the evening of June 6, while stopping for a few hours on an island in the Mackenzie about 20 miles below the mouth of the Nahanni, I discovered a nest of this species, which I collected, together with the parent birds. The nest was placed in a small spruce growing in a dense forest and was about 7 feet from the ground. It is composed outwardly of small spruce twigs and sphagnum. On this foundation is reared a cup-shaped superstructure of bark, grass, and sphagnum mixed with mud, the latter material apparently having adhered to the roots of the moss. This cup is thickly and softly lined with fine grass and a few feathers. The eggs, 3 in number, had been incubated about three days. The birds flew excitedly about, uttering their characteristic alarm notes. The species was observed on but one other occasion. While collecting on Manito Island near Fort Good Hope on June 23, I saw a pair whose actions indicated that they had a nest somewhere in the vicinity. After a precipitate approach in response to my calling, their curiosity seemed to be satisfied and they retired into the recesses of a swamp. The natives at Fort Norman and Fort McPherson recognized my specimens, and told me that the species occurred in the neighborhood of those posts.

This bird was described by Swainson from a specimen taken at Fort Franklin, Great Bear Lake, in May, 1826. Concerning the species, Richardson says: "We did not hear its song, nor acquire

^a Ann. Rept. Can. Geol. Surv., IV (new ser.), p. 86D, 1891.

^b Ann. Rept. Dept. Interior (Canada) for 1900-1901, p. 135, 1902.

^c Ibid., p. 122, 1902.

^d Sport and Travel in Northland of Canada, p. 208, 1904.

^e Cat. Canadian Birds, Part III, p. 720, 1904.

any information respecting its habits, except that it builds its nest in a bush, similar to that of the *Merula migratoria*.”^a Baird says: “Mr. Kennicott found another in the Rocky Mountains, on Porcupine River, * * * August 28, 1861.”^b Macoun publishes the following note:

I have a nest and four eggs that were taken by Rev. Mr. Stringer in the east channel of the Mackenzie River, 40 miles from its mouth. The nest was found, June 5th, 1895, in a spruce tree, 15 feet from the ground. The nest is made of goose grass and is six inches in diameter and three inches deep. The eggs are a paler blue than a robin's, and are spotted with brown. (W. Raine.)^c

Saxicola œnanthe leucorhoa (Gmel.). Greenland Wheatear.

Under the name *Sylvia œnanthe*, J. C. Ross recorded a specimen taken at Felix Harbor, Boothia, May 2, 1830.^d It was the only one observed, and appears to represent the only record for this region.

Sialia currucoides (Bechstein). Mountain Bluebird.

This beautiful bird is of regular occurrence in the region now under consideration only in its southwestern part, along the Rocky Mountains and among their foothills, though a few specimens, including the type, have been taken to the eastward of the Mackenzie. During our investigations we met with it but once. On September 3, 1904, while traveling along the road near Stony Creek about 60 miles north of Edmonton I observed at least fifty individuals, old and young. The birds were in a loose flock and appeared to be moving westward, feeding as they traveled. The species was described to me by a young man who had spent the winter and spring of 1904 at Fort Nelson, on Nelson River, in northeastern British Columbia. He stated that it arrived there about May 10. According to information obtained by Merritt Cary, it is a common species in the Grand Prairie district, on upper Peace River.

The Arctic bluebird was first described by Swainson, from a specimen taken at Great Bear Lake, concerning which Richardson says:

The only specimen that we procured of this beautiful bird was shot at Fort Franklin in July, 1825. It is merely a summer visitor to the fur countries, and we obtained no information respecting its habits.^e

King took a specimen, which was recorded by Richardson, on Great Slave Lake. The exact locality was not specified, but was probably Fort Resolution.^f

^a Fauna Boreali-Americana, II, pp. 187, 188, 1831.

^b Rev. Am. Birds, p. 32, June, 1864.

^c Cat. Canadian Birds, Part III, p. 724, 1904.

^d Appendix to Ross's Second Voyage, p. xxvi, 1835.

^e Fauna Boreali-Americana, II, p. 209, 1831.

^f Narrative Arctic Land Expedition to Great Fish River, Appendix, p. 260, 1836.

In the narrative of his third overland journey to the Arctic Sea, Richardson, perhaps referring only to his early experience with the species, says that *Sialia arctica* "enlivens the banks of the Mackenzie, coming, however, not from the Atlantic coasts, but from the opposite side of the Rocky Mountain Range."^a The catalogues of the National Museum record a skin from Fort Halkett, on Liard River, and eggs from Lesser Slave Lake. Macoun, on the authority of Spreadborough, says:

Observed a few about the end of July, 1903, at Dunvegan, Peace River; observed nesting at Lacombe, near Edmonton, Alta., June 18, 1897; * * * common from the upper crossing of the Lob-stick River to Camp River, B. C., west of the Athabasca Pass; also seen in large flocks at the Henry House, Athabasca Pass, September 2nd, 1898; last seen September 25th.^b

In 1895 J. Alden Loring reported a flock seen on the Jasper House trail at the crossing of McLeod River, probably in August. In 1896 he reported the species common in small flocks all along the trail between Edmonton and Jasper House in the early summer, and saw several families in the mountains and foothills along the trail between Jasper House and Smoky River in the late summer and early autumn.

MacFarlane, in a manuscript list, records a specimen which was shot at Fort Resolution early in June, 1880. It was sent to J. J. Dalglish, who identified it. H. W. Jones, in a letter, reports seeing one at Hay River, Great Slave Lake, on July 12, 1907.

REPTILES AND BATRACHIANS OF THE ATHABASKA-MACKENZIE REGION.

But few reptiles and batrachians live in the territory now under review, and all the species known there were observed by our party. No systematic collection in this class has been made, but the list is probably fairly complete, although one or two salamanders may be found to occur. In the case of most of the species our observations extend the previously known ranges. Dr. Leonard Stejneger of the National Museum has assisted me in the work of identification.

Thamnophis sirtalis parietalis (Say.). Northern Garter Snake.

A specimen taken by us at Edmonton, Alberta, May 10, 1903, is referred to this form by Dr. L. Stejneger. This snake is common about Edmonton and along the road to Athabaska Landing. We did not observe it north of the latter point, but I was informed that garter snakes, probably of this form, are found in the Peace River Valley, and are especially common near Dunvegan, on the upper

^a Arctic Searching Expedition, I, p. 200, 1851.

^b Cat. Canadian Birds, Part III, p. 730, 1904.

Peace. From several reliable sources I secured also information of its occurrence on the plains of Salt River, which enters the Slave near Fort Smith. This locality is said to mark its northern limit.

Richardson records the occurrence of *Tropidionotus sirtalis* on Serpent Lake, a short distance south of Isle à la Crosse Lake.^a

***Bufo lentiginosus woodhousei* B. & G.** Western Toad.

This form of the common toad is abundant along the Athabaska and Slave north at least to Fort Smith, where we took an adult, June 21, 1901. The species was common in the swamps at Fort Chipewyan, on June 3, 1903, and was then depositing its eggs and in full voice.

Cope records a specimen taken by Kennicott on Athabaska River [below the Clearwater].^b

***Rana pipiens* Gmel.** Leopard Frog.

Specimens of this frog were collected at Smith Landing in June, 1901, and the species was observed also at Fort Smith. It was not seen farther north.

***Rana cantabrigensis latiremis* Cope.** Northern Wood Frog.

This is the common frog throughout the region north to Great Bear Lake and the lower Mackenzie. In the course of our journeys we collected a large series, comprising specimens from the following localities: Fifty miles north of Edmonton; Fort Chipewyan; Slave River (near mouth of Peace); Smith Landing; Fort Smith; Fort Resolution; Fort Rae; Grandin River; Lake St. Croix; Fort Providence; Willow River; Fort Simpson; mouth of Nahanni River; Birch Island, 90 miles below Fort Wrigley; Fort Norman; and site of old Fort Good Hope.

At most of these localities we found the species common. Along the canoe route north of Fort Rae it was only occasionally seen, and none were observed about Great Bear Lake, probably on account of the late date of our visit. Richardson records frogs, undoubtedly of this species, from Fort Franklin, where he says they croak loudly in the beginning of June.^c Boulenger, under the name *R. cantabrigensis*, records specimens taken by Richardson at Great Bear Lake.^d Cope records specimens from Athabaska River, Fort Resolution, Big Island, and Fort Simpson.^e The frogs reported by MacFarlane as found on Anderson River^f were undoubtedly of this species.

^a Arctic Searching Expedition, I, p. 98, 1851.

^b Batrachia of N. Am. (Bull. 34, U. S. Nat. Mus.), p. 284, 1889.

^c Arctic Searching Expedition, II, p. 255, 1851.

^d Cat. Batr. Salientia Brit. Mus., p. 45, 1882.

^e Batrachia of N. Am. (Bull. 34, U. S. Nat. Mus.), pp. 437, 438, 1889.

^f Canadian Record of Science, IV, p. 52, 1890.

In the spring of 1904 H. W. Jones heard the notes of this frog beside the Mackenzie above Fort Simpson on April 22. I heard the first ones in the vicinity of the post April 28, when I took three specimens. At this time the ponds were still frozen to the bottom in most places, but had thawed in the more exposed parts.

Chorophilus septentrionalis Boulenger. Northern *Chorophilus*.

This little frog, whose trilling notes are exactly similar to those of the more southern forms of the genus, is fairly common nearly throughout the region. The name was based on specimens taken on Great Bear Lake.^a

We took the species at the following localities: Twenty-five miles north of Edmonton; Slave River, 25 miles below the Peace; Smith Landing; and Fort Resolution. At Fort Simpson I first heard its notes on May 3, 1904, but failed to take specimens. I heard it also on the Mackenzie above Fort Norman early in June.

FISHES OF THE ATHABASKA-MACKENZIE REGION.

The following list includes practically all of the species of freshwater and anadromous fishes known to occur in the Mackenzie Valley. It is based primarily on a collection made in the summers of 1903 and 1904. As my time was mainly occupied in other work, the collection of fishes was far from complete, some common species being purposely not preserved, while lack of facilities for their capture prevented the acquisition of small species, with a few exceptions.

By some unfortunate accident a considerable portion of the collection disappeared in the interval between its arrival in Washington and the time when it could be examined. These lost specimens unfortunately included most of the examples of *Coregonus*—specimens which would have settled a number of doubtful points—from widely separated localities, some of them remote from the lines of regular travel. The remainder of the collection has been identified by Barton W. Evermann and Edmund L. Goldsborough, and the records incorporated in their recent Check List of the Freshwater Fishes of Canada, published in the Proceedings of the Biological Society of Washington. In view of the fact that so many of my specimens were lost before they could be examined critically, I was gratified to find that the collection included a number of species not hitherto recorded from the Mackenzie Valley, and one which is new to the fauna of Canada.

Collections of fishes from the Mackenzie region have been singularly unfortunate. A part of the first collection ever made there, those specimens taken on Sir John Franklin's first journey, had to be abandoned during the disastrous retreat of the expedition across

^a Cat. Batr. Salientia Brit. Mus., p. 336, 1882.

the Barren Grounds. A considerable part of Kennicott's Yukon and Mackenzie collection also was lost on the Methye Portage, probably having been thrown away by some weary and irresponsible voyageur.

In addition to the records furnished by the specimens I have included notes regarding the occurrence of a number of the better-known species in various parts of the region, in order to give their distribution in more detail. No attempt has been made, however, to include all the records available.

Lampetra aurea (Bean). Lamprey.

Richardson, under the name *Petromyzon fluvialis*, recorded a specimen which was found adhering to an inconnu (*Stenodus mackenzii*) taken in Great Slave Lake.^a Evermann and Goldsborough refer this record to *L. aurea*.^b It appears to relate to the only specimen of lamprey known to have been taken in the Mackenzie Valley.

Catostomus catostomus (Forster). Northern Sucker.

This widely distributed species is extremely abundant throughout the region, and is taken in large numbers by the natives. Its abundance makes it an important food fish, although its quality is far from the best. In some localities many are taken in winter in nets set beneath the ice.

Specimens taken by me in a small lake near MacTavish Bay, Great Bear Lake, and near Fort Good Hope, have been recorded by Evermann and Goldsborough.^c

The Bear Lake specimen was taken in a small, deep lakelet on the summit of a rocky promontory 400 feet high, on the southern shore of MacTavish Bay. The little lake had no visible inlet, and its outlet, a tiny stream, fell over the cliff at its margin, a hundred feet at a time, into the lake below. As it was manifestly impossible for any fish to gain access to the lakelet by way of its outlet, I was much surprised to find it inhabited. Besides the small one secured, I saw a number of larger ones, presumably of the same species, in its clear depths. How these fish first became established there is not apparent.

This species is abundant at the mouth of the Mackenzie in June. Simpson noted it near the mouth of the Coppermine.^d MacFarlane mentions 'carp' among the fish of the Anderson;^e and Tyrrell states that they abound in Artillery Lake.^f Dawson took specimens in Frances Lake, at the head of Liard River.^g

^a Fauna Boreali-Americana, III, p. 294, 1836.

^b Proc. Biol. Soc. Wash., XX, p. 91, 1907.

^c Proc. Biol. Soc. Wash., XX, p. 93, 1907.

^d Narrative Discoveries on North Coast of America, p. 267, 1843.

^e Canadian Record of Science, IV, p. 52, 1890.

^f Ann. Rept. Dept. Interior (Canada) for the year 1900-1, p. 115, 1902.

^g Ann. Rept. Geol. Surv. Canada, 1887, p. 231B, 1888.

***Moxostoma lesueuri* (Richardson). Gray Sucker.**

Under this name I include a few notes on a large-scaled sucker, usually called in the north gray sucker. It is equally common with the preceding species in many localities, and has nearly or quite as extensive a range. It is a common fish in Great Slave Lake and the Mackenzie. Père Giroux informed me that it appears in numbers at Arctic Red River about the first week in June, but practically disappears after remaining abundant about three weeks. A specimen which he gave me measured: Total length, 18 inches; depth, $2\frac{3}{4}$ inches. It was among those subsequently lost.

***Couesius plumbeus* (Agassiz). Northern Shiner.**

Previous to our explorations this species was unknown as an inhabitant of the Mackenzie Valley. In August, 1903, while following the canoe route between Great Slave and Great Bear lakes, I observed these small 'shiners' in a number of places. While encamped on Lake St. Croix I succeeded after a good deal of effort (for I was not provided with small hooks) in catching two of these fishes, using small spiders for bait. These specimens have been identified and recently recorded by Evermann and Goldsborough.^a

This fish probably has an extensive distribution in the Mackenzie Valley. In June, 1904, I saw a number of small fishes of precisely similar appearance and probably of the same species as my Lake St. Croix specimens, in a small pond near the mouth of North Nahanni River. I have seen similar minnows in a number of other localities.

***Platygobio gracilis* (Richardson). Flat-headed Minnow.**

This peculiar fish was first described by Richardson from the Saskatchewan at Carlton House, but apparently was not recorded from the Mackenzie Valley until 1907, when Evermann and Goldsborough recorded specimens taken by myself in 1904 at Grand Rapid, Athabaska River; and Fort Simpson and Fort Good Hope, Mackenzie River.^a Mr. Evermann, however, tells me that in working over the specimens in the National Museum he discovered an example which was taken by Kennicott at Fort Simpson, but which had been previously overlooked.

I found the flat-headed minnow to be an exceedingly abundant fish throughout the entire length of the Athabaska and Mackenzie rivers, from Athabaska Landing northward. These muddy rivers seem to be its delight, and I have never seen it in clear water. It congregates in the eddies close to the bank and swims slowly along with the top of its head nearly flush with the surface. It is readily caught with a baited hook, and its capture is a favorite amusement with the Indian

^a Proc. Biol. Soc. Wash., XX, p. 98, 1907.

women and children when the boats are tied up to the bank. Being slender and bony, it is but an indifferent food fish. It is usually called 'roach' by the English-speaking inhabitants.

Hiodon alosoides (Rafinesque). Goldeye.

The goldeye is a rather common inhabitant of Athabaska River, Athabaska Lake, and Slave River, becoming scarcer northward, and being practically unknown north of Great Slave Lake. It is less esteemed than the whitefish, with which it is taken.

The most northern record of this species is of an example which I obtained from a native at Fort Norman on June 12, 1904. He had just taken it in his herring net, set at the mouth of Bear River. It was considered a great rarity—in fact, the man had never before taken one like it. Unfortunately, this specimen was among the number lost after reaching Washington.

Coregonus spp. Whitefish.

Owing to the loss of most of my specimens of this genus on which I depended for identification, I find it impossible to correlate most of my notes with definite specific names. The following species are known to occur in the Mackenzie Valley: *C. quadrilateralis*, described by Richardson, from Fort Enterprise, is a fish of very wide distribution; *C. richardsoni* Gunther was described from Arctic North America, probably from Richardson's collection. It is not well known, and may be the same as *C. kennicotti*, the type locality of which is Fort Good Hope.

Whitefish of one or more species are found in nearly every lake and stream throughout the North. Some of the species are anadromous. The average weight of those taken is from 2 to 4 pounds, but in some lakes they attain a weight of 8, 12, or even 20 pounds. As a food fish probably none surpass it. In regard to this I may quote Richardson's encomium, as his opportunity for forming an opinion was of the best. He says:

Several species of this subgenus [*Coregonus*] have been celebrated for the delicacy of their flavour, but none have been more justly so than the *Attihawmeg*, which is an inhabitant of all the interior lakes of America, from Erie to the Arctic Sea. Several Indian hordes mainly subsist upon it, and it forms the principal food at many of the fur posts for eight or nine months of the year, the supply of other articles of diet being scanty and casual. Though it is a rich, fat fish, instead of producing satiety it becomes daily more agreeable to the palate; and I know from experience, that though deprived of bread and vegetables, one may live wholly upon this fish for months, or even years, without tiring.^a

So important are whitefish as an article of diet that the sites of many, perhaps the majority, of the trading posts, as well as the wintering stations of a number of exploring expeditions, places which

^a Fauna Boreali-Americana, III, p. 195, 1836.

have become famous in Arctic literature, have been selected with a view to the local abundance of this fish.

Whitefish are taken altogether in gill nets, and at all times of the year. The nets are less successful, however, during the almost continuous day of midsummer than later, when there is more or less darkness. But it is in autumn, just before the lakes close, that the 'fall fishery' is made, when more are taken than at any other season. At this time the whitefish congregate in the shallower parts of the lakes to spawn, and being then abundant and at their best, and the weather being favorable for their preservation, are taken in great numbers. A few citations will give some idea of the immense quantities of these fish which are annually taken, and of their great importance. Ogilvie, who spent a part of the fall of 1888 at Fort Chipewyan, says that the Hudson's Bay Company required 36,000 for the use of its post, the Roman Catholic mission 12,000, and the remainder of the population at least 30,000 more. Most of these were caught near the post during three weeks.^a

R. G. McConnell spent the autumn of 1887 about Great Slave Lake and has this to say in regard to its whitefish:

The Big Island fishery supplied Fort Simpson and Fort Providence last year with about 40,000 fish, besides affording constant support to a number of Indians. At the mouth of the Beaver about 20,000 were taken and the fisheries at the mouth of Hay River, in the bay in front of Fort Rae, and near Fort Resolution, yielded corresponding quantities. I estimated the total yield of the lake for the year 1887 at about half a million pounds. * * * The whitefish taken at Big Island average nearly 3 pounds in weight while those from Fort Rae are much smaller, and may belong to a different species.^b

After the regular fall fishery is brought to a close by the freezing over of the lakes, large numbers of whitefish are sometimes taken in nets set beneath the ice. Richardson describes this method as follows:

The Attihawmeg is taken in the winter time in gill nets set under the ice. Each net is fifty or sixty fathoms long, and of a depth proportionate to that of the water, and in setting it for the first time a series of holes are made through the ice, at such a distance apart, that a long stick can be readily passed in the water from one to the other: a line, rather longer than the net to which it is fastened, being attached to the stick, is carried along and brought out at the extreme hole. The net being buoyed up above by thin oblong pieces of fir, and loaded below with stones, is drawn beneath the ice by means of the line, and firmly fixed at each end to stakes thrust through the holes. After the first time the intermediate holes in the ice, being useless, are allowed to freeze up, but the extreme ones are opened daily, and the net examined by the fisherman, who draws it out at one hole, while his assistant veers away the line at the other. * * * Most of the fish enter the net by night. They freeze as they are taken from the water, and are thus preserved in a perfectly sound state until spring.^c

^a Ann. Rept. Dept. Interior (Canada) for 1889, p. 90, 1890.

^b Ann. Rept. Geol. Surv. Canada, IV, p. 74D, 1891.

^c Fauna Boreali-Americana, III, p. 197, 1836.

In August, 1903, while following the canoe route between Great Slave Lake and MacTavish Bay, Great Bear Lake, my party subsisted to a considerable extent on these fish. We had more success with the nets in Lake St. Croix and Lake Hardisty than in any other places, mainly because it so happened that on these lakes we encamped at especially favorable fishing places. On one occasion a net about 75 feet in length took during the night 20 whitefish averaging about 4 pounds each. Large whitefish (the species is probably *C. kennicotti*) also occur in Great Bear Lake, and we took a few.

At least two species of *Coregonus*, the smaller of which is called locally 'broken nose,' are abundant in the lower Peel and Mackenzie rivers nearly throughout the summer. Specimens of both were taken but were lost. Kennicott also took both species and gave some notes on their habits, but as his specimens also were lost I am unable to identify the species. It is evident that a full collection of whitefishes from this region is still especially desirable.

Argyrosomus tullibee (Richardson). Tullibee.

The foregoing notes on *Coregonus* refer in part to this species, as it is taken together with species of that genus in many places north to the Arctic coast, if the local name 'tullibee' is distinctive. It is mentioned in many narratives, and the name is in common use throughout the region for a certain species. Père Giroux informed me that these fish are extremely abundant at Arctic Red River in September, when they come in from the sea and spawn in very deep basins in the Mackenzie, where as many as a hundred may be taken in a net sunk to the bottom. They remain during October. My specimens having been lost, the identification is not positive.

Simpson reported 'tullibee' taken near the mouth of the Coppermine.^a

Argyrosomus lucidus (Richardson). Great Bear Lake Herring; Herring Whitefish.

This little whitefish, first described by Doctor Richardson from Great Bear Lake, is an important food fish. It is extremely abundant in that lake, and also ascends the Mackenzie, Anderson, and other rivers in summer, presumably to spawn. Père Giroux, of Arctic Red River, informed me that it passes there on its way up the Mackenzie about the second or third week in June, remaining abundant about three weeks; that it is taken nearly all summer about Fort Good Hope; and that it returns to the mouth of the Mackenzie in late autumn. It was just appearing at Fort Good Hope on June 20, 1904. It ascends the river at least to Fort Simpson, and numbers are taken

^a Narrative Discoveries on North Coast of America, p. 267, 1843.

in nets set at right angles to the bank. A special net, having a very small mesh, is necessary for the capture of this species, as it is smaller than any other fish regularly taken in the region. Its excellent flavor and good condition, however, make it one of the most desirable. The Hudson's Bay and other trading companies, as well as the mission establishments, regularly establish a fishery at the western end of Great Bear Lake, where great quantities are taken each autumn. During a period of about eighteen months in 1825-26, when Franklin's second expedition was quartered at Fort Franklin, about 50,000 were taken.^a

A specimen taken at Arctic Red River July 16, 1904, measured $16\frac{1}{2}$ inches in length; $3\frac{1}{4}$ inches in depth. This was as large as any I saw, and larger than the usual size of the fish in Great Bear Lake, where I saw large numbers.

MacFarlane states that some were obtained in Anderson River,^b and it has been recorded from Herschel Island and other points west of the Mackenzie.

Stenodus mackenzii (Richardson). Inconnu; Coney.

This large and important fish has a rather extensive distribution, being found in the Yukon and Mackenzie (and probably in the larger intermediate rivers), and also in the Anderson. It ascends these rivers in numbers to the first strong rapids, which it very rarely surmounts. Its range is thus limited by the Smith Rapids at Fort Smith, although great numbers ascend to their very foot. It also ascends all of the larger tributaries of Great Slave Lake to the first rapids.

I find that Hearne first recorded this fish from the Mackenzie region, taking it in Great Slave Lake in January, 1772, when he crossed its eastern arm from north to south. After mentioning a number of species common in this lake, he says:

Besides these, we also caught another kind of fish, which is said by the Northern Indians to be peculiar to this lake; at least none of the same kind have been met with in any other. The body of this fish much resembles a pike in shape; but the scales, which are very large and stiff, are of a beautifully bright silver colour: the mouth is large, * * * and though not provided with any teeth, takes a bait as ravenously as a pike or a trout. The sizes we caught were from two feet long to four feet. * * * The Northern Indians call this fish Shees.^c

This description undeniably refers to the inconnu. True, *Stenodus* is provided with teeth, but as they are small and inconspicuous, the fish is quite generally supposed to be toothless, and is called the 'toothless fish' by some of the native tribes.

^a Richardson, Fauna Boreali-Americana, III, p. 208, 1836.

^b Second Rept. Committee of Senate (Canada) on Mackenzie Basin, p. 54, 1891.

^c Journey to Northern Ocean, p. 249, 1795.

These fish ascend the Mackenzie in summer, but apparently do not winter in that stream. Père Giroux told me that they pass Arctic Red River from about the second week in June to the 1st of August, and reach there on their return toward the end of October, and that they winter at the mouth of the Mackenzie, where they are taken in numbers by the Eskimo at that season.

The Eskimo catch them through the ice or from the edge of a floe by means of a stout line which is attached to a stick about 15 inches long having a pistol-shaped handle to insure a firm grasp, and which has short pegs inserted near its extremities. This is used as a reel in lengthening and shortening the line. The bait is an ivory imitation of a small fish furnished with a barbless hook. The fish seizes this moving bait and is hauled out before it can disengage itself from the hook. The natives are said to be very successful in this method.

The 'conies' are taken in summer at all the posts on the Mackenzie as far up at least as Fort Simpson, but I did not learn whether or not they ascend the Liard. They are taken in nets usually set in eddies. Most of them are caught in September and October, when presumably they are spawning, and are hung on stages to freeze. When thus preserved they are never used for human food except from necessity, as they are usually oily and rank, but are used for dog food. In summer, however, when many are taken in the white-fish nets, the smaller ones are quite palatable.

This fish remains in Great Slave Lake the year round, but as far as I know this is the only inland lake which is thus distinguished. The fish frequently attains a weight of 30 or 40 pounds, and is said on good authority to reach even as high as 60 pounds. It is found as far east in Great Slave Lake as the Narrows, where Back took it in 1833. The vicinity of Rocher River, east of Fort Resolution, is a favorite fishery. In 1903 I took it at the lowermost rapid on Grandin River. Though ordinarily caught in nets, it takes a bait readily, especially in a strong current, or at the foot of a rapid. It is thus easily caught at the outlet of Great Slave Lake and in many other places.

It is not a regular inhabitant of Great Bear Lake, but has been taken on one occasion at Fort Confidence.^a MacFarlane states that it is abundant in the Anderson, whose Hare Indian name, 'Beghula Tesse,' is said to be derived from this fish.

Oncorhynchus nerka (?) (Walbaum). Sockeye Salmon.

Occasional specimens of salmon are taken in the Mackenzie. These are said by the traders, many of whom, because of a former residence in British Columbia or on the Yukon, are familiar with salmon, to

^a Simpson, Narrative Discoveries on North Coast of America, p. 217, 1843.

be identical with the common one of the Yukon. McConnell, on the authority of John Reid, mentions that one was taken near Fort Providence some years ago.^a Père Giroux told me that perhaps three or four were taken at Arctic Red River, among thousands of whitefish, in the course of the autumn. John Firth also informed me that salmon like those found in the Yukon are occasionally taken in Peel River.

Cristivomer naymacush (Walbaum). Lake Trout.

This beautiful fish is an inhabitant of nearly every body of water throughout the north, not only in the Mackenzie basin, but in many other of the river systems. Being partial to clear, deep water, it is seldom found in the main rivers, although when these become clear, as is sometimes the case in autumn, numbers of trout find their way thence from the lakes. In the larger bodies of water, lake trout frequently attain a weight of 50 pounds, and occasionally even more. They are caught in large numbers and furnish a rich and nourishing food, but can not be eaten steadily, as they soon pall upon the appetite. In the summer season they take a moving bait readily, especially in swift water, but by far the greater number are caught in nets. In winter they seek the depths of the lakes, and are then taken with hooks set through the ice.

Athabaska Lake, the Eastern and Northern arms of Great Slave Lake, and Great Bear Lake abound especially in these fine trout, and as the water is there beautifully clear the traveler frequently sees them pursuing their prey in the depths, or lying motionless near the bottom. In the swift streams which enter these lakes, and in some which fall into the Arctic Sea, the pools at the foot of rapids are always tenanted by these voracious fish. I found them abundant in the lakes and streams between Great Slave and Great Bear lakes, and along the south shore of that body of water. They took a spoon bait readily up to the last of August, but after that could be caught only in the nets. On September 15, while making a traverse of about 3 miles across the mouth of a deep bay near Manito Islands, we passed a broad level bar covered by only about 12 feet of water, though elsewhere the bottom was invisible. On this bar we saw hundreds of large trout, either lying motionless or swimming lazily about. I supposed them to be spawning. Large numbers were being caught by the Indians at Fort Franklin during September.

A trout taken by Simpson's party at Fort Confidence, Great Bear Lake, measured $4\frac{1}{2}$ feet in length and 27 inches in girth, and weighed 47 pounds.^b Richardson states that Franklin's party, during eighteen

^a Ann. Rept. Geol. Surv. Canada, IV, p. 74D, 1891.

^b Narrative Discoveries on North Coast of America, p. 217, 1843.

months' residence at Fort Franklin in 1825-26, took 3,500 trout weighing from 2 to 30 pounds each.^a

SPECKLED TROUT.—Under this general heading I include a few notes collected from various sources regarding the occurrence of speckled or brook trout, probably of several species, in a number of widely separated localities in the Mackenzie Basin.

Mr. John Firth of Fort McPherson assured me that speckled trout are found in West Rat River, a tributary of the Porcupine west of Fort McPherson. It is probable that these are either *Salmo mykiss* or *Salvelinus malma*, both of which are known to occur in Alaskan streams. In East Rat River also, which is connected with the westward-flowing stream (and therefore may contain trout of the same species), but which flows eastward into the Peel, he said that speckled trout are common.

Mr. Firth also informed me that a form of speckled trout is found in a stream which enters the sea a short distance west of the mouth of the Mackenzie. MacFarlane states that speckled trout have been taken in lower Anderson River.^b As anadromous trout of the *Salvelinus alpinus* type are known to occur in the Coppermine, these records may refer to the same species.

I also learned from several independent sources that speckled trout occur in the Towattinow and in one or two other tributaries of the Athabaska, but I was never able to procure specimens.

Thymallus signifer (Richardson). Arctic Grayling.

The Arctic grayling, usually called bluefish in the north, has a very extensive range. It occurs throughout the region from Peace River and Athabaska Lake northward and northwestward to the Arctic Ocean. I can not find that it has been detected in the Athabaska. As it prefers clear streams it is somewhat local in distribution, occurring but seldom in the main rivers, which are usually muddy, but being abundant in many of the clear tributaries and the lakes which they drain. During my explorations I met with the grayling in the lake country between Great Slave and Great Bear lakes and at a number of points on the Mackenzie. It was especially abundant in the rapid stream which I descended to MacTavish Bay in August, 1903, and I caught many while fishing for trout with a spoon hook. It was common also in Great Bear Lake near Fort Franklin a little later, where many were being taken in the whitefish nets.

In the spring of 1904 I had an opportunity to observe the method of taking this fish employed by the Indians of the Mackenzie. A

^a Fauna Boreali-Americana, III, p. 208, 1836.

^b Second Rept. Committee of Senate (Canada) on Mackenzie Basin, p. 54, 1891.

small stream, called locally Bluefish River, flowing into the Mackenzie opposite Fort Simpson, was the scene of operations. The fish descend the stream in large numbers at this season, and the natives take advantage of this habit. When I visited the place, on May 16, the fishing was well under way. A tight dam (here called a 'barrier') constructed of logs, stones, and interlacing spruce branches supported by stakes driven into the gravelly bottom, was built across the river at a favorable point. This dam was >-shaped and at the point of convergence an opening was left in which was fixed a sort of trough-like basket. This was constructed by binding together side by side slender peeled spruce poles about 10 feet in length, the thicker ends being all placed together, so that the finished article was a basket 10 feet long, open at the top and the larger end, where it was about 2 feet wide, and tapering to a point at the other. This trough or basket projected down stream from the apex of the dam, the broader open end nearly submerged, while the smaller end was slightly tilted and was practically dry, the structure being sufficiently open to allow the intruding current to escape without overflowing. In descending the stream the fish encounter this barrier, and following its converging arms are led into the basket. When they find themselves trapped they quickly turn and would mount the rushing current and escape were they not instantly scooped up by the watchful native, who kneels on a platform beside the trap. The amount of labor involved in constructing one of these 'barriers' is considerable, as the dam must be built anew each spring just after the stream opens, when the water is ice cold; but as 200 or more fish are often taken in a night, at a season when the natives are usually short of food, the method is quite generally employed. The fish which I saw taken at this place varied from 11 to 16 inches in length. The fish of Rabbitskin River, a tributary of the Mackenzie above Fort Simpson, are said to average larger.

The grayling is said to be scarce in the Liard below the mouth of the Nelson, but to be common above that point. It is also found in most of the tributaries of the Mackenzie, several of which have local names referring to its occurrence.

As an index to the distribution of this interesting fish I have selected the following references: Back recorded it from the mouth of Hoarfrost River, Great Slave Lake; from the head of Back River; and from Lake Pelly on the same stream.^a Dr. G. M. Dawson reported its capture in upper Peace River;^b and in the Finlayson, a tributary of the upper Liard.^c MacFarlane has recorded it from Anderson River.^d

^a Narrative Expedition to Mouth Great Fish River, pp. 114, 157, 346, 1836.

^b Rept. Prog. Geol. Surv. Canada, 1875-76, p. 38, 1877.

^c Ann. Rept. Geol. Surv. Canada, 1887, p. 231B, 1888.

^d Canadian Record of Science, IV, p. 52, 1890.

I am not aware that the grayling has been recorded from any stream tributary to Hudson Bay, except in one instance. Doctor Bell mentions that it was taken in tributaries of the lower Churchill, and that a specimen was identified by Professor Gill as *Thymallus signifer*.^a A possible explanation of the occurrence of this fish in the Churchill is suggested by the fact that there is direct water connection between Churchill River and Athabaska Lake. The grayling occurs in Black or Stone River, which flows from Wollaston Lake into Athabaska Lake.^b The waters of another outlet of Wollaston Lake, Cochrane River, flow by way of Reindeer Lake into the Churchill, thus affording to a torrent-loving species like the Arctic grayling a ready means of communication.

Osmerus dentex Steindachner. Smelt.

A specimen of this fish presented to me by Père Giroux, of Arctic Red River, on July 16, 1904, has been recorded by Evermann and Goldsborough, and apparently furnishes the first record for Canada.^c Père Giroux informed me that the species is common at Arctic Red River all the summer and autumn. It is a common species on the Alaskan coast, and is an important food fish in some sections.

Esox lucius Linnæus. Pike; Jackfish.

This species, the only pike of the Mackenzie Valley, is extremely abundant in practically all the waters of the region, and has given its name to scores of lakes and streams. In the larger lakes it attains a weight of 35 pounds or more. In this region of excellent food fishes it is not highly esteemed, but being easily captured it is often a means of preventing much suffering from famine. As far as I can ascertain it is not found in the Ark-i-linik, Great Fish, or Coppermine rivers, but it is an inhabitant of the Anderson. It is much less common in the muddy rivers than in the clear lakes. The pools at the foot of falls or rapids are favorite haunts, and in these situations it is especially easy to secure.

Pygosteus pungitius (Linnæus). Nine-spined Stickleback.

I took two adult specimens of this fish, less than two inches in length, in a small muskeg pond a short distance from MacTavish Bay, Great Bear Lake. Evermann and Goldsborough have recently recorded these specimens, and refer *Gosterosteus concinnus*, described by Richardson from Great Bear Lake (Fauna Boreali-Americana, III, p. 57, 1836), to the same form.^d It is probable that the sticklebacks

^a Rept. Prog. Geol. Surv. Canada, 1878-79, p. 7C, 1880.

^b Tyrrell, Ann. Rept. Geol. Surv. Canada, VIII, p. 14D, 1896.

^c Proc. Biol. Soc. Washington, XX, p. 105, 1907.

^d *Ibid.*, p. 106, 1907.

observed by Kennicott at Fort Resolution, May 15, 1860, and later at Peel River (Fort McPherson), belong to the same species.^a

Although so small, these sticklebacks often occur in such myriads that they are used for food. Richardson states that they were collected by the sledge load from a lake near Cumberland House, to be used for dog food.^b Nelson reports that in the marshy country between the mouths of the Yukon and the Kuskoquim they were caught in great numbers in dip nets and formed an important item in the food supply of that district.^c

Stizostedion vitreum (Mitchill). Wall-eyed Pike; Doré; Pickerel.

The doré, as it is almost universally called in the north, is rather common north to Great Slave Lake. It is taken in numbers in Athabaska River, Athabaska Lake, and Slave River, and is rather common in Great Slave Lake. It is found also in many of the smaller rapid streams such as are frequented by the grayling, and is an active and spirited fish, readily taking a troll, and when hooked fighting vigorously for its liberty. It is an excellent food fish, but of course must yield the palm in this regard to the unsurpassed whitefish, with which it is associated. The northernmost point where I took it was lower Grandin River, north of Fort Rae, and I was informed that it is fairly common in Willow or Horn River, near Fort Providence.

Cottus cognatus Richardson. Bear Lake Bullhead; Miller's Thumb.

This small cottoid was described by Richardson from specimens taken in Great Bear Lake in May, at which time, he says, it resorts to the stony shallows to spawn.^d It is probable that the species has an extensive distribution in the north, but it has not been detected elsewhere in the Mackenzie region. Evermann and Goldsborough have recently recorded it from Lake Bennett, British Columbia.^e

Oncocottus hexacornis (Richardson). Six-horned Bullhead.

This sculpin was described from specimens collected at the mouth of Tree River, near the Coppermine.^f It is a salt-water species, which occasionally enters the mouths of rivers. Père Giroux informed me that it comes rarely to Arctic Red River.

Lota maculosa (Le Sueur). Loche; Methye; Maria.

This voracious fish is present in nearly every lake and stream throughout the Mackenzie region, and also in the Arctic Ocean. It

^a Trans. Chicago Acad. Sci., I, pp. 171, 208, 1869.

^b Fauna Boreali-Americana, III, p. 57, 1836.

^c Report on Nat. Hist. Collections in Alaska, p. 301, 1888.

^d Fauna Boreali-Americana, III, p. 40, 1836.

^e Bull. Bur. Fisheries, XXVI, p. 307, 1907.

^f Richardson in Franklin's Narrative Journey to Polar Sea, p. 726, 1823.

is so little esteemed as a food fish that even the dogs will not eat it unless starving, but the liver and roe are considered delicacies. It is taken in nets set for other fish and on hooks set for lake trout.

Père Giroux, of Arctic Red River, informed me that the loche appears at that place in numbers about June 15 and passes up the river, and that there is a return movement in November and December. The natives of the upper river (at Fort Simpson and elsewhere) catch many in autumn, just before the river freezes over, by means of baited hooks thrown from the shore and allowed to sink to the bottom. Examples upward of 3 feet in length are thus often taken. Some of the Indians believe that no more loche will be taken if the bones of one are eaten by a dog.

The wide distribution of this fish is attested by many references scattered through the narratives of northern travel, but they need not be particularized.

Thomas Simpson recorded great numbers coming in with the rising tide a short distance west of the mouth of the Mackenzie, and also took specimens near the mouth of the Coppermine.^a

TREES AND SHRUBS OF ATHABASKA-MACKENZIE REGION.

The following list of trees and shrubs contains, with one or two exceptions, only those species which were collected or observed by our parties, and is by no means a complete list of the species of the region. Most of the annotations are from our own notes. The species of *Salix* and *Ribes*, except where otherwise credited, have been identified by F. V. Coville; in the case of the other shrubs my own identifications have been verified by his assistants, mainly by W. F. Wight. G. B. Sudworth has made a few suggestions regarding names. No attempt has been made to include all species reported by other observers, but in the case of some species observed by us notes regarding distribution have been collected from published sources. In order to avoid frequent repetition these notes are not accompanied by references, but they are mainly from the following sources:

- DEASE and SIMPSON. Narrative Discoveries on North Coast of America, by Thomas Simpson, 1843. List of plants, by W. J. Hooker, pp. 409-418.
- TYRRELL BROTHERS. Ann. Rept. Geol. Surv. Canada, IX, 1897. List of plants, by John Macoun, pp. 205F-218F.
- J. W. TYRRELL. Ann. Rept. Dept. Interior (Canada), for 1901. List of plants, by John Macoun, pp. 61-62 of separate.

For fuller reference to these publications, see Bibliography, p. 535.

^a Narrative Discoveries on North Coast of America, pp. 111, 267, 1843.

Pinus divaricata (Ait.) Du M. de C. Banksian Pine.

This is the only species of pine on the lower Athabaska and northward. Between Edmonton and Athabaska Landing it forms extensive forests in several places. Along the Athabaska and Slave rivers it appears only occasionally, usually where high gravelly banks approach the river. It is common, however, on the rocky hills about Fort Chipewyan and Smith Landing, and is the predominating tree on the rolling sandy plains on Smith Portage and about Fort Smith. It occurs commonly on the Simpson Islands and about the Northern Arm of Great Slave Lake. On my route to the northward of Fort Rae it was seen in many places on Grandin River, reaching a diameter of 18 inches, but not growing very tall. North of the height of land it was rare, but I saw many trees on a portage a few miles north of the outlet of Lake Hardisty.

On the Mackenzie it is common north to about latitude $64^{\circ} 30'$. About Fort Simpson in suitable localities it forms groves of well-grown trees, reaching a diameter of 18 inches. A tree 11 inches in diameter near the base, examined at Fort Simpson, had 102 annual rings. On the north slope of the Nahanni Mountains, 75 miles below Fort Simpson, the species ascends to about 1,000 feet and then becomes a dwarfed shrub and disappears. On the southern slopes of the same mountains it occurs as a fairly well-grown tree to about 2,000 feet, near the summit.

In the country to the eastward of our routes it was detected by the Tyrrell brothers as far north as Selwyn and Theitaga lakes; and by J. W. Tyrrell on Kipling Lake, a few miles east of the eastern end of Great Slave Lake.

The wood of this pine is put to very little use in the region, except for fuel.

Larix laricina (Du Roi) Koch. Tamarack.

The tamarack is found throughout the region north to the limit of the forest, occurring mainly in muskegs, where it is sometimes the predominating tree. Since its wood is tougher than any other native to the region, it is used to a considerable extent to form the keels and gunwales of boats, and for other purposes where extra strength is required.

We observed this tree in suitable places in all the country traversed on our journeys from the Saskatchewan north to the lower Mackenzie. It is rather common along the southern shores of Great Bear Lake, where the largest one seen, near Leith Point, was about 12 inches in thickness at the base, but was not over 30 feet in height. While traveling along this shore in the autumn of 1903 I first noted the leaves of the species beginning to change color on September 12, near McVicar Bay. Two days later its yellow foliage gave a decided impress

to the scenery. On September 18, at Fort Franklin, its leaves were dropping, and soon afterwards the trees were bare.

At Fort Simpson it is common and reaches a good size. On June 1, 1904, the leaves were just beginning to appear, tingeing the swamps with their beautiful shade of green. As I descended the river the progress of vegetation kept pace in a general way with my rate of travel. At Fort Norman, on June 11, the leaves and cones of the tamaracks were just appearing, and at Fort Good Hope, ten days later, they were about half grown. The species occurs as a small tree at Fort McPherson, and it is the only tree mentioned by McConnell as growing on the plateau to the westward at an altitude of 1,200 feet, where it attains a maximum diameter of 2 inches and a height of 6 or 8 feet. On the Nahanni Mountains, 75 miles below Fort Simpson, it ascends to timberline, at an approximate altitude of 2,000 feet on northern slopes, occurring, of course, as a dwarfed shrub at its upper limit.

In places the tamarack extends quite to the tree limit. It was found by the Tyrrell brothers on the Telzoa north to Dubawnt Lake, and by J. W. Tyrrell on Thelon River near its junction with the Hanbury (p. 31 of separate).

Picea canadensis (Mill.) B. S. P. White Spruce.

This species, usually called "pine" in the north, is the commonest timber tree of the region, and occurs north to the limit of the forest. Along certain rivers which enter the Barren Grounds from the southward the range of this species is extended far beyond its general limits, and sometimes the isolated colonies are of large extent.

Most of the lumber used in building and general constructive work throughout the region is furnished by this species. Its wood is soft and easily worked, and though admirably adapted for some purposes, is used for others only from necessity. Its slender fibrous roots, split into long strips, are used by the natives to sew together the pieces of birch bark in the construction of canoes and various utensils. Its bark, stripped from the trunks in early spring, forms the usual roofing material, taking the place of shingles throughout the region, except at a few favored posts. A canoe, quickly made from a long section of bark by closing the ends and strengthening the structure with a few ribs, is often made by the natives for temporary use.

It reaches its perfection in the alluvial bottoms of the Athabaska and Slave River valleys, but is practically absent from their deltas. In favorable places along Slave River it attains a diameter of 3 feet and a height of nearly 150. On some of the islands in Great Slave Lake, exposed and wind-swept at all seasons, it occurs in a more or less stunted form. On the canoe route between Fort Rae and Great Bear Lake it is common, varying in luxuriance according to the local conditions. Along the southern shore of Great Bear Lake it forms

the bulk of the forest. In exposed situations near Leith Point it is somewhat dwarfed, seldom exceeding a diameter of 1 foot and a maximum height of 40 feet. A few miles back from the shore, in slightly more favorable locations, trees 2 feet in diameter at the base were seen, but none of these exceeded 50 feet in height. A tree 12 inches in diameter, growing in an exposed situation near the shore, had 257 annual rings. In this specimen the outer layers were exceedingly thin and could be counted only by the aid of a fine-pointed needle. At this rate, the age of a tree of twice this diameter can scarcely be estimated at less than 1,000 years. (Pl. XXIV, fig. 1.) Farther west along the shore the species attains greater perfection of habit, especially in some of the sheltered bays. At Fort Franklin it is the commonest tree, but at present is represented by scarcely any individuals of the original forest, which has been removed for building purposes. Trees over 8 or 9 inches in diameter are rare. A sapling 4 feet in height and 1 inch in diameter, on the site of Fort Franklin, had been growing for thirteen years.

On the Mackenzie it does not attain the size reached farther south, but is still a stately tree. One measured by Richardson on the Mackenzie above Fort Norman was 122 feet in height. On the alluvial banks and islands of the lower Mackenzie and Peel rivers it attains a diameter of 18 inches.

On the northern slopes of the mountains near the mouth of the Nahanni this tree ascends to timberline, but above an altitude of 500 feet seldom exceeds a height of 25 feet (Pl. XXIV, fig. 2).

In the region to the eastward of Great Slave Lake it reaches its northern limit on Artillery Lake and on Thelon River, where isolated groves extend to latitude $62^{\circ} 22'$, well within the general confines of the Barren Grounds.

Picea mariana (Mill.) B. S. P. Black Spruce.

The black spruce extends northward nearly to the limit of the forest, but is confined mainly to the muskegs, seldom growing on the alluvial bottom lands, where the white spruce attains its perfection. It furnishes a poorer quality of lumber than the white spruce, and is put to fewer uses. I noted it in places all along the main route to the mouth of the Mackenzie and on my canoe route to the eastward nearly to Great Bear Lake. A tree 4 inches in diameter, growing in a sheltered situation on Lake Hardisty, had 78 annual rings, and a sapling 1 inch thick at the base, near the same locality, had been growing fifteen years. This species ascends the northern slopes of the mountains at the mouth of Nahanni River to timberline at about 2,000 feet.

Abies balsamea (Linn.) Mill. Balsam Fir.

The balsam fir occurs rather commonly along the Athabaska from Athabaska Landing to the delta. On the lower part of the river it



FIG. 1.—WHITE SPRUCE NEAR LEITH POINT, GREAT BEAR LAKE.
[This tree, 2 feet in diameter, was estimated to be at least 1,000 years old.]

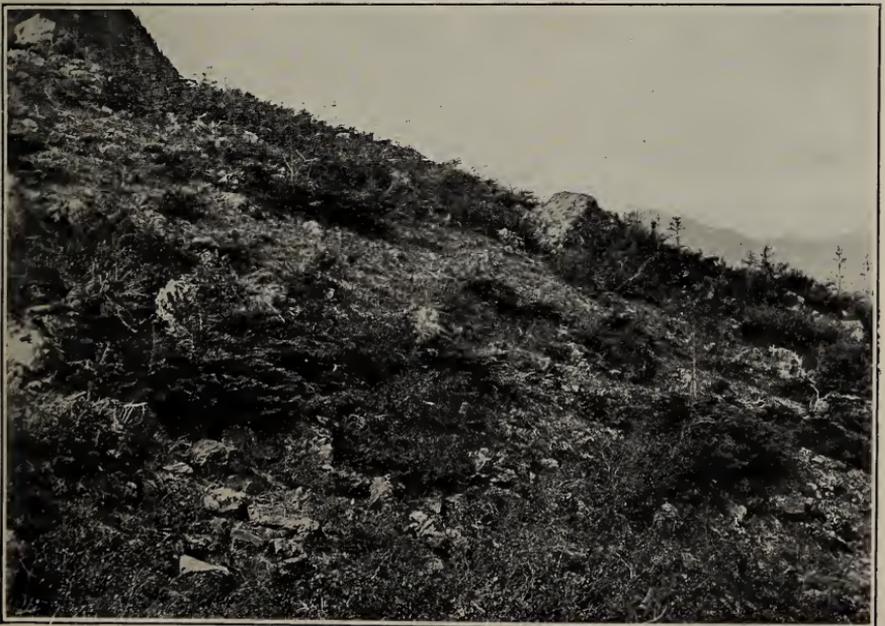


FIG. 2.—DWARFED TREES, MAINLY WHITE SPRUCE, ON UPPER SLOPE OF MOUNT
THA-ON'-THA.

is a good-sized tree. North of this point I have no authentic data as to its occurrence.

Juniperus sabina Linn. Creeping Juniper.

This trailing shrub grows mainly on gravelly banks and rocky ledges throughout the forested belt. It occurs in a dwarfed state on the semibarren shore of Great Bear Lake near Leith Point. It ascends to the summit of the mountains near the mouth of Nahanni River to an altitude of over 2,000 feet, and, according to Richardson, reaches an altitude of 1,000 feet within the Arctic Circle. To the eastward of our routes the species was found by the Tyrrell brothers as far north as Carey Lake. (See fig. 16.)



Fig. 16.—Creeping juniper (*Juniperus sabina*), Fort Chipewyan.

Juniperus nana Willd. Low Juniper.

This is a common shrub throughout the wooded region, occurring principally on dry ground, and ascending the mountains to timberline. It was found by the Tyrrell brothers on the north shore of Carey Lake. Like the preceding species it is usually loaded with fruit in the spring.

Populus balsamifera Linn. Balsam Poplar.

The balsam poplar inhabits the entire length of the Athabaska, Slave, and Mackenzie rivers, reaching its greatest perfection of habit on the Athabaska, Slave, Peace, and Liard rivers. On the Macken-

zie at Fort Simpson it is a stately tree, but below that point it rapidly decreases in size, and on the lower Mackenzie and Peel rivers occurs only as a small tree. Its wood is put to very little use except for fuel, and even for this purpose it is not well adapted.

In 1903, at Brulé Rapid, Athabaska River, its catkins opened on May 26. On May 30, on the lower Athabaska, its leaves had expanded sufficiently to be conspicuous, and they were nearly full grown on Rocher River on June 6.

At Fort Simpson, on May 18, 1904, the leaves on the balsam poplars were just starting, but on account of a cold rainy period following they were only half grown on June 2, and were in about the same stage at Fort Norman on June 11.

On the canoe route north of Great Slave Lake I last noted it near the northern end of Lake Hardisty, and I next saw it on the upper part of Bear River, while descending that stream to the Mackenzie.

J. W. Tyrrell states that a few trees, the last outliers of the species in that direction, were seen on Fairchild Point at the eastern extremity of Great Slave Lake.^a

Populus tremuloides Michx. Aspen Poplar.

The aspen poplar occurs nearly throughout the wooded region. In favorable places along the Athabaska and Slave (see Pl. VI, fig. 2), it attains a large size, and this is the case also about Fort Simpson. Northward and eastward of these valleys it reaches only a moderate size. On the most exposed parts of the southern shore of Great Bear Lake it occurs only as a dwarfed tree, but west of McVicar Bay it reaches a fair size. On the lower Mackenzie and Peel rivers it seldom attains a diameter of more than 6 inches. East of the Great Slave Lake region it was found by the Tyrrell brothers to extend north to Daly Lake on Telzoa River.

In 1903 the leaves of the aspens were first seen, near Little Buffalo River, on the morning of May 26, and made much progress during that day. During that autumn, on the southern shore of Great Bear Lake, the leaves had turned yellow on September 14.

In 1904, at Fort Simpson, the aspen leaves first showed on May 13, and on the following day were half an inch in length. A cold spell which followed retarded their growth, and they were only half grown by June 2, and were at the same stage at Fort Norman on June 11.

The species is of little economic importance in the north, being used only for firewood.

Salix padophylla Rydberg.

Specimens collected on the slopes of the Nahanni Mountains on June 6, 1904, are referred to this species by P. A. Rydberg. The

^a Ann. Rept. Dept. Interior (Canada), 1900-1901, p. 110 (p. 15 of separate), 1902.

leaves appear to be nearly full grown and the catkins are bursting their capsules.^a

Salix lutea Nutt. Yellow Willow.

This species is very conspicuous in the Athabaska-Peace delta, where specimens taken on June 2, 1903, were just bursting into leaf. Its twigs and catkins at that period impart a decidedly yellow effect to the thickets.

Salix myrtilifolia Anders. Myrtle Willow.

This low willow was taken on the summit of the Nahanni Mountains, where it assumes the form of a prostrate or trailing shrub, rising only 2 or 3 inches above the ground. Specimens taken there on July 15, 1903, held catkins 30 mm. long; their capsules were just bursting. On June 4, 1904, at the same place its leaves were nearly full grown. At Fort Good Hope it occurs at the river level.

Salix pseudo-myrsinites Anders.

Taken at Fort Resolution and Fort Providence. Specimens collected at the former place on June 21, 1903, had the leaves nearly fully developed. At Fort Providence, on July 5, the fruiting catkins were bursting their capsules.

Salix myrtilloides Linn. Bog Willow.

This species was taken on June 12, 1904, in a muskeg at Fort Norman, where it is abundant. The leaves and catkins were nearly fully developed at that date.

Salix fluviatilis Nutt. Sandbar Willow.

A willow taken at the mouth of North Nahanni River is identified as this species. Sandbar willows, evidently of the same species, cover the low islands and banks of the Athabaska, Slave, and Mackenzie rivers throughout their courses.

Salix nuttallii Sargent. Nuttall Willow.

This willow was collected at Fort Simpson, where on May 29 its pistillate catkins were from one-half to three-fourths of an inch in length, though the leaves had not appeared.

Salix alaxensis (Anders.) Coville. Felt-leaf Willow.

This beautiful willow, whose leaves are remarkably soft and felt-like, is a northern type. We found it common along the southern shore of Great Bear Lake, where its leaves had already turned yellow on August 27, though its catkins were just opening. It ranges south along the summits of the mountains. On the Nahanni Moun-

^a Owing to the difficulty of distinguishing most of the willows in the field, the notes here given are mainly taken from identified specimens. A few other species were collected but remain unidentified.

tains, on June 4, 1904, the pistillate catkins were 1 inch in length and the leaves about one-third grown.

Salix bebbiana Sargent. Bebb Willow.

This is one of the commonest willows, forming dense thickets on the banks of the streams and in the alluvial swamps north to the lower Mackenzie. Specimens were collected at various points between Grand Rapid and Fort Good Hope. On the upper Mackenzie it grows to be a fair-sized tree—nearly a foot in diameter and 25 feet high. At Fort Simpson on May 12, 1904, the leaves and staminate catkins were over an inch long, being farther advanced than on Great Slave Lake on June 21 of the previous year.

Salix arbusculoides Anders. Little-tree Willow.

Specimens referred to this species were taken at Fort Resolution, Loon Island (50 miles north of Fort Resolution), Lake St. Croix, Nahanni Mountains, Fort Norman, and Fort McPherson. Its leaves open rather early, and were nearly full grown on the slopes of the Nahanni Mountains on June 6, 1904.

On Loon Island, which is wind swept at all seasons and where almost Barren Ground conditions prevail, the willows were stunted, and the specimens collected, though mature, have exceedingly small leaves.

This species extends north of the tree limit, and is perhaps the largest species on the Barren Grounds.

Salix chlorophylla Anders. Tea-leaved Willow.

This willow, whose twigs are dark reddish, was common at Fort Simpson. On May 12 its leaves were just starting, and three days later they were half an inch in length; the pistillate catkins were then over 1 inch long.

Salix anglorum Cham. Robert Brown Willow.

This dwarf willow was collected only on the exposed shores of Great Bear Lake near Leith Point. Usually its gnarled and sparsely leaved stems cling closely to the rocks, and even in the most favorable situations it attains a height of only a few inches. I took it on the Hudson Bay Barren Grounds in 1900.

My specimens were determined by P. A. Rydberg.

Salix seemannii Rydberg.

Willows identified as this species by P. A. Rydberg were collected near Leith Point, on Great Bear Lake, and at Forts Providence and McPherson. The species was abundant at the latter locality.

Salix glaucops Anders.

Willows referred to this species by P. A. Rydberg were collected near Leith Point, on the south shore of Great Bear Lake, on August

31, 1903. It was the most abundant willow along that shore, and at that date its foliage had already turned, and imparted a brilliant yellow color to the half barren rocky areas.

Specimens collected near Lake St. Croix on August 19, 1903, are referred by Rydberg to *S. g. glabescens*.

Salix niphoclada Rydberg.

Our collection contains specimens referred by P. A. Rydberg to this species from Fort Resolution and Fort Good Hope. At the latter place it was abundant, and on June 23, 1904, had leaves only about half an inch in length.

Salix reticulata Linn. Net-veined Willow.

This dwarf willow was common along the southern shore of Great Bear Lake and covered the gently sloping banks of Bear River for a few miles below its head. On August 31, 1903, near Leith Point, the fruiting catkins were just bursting their capsules. It has an extensive distribution southward along the high mountains.

Myrica gale Linn. Sweet Gale.

This shrub occurs in suitable places throughout the region north to Great Bear Lake. It was abundant on river banks on the canoe route north of Great Slave Lake. On the southern shores of Great Bear Lake it occurs in a somewhat dwarfed state, with small leaves.

Corylus americana Walt. Hazelnut.

This hazel is common on the road a few miles south of Athabaska Landing. This is its northern limit, as far as we observed.

Corylus rostrata Ait. Beaked Hazelnut.

The beaked hazel was noted along the roadside south of Athabaska Landing and at various points along the Athabaska down to the mouth of the Clearwater, where it is a common shrub. Its nuts were nearly ripe about the middle of August.

Betula papyrifera Marsh. Canoe Birch.

The canoe birch is a common tree throughout the wooded region. It reaches its perfection in the southern part of the country and northward gradually decreases in size. On the canoe route north of Fort Rae it was found to be common, reaching a diameter of nearly 1 foot as far north as Lake St. Croix. A tree 5 inches in diameter examined near that lake had 65 annual rings. Another specimen 1 $\frac{3}{4}$ inches in diameter, on the shores of Lake Hardisty, had been growing twenty-five years, and one three-fourths of an inch thick was 15 years old. Along the southern shores of Great Bear Lake it occurs only in a somewhat dwarfed state, but it reappears as a fair-sized tree on Bear River. Along the Mackenzie it occurs as an economically

important species north to the delta. East of the territory covered by our observations Tyrrell observed trees large enough to furnish bark for canoes at the north end of Selwyn Lake; Hanbury noted the species on upper Dease River in 1902.

This birch opens its leaves about the same time as the aspen poplar. At Fort Simpson, in 1904, the leaves first showed on May 13, and were half an inch long on the following day. They were not fully out, however, until over two weeks later.

This tree is of great economic importance to the natives of the region. Its wood, though soft when green, is rather hard when seasoned, and takes a high polish. The frames of snowshoes, the runners of sleds and toboggans, and the handles of axes and other tools are usually made of it. In addition to furnishing the covering for canoes, its bark is used in the construction of baskets and various household utensils, and to some extent for constructing shelters.

The natives gather the sap in spring and boil it down into sirup. An incision is made with the axe on the side of the tree, and the sap gathers and drops from a projecting point of bark. At Fort Simpson, in 1904, the sap was running freely from April 20 to May 1.

Betula alaskana Sarg. Alaskan Birch.

This species, which seems to be related to *B. occidentalis* of Hooker, was collected by Alfred E. Preble and Merritt Cary at Fort McMurray. We did not detect it elsewhere.

Betula glandulosa Michaux. Dwarf Birch.

Throughout the region now under review northward into the Barren Grounds dwarf birches of one or more species occur. In the Hudsonian zone the larger one, *B. glandulosa*, which is common in the southern part of the region, is largely replaced by a more dwarfed species, with smaller and more rounded leaves, *B. nana* of the present report. Both species, however, were found growing side by side at Fort Good Hope and at Fort McPherson.

Betula nana Linn. Northern Dwarf Birch.

This species occupies favorable situations—marshes and borders of streams—practically throughout the Hudsonian zone. Dwarf birches believed to belong to this species were collected near Lake St. Croix, at Fort Good Hope, and on the Nahanni Mountains, and the form was common along the shore of Great Bear Lake, and on the Mackenzie from Fort Norman to the delta. Its seeds furnish a favorite food for the smaller seed-eating birds during the early autumn.

At Fort Franklin its leaves were falling on September 18, 1903, and in the following spring, on the lower Mackenzie, its foliage opened about the middle of June.

***Alnus alnobetula* (Ehrh.) Koch. Mountain Alder.**

This alder occurs throughout the region from the Saskatchewan northward to the tree limit. It is abundant on the Athabaska Landing road, and appears here and there along the water route north to Great Slave Lake, though usually less common than the hoary alder. North of Great Slave Lake it is the predominating alder, and on the canoe route between that body of water and Great Bear Lake, and along its shores, was the only alder detected. It was also the common species on the Mackenzie north to the delta. At Fort Simpson, in 1904, its buds began to swell about March 30, its catkins opened on April 23, and its leaves began to unfold on May 20. The leaves were in about the same condition at Fort Norman on June 11.

A specimen $1\frac{1}{2}$ inches in diameter, growing on the shores of a large lake a few miles south of MacTavish Bay, had 23 annual rings.

The alders seen by Hanbury on upper Dease River ^a were undoubtedly this species. In the region east of the Mackenzie system it was found by the Tyrrell brothers as far north as Carey Lake and Ferguson River.

***Alnus incana* (Linn.) Willd. Hoary Alder.**

This alder is the more common of the two species north to Great Slave Lake, and occurs along the Mackenzie north to Peel River. It was not detected on the canoe route followed between Great Slave and Great Bear lakes.

An infusion of the inner bark of the alders, the bark being first broken up by chewing, is used by the Indians to stain dressed caribou skins, the resulting color being a bright tan. Otherwise the alder is of little economic importance to the native tribes.

***Ribes oxycanthoides* Linn. Northern Gooseberry.**

This is the commonest representative of the genus throughout the region, being especially abundant in the vicinity of the trading posts, where it often forms dense thickets. About Athabaska Lake its leaves open about the first of June, its blossoms appear about the same time, and the fruit ripens about the first of September. Farther north it flowers considerably later, but matures its berries at about the same date. Near Leith Point, Great Bear Lake, on September 8, 1903, its leaves had turned red and its fruit was well developed and fully ripe.

At Fort Simpson, on May 8, 1904, its leaves had just sprouted; on May 21 the flowers had appeared; and on May 29 the leaves were about half developed.

The berries of this gooseberry are well flavored and are gathered by all the Indian tribes within its range.

^a Sport and Travel in Northland of Canada, p. 239, 1904.

Ribes rubrum Linn. Red Currant.

The red currant occurs throughout the region north at least to Great Bear Lake. It usually grows in woods, where its dark-tinged foliage makes it a conspicuous shrub. Its well-flavored berries, which grow in drooping racemes, are ripe in late August and early September. I found it fairly common along the canoe route between Great Slave and Great Bear lakes, along the southern shore of that body of water, and at Fort Franklin.

At Fort Simpson it was in flower on May 20, 1904, at which time its leaves were about half grown.

Ribes hudsonianum Richardson. Northern Black Currant.

This is the least common of the species of *Ribes* observed by us. We took specimens in various places from the Athabaska nearly to Great Bear Lake. It was in flower at Smith Landing on June 11, 1903, and held ripe fruit on Lake Hardisty on August 19. J. W. Tyrrell found it on Artillery Lake in the summer of 1900.

Ribes prostratum L'Her. Fetid Currant.

This currant, whose prickly, resinous-flavored fruit is scarcely edible, is common throughout the country from the Athabaska north at least to Great Bear Lake. When ripe its berries are black, not red as stated in most text-books. It was abundant in the country north of Fort Rae, and its fruit was ripe on Lake Hardisty on August 16, 1903. It was noted also at Fort Franklin.

In the region to the eastward of our route it was collected by the Tyrrell brothers as far north as Daly and Carey lakes.

Rubus chamaemorus Linn. Cloudberry.

This herbaceous raspberry is scarcely entitled to a place in a list of shrubs, but may be included because of its abundance and general interest. It occurs in suitable places, mainly peaty bogs, from the Saskatchewan to the Arctic Sea, but is not abundant south of Great Slave Lake, and reaches its perfection along the southern border of the Barren Grounds. It flowers from the first to the last of June, according to latitude, and its solitary berry ripens in July or August. The berries in ripening first turn red, but become amber-colored when fully ripe, and are generally referred to as yellow-berries. The fruit has a pleasant though rather insipid taste. On the southern shore of Great Bear Lake a few berries still remained on the stems at the latter end of August.

It was collected by the Tyrrell brothers on Carey Lake and by J. W. Tyrrell on Artillery Lake.

Rubus arcticus Linn. Arctic Raspberry.

This beautiful little raspberry has a distribution similar to that of *R. chamaemorus*. Its bright pink flowers appear in June, and its

usually solitary reddish berry, which has a delightful flavor, ripens in July or August.

J. B. Tyrrell collected this species on Carey Lake, and J. W. Tyrrell found it on Hanbury River in 1900.

***Rubus strigosus* Michaux.** Red Raspberry.

The wild red raspberry is an abundant shrub nearly throughout the forested region. It attains its greatest perfection in the southern part of this area, along the Athabaska and Slave rivers, where it forms dense thickets, particularly in the burned areas, and bears profusely. Along the canoe route between Great Slave and Great Bear lakes it is common, but does not attain its normal size, though it bears good fruit as far north as Great Bear Lake. On Lake St. Croix its berries were just ripening on August 14, 1903. On the Mackenzie it was not noted north of Fort Good Hope, but probably extends farther. In places where the plant is common, as along the Athabaska, its fruit forms a favorite food of the black bear.

The Tyrrell brothers collected it on the north shore of Carey Lake, in 1893.

***Dasiphora fruticosa* (Linn.) Rydberg.** Shrubby Cinquefoil.

This is an abundant shrub throughout the region north to the limit of the forest. Through the region south of Great Slave Lake its conspicuous yellow flowers appear early in June, and continue blooming for about two months. It was in full flower along the canoe route north of Fort Rae during August, 1903, and at Leith Point, at the end of August, a few blossoms still persisted on the stems. Here, and generally along the northern border of its range, the plant occurs in a somewhat dwarfed state. It is common along the Mackenzie, and was observed just leaving out near the mouth of Nahanni River on June 4, 1904, and was in flower at Fort Good Hope on June 21. Mr. E. S. Jones gave me a specimen in flower which he gathered on Richards Island, near the mouth of the Mackenzie, late in June.

The plant was collected by the Tyrrell brothers on the north shore of Athabaska Lake near Fond du Lac.

***Dryas integrifolia* Vahl.** Entire-leaved Avens.

This herbaceous shrub is common through the Barren Grounds, and along the extreme upper edge of the timbered country, and is thus one of the species most characteristic of the Arctic zone. I first noted it on the southern shore of Great Bear Lake near Leith Point, where it was abundant. Along the Mackenzie I took flowering specimens on the summit of the Nahanni Mountains on June 4, 1904, but at the river level first detected it near Fort Good Hope, where it was in flower on June 23 (Pl. XXV, fig. 1). G. A. Ball gave me speci-

mens taken on the summit of Bear Rock, near Fort Norman, on June 21.

J. W. Tyrrell took specimens on Artillery Lake in 1900.

Dryas drummondii Richardson. Drummond Mountain Avens.

Specimens just out of flower were taken by Alfred E. Preble and Merritt Cary on the summit of the Nahanni Mountains, near the mouth of that river, on July 16, 1903.

Rosa acicularis Lindl. Wild Rose.

This beautiful rose occurs abundantly throughout the timbered region. About the post clearings, and in favorable places on the river banks, it forms dense thickets, which in July are resplendent with pink flowers. Their color seems to increase in intensity northward.

In 1903 the first flowers were seen on Slave River, 90 miles below Fort Smith, on June 16, and the shrub was in full flower on the shores of Great Slave Lake about the first of July (Pl. XXV, fig. 2). Along the canoe route north of Great Slave Lake it is abundant, and it was seen occasionally along the southern shore of Great Bear Lake. It is abundant along the Mackenzie, ascending nearly to the summit of the adjacent mountains, and extending northward to the delta. Its leaves were just unfolding at Fort Norman on June 11, 1904, and it was in flower at Fort Good Hope on June 21.

Mr. E. S. Jones informed me that on Richards Island it grows to a height of 3 feet and forms thickets.

A species of rose with slender reddish branches, practically unarmed, is rather common along the Athabaska and on the road south of Athabaska Landing, but the species has not been determined.

Amelanchier alnifolia Nutt. Serviceberry.

This shrub, whose berries are used extensively by the various tribes, especially through the southern part of its range, is a common species along the Athabaska and Slave, and extends northward nearly to the limit of the woods. It flowers, even as far north as the upper Mackenzie, about the first week in June, and ripens its fruit in August. Along the canoe route between Great Slave and Great Bear lakes it occurs usually as a low shrub and does not produce much fruit. Its berries were ripening along Grandin River on August 3.

The Tyrrell brothers collected this shrub at the "Northwest Angle" of Athabaska Lake—near the most northern point on the lake.

Prunus pennsylvanica Linn. f. Red Cherry.

This is the common wild cherry of the region. It is common along Athabaska and Slave rivers and about the great lakes into which they flow. Along the Athabaska its sour and scarcely edible fruit ripens about the middle of August. I did not detect it north of Great Slave Lake, although it probably ranges farther north.



FIG. 1.—MAT OF *DRYAS INTEGRIFOLIA*, FORT GOOD HOPE, JUNE 23, 1904.



FIG. 2.—WILD ROSES (*ROSA ACICULARIS*), FORT RESOLUTION, JULY 9, 1903.

The Tyrrell brothers took it on Daly Lake—not far from the tree limit.

***Prunus virginiana* Linn. Chokecherry.**

This black-fruited cherry is common on the banks of the Athabaska, and is said to occur abundantly, also, along the Peace. Its fruit was nearly ripe at Fort McMurray on August 11, 1904, and fully so at Boiler Rapid a few days later. The fruit is eaten to some extent by the voyagers, but is not much relished. The shrub was not detected by us north of the Athabaska.

***Empetrum nigrum* Linn. Crowberry.**

The black crowberry occurs nearly throughout the region, being, to the southward of Great Slave Lake, mainly an inhabitant of the peaty bogs, but becoming more generally distributed north of that point. It reaches its greatest luxuriance on the northern border of the forest, but extends north to the Arctic Sea. On the canoe route north of Great Slave Lake it is common. Its berries were ripe on Lake St. Croix on August 14, 1903. On the sandy shores of Great Bear Lake it attains a high degree of development, covering considerable areas with a thick mat, and being loaded with the large juicy black berries. During the closing days of August and the first week of September, 1903, near Leith Point, its fruit formed the principal food of the geese and plovers, which were fattening previous to taking their southward flight. The berries become very juicy after the first frosts, and form an agreeable food for man.

It is common along the Mackenzie, and ascends the Nahanni Mountains to their summits.

Along the canoe route followed between Athabaska Lake and Chesterfield Inlet in 1893 the Tyrrell brothers found this shrub abundant, but observed very little fruit north of the edge of the Barren Grounds.

***Acer spicatum* Lam. Mountain Maple.**

This maple, apparently the only one which enters the territory now under consideration, was collected at Fort Chipewyan by the Tyrrell brothers in 1893. This is its most northerly recorded station. It was not observed by us.^a

^a *Acer negundo*. In an inclosed yard at Fort Simpson are several examples of the ash-leaved maple. They were introduced a number of years ago, but I was unable to ascertain even the approximate date. They appear to be healthy, but have scarcely attained the dignity of trees.

Elæagnus argentea Pursh. Silverberry.

This highly ornamental shrub occurs in suitable places, usually dry clay banks, along the Athabaska, Slave, and Mackenzie rivers nearly to Fort Norman. It was in flower at Smith Landing on June 10, 1903, and its beautiful silvery berries were ripe at Fort McMurray about the middle of August. Its fruit is inedible for man, but is said by Richardson to be eaten to some extent by geese in spring. The natives sometimes use the dried berries for purposes of ornament.

Lepargyræa canadensis (Linn.) Greene. Canadian Buffaloberry.

This is a common shrub throughout the country north to the edge of the timber. Its leaves open in most parts of the region about June 1, and it flowers at about the same date. On lower Grandin River its berries were ripe about the first of August. Along the exposed southern shore of Great Bear Lake it is a decumbent shrub with small leaves. It occurs abundantly along the whole course of the Mackenzie. Its bright red berries have a peculiar sour-bitter taste, but are used by some of the Indian tribes, particularly the Beavers, as food.

Cornus canadensis Linn. Dwarf Cornel.

The dwarf cornel or bunchberry is scarcely a shrub, but seems worthy of mention. It extends nearly or quite throughout the wooded region, ripening its bright red berries along the Athabaska late in August.

The Tyrrell brothers took it on Daly Lake in 1893.

Cornus stolonifera Michx. Red-osier Cornel.

This is a conspicuous shrub along the streams throughout the wooded country, where it is usually called 'red willow.' Its inner bark, scraped in fine shavings and dried, is used extensively as a substitute for tobacco, though usually mixed with it. An infusion of its bark is said to be used for dyeing tanned skins.

In the southern part of the region, where this shrub attains its perfection, its white berries are greedily eaten by black bears. Along the Athabaska in August, 1904, I found many places where the bushes had been broken down by the animals to secure the berries. This was particularly the case near Pelican Rapid on August 27. At this time the berries were fully ripe, yet the shrubs were not entirely out of flower.

Ledum grœnlandicum Eder. Labrador Tea.

Throughout the wooded region this broad-leaved *Ledum* is a rather abundant shrub in the drier muskegs, where it forms dense patches. It was collected in a more or less typical form north to the shores of Great Bear Lake, and along the Mackenzie to Fort McPherson. Near Leith Point, Great Bear Lake, it was somewhat dwarfed, with smaller leaves.

An infusion of the leaves of this plant is sometimes used as a substitute for tea.

Ledum palustre Linn. Narrow-leaved Labrador Tea.

On the Barren Grounds and in the northern part of the wooded country a very narrow-leaved *Ledum* is common. Typical specimens were taken in a muskeg at Fort Norman, where the species was growing beside the broad-leaved *L. groenlandicum*. It was similarly observed at Fort McPherson. A specimen in flower taken by E. S. Jones on Richards Island in June, 1904, is also typical of this form.

The Tyrrell brothers collected specimens at various points between Daly Lake and Chesterfield Inlet in 1893, and J. W. Tyrrell found it near Artillery Lake in 1900. It appears also in the list of specimens collected by Dease and Simpson on the Arctic coast to the eastward of the Coppermine in the summer of 1839.

Rhododendron lapponicum (Linn.) Wahl. Lapland Rose Bay.

This beautiful species was common near Leith Point, where specimens not long out of flower were taken on August 31, 1903. During the following summer I found it common at Fort Good Hope, where it was in full flower on June 21. Mr. G. A. Ball gathered specimens on the summit of Bear Rock, near Fort Norman, on the same date; and E. S. Jones gave me specimens from Richards Island, taken in late June.

It is apparently common on the Barren Grounds. It was found at Dubawnt Lake in 1893 by the Tyrrell brothers, and on Artillery Lake in 1900 by J. W. Tyrrell; it appears also in the list of plants collected by Dease and Simpson on the Arctic coast east of the Coppermine in 1839.

Kalmia glauca Ait. Swamp Laurel.

This pretty species was not noted south of Smith Landing, though it undoubtedly occurs farther south. It was a common and conspicuous species in the muskegs at that place about the middle of June, being then in full flower. I found it common also on upper Grandin River in August, 1903.

It apparently extends north to the Barren Grounds, having been found near Fond du Lac, Athabaska Lake, and at Daly Lake, by the Tyrrells in 1893, and on Hanbury River by J. W. Tyrrell in 1900.

Cassiope tetragona (Linn.) D. Don. Four-angled Cassiope.

This Arctic shrub is abundant on the semibarren shores near Leith Point, where a few flowers still persisted on the stems at the end of August. It is found far northward through the Barren Grounds. The Tyrrells collected it at Dubawnt Lake in 1893, and J. W. Tyrrell took it on Hanbury River in 1900. Dease and Simpson collected it at Fort Confidence and on the Arctic coast east of the Coppermine.

Andromeda polifolia Linn. Wild Rosemary.

This is an abundant shrub from Great Slave Lake northward, and doubtless occurs also in muskegs south of that region. It was in full flower on the Simpson Islands, Great Slave Lake, in July, 1903, was common north of Fort Rae, and was extremely abundant on the southern shores of Great Bear Lake in late August, being then in fruit. On the Mackenzie it was in full flower at Fort Norman on June 11, 1904, and at Fort McPherson on July 1.

It occurs abundantly on the Barren Grounds. It was collected by Dease and Simpson on the Arctic coast east of the Coppermine in 1839. The Tyrrell brothers took it on the north shore of Athabaska Lake, and on Daly and Dubawnt lakes, in 1893; and J. W. Tyrrell collected specimens on Artillery and Clinton-Colden lakes in 1900.

Chamædaphne calyculata (Linn.) Moench. Leatherleaf.

This marsh shrub is a common species in the muskegs probably throughout the wooded area. It was abundant on the canoe route north of Great Slave Lake in August, 1903, being then out of flower. Along the Mackenzie it is common, and it was in full flower at Fort Norman on June 12, 1904.

The Tyrrell brothers collected it on Selwyn Lake in 1893.

Arctostaphylos uvaursi (Linn.) Spreng. Red Bearberry.

This trailing shrub is a common plant on the drier parts throughout the territory covered by our observations, and extends also into the Barren Grounds. It flowers during June and its bright red inedible berries persist through the winter. On the exposed southern shores of Great Bear Lake it is dwarfed, with very small leaves, and its fruit was ripe at the end of August, 1903.

The various native tribes smoke the dried leaves, usually mixed with tobacco.

Mairania alpina (Linn.) Desv. Alpine Bearberry.

This herbaceous shrub is common in suitable places throughout the wooded region, and northward into the Barren Grounds. Its leaves turn a bright red in early autumn, before the frosts, and often large areas are brilliantly colored by them. The smooth, juicy berries are attractive to the eye, but are nearly tasteless. Their color when ripe may be either black or red. Of the myriads of fruited plants which I observed on my trips all bore red berries except a few seen near MacTavish Bay on August 27, 1903, at which time the leaves had turned red. W. H. Osgood informs me that on the mountains of Alaska black berries are the rule.

Vitisidæa vitisidæa (Linn.) Britt. Mountain Cranberry.

This widely distributed shrub occurs abundantly throughout the region now under review. Its berries remain on the stems through

the winter and form an important food of the geese in their northern migrations. The fruit is also keenly relished by the natives, especially in spring, when it is at its best.

On the Mackenzie, I noted the plant in flower at Fort Simpson on May 16, 1904, at Nahanni River on June 4, at Fort Good Hope June 21, and at Fort McPherson July 6.

The Tyrrell brothers in 1893 collected the plant as far north as Dubawnt Lake, and J. W. Tyrrell took it on Artillery Lake in 1900.

Oxycoccus oxycoccus (Linn.) MacM. Small Cranberry.

Though doubtless found farther south, this cranberry was not noted south of the Simpson Islands, Great Slave Lake. It was common thence northward, especially so about Great Bear Lake and at Fort Norman.

The Tyrrell brothers collected it on Daly Lake in 1893.

Vaccinium uliginosum Linn. Bog Blueberry.

This widely distributed shrub is the commonest blueberry throughout the region north to the Arctic Sea. It is especially common from Great Slave Lake northward along the canoe route, where it attains a height of 2 or 3 feet. On the exposed shores of Great Bear Lake it becomes dwarfed, the plant being reduced to a few short woody stems, which cling closely to the rocky ground and bear very little foliage, but which are loaded with fine fruit. It was ripe in August along this route.

It is abundant along the Mackenzie, and ascends the Nahanni Mountains to timberline. Plants in flower were gathered by E. S. Jones on Richards Island in late June, 1904.

The Tyrrell brothers in 1893 took specimens as far north as Dubawnt Lake, and J. W. Tyrrell collected it on Artillery Lake and Hanbury River in 1900.

Vaccinium canadense Richardson. Low Blueberry.

This is the common blueberry in the southern part of the region. Specimens in flower were collected at Smith Landing on June 13, 1903. The plant occurs along the Athabaska, and is very abundant on the sandy plains north of Edmonton, where the berries are gathered in great quantities in early September.

Viburnum opulus Linn. Cranberry Tree.

This shrub, whose Cree name has been corrupted into Pembina, a common geographical name in the region, was not observed north of the junction of the Athabaska and the Clearwater. South of this point it is abundant, and its bunches of orange-red fruit are conspicuous on the Athabaska banks in August. The Crees frequently make a sauce from its berries, which taste much like the common cranberry. The fruit is fully ripe at the end of August.

Viburnum pauciflorum Pylaie. Few-flowered Viburnum.

This viburnum is common throughout the wooded country. Through the southern part of the region it blossoms in June, and the berries are ripe in August. Farther north it blossoms later, but ripens its fruit at about the same time. On the canoe route north of Great Slave Lake ripening fruit was noted on Grandin River on August 1, 1903, and the leaves had turned scarlet, south of MacTavish Bay, on August 24.

The shrub is common along the Mackenzie. At Fort Simpson its buds began to swell on April 12, 1904, and its leaves began to unfold on May 18. On the Nahanni Mountains, where it ascends to timberline, its leaves were only half grown on June 4, and they were in the same condition at Fort Norman a week later. The shrub was in flower at Fort Good Hope on June 21.

The Tyrrell brothers took specimens on Daly Lake in 1893.

Symphoricarpos racemosus Michx. Snowberry.

The snowberry is an extremely abundant shrub on the road between Edmonton and Athabaska Landing, and in suitable places along the river down to Fort McMurray, where it is common. Its berries are ripe in late August.

Symphoricarpos occidentalis Hook. Wolfberry.

Specimens of this shrub, just forming fruit, were collected at Fort McMurray in August, 1901. It is much less abundant than *S. racemosus*.

Lonicera glaucescens Rydb. Douglas Honeysuckle.

This is a common shrub along the Athabaska and upper Slave rivers. Specimens were collected at several points between Athabaska Landing and Smith Landing. In late August the clusters of beautiful coral-red berries are conspicuous along the banks of the Athabaska.

Lonicera involucrata (Richardson) Banks. Involucrated Fly-honeysuckle.

This shrub is common on the banks of the Athabaska, attaining a height of at least 5 or 6 feet. Near the Pelican Rapid on August 28, 1904, the blackish berries had fallen.

Artemisia frigida Willd. Pasture Sagebrush.

This slightly shrubby sage grows abundantly along the banks of the Athabaska, especially about the rapids. It is said by Macoun to occur abundantly as far north at least as Peace River, and to be of great economic importance as a forage plant.

Several herbaceous sages occur in the region, some far northward. Merritt Cary collected *A. longifolia* at Boiler Rapid, and *A. vulgaris* at Fort Wrigley.

BIBLIOGRAPHY.

The following list of titles is known not to be complete, but includes the principal books or articles which relate mainly to the region now under review, and which contain references to its birds or mammals. Works of a general nature, though containing original matter relating to the district, have usually been excluded.

1795. HEARNE, SAMUEL. *A Journey from Prince of Wales's Fort in Hudson's Bay to the Northern Ocean. Undertaken by Order of the Hudson's Bay Company, for the Discovery of Copper Mines, a North West Passage, &c., in the years 1769, 1770, 1771 & 1772.* 4to, pp. I-XLIV, 1-458. London, 1795. There is also a Dublin edition, 8vo, 1796, and another London edition, 1807.

Contains, scattered throughout the narrative, many notes on the mammals and birds of the region; Chapter X, pp. 358-458, treats exclusively of the natural history of the Barren Grounds, and the Great Slave Lake and Hudson Bay regions.

1801. MACKENZIE, ALEXANDER. *Voyages from Montreal, on the River St. Laurence, through the Continent of North America, to the Frozen and Pacific Oceans; in the years 1789 and 1793.* With a preliminary account of the rise, progress and present state of the Fur Trade of that country. 4to, pp. 412. London.

Mackenzie was the first traveler to descend the Mackenzie River; and the first to cross the continent north of Mexico, which he accomplished by ascending the Peace and descending the rivers west of the divide. His narratives of these voyages contain many notes on natural history.

1820. HARMON, DANIEL WILLIAMS. *A Journal of Voyages and Travels in the interior of North America, between the 47th and 58th degrees of north latitude, extending from Montreal nearly to the Pacific Ocean, a distance of about 5,000 miles, including an account of the principal occurrences, during a residence of nineteen years, in different parts of the country.* To which are added, a concise description of the face of the country, its inhabitants, their manners, customs, laws, religion, etc., and considerable specimens of the two languages, most extensively spoken; together with an account of the principal animals, to be found in the forests and prairies of this extensive region. Illustrated by a map of the country. 8vo, pp. 432. Andover.

This journal of Harmon, "a partner in the North West Company," (edited by Daniel Haskel), relates mainly to the region about Red River, the Saskatchewan, Athabaska and Peace rivers, and the Stuart Lake region. Notes on the larger mammals and birds occur throughout the narrative and "a concise account of the principal animals" occupies pp. 415-432.

1821. FISHER, ALEXANDER. A Journal of a Voyage of Discovery to the Arctic Regions in His Majesty's Ships *Hecla* and *Griper*, in the years 1819 & 1820. Svo, pp. 320 (second edition). London.

The private journal of Alexander Fisher, assistant surgeon on Parry's First Voyage. Contains many notes on the natural history of the region visited, especially of Winter Harbor, and the interior of Melville Island.

1821. PARRY, WILLIAM EDWARD. Journal of a voyage for the discovery of a N. W. passage from the Atlantic to the Pacific; performed in the years 1819-20, in his Majesty's Ships *Hecla* and *Griper*. 4to, pp. i-xxix; 1-310; i-clxxix (appendices). London.

Contains many observations relative to the natural history of Melville Island. (See also Supplement to the Appendix, 1824.)

1823. FRANKLIN, JOHN. Narrative of a Journey to the shores of the Polar Sea, in the years 1819, 20, 21, and 22. Zoological Appendix: Mammals and Birds, by Joseph Sabine; Notice of the Fishes, Botanical Appendix, by John Richardson. 4to, pp. i-xvi, 1-768. London.

An account of a journey to the Arctic Ocean by way of Athabaska and Great Slave lakes and Coppermine River, eastward along the Arctic coast to Point Turnagain, and overland across the Barren Grounds to Great Slave Lake. Many notes on the natural history of the region appear in the narrative, and in the appendices are scientific accounts of the specimens of the birds and mammals brought back, of the fishes collected and observed, and of the plants obtained.

1824. SABINE, EDWARD. A Supplement to the Appendix of Captain Parry's [first] Voyage for the Discovery of a North-west passage in the years 1819-20. Vertebrata by Edward Sabine.

A scientific account of the collections and observations made on Parry's first voyage, mainly relating to Melville Island.

- 1825 (1827). RICHARDSON, JOHN. Appendix to Captain Parry's Journal of a Second Voyage. >Zoological Appendix, pp. 287-379. (Published probably in 1827.)

Contains description of *Arvicola trimucronata* from Point Lake, Mackenzie; also notes on occurrence and habits of a number of species of mammals and birds at Fort Enterprise, on Coppermine River, and at other points in the Athabaska and Mackenzie region.

1826. PARRY, WILLIAM EDWARD, and ROSS, JAMES CLARK. Journal of a Third Voyage for the Discovery of a Northwest Passage from the Atlantic to the Pacific; performed in the years 1824-25, in His Majesty's Ships *Hecla* and *Fury*, under the orders of Captain William Edward Parry. 4to, pp. i-xxviii, 1-186; 1-151. (Appendix on Zoology, Ross, pp. 1-151.)

The zoological appendix refers mainly to the natural history of Port Bowen, where the expedition wintered, and other points about Prince Regent Inlet. A few notes on natural history occur in the narrative.

1828. FRANKLIN, JOHN, and RICHARDSON, JOHN. Narrative of a Second Expedition to the shores of the Polar Sea, in the years 1825, 1826, and 1827, by John Franklin. Including an account of the progress of a detachment to the eastward, by John Richardson, surgeon and naturalist to the expedition. 4to, pp. 1-320; and Appendix, pp. i-clvii; with 31 Plates and six Maps. London. A Philadelphia edition, Svo, pp. 318, 1828, has been examined also.

Many notes on the natural history of the region explored occur in the narrative. "An account of the objects of Natural History has been reserved for a separate Work, which will be published as soon as possible, by Dr. Richardson and Professor Hooker." The magnificent series of volumes, Fauna and Flora Boreali-Americana, was the outgrowth of this idea.

1828. RICHARDSON, J. Short characters of a few quadrupeds procured on Captain Franklin's late expedition. <The Zoological Journal, III, No. 12, pp. 516-520. January to April, 1828.

Brief descriptions of the following species new to science: *Sorex forsteri*, *Sorex palustris*, *Arvicola borealis*, *Arvicola (Lemmus) helvolicus*, *Myoxus drummondi*, *Cricetus talpoides*, *Pteromys alpinus*, *Lepus (Lagomys) princeps*.

1829. DOUGLAS, DAVID. Observations on some Species of the Genera Tetrao and Ortyx, natives of North America; with Descriptions of Four new Species of the former, and Two of the latter Genus. <Trans. Linn. Soc., XVI, pp. 133, 149, 1829.

Original descriptions of *Tetrao umbelloides*, *franklini*, and *richardsoni*, from Canadian Rocky Mountains; a few notes on distribution of *Canachites canadensis* and *Bonasa umbellus umbelloides* in the Athabaska region.

1829. RICHARDSON, J. Fauna Boreali-Americana. Part First. Quadrupeds. 4to, pp. I-XLVI, 1-300. London.

This work, in which the material accumulated on the first two journeys of Franklin and the early voyages of Ross and Parry is elaborated, contains a great deal of information on the mammals of the Athabaska and Mackenzie region.

1831. [SWAINSON, W., and RICHARDSON, J. Exhibition of new species of birds from British America, about to be described in the forthcoming Fauna Boreali-Americana.] <Proc. Zool. Soc. London, Part I, p. 132.

Includes several species from the Mackenzie region.

1831. SWAINSON, W., and RICHARDSON, J. Fauna Boreali-Americana. Part Second. The Birds. 4to, pp. I-LXVI, 1-524. London.

This publication, for many years the standard work on the birds of British America, contains a great deal of information on the birds of the Athabaska and Mackenzie region.

1835. ROSS, JOHN. Narrative of a Second Voyage in search of a Northwest Passage, and of a Residence in the Arctic Regions during the years 1829, 1830, 1831, 1832, 1833. Including the Reports of Commander, now Captain, James Clark Ross, and the Discovery of the Northern Magnetic Pole. 4to, pp. I-XXXIV, 1-740. London.

Refers mainly to region about Felix Harbor, Boothia.

1835. ROSS, JAMES CLARK. Appendix to the Narrative of a Second Voyage in search of a North-West Passage, and of a residence in the Arctic Regions during the years 1829, 1830, 1831, 1832, 1833. 4to, pp. I-XII; 1-120; I-CXLIV; London.

Report on Natural History by J. C. Ross, pp. VII-XLV, refers mainly to region about Felix Harbor, Boothia.

1836. BACK, G. Narrative of the Arctic Land Expedition to the mouth of the Great Fish River, and along the shores of the Arctic Ocean in the years 1833, 1834, and 1835; by Captain Back, R. N., commander of the Expedition. Zoological Appendix by John Richardson. 8vo, pp. I-X, 1-663. London.

Many notes on the natural history of the region traversed appear in the narrative. In the appendix are "Zoological Remarks" by Richardson, being observations on the distribution of life in the region between Hudson Bay and Great Bear Lake, a nominal list of the mammals obtained, and a list of the birds, in which the localities of a few species are indicated, followed by a commentary "respecting those which are objects of chase to the Indian hunter," with "a few brief remarks on the specimens of the other species when they serve for the elucidation of doubtful points of their history."

1836. KING, RICHARD. *Temperature of Quadrupeds, Birds, Fishes, Plants, Trees, and Earth, as ascertained at different times and places in Arctic America, during Captain Back's Expedition.* <Edin. New Philos. Journal, XXI, pp. 150, 151.

From observations made mainly at Great Slave Lake, and near the mouth of Great Fish River.

1836. KING, RICHARD. *Narrative of a journey on the Shores of the Arctic Ocean, in 1833, 1834, and 1835; under the command of Capt. Back, R. N., 2 vols., 12 mo: Vol. I, pp. i-ix, 1-312; Vol. II, pp. i-viii, 1-321.* London.

In this narrative of Back's Journey of exploration down Great Fish River, by the surgeon and naturalist of the expedition, are found a great many notes on the natural history of the region traversed.

1837. RICHARDSON, JOHN. *Report on North American Zoology.* <Rept. Sixth Meeting Brit. Assn. Adv. Sci. for 1836, V, pp. 121-224.

Many species mentioned from the Athabaska and Mackenzie region.

1838. DEASE, PETER WARREN, and SIMPSON, THOMAS. *An Account of the Recent Arctic Discoveries by Messrs. Dease and T. Simpson.* Communicated by J. H. Pelly, Esq., Governor of the Hudson's Bay Company. <Journ. Royal Geog. Society; Vol. 8, pp. 213-225.

A brief report by Dease and Simpson, addressed to the Governors and Committee of the Hudson's Bay Company, and dated Fort Norman, September 5, 1837. It gives an account of the expedition from the time they left Fort Chipewyan to that date, when, after exploring the seacoast from the mouth of the Mackenzie to Point Barrow, they reached Fort Norman on their way to Fort Confidence on Great Bear Lake. A few brief references are made to the fauna and flora of the Arctic Coast.

1843. RICHARDSON, JOHN. *Geographical Distribution of some American Birds.* <Ann. and Mag. Nat. Hist., XI, p. 484, 1843.

A list of twelve species collected in the summer of 1840, at Fort Simpson on the Mackenzie. Most of these are for the first time recorded from the Mackenzie.

1843. SIMPSON, THOMAS. *Narrative of the Discoveries on the North Coast of America; effected by the Officers of the Hudson's Bay Company during the years 1836-39.* 8vo, pp. 419. London.

An account of the journey of Thomas Simpson and Peter Warren Dease, of the Hudson's Bay Company, from Red River settlement to the mouth of the Mackenzie, along the Arctic Coast to Point Barrow, on Great Bear Lake, and on the Arctic Coast from the mouth of the Coppermine eastward to Castor & Pollux River, east of Back's Great Fish River, and back to Red River settlement. Notes on the natural history of the region visited are found throughout the narrative. A list of the plants collected, mainly by Mr. Dease, is contributed by W. J. Hooker, and occupies pp. 409-418.

1845. ISBISTER, A. K. Some Account of Peel River, N. America. <Journ. Roy. Geog. Soc., Vol. XV, Article XI, pp. 332-345.
A general account of the Peel and Rat rivers and portions of the adjacent country, with brief notes on the fauna and flora.
1849. M'LEAN, JOHN. Notes of a Twenty-five Years' Service in the Hudson's Bay Territory. Two vols., Svo: I, pp. 308; II, pp. 328. London.
This is a narrative of the author's experiences while a trader in various parts of Canada. His wanderings included a short sojourn on Great Slave Lake and the Mackenzie.
1850. GOODSIR, ROBERT ANSTRUTHER. An Arctic Voyage to Baffin's Bay and Lancaster Sound, in Search of Friends with Sir John Franklin. 12mo, pp. 152. London.
An account of a whaling voyage to Baffin's Bay and Lancaster Sound in 1849. Many notes on natural history occur.
1851. RICHARDSON, JOHN. Arctic Searching Expedition: A Journal of a Boat-Voyage through Rupert's Land and the Arctic Sea, in search of the Discovery Ships under command of Sir John Franklin. With an Appendix on the Physical Geography of North America. Two vols., Svo; Vol. I, pp. 413; vol. II, pp. 426. London. There is also a New York edition (1 vol., Svo, pp. 516, 1852), apparently identical in matter.
A narrative of an expedition to the Arctic Sea by way of the Methye, Clearwater, Athabaska, Slave, and Mackenzie Rivers. The coast to the eastward of the mouth of the Mackenzie was followed to the mouth of Coppermine River, and the party then traveled overland to Great Bear Lake, where it passed the winter of 1848-49. The narrative is filled with notes on the natural history, physiography, geology, and climatology of the region visited, as well as of many other portions of northern North America.
1851. SNOW, W. PARKER. Voyage of the *Prince Albert* in search of Sir John Franklin: A Narrative of Every-day Life in the Arctic Seas. 12mo, pp. 416. London.
A narrative of the voyage of the *Prince Albert* to Prince Regent Inlet and Wellington Channel in 1850. A very few notes on natural history appear in the narrative, and a few more in "Scientific and General Remarks," in the Appendix.
1852. OSEORN, SHERARD. Stray Leaves from an Arctic Journal; or, Eighteen Months in the Polar Regions, in search of Sir John Franklin's Expedition, in the years 1850-51. 12mo, pp. 320. London.
The *Pioneer*, one of Austin's squadron, wintered at Griffiths Island. In the spring of 1851, Osborn, among others, made a sledge journey to the northern shores of Prince of Wales Land. A very few natural history notes are given.
1852. PETERMAN, AUGUSTUS. Notes on the Distribution of Animals available as Food in the Arctic Regions. <Journ. Roy. Geog. Soc. London, XXII, pp. 118-127.
The scope of this article is partially explained by the title. Particular stress is laid on the probability of the members of the Franklin expedition obtaining food.
1852. RAE, JOHN. Journey from Great Bear Lake to Wollaston Land. <Journ. Roy. Geog. Soc., XXII, pp. 73-82.
This is Dr. Rae's official report, communicated by the Hudson's Bay Company to the Royal Geographical Society, concerning his expedition by dog-sled to Wollaston Land from Fort Confidence, Great Bear Lake,

in the spring of 1851. A few notes on the natural history of the region are given.

1852. RAE, JOHN. Recent Explorations along the South and East Coast of Victoria Land. <Journ. Roy. Geog. Soc., XXII, pp. 82-96.

Dr. Rae's official report to the Hudson's Bay Company, communicated by them to the Royal Geographical Society, concerning his expedition by boat from Coppermine River eastward along the Arctic Coast and on the coast of Victoria Land, in the summer of 1851. He gives a few notes on the natural history of the region.

1852. SUTHERLAND, PETER C. Journal of a Voyage in Baffin's Bay and Barrow Straits, in the years 1850-1851, performed by H. M. Ships *Lady Franklin* and *Sophia*, under the command of Mr. William Penny in search of the Missing Crews of H. M. Ships *Erebus* and *Terror*: with a Narrative of Sledge excursions on the ice of Wellington Channel; and observations on the Natural History and Physical features of the Countries and frozen seas visited. With Maps, Plates, and Wood-engravings. Two Vols.: I, pp. 1-506; II, pp. 1-363, I-CCXXXIII. London.

The ships' headquarters while in the Arctic was Assistance Bay, southern end of Cornwallis Island. Sledging parties examined Wellington Channel and adjacent inlets, and parts of the shores of North Devon, Albert Land, Cornwallis Island, Bathurst Island, Baillie Hamilton Island, and Baring Island.

1853. HOOPER, W. H. Ten Months among the Tents of the Tuski, with incidents of an Arctic Boat Expedition in search of Sir John Franklin, as far as the Mackenzie River, and Cape Bathurst. 8vo, pp. 417, with illustrations and map. London.

Account of the outward voyage of H. M. S. *Plover* and the boat expedition dispatched eastward from near Point Barrow. Members of this expedition wintered at Fort Franklin and Fort Simpson. A small collection was made and many notes recorded.

1853. INGLEFIELD, E. A. A Summer Search for Sir John Franklin; with a peep into the Polar Basin. With short notices, by Professor Dickie, on the Botany, and by Dr. Sutherland, on the Meteorology and Geology; and a New Chart of the Arctic Sea. 12mo, pp. 232. London.

Inglefield in the *Isabel* visited the *North Star* at Beechey Island, and then returned to England. The notes on natural history are inconsiderable.

1853. KENNEDY, WILLIAM. A Short Narrative of the Second Voyage of the *Prince Albert*, in search of Sir John Franklin, with illustrations, and a map by Arrowsmith. 12mo, pp. 202. London.

The *Prince Albert* wintered in 1851-52 at Batty Bay, Prince Regent Inlet. During the following spring Kennedy and Bellot journeyed by sledges entirely around North Somerset, crossing Prince of Wales Land and examining a part of its shore line on the way. A few notes on the natural history of the region are given.

1854. FRANCHÈRE, GABRIEL. Narrative of a Voyage to the Northwest Coast of America in the years 1811, 1812, 1813, and 1814, or the First American Settlement on the Pacific. 12mo, pp. 376 (English edition, translated and edited by J. V. Huntington). New York, 1854.

The author was stationed for some time at Astoria in the employ of the Pacific Fur Company. In the summer of 1814, after the transfer of the post to the Northwest Company, he crossed the continent

to Montreal by way of the Columbia, Athabaska, Saskatchewan, and the Great Lakes.

1854. RICHARDSON, JOHN. The Zoology of the Voyage of H. M. S. *Herald*, under the command of Captain Henry Kellett, during the years 1845-51. >Vertebrals, including Fossil Mammals. 4to, pp. 1-21, 1-171; Pl. xxxiii. London.

Descriptions of skeletons of *Ovis montana* from Rocky Mountains west of Mackenzie River; of Barren Ground Caribou from Fort Confidence; and of a Musk-ox, probably the one taken by Rae near the mouth of Coppermine River in summer of 1851.

1855. BELCHER, EDWARD. The Last of the Arctic Voyages; Being a Narrative of the Expedition in H. M. S. *Assistance*, under the command of Captain Sir Edward Belcher, C. B., in search of Sir John Franklin, during the years 1852, 1853, 1854. With notes on the Natural History by Sir John Richardson, Professor Owen, Thomas Bell, J. W. Salter, and Lovell Reeve. Two Volumes: Vol. I, pp. 383; Vol. II, pp. 419. London.

The different parties from the *Assistance* examined portions of Barrow Strait, Wellington Channel, Northumberland Sound, and Arthur Strait. Very few natural history notes occur in the text. The Appendix (Vol. II, pp. 263-419) includes reports on Meteorology, Fishes, Fossils, Shells, and Crustacea.

1856. [ANDERSON, JAMES.] Letter from Chief Factor James Anderson, to Sir George Simpson, F. R. G. S., Governor in Chief of Rupert Land. <Journ. Royal Geog. Soc., XXVI, pp. 18-25.

Being Anderson's official report, communicated by the Hudson's Bay Company to the Royal Geographical Society, concerning the expedition of Messrs. Anderson and Stewart down Back River in the summer of 1855. A few notes on game are given.

1856. [M'CLINTOCK, C. L.] Extracts from Captain M'Clintock's Diary. <The Natural History Review, Proc. of the Dublin Nat. Hist. Soc., and the Dublin University Zoological Association, for the sessions 1855-56. Vol. III, pp. 40-42.

Extracts, mainly relating to natural history, from the journal of Captain M'Clintock, kept during a journey on Melville Island in April, May, and June, 1853.

1856. OSBORN, SHERARD. The Discovery of the North-West Passage by H. M. S. *Investigator*, Capt. R. M'Clure, 1850, 1851, 1852, 1853, 1854. Edited by Commander Sherard Osborn, from the logs and journals of Capt. Robert Le M. M'Clure. 8vo, pp. 405. London.

Contains notes on the fauna of Prince Albert Land and Banks Land, particularly about Prince of Wales Strait and Mercy Bay.

1857. [ANDERSON, JAMES.] Extracts from Chief-Factor James Anderson's Arctic Journal. <Journ. Royal Geog. Soc., Vol. XXVII, pp. 321-328.

These extracts from James Anderson's journal of the trip down the Great Fish River in the summer of 1855, were communicated to the Royal Geographical Society by John Richardson. They contain a few notes on the natural history of the region.

1857. ARMSTRONG, ALEXANDER. A Personal Narrative of the Discovery of the North-west Passage; with numerous incidents of travel and adventure during nearly five years' continuous service in the Arctic regions while in search of the Expedition under Sir John Franklin. By Alex. Armstrong, surgeon and naturalist. 8vo, pp. 616. London.

This narrative of the voyage of the *Investigator* is replete with notes on the natural history of Prince of Wales Strait, Prince Albert Land, Banks Land, Bay of Mercy and other points in the region.

1857. [BILLINGS, E.] Gleanings in the Natural History of the Hudson's Bay Company's Territories. <Canad. Nat. and Geol., II, pp. 170-188, July, 1857.

Notes on various mammals and birds, extracted from M'Clure's Discovery of the North-West Passage (edited by Osborn), and Richardson's Journal of a Boat Voyage.

1857. M'DOUGALL, GEORGE F. The Eventful Voyage of H. M. Discovery Ship *Resolute* to the Arctic Regions in search of Sir John Franklin and the missing crews of H. M. Discovery Ships *Erebus* and *Terror*, 1852, 1853, 1854. To which is added an account of her being fallen in with by an American whaler after her abandonment in Barrow Straits, and of her presentation to Queen Victoria by the Government of the United States. Svo, pp. 530. London.

This narrative, by the Master of the *Resolute*, contains a great many notes on the fauna of Melville and Prince Patrick islands.

1860. M'CLINTOCK, F. L. The Voyage of the *Fox* in the Arctic Seas. A Narrative of the Discovery of the Fate of Sir John Franklin and his companions. With maps and illustrations. Svo, pp. 375. Boston.

After spending nearly a year in the ice-pack in Baffin Bay, the *Fox* passed through Lancaster Sound in the summer of 1858, entered Barrow Strait, visited Beechey Island, and sailed south into Prince Regent Inlet. A year was spent in Bellot Strait and sledging parties examined the coasts of Prince of Wales Island, Boothia Felix, King William Island, etc., and first settled definitely the fate of Franklin and his companions. The notes on natural history refer mainly to Bellot Strait.

1860. WALKER, D. Notes on the Zoology of the last Arctic Expedition under Captain Sir F. L. M'Clintock, R. N. <Proc. Roy. Soc. Dublin, III, pp. 61-67.

Notes taken during the voyage of the *Fox*. Refers mainly to region about Bellot Strait.

1861. CASSIN, JOHN. [Communication in reference to a new species of Goose from Arctic America.] <Proc. Acad. Nat. Sci. Phila. [XIII], pp. 72, 73, March, 1861.

Anser rossii, new species, described from specimens sent to the Smithsonian Institution from Great Slave Lake by Robert Kennicott; *Anser hyperboreus*, *Anser albatrus*, and *Anser carulescens* briefly characterized.

1861. COUES, ELLIOTT. A Monograph of the Genus *Aegiothus*, with descriptions of new species. <Proc. Acad. Nat. Sci. Phila. [XIII], pp. 373-390, November, 1861.

A. exilipes described from specimens collected by B. R. Ross at Fort Simpson; and *A. fuscescens* (= *A. linaria*) recorded from Forts Simpson and Resolution.

1861. RICHARDSON, JOHN. The Polar Regions. Svo, pp. 400. Edinburgh.

A general account of the physical geography, progress of discovery, currents, ice, winds, temperature, geology, fauna, flora, etc., of the Polar Regions. Chapter XVII on Zoology, pp. 274-284, gives a short account of the distribution and general characteristics of some of the more common mammals, birds, and fishes.

1861. [RICHARDSON, JOHN.] Mammalia and Birds of Arctic Regions. <Edin. New Philos. Journ., N. S., XIII, pp. 161-164. January to April, 1861.
Extracts from a letter written to Sir John Richardson by Bernard R. Ross, in which he gives nominal lists of mammals and birds collected in the Mackenzie River region.
1861. Ross, B. R. An account of the Animals useful in an economic point of view to the various Chipewyan Tribes. <Canad. Nat. and Geol., VI, pp. 433-441.
Treats briefly of the foxes, bears, marmots, beaver, porcupine, rabbit, moose, reindeer, buffalo, musk-ox, and mountain goat, and very briefly of a few species of birds. *Arctomys kennicottii* described on page 435.
1861. Ross, B. R. List of Species of Mammals and Birds—collected in McKenzie's River District during 1860-61. From June 1860 to April 1861. <Canad. Nat. and Geol., VI, pp. 441-444.
A tabular list, the species numbered consecutively, giving the number of each species collected, and localities. Species that winter are indicated by an asterisk. 98 species, 17 of which are mammals, are mentioned.
1861. ROSS, BERNARD ROGAN. A popular Treatise on the Fur-bearing Animals of the Mackenzie River District. <Canad. Nat. and Geol., VI, pp. 5-36.
Treats *Lynx canadensis*, *Canis occidentalis* var. *griseus*, *Canis familiaris* vars. *borealis* et *lagopus*, *Vulpes fulvus*, *Vulpes lagopus*, *Mustela pennanti*, *Mustela americana*, *Putorius vison*, *Gulo luscus*, *Lutra canadensis*, *Ursus americanus*, *Ursus horribilis*, *Ursus maritimus*, *Ursus arctos*.
1862. ROSS, BERNARD R. List of Mammals, Birds, and Eggs, observed in the McKenzie's River District, with Notices. <Canad. Nat. and Geol., VII, Art. XIII, pp. 137-155. February, 1862.
List of the mammals, numbered 1 to 48, the scientific, common, and native names, and the distribution in the district in general terms, being given. List of the birds numbered 1 to 192, the scientific and common names and the distribution in the district in general terms; winter residents marked with an asterisk (*); a dagger (†) indicates that eggs were obtained.
1862. ROSS, BERNARD H [=R]. On the Mammals, Birds, etc., of the Mackenzie River District. <Nat. Hist. Review, Vol. II (second series), pp. 269-290. July, 1862.
The main portion of this article entitled: "A List of Mammals, Birds and Eggs observed in the McKenzie's River District, with Notices," occupies pp. 271-290, and is identical (except for some slight textual differences) with his article in the Canadian Naturalist and Geologist for 1862, above cited. Pages 269-271 of the present article are occupied by a prefatory letter to Sir John Richardson. A parallel (||) indicates species which have been taken at Fort Simpson.
1863. BLAKISTON, T. On the Birds of the Interior of British America. <Ibis, V, pp. 39-87, 121-155.
A nearly complete list of the birds of the interior of Canada, east of the Rocky Mountains, compiled from Fauna Boreali-Americana, and the writings of Murray, Ross, etc., together with the results of the author's own observations in the Saskatchewan and Hudson Bay regions.

1863. HIND, HENRY YOULE. Explorations in the Interior of the Labrador Peninsula, the country of the Montagnais and Nasquapee Indians. Two vols: I, pp. 351; II, pp. 304. London.
- An account of an expedition into the interior of Labrador by way of the Moisie River, in the summer of 1861. In connection with remarks on animals met with, an occasional note regarding the natural history of other portions of the north is given; the appendix includes a short account of Anderson River, with some allusions to its fauna.
1865. KIR[К]BY, W. W. A Journey to the Youcan, Russian America. <Ann. Rept. Smithsonian Institution for the year 1864. Pp. 416-420.
- Narrative of a journey from Fort Simpson to Fort Yukon by way of the Mackenzie, Peel, and Porcupine rivers. A few notes on natural history are given.
1865. MILTON, W. W. F., and CHEADLE, W. B. The North-West Passage by Land. Being the Narrative of an Expedition from the Atlantic to the Pacific undertaken with the view of exploring a route across the continent to British Columbia through British territory, by one of the northern passes of the Rocky Mountains. 8vo, pp. 397. London.
- This journey, the object of which is explained by the title, was made in 1862 and 1863, by way of the Saskatchewan and the Yellow Head Pass, the party wintering near Fort Carlton. The narrative contains many notes on the fauna of the region traversed.
1866. FERNAND-MICHEL, F. F. Dix-huit Ans chez les Sauvages. Voyages et Missions de Mgr. Henry Faraud, Évêque d'Anemour, vicaire apostolique de Mackenzie, dans l'extreme Nord de l'Amérique Britannique. D'après les documents de Mgr. l'Évêque d'Anemour par Fernand-Michel. 8vo, pp. 456. Paris.
- A narrative of travels and missionary labors, beginning about 1846, in the Athabaska-Mackenzie region, with a general account of the Indian tribes. Short accounts of the principal large game animals are given.
1869. [COMMITTEE, *Chicago Academy Sciences.*] Biography of Robert Kennicott. <Trans. Chicago Acad. Sci., I, Article VI, pp. 133-226.
- Includes narrative of Kennicott's travels in Arctic America, with many extracts from his journals.
1870. TACHÉ, A. A. Sketch of the North-West of America. [Translation, from the original French, 1868, by D. R. Cameron.] 8vo, pp. 216. Montreal.
- A general description of the Saskatchewan, Athabaska, and Mackenzie valleys. Chapter VII contains lists, with some annotations, of the principal species of mammals, birds, reptiles, batrachians, and fishes, known to inhabit the region.
1871. HARTING, J. E. Catalogue of an Arctic Collection of Birds presented by Mr. John Barrow, F. R. S., to the University Museum at Oxford. <Proc. Zool. Soc. London [XXXIX], pp. 110-123, 1871.
- Mentions a few specimens from the Mackenzie River and a number from various points in the Arctic islands.
1873. BUTLER, W. F. The Wild North Land: Being the story of a winter journey, with dogs, across northern North America. 8vo, pp. 358. London.
- A popular account of a winter journey from Fort Garry (Winnipeg) to the Pacific, via the plains of the Assiniboine and Saskatchewan, and the valleys of the Clearwater, Athabaska, Peace, and Fraser rivers, with incidental references to the fauna.

1873. GRANT, GEORGE M. *Ocean to Ocean. Sandford Fleming's Expedition through Canada in 1872. Being a diary kept during a journey from the Atlantic to the Pacific with the Expedition of the Engineer-in-Chief of the Canadian Pacific and Intercolonial Railways.* Svo, pp. 371, with 60 illustrations. London.

This expedition crossed the continent by way of Manitoba, the Saskatchewan valley, and Yellow Head Pass. Many incidental notes on the fauna occur.

1875. PETITOT, E. *Géographie de L'Athabaskaw-Mackenzie et des Grands Lacs du Bassin Arctique.* <Bulletin de la Société de Géographie. Pp. 5-42 (July); pp. 126-183 (August); pp. 242-290 (September); with a map of the region from Great Slave Lake northward.

A geographical and general description of the region, based mainly on the explorations of the author, for many years a missionary in the Mackenzie region. Traveling mainly on snowshoes, he visited many remote districts never before explored. The present account and map may be considered the official announcement of some of his geographical discoveries.

1877. ALLEN, J. A. *Northern Range of the Bison.* <Am. Nat., XI, p. 624. October, 1877.

Extract of letter from E. W. Nelson concerning presence of bison on Great Slave Lake near Hay River in 1871.

1877. MACOUN, JOHN. *Report of Professor Macoun, Botanist to the Expedition, addressed to Alfred R. C. Selwyn. (Accompanying a Report by Selwyn entitled: Report on Exploration in British Columbia.)* <Report Progress Geological Survey of Canada, 1875-76, pp. 110-232.

A report, with numerous detailed notes on the flora, and a few on the fauna, of the route traveled from Vancouver Island to Winnipeg by way of Quesnel, Stuart Lake, the Peace, Athabaska, and Clearwater rivers, and the Saskatchewan Plains.

1878. ANDERSON, ALEXANDER CAULFIELD. *Notes on Northwestern America.* <Canad. Nat. and Quarterly Journ. of Sci., VIII, No. 3, pp. 135-156.

General description of western part of British America. Under heading: "Distribution of the more Prominent Quadrupeds", some definite limits of range are given.

1881. BELL, ROBERT. *Report on Hudson's Bay and some of the Lakes and Rivers lying west of it.* <Report Progress Geological Survey of Canada, 1879-80, pp. 1C-113C.

Includes brief description of route followed by Cochrane, of the Survey, from Cumberland House to the head of Reindeer Lake, with a few brief notes on the fauna.

1881. DAWSON, GEORGE M. *Report on an exploration from Port Simpson on the Pacific Coast, to Edmonton on the Saskatchewan, embracing a portion of the northern part of British Columbia and the Peace River Country.* <Rept. Progress Geol. Survey of Canada, 1879-80, pp. 1B-177B.

A detailed account, chiefly physiographical and geological, of the region traversed by way of Peace River, Lesser Slave Lake and Athabaska Landing, with a list of the plants collected, appendices on other subjects, and a few notes on the fauna.

1881. GILDER, WILLIAM H. Schwatka's Search. 8vo, pp. 316. New York.
An account of an overland journey, made in 1879-80, by Lieut. Frederick Schwatka, from Daly Bay, near Chesterfield Inlet, Hudson Bay, to King William Land and return. Contains many notes on the game animals of King William Land and the lower part of Back River.
1881. MACOUN, JOHN. Manitoba and the Great North-West. 8vo, pp. 687. Guelph, Ontario.
Chapter XXI, pp. 354-373, "Birds of the North-West," enumerates 235 species. The notes refer mainly to the plains region of Manitoba, Saskatchewan, and Alberta, but the occurrence of a few species on the Athabaska is recorded.
1883. PETITOT, ÉMILE. On the Athabasca District of the Canadian North-West Territory. <Proc. Roy. Geog. Soc. and Monthly Record of Geography [1883], No. 11, pp. 633-655. November, 1883.
A popular account of the Athabaska region. Many notes on the fauna and flora are given.
1884. BELL, ROBERT. Report on part of the Basin of the Athabasca River, North-West Territory. <Rept. Prog. Geol. and Nat. Hist. Survey of Canada, 1882-3-4, Part CC, pp. 1CC-37CC. (Part CC dated 1884, volume dated 1885.)
Geological and general description of La Biche River, of the Athabaska from the mouth of La Biche River to Athabaska Lake, and of Clearwater River.
1884. McCORMICK, R. Voyages of Discovery in the Arctic and Antarctic Seas, and round the World; being personal narratives of attempts to reach the North and South Poles; and of an open-boat expedition up the Wellington Channel in search of Sir John Franklin and Her Majesty's Ships *Erebus* and *Terror*, in Her Majesty's boat *Forlorn Hope*. Two volumes: pp. 432; 412. London.
The author spent the summer of 1852 at Beechey Island and northward along the western coast of North Devon. A great many notes on natural history are given.
1884. RIDGWAY, ROBERT. Note on the *Anser hyperboreus*, Pall., and *Anser albatus*, Cass. <Proc. Biol. Soc. Wash., II, pp. 107, 108. April 28, 1884.
The name *hyperboreus* restricted to the form breeding from northern Alaska eastward at least to mouth of Mackenzie River.
1885. OGILVIE, WILLIAM. Extract from the Report of Mr. Ogilvie on the Survey of Block and Township Outlines in the winter and summer of 1883. <Ann. Rept. Dept. Interior (Canada) for the year 1884, (Sessional Papers, No. 13,) Part II, pp. 36-45.
A general report on work done mainly in the Lesser Slave Lake region. A few notes on the fauna occur.
1885. OGILVIE, WILLIAM. Report by William Ogilvie [on the Athabaska and Peace Rivers]. <Ann. Rept. Dept. Interior [Canada] for the year 1884 (Sessional Papers No. 13), Part II, pp. 46 to 56.
Report, chiefly topographical, of an exploration of portions of Athabaska and Peace rivers in 1884. Mr. Ogilvie descended the Athabaska from Athabaska Landing, ascended the Peace to Dunvegan, and returned to Athabaska Landing by way of Lesser Slave Lake.
1885. PETITOT, ÉMILE. On the Athabasca District of the Canadian North-West Territory. <Canadian Record of Science, Vol. 1, 1884-5, pp. 27-53. (1885.)

A reprint of the article in Proceedings Royal Geographical Society for November, 1883, above cited.

1886. DAWSON, H. P. Observations of the International Polar Expeditions, 1882-83. Fort Rae. Pp. 326; plates (diagrammatic) 32. London.

This is a report on meteorological and magnetic observations carried on from September 1, 1882, to August 31, 1883, at Fort Rae, one of a number of circumpolar stations which were simultaneously occupied. A few faunal notes occur in the brief introductory description of the station.

1886. TURNER, LUCIEN M. 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. No. II, Arctic Series of Publications issued in connection with the Signal Service, U. S. Army. With 26 Plates, pp. 226. Washington, 1886.

This report relates mainly to the lower Yukon and the Aleutian Islands, and consists of six parts, on the following subjects: I, General Description; II, Meteorology; III, Plants; IV, Fishes; V, Birds; VI, Mammals. The discovery by MacFarlane of the breeding of *Parus cinctus obtectus* (= *Penthestes c. alascensis*) at Fort Anderson is here for the first time recorded.

1887. CHAMBERLAIN, MONTAGUE. A Catalogue of Canadian Birds with notes on the Distribution of the Species. Svo, pp. 143. St. John, New Brunswick.

Many species are recorded from the Great Slave Lake and Mackenzie River region. Though the authority for the records is seldom given, there seems to be little or no original information regarding this region.

1887. PETITOT, ÉMILE. Les Grands Esquimaux. Ouvrage accompagné d'une carte et de sept gravures d'après les croquis de l'auteur. Svo, pp. 307. Paris.

Relates mainly to the topography of the Anderson River region, visited by Petitot in 1865, and to the home life of the Eskimo.

1888. BOMPAS, WILLIAM CARPENTER. Diocese of Mackenzie River. By Right Reverend William Carpenter Bompas, D. D., Bishop of the Diocese. 12mo, pp. 108, with map. London.

This volume, one of a series entitled "Colonial Church Histories," gives a general account of the Diocese of Mackenzie River, nearly co-extensive with the present Provinces of Mackenzie and Yukon. Chapter VI, pp. 59 to 68, treats of the fauna and flora.

1888. [CANADIAN GOVERNMENT.] Report of the Select Committee of the Senate appointed to enquire into the resources of the Great Mackenzie Basin. Third Report of the Select Committee of the Senate * * * appointed to inquire into the resources of that part of the Dominion lying north of the Saskatchewan watershed, east of the Rocky Mountains and west of Hudson's Bay, and comprising the Great Mackenzie Basin—its extent of navigable rivers, lakes and sea coast, of arable and pastoral land, its fisheries, forests and mines, and to report upon its possible commercial and agricultural value. Pp. 310. Ottawa.

A mass of miscellaneous information regarding the resources of this region, received from various members of the Hudson's Bay Company, missionaries, explorers, and other persons acquainted with the country. It includes: "List of mammals found within the basin of the Mackenzie River, submitted by Professor Macoun;" "List of the fishes

known to occur in the Mackenzie Basin, submitted by Professor Macoun;" "Birds breeding in the Mackenzie River Basin, compiled by Professor Macoun;" and "List of trees of the Mackenzie River Basin," evidently by the same author. Besides these lists, which are slightly annotated, many notes on natural history, usually of a general nature, occur in the text.

1888. DAWSON, GEORGE M. Report on an Exploration in the Yukon District, N.W.T. and adjacent Northern Portion of British Columbia. <Ann. Rept. Geol. Surv. Canada, 1887, Part B. Pp. 227 B, with index.

This is Doctor Dawson's report on an exploration of the upper Liard and Yukon rivers. He was assisted on the upper Liard by R. G. McConnell. They separated at the junction of the Dease and Frances, McConnell descending the Liard, and Dawson ascending the Frances. McConnell's report on the Liard is elsewhere cited. The present report, which includes appendices on Botany, Indian tribes, Zoology, Lithology, and Meteorology, relates in part to the upper Liard.

1888. GREELY, ADOLPHUS W. Report on the Proceedings of the United States Expedition to Lady Franklin Bay, Grinnell Land. [Report of International Polar Expedition.] Two vols.: pp. 545; 738. Washington.

This expedition left the United States in the *Proteus* in the summer of 1881 and returned in 1884. Headquarters were established at Fort Conger, Lady Franklin Bay, Grinnell Land, from which the interior of Grinnell Land and adjacent coasts of Grinnell Land and Greenland were examined, the party reaching the highest latitude then attained.

In Appendix 129 (Vol. II, pp. 1-10) and App. 131 (Vol. II, pp. 19-37) are given the reports on mammals and birds, respectively. In connection with the notes recorded on this expedition, many recorded by other northern expeditions are given. This is particularly true in the case of birds (Vol. II, pp. 30-37) where the principal notes made by several Arctic observers are summarized in tabular form.

1888. NELSON, EDWARD W. Report on Natural History Collections made in Alaska between the years 1877 and 1881. No. III, Arctic Series of publications issued in connection with the Signal Service, U. S. Army. With 21 Plates. Pp. 337. Washington, 1887 (1888).

This report, which was edited by H. W. Henshaw, is based primarily on Nelson's observations in the lower Yukon region, but many original and published records from other portions of Alaska are given. Besides the Narrative, by Nelson, the work consists of four parts on the following subjects: I, Birds of Alaska, with a Partial Bibliography of Alaskan Ornithology, by Nelson; II, Mammals of Northern Alaska, Nelson and F. W. True; III, Notes on Alaskan Fishes, Nelson and T. H. Bean; IV, Diurnal Lepidoptera, Nelson and W. H. Edwards. The range of the forms of *Picoides americanus* throughout British America is discussed, pp. 157-159, and many notes on the occurrence of other birds in the Mackenzie River Region are here published.

1888. PETITOT, ÉMILE. En Route pour la Mer Glaciale. Ouvrage accompagné de gravures d'après les dessins de l'auteur. Svo, pp. 394. Paris.

Narrative of a journey from France to the Mackenzie, via England, Maine, lower Canada, the Great Lakes, Lake Winnipeg, and the Saskatchewan, Clearwater, and Athabaska rivers.

1888. RAE, JOHN. Notes on some of the Birds and Mammals of the Hudson's Bay Co's. Territories and the Arctic Coast. <Canadian Record of Science, Vol. III, No. 3, pp. 125-136.

Mainly on the more common birds and mammals of Hudson Bay; note on abundance and migration of lemmings (*Myodes hudsonicus*), near the mouth of Coppermine River in June, 1851.

1889. COLLINSON, RICHARD. Journal of H. M. S. *Enterprise*, on the expedition in search of Sir John Franklin's Ships by Behring Strait, 1850-55. (Edited by Thomas Bernard Collinson.) 8vo, pp. 520. London.

Contains many notes on the natural history of the region visited, relating principally to the wintering stations of the ship in Walker Bay, Prince Albert Land; Cambridge Bay, Victoria Land; and Camden Bay, Alaska.

1889. FAWCETT, T. Exploratory Survey of Athabasca and Churchill Rivers. <Ann. Rept. Dept. Interior (Canada) for the year 1888. (Sessional Papers No. 15.) Part II, pp. 72-84.

A general report of an exploratory survey of the Athabaska from the mouth of Lesser Slave River to the mouth of the Clearwater, of that stream, and thence to the Saskatchewan, made in the summer of 1888. The author was accompanied by J. M. Macoun, who took many ornithological notes, which were first published some years later. Only a few minor references to the natural history of the region appear in this report.

- 1889, 1890. MASSON, L. R. Les Bourgeois de la Campagne du Nord-Ouest. Recits de Voyages Lettres et Rapports inedits relatifs au Nord-Ouest Canadien. 8vo. Première Serie, pp. 413, 1889; deuxième serie, pp. 499, 1890. Quebec.

This interesting collection includes several series of letters written by employees of the North-West Company to Roderick McKenzie, who intended publishing a history of the Northwest, and a number of journals. It throws much light on the history of the region previous to 1821, and is especially valuable on this account, since most of the journals of the early traders were destroyed at that time, on the coalition of the Hudson's Bay and the North-West companies. In several of the letters the birds and mammals known by the writers to inhabit their stations are enumerated.

1889. PETITOT, ÉMILE. Quinze ans sous le Cercle Polaire, Mackenzie, Anderson, Youcon. Par Émile Petitot, ancien missionnaire, etc. Ouvrage accompagné de 18 gravures de H. Blanchard et d'une carte d'Erhard d'après les dessins de l'auteur. 8vo, pp. 322. Paris.

A general account of this region, based mainly on journeys made by the author. Many notes on natural history occur.

1890. BELANGER, P. B. R. Survey of Trails and Settlements at Lake Ste. Anne and Lac La Biche. <Ann. Rept. Dept. Interior [Canada] for the year 1889. Part II, No. 12, pp. 40-43.

This report contains brief general descriptions of these two localities, and includes a few notes on the fauna.

1890. LOCKHART, J. G. Notes on the Habits of the Moose in the far North of British America in 1865. <Proc. U. S. Nat Mus., XIII, pp. 305-308.

Relating chiefly to the habits of the moose in the Great Slave Lake region.

1890. MACFARLANE, R. On an Expedition down the Begh-ula or Anderson River. <The Canadian Record of Science, IV, pp. 28-53, January, 1890. Introduction by George M. Dawson.
Account of an exploration from Fort Good Hope on the Mackenzie to Lockhart River, and thence down the Lockhart and Anderson rivers nearly to the sea, and on the upper Anderson.
1890. MACFARLANE, RODERICK ROSS. Land and Sea Birds nesting within the Arctic Circle in the Lower Mackenzie District. <The Historical and Scientific Society of Manitoba. Transaction 39. Season 1888-9 (1890).
An annotated list of the birds observed and taken in the Anderson River region, from April, 1862, to June, 1865, inclusive; annotations mainly in reference to nesting habits, nests, and eggs. (See 1891, MacFarlane.)
1890. OGILVIE, WILLIAM. Exploratory Survey of part of the Lewes, Tat-on-duc, Porcupine, Bell, Trout, Peel, and Mackenzie Rivers. <Ann. Rept. Dept. Interior [Canada] for the year 1889. Part VIII, pp. 1-114.
General description of a route followed during the seasons of 1887 and 1888. The report contains much general information regarding the country traversed, with many notes on the timber, agricultural and mineral resources, and the fauna.
- 1890 ? RAE, JOHN. Notes on some of the Birds and Mammals of the Hudson's Bay Company's Territory, and of the Arctic Coast of America. (Communicated by G. J. Romanes.) <Journ. Linn. Soc. London, Zool., XX, pp. 136-145, 1886 to 1890. (Read Feb. 16, 1888.)
The same, with a few omissions and minor changes, as the article published in the Canadian Record of Science for 1888, above cited.
1890. THOMPSON, W. T. Survey of Township Outlines [in Lesser Slave Lake region]. <Ann. Rept. Dept. Interior [Canada] for the year 1889. Part II, No. 12, pp. 66-72.
This report contains a brief general description of this region, together with a few notes on the fauna.
1891. [CANADIAN GOVERNMENT.] Report of the Select Committee of the Senate on certain documents relating to the resources of the Great Mackenzie Basin. Pp. 71. Ottawa.
This supplementary report of the select committee comprises information from several sources received too late for incorporation in the main report (1888). MacFarlane contributes lists of the mammals and birds of the region.
1891. MACFARLANE, R. Notes on and List of Birds and Eggs collected in Arctic America, 1861-1866. <Proc. U. S. Nat. Mus., XIV, pp. 413-466.
A reprint, with corrections and additions, of the paper published in Transactions of the Historical and Scientific Society of Manitoba. (See 1890. MacFarlane.)
1891. MCCONNELL, R. G. Report on an Exploration in the Yukon and Mackenzie Basins, N. W. T. <Annual Report Geological Survey of Canada, IV (new series), 1888-89, pp. 1D-163D, with map.
A detailed physiographical, geographical, and geological report on the Liard and Mackenzie rivers and parts of Slave River and Great Slave Lake. A few notes on natural history are given. The dates of arrival of a number of species of birds at Forts Simpson and Providence in the spring of 1888 are noted.
1891. PETITOT, ÉMILE. Autour du Grand Lac des Esclaves. Ouvrage accompagné de gravures et d'une carte par l'auteur. Pp. 364. Paris. (Deuxième édition, 1891.)

A general account of the Great Slave Lake region, mainly based on several journeys made by the author, formerly a missionary in this region. Contains many notes on natural history.

1892. [EDITORIAL.] Summer Migrants at Fort Simpson. <Ibis, IV (sixth ser.), p. 188, 1892.
- Quotes R. G. McConnell, in Rept. Geol. Surv. Canada, 1888-9, regarding time of arrival of a few birds at Fort Simpson (and Fort Providence), Mackenzie.
1892. McCONNELL, R. G. *Ovis canadensis dalli*, Nelson. <Ottawa Naturalist, VI, pp. 130-132.
- Record of specimen killed in mountains west of Fort McPherson in 1888, with notes regarding distribution, weight, and variation of species.
1892. PIKE, WARBURTON. The Barren Ground of Northern Canada. 8vo, pp. 300. London and New York.
- Contains much original information regarding the fauna, especially the larger game animals, of the country about the eastern end of Great Slave Lake, the Barren Grounds about the head of Coppermine River and the upper part of Back River, and of the Peace River Valley.
1892. RAINE, WALTER. Bird-nesting in North-West Canada. By Walter Raine. Illustrated. 8vo, pp. 197. Toronto.
- An account of an egg-collecting excursion made along the line of the Canadian Pacific Railroad, in Assiniboia and Alberta, during the summer of 1891. Mention made of the nesting of a few species at Edmonton.
1892. TYRRELL, J. B. The Winter Home of the Barren Ground Caribou. Ottawa Naturalist, VI, pp. 128-130.
- General notes on the species, mainly relating to the country south-east of Athabaska Lake.
1893. DOWLING, D. B. Narrative of a Journey in 1890, from Great Slave Lake to Beechy Lake, on the Great Fish River. From the journal of James McKinley, officer in charge at Fort Resolution, H. B. Co. <Ottawa Naturalist, VII, pp. 85-92, 101-114.
- Short description of the region visited in 1889 and 1890 by Warburton Pike, with extracts from the journal of James MacKinlay, who accompanied Pike in 1890. Zoological notes occupy pp. 107-109.
1893. McCONNELL, R. G. Report on a Portion of the District of Athabasca, comprising the Country between Peace River and Athabasca River north of Lesser Slave Lake. <Annual Report Geological Survey of Canada, V (new ser.), 1889-90-91. Part D, pp. 1D-67D. With a Map and two Sections.
- A geological and general description of the region from explorations and surveys along the Peace and Athabaska rivers and their principal tributaries.
1893. OGILVIE, WILLIAM. Report on the Peace River and Tributaries in 1891. <Ann. Rept. Dept. Interior (Canada) for the year 1892 (Sessional Papers No. 13), Part VII, pp. 1-44.
- This report contains a large amount of varied information regarding the Liard, Nelson, and Peace rivers, including many notes on the fauna, and in addition many notes regarding other portions of the region, mainly taken from the journal of James MacKinlay, who accompanied Warburton Pike to the Barren Grounds northeast of Great Slave Lake in 1890.

1893. PETITOT, EMILE. Exploration de la Region du Grand Lac des Ours (Fin des Quinze ans sous le Cercle Polaire), Par Émile Petitot, ancien missionnaire arctique, etc. Ouvrage accompagné de gravures et de deux cartes dessinées par l'auteur. Svo, pp. 469. Paris.
- A general account of the Great Bear Lake region, including short notices of the early expeditions which wintered there, but mainly based on several journeys of exploration made by the author mostly during the winter months between the years 1867 and 1878. Many notes on natural history occur.
1894. MILNE, J. W. The Panther in Canada. <The Biological Review of Ontario. Vol. 1, No. 4, pp. 81-83. October, 1894.
- Notes the occurrence of the panther in several localities in the mountains of southwestern Alberta in 1883 and 1884.
1894. TYRRELL, J. BURR. An Expedition through the Barren Lands of Northern Canada. <The Geographical Journal, Vol. IV, No. 5, pp. 437-450, November, 1894.
- A short account of an exploration between Athabaska Lake and Chesterfield Inlet in 1893. A few notes on the fauna are given.
1895. COLEMAN, A. P. Mount Brown and the Sources of the Athabasca. <The Geographical Journal, Vol. V, No. 1, pp. 53-61, January, 1895.
- An account of an exploration of the region about the sources of the Athabaska in 1893. A few notes on the fauna are given.
1895. TYRRELL, J. BURR. A Second Expedition through the Barren Lands of Northern Canada. <The Geographical Journal, Vol. VI, No. 5, pp. 438-448. November, 1895.
- A short account of an expedition through eastern Athabaska and Mackenzie, by way of Reindeer Lake and Kazan and Ferguson rivers in 1894. A few notes on the fauna are given.
1896. RHOADS, SAMUEL N. Synopsis of the Polar Hares of North America. <Proc. Acad. Nat. Sci. Phila., 1896, pp. 351-376.
- Skin of polar hare, supposed to be referable to an undescribed species, recorded from Great Slave Lake.
1896. TYRRELL, J. BURR. Report on the Country between Athabasca Lake and Churchill River with notes on two routes travelled between the Churchill and Saskatchewan Rivers. <Annual Report Geological Survey of Canada, VIII (new series), Part D, pp. 5D to 120D.
- Chiefly physiographical and geological; notes on fauna pp. 13D and 14D, and here and there throughout the report.
1896. WHITNEY, CASPAR. On Snow-shoes to the Barren Grounds. Twenty-eight hundred miles after Musk-oxen and Wood-bison. Svo, pp. 324. New York.
- An account of a journey, made mainly on snowshoes, from Edmonton, Alberta, to the Barren Grounds north of Great Slave Lake, and return. Numerous notes on natural history are given.
1897. COUES, ELLIOTT. Early Notice of *Gavia adamsi*. <Auk, XIV, p. 402.
- Attention called to Franklin's recognizable description of this bird as occurring at Fort Enterprise.
1897. TYRRELL, J. BURR. Report on the Doobaunt, Kazan and Ferguson Rivers and the North-west Coast of Hudson Bay, and on two overland routes from Hudson Bay to Lake Winnipeg. <Annual Report Geological Survey of Canada, IX (new series), 1896, Part F. (1897.)

A geological and general description of the country explored between Athabaska Lake and Chesterfield Inlet in the summer of 1893, and on another route northward from Reindeer Lake in 1894. A few notes on the fauna of the region given.

1898. HOUGH, E. Buffalo Jones in the Arctic Circle. <Forest and Stream, Vol. LI, pp. 389, 390. November 12, 1898.

A brief account of the trip of C. J. Jones to the Barren Grounds north and east of Great Slave Lake in 1897-8, in search of musk-oxen.

1898. RHOADS, SAMUEL N. Notes on Living and Extinct Species of North American Bovidæ. <Proc. Acad. Nat. Sci. Phila., 1897, pp. 483-502. (1898.)

The bison inhabiting the region southwest of Great Slave Lake described as *Bison bison athabascæ* from specimens taken southwest of Fort Resolution. Some original information regarding its distribution.

1898. RUSSELL, FRANK. Explorations in the Far North. Being the report of an expedition under the auspices of the University of Iowa during the years 1892, '93, and '94. Published by the University. 8vo, pp. 290. Iowa City, Iowa.

The report of a trip made by the author to the north for the purpose of collecting ethnological and natural history specimens. The work was done mainly on the lower Saskatchewan, and in the Athabaska and Mackenzie region.

1898. TYRRELL, J. W. Across the Sub-Arctics of Canada. A Journey of 3,200 miles by canoe and snowshoe through the Barren Lands. 8vo, pp. 280. New York.

A popular account of a journey of exploration, carried on by the Canadian Geological Survey during the summer, autumn, and early winter of 1893, to and through the Barren Grounds by way of Athabaska River, Athabaska Lake, and a chain of lakes and rivers to Chesterfield Inlet; thence down the coast of Hudson Bay to York Factory; and by way of Oxford House and Norway House to Winnipeg.

1899. ALLEN, J. A. On Mammals from the Northwest Territory collected by Mr. A. J. Stone. <Bull. Am. Mus. Nat. Hist., XII, Article I, pp. 1-9. March 4, 1899.

A number of species recorded from Liard River and Nahanni Mountains. The gray phase of *Evotomys gapperi* recorded from Red Deer River, Alberta.

1899. INMAN, HENRY. Buffalo Jones' Forty Years of Adventure. 8vo, pp. 469. Topeka, Kansas.

This narrative, compiled by Inman from the journals of C. J. Jones, includes the story of his travels in the Barren Grounds after Musk-oxen, and his descent of the Mackenzie and Yukon.

1899. LORING, J. ALDEN. Western or Yellow-Haired Porcupine. <Forest and Stream, LII, pp. 345, 346. May 6, 1899.

A popular article containing reference to occurrence and habits of this animal in mountains of Alberta.

1899. LORING, J. ALDEN. The Canadian Lynx. <Forest and Stream, LIII, No. 5, p. 84, July 29, 1899.

Notes on habits, mainly as observed in western Alberta in 1895 and 1896.

1899. STONE, A. J. Field Notes on the larger Mammalia of the Stickine, Dease, and Liard Rivers, N. W. British Columbia. <Third Ann. Rept. New York Zool. Soc., pp. 53-61. May 1, 1899.
Account dated at Fort Simpson, May 30, 1898. Notes made on his journey from the Pacific during previous year.
1900. ALLEN, J. A. Note on the Wood Bison. <Bull. Am. Mus. Nat. Hist., XIII, pp. 63-67.
A summary of the principal recent evidence regarding the abundance and distribution of *Bison bison athabascæ* Rhoads.
1900. BELL, ROBERT. [Preliminary Report of Explorations about Great Slave Lake in 1899.] <Summary Report of the Geological Survey [Canada] for the year 1899. Pp. 103 to 110. Ottawa.
A preliminary account, geological and topographical, of portions of the eastern part of Great Slave Lake.
1900. HANBURY, DAVID T. A Journey from Chesterfield Inlet to Great Slave Lake, 1898-9. <The Geographical Journal, XVI, No. 1, pp. 63-77. July, 1900.
Narrative of a journey between Chesterfield Inlet and Great Slave Lake by way of the Thelon or Ark-i-linik River, Hanbury River, and Artillery Lake. Some mention made of the fauna.
1900. McEVOY, JAMES. Report on the Geology and Natural Resources of the Country traversed by the Yellow Head Pass Route from Edmonton to Tête Jaune Cache, comprising portions of Alberta and British Columbia. <Annual Report Geological Survey of Canada, XI (new series), pp. 1D-44D.
Report of an exploration made in the summer of 1898. It comprises a general and geological description of the country traversed, and many notes on the fauna and flora.
1900. MERRIAM, C. HART. Description of Twenty-six new Mammals from Alaska and British North America. <Proc. Washington Acad. Sci., II, pp. 13-30. March 14, 1900.
Microtus macfarlani and *Lepus americanus macfarlani* described from Fort Anderson, Mackenzie.
1900. STONE, A. J. Some Results of a Natural History Journey to Northern British Columbia, Alaska, and the Northwest Territory, in the interest of the American Museum of Natural History. <Bull. Am. Mus. Nat. Hist., XIII, pp. 31-62.
Mr. Stone crossed British Columbia by way of the Stikine River and Dease Lake and descended the Liard and Mackenzie rivers to Fort McPherson on the Peel, making several side trips for purposes of collecting. Thence he explored the Arctic Coast west to Herschel Island and east to the region about Cape Lyon. His valuable notes on natural history relate chiefly to the distribution of the larger mammals.
1901. ALLEN, J. A. The Musk-Oxen of Arctic America and Greenland. <Bull. Am. Mus. Nat. Hist., XIV, pp. 69-86, Author's edition issued March 30, 1901.
Notes on the distribution of *Ovibos moschatus* in Mackenzie.
1901. BELL, J. MACINTOSH. [Preliminary Report of an exploration of the region of Great Bear Lake in 1900.] <Summary Report of the Geological Survey [Canada] for the year 1900, XIII, pp. 95 to 103. Ottawa.
A preliminary account of a journey of exploration to the Great Bear Lake region. A few notes on the fauna and flora are given.

1901. BELL, J. MACINTOSH. Report on the Topography and Geology of Great Bear Lake and of a Chain of Lakes and Streams thence to Great Slave Lake. <Ann. Rept. Geol. Surv. Canada, XII (new ser.), Part C, pp. 1C to 36C. (Published separately as Publication No. 725.) Ottawa.
A detailed account, chiefly topographical and geological, of the country explored by J. M. Bell in 1900.
1901. BELL, J. MACINTOSH. Explorations in the Great Bear Lake Region. <The Geographical Journal, XVIII, No. 3, pp. 249-258. September, 1901.
A short account of explorations in the Great Bear Lake region and southward to Great Slave Lake in 1900.
1901. [MACRAE, J. A.] Notes taken in the Peace River, Athabaska, and adjacent Country. <Ottawa Naturalist, XIV, pp. 226-230.
A letter from J. A. Macrae to Otto J. Klotz, giving many general notes, including some on natural history, taken in the Peace and Athabaska country in 1900.
1901. McLEAN, W. J. Notes and Observations of Travels on the Athabaska and Slave Lake Regions in 1899. <The Historical and Scientific Society of Manitoba, Transaction No. 58, pp. 7 (not numbered). February 12, 1901.
A brief account of a summer trip to Great Slave Lake. Many notes on the natural history of the region about the eastern part of the lake.
1902. [ANONYMOUS.] Musk-Oxen in Captivity. <Forest and Stream, LVIII, pp. 145, 146. Feb. 22, 1902.
A short account of a young female Musk-ox, taken about 30 miles east of Franklin Bay, Mackenzie, in March, 1901, and brought alive to San Francisco by Captain H. H. Bodfish, of the whale ship *Beluga*. Said to be the first live musk-ox ever brought to the United States.
1902. ALLEN, J. A. List of Mammals Collected in Alaska by the Andrew J. Stone Expedition of 1901. <Bull. Am. Mus. Nat. Hist., XVI, pp. 215-230. July 12, 1902.
Eutamias dawsoni recorded from Liard River and Fort Norman, Mackenzie.
1902. H[ORNADAY], W. T. The Musk-Ox. <Zoological Society Bulletin. Published by the New York Zoological Society. No. 7, pp. 33-35. September, 1902.
An account of the female musk-ox brought from Franklin Bay by Captain H. H. Bodfish, and eventually purchased by the New York Zoological Society.
1902. PREBLE, EDWARD A. Descriptions of new species of *Synaptomys* and *Phenacomys* from Mackenzie, Canada. <Proc. Biol. Soc. Wash., XV, pp. 181, 182. August 6, 1902.
•*Synaptomys (Mictomys) bullatus* described from Trout Rock, near Fort Rae; *Phenacomys mackenzii* from Fort Smith.
1902. TYRRELL, J. W. Report of J. W. Tyrrell, D. L. S., Exploratory Survey between Great Slave Lake and Hudson Bay, Districts of Mackenzie and Keewatin. <Ann. Rept. Dept. Interior (Canada) for the year 1900-1901 (Sessional Paper No. 25), Part III, Appendix No. 26 to the Report of the Surveyor General, text pp. 98-155, including 4 appendices, as follows: No. 1.—Elevations and Distances. No. 2.—Portages. No. 3.—Latitudes, Longitudes and Declinations. No. 4.—Meteorological Observations recorded upon Expedition by Rev. J. Lofthouse. A

Series of 61 Plates, from photographs taken by Tyrrell during the expedition, occupy pp. 207 to 329 of this part, being separated from the text.

This is a general report of a route explored in 1900 between Great Slave Lake and Hudson Bay, by way of Artillery Lake, Hanbury and Thelon rivers, and Chesterfield Inlet. Many notes on natural history, especially relating to the larger mammals, are found in the report. These notes are partially summarized on pp. 121 and 122.

There is another edition, published as a separate, apparently identical in matter, but with pages numbered 1 to 62, and with the addition of Appendix No. 5.—List of Plants, by Prof. John Macoun. In this edition the plates, numbered and paged as in the original, are bound with the text, which they follow.

1902. WHITEAVES, J. F. Note on the Nesting of the Northern Raven (*Corvus corax principalis*) in Canada. <Ottawa Naturalist, XVI, p. 86. June, 1902.

Mention made of five "raven's eggs, found on Artillery Lake May 24, 1900, by C. Fairchild."

1903. ALLEN, J. A. Mammals Collected in Alaska and Northern British Columbia by the Andrew J. Stone Expedition of 1902. <Bull. Am. Mus. Nat. Hist., XIX, pp. 521-567. October 10, 1903.

Several species of small mammals recorded from Fort Liard, Fort Norman, and other points in Mackenzie.

1903. [CANADIAN GOVERNMENT.] Summary of Reports on the Peace River and its Tributaries by Surveyors of the Department of the Interior and Geological Survey Department between the years 1884 and 1902. 8vo, pp. 1-7, Government Printing Bureau, Ottawa.

Contains brief extracts from various reports (some unpublished) relating to the region. A few notes on the fauna are included.

1903. HANBURY, DAVID T. Through the Barren Ground of North-Eastern Canada to the Arctic Coast. <The Geographical Journal, XXI, pp. 178-191.

A short account of a journey in Northern Canada in 1901-2. A few notes on the fauna are given.

1904. HANBURY, DAVID T. Sport and Travel in the Northland of Canada. Includes appendices on Geology, Rock Specimens, Lepidoptera, Flora, Measurements of Eskimo, Eskimo vocabulary, etc. 8vo, pp. 319, with illustrations and maps. London and New York.

Narrative of journeys made in northern Canada in 1898, 1899, 1901, and 1902. A great many notes on natural history are given.

1904. RAINE, WALTER. Discovery of the eggs of Solitary Sandpiper. <Ottawa Naturalist, XVIII, pp. 135-138. October, 1904.

Account of discovery of three sets of eggs of this species in northern [now central] Alberta in 1903 and 1904.

1904. SCHALOW, HERMAN. Die Vögel der Arktis. Fauna Arctica. Eine Zusammenstellung der arktischen Tierformen, mit besonderer Berücksichtigung des Spitzbergen-Gebietes auf Grund der Ergebnisse der Deutschen Expedition in das Nördliche Eismeer im Jahre 1898. Band IV, Lieferung I, pp. 81-288. Jena.

Gives notes on 270 species and subspecies, the annotations relating chiefly to distribution. Contains ornithological bibliography, and discussion of fauna of various parts of region.

1905. [ALLEN, J. A.] The Andrew J. Stone Explorations in Arctic and Sub-arctic America. Large 4to, pp. 38, with 55 text and plate figures. Published by the American Museum of Natural History. Edition limited to one hundred numbered copies.

This beautifully illustrated brochure contains a brief account of Mr. Stone's explorations in Alaska, British Columbia, and the Mackenzie Valley, and of the more important of his discoveries regarding the mammal life of the region.

1905. MACFARLANE, R. Notes on Mammals collected and observed in the northern Mackenzie River District, Northwest Territories of Canada, with remarks on Explorers and Explorations of the Far North. <Proc. U. S. Nat. Mus., XXVIII, pp. 673-764, with 5 plates. June, 1905.

Notes on the habits and distribution of most of the mammals of northern Canada, especially the larger species, mainly from original observations. Under most of the fur-bearing animals statistics are given regarding numbers of skins collected.

1906. FLEMING, JAMES H. An Arctic record for the American Pelican. <Auk, XXIII, p. 218.

Record of one taken on Liverpool Bay in the summer of 1900.

1908. JARVIS, A. M. Report of Inspector A. M. Jarvis on Wood Buffalo in the Mackenzie River District. <Rept. Royal Northwest Mounted Police for 1907, pp. 122-129, 1908.

Report on three trips made into the country west of Fort Smith in the summer of 1907. Two herds were seen and traces of several other herds observed. A few notes on other mammals are given.

1908. MAIR, CHARLES, and MACFARLANE, RODERICK. Through the Mackenzie Basin. A Narrative of the Athabasca and Peace River Treaty Expedition of 1899, by Charles Mair. Notes on the Mammals and Birds of Northern Canada, by Roderick MacFarlane. 8vo, pp. 494, with many half-tone illustrations. Toronto.

The narrative, by Mair, occupying pp. 1-149, describes the country bordering the Peace and Athabasca rivers, and contains a few natural history notes. MacFarlane's "Notes on Mammals" (and bibliography), pp. 153-283, is a reprint of his list published in Proc. U. S. Nat. Mus., XXVIII, pp. 673-764, 1905. The notes on birds comprise: "List of Birds and Eggs observed and collected in the North-West Territories between 1880 and 1894." These notes relate mainly to the regions about Cumberland House, Sask.; Stuart Lake, B. C.; and Athabasca and Great Slave lakes. Some references are also made to his former collections in the Anderson River region.

1908. SETON, ERNEST THOMPSON. Bird Records from Great Slave Lake Region. <Auk, XXV, pp. 68-74. January, 1908.

Annotated list of 88 species observed about Great Slave Lake, and northeasterly to Aylmer Lake, in the summer of 1907.

INDEX.

[New species are in **black-face type**; synonyms in *italics*; pages containing the principal reference to a species in black-face figures.]

- Abies balsamea, 86, **518-519**.
 Acanthis hornemanni exilipes, **417-418**, 419.
 linaria, **418-419**, 420.
 linaria holbœlli, **420**.
 Accipiter. (See also Astur.)
 Accipiter cooperi, **353**.
 velox, **352-353**.
 Acer negundo, 529.
 spicatum, **529**.
 Achorutes, 40.
 Acknowledgments, 15, 515.
 Actitis macularia, **329-331**.
 Ægialitis hiaticula, **335**.
 sempalmata, **335**.
 Aegiothus canescens, 418.
 exilipes, 542.
 fuscescens, 542.
 Aeronautes melanoleucus, **390**.
 Agelaius phœniceus arctolegus, **408-409**.
 A-ha-lik', 290.
 A-hau-lin', 290.
 Aix sponsa, **284**.
 Alberta Province, 125.
 Alces, 51.
 americanus, **130-135**.
 Alder, 349, 418, **525**.
 Alle alle, **260**.
 Alnus alnobetula, 47, 86, 349, 418, 438, **525**.
 incana, 86, 349, 418, **525**.
 Amelanchier, 93.
 alnifolia, 86, **528**.
 Ammodramus. (See also Passerculus.)
 Ammodramus lecontei, **429**.
 nelsoni, **429**.
 Ampelis. (See Bombycilla.)
 Amundsen, Roald, 68.
 Anas boschas. (See A. platyrhynchos.)
 crecca, 281.
 cygnus, 310.
 mollissima, 292.
 penelope, 280.
 platyrhynchos, **277-278**.
 rubripes, **278**.
 Anderson, James, 69.
 Andromeda polifolia, 105, 342, 343, **532**.
 Anemone, purple, 93.
 Anemone richardsoni, 103.
 Anorthura. (See Nannus.)
 Anser albatrus, 542, 546.
 albifrons gambeli, **302-304**.
 cœrulescens, 542.
 hyperboreus, 542, 546.
 rossii, 542.
 Antennaria, 93.
 Anthus, 50.
 ludovicianus, 481.
 rubescens, 51, 427, **481-482**.
 Ants, 350, 388.
 Apocynum androsæmifolium, 91.
 Aquila chrysaetos, **358-360**.
 Aragallus, 342.
 Archibuteo, 356.
 lagopus, 358.
 lagopus sancti-johannis, **357-358**.
 Arctic-Alpine zone, **50-51**.
 Arctic Fox, 50.
 zone, 50.
 Arctomys, 162.
 columbianus, 165.
 hoodii, 166.
 kennicottii, 162, 543.
 lateralis, 166.
 monax, 160, 162.
 monax empetra, 159.
 parryi erythroglutea, 164.
 pruinosis, 160, 162.
 richardsoni, 161.
 Arctostaphylos uvaursi, 220, 337, 338, **532**.
 Ardea herodias, **311**.
 Arenaria, 50.
 interpres morinella, **335-336**.
 Argyrosomus lucidus, **507-508**.
 tullibee, **507**.
 Arquatella maritima, **320**.
 Artemisia frigida, **534**.
 longifolia, 534.
 vulgaris, 534.
 Arum, water, 98, 115.
 Arvicola (subgenus), 190.
 Arvicola, 184.
 amphibius, 190.
 borealis, 183, 184, 185, 537.
 helvolus, 537.
 richardsoni, 191.
 riparius, 190.
 trimucronata, 536.
 Asio flammeus, **367-368**.
 wilsonianus, **367**.

- Assiniboia Territory, 125.
 Astur atricapillus, 353-355.
 palumbarius, 354.
 Athabaska Landing, 110.
 Territory, 125.
 Attihawmeg, 505, 506.
 Avens, 103, 527-528.
 Avocet, 317.
Aythya. (See Marila.)
 Back, George, 63.
 Badger, 229.
 Balena mysticetus, 126-127.
 Baldpate, 279-280.
 Balsam poplar. (See Poplar.)
 Barley, 350.
 Barren Grounds, 46-49.
 Bartramia longicauda, 328-329.
 Bat, hoary, 251.
 little brown, 249-250.
 Say, 250.
 silver-haired, 250-251.
 Batrachians, 500-502.
 Bay, Lapland rose, 531.
 Bear, Barren Ground, 224-225.
 black, 220-222, 527, 530.
 brown, 222.
 cinnamon, 221, 222.
 grizzly, 223-224.
 polar, 225-227.
 Bearberry, 220, 337.
 alpine, 343, 532.
 red, 532.
 Bear Rock, 33, 105.
 Beaulieu family, 96.
 Beaver, 194-195, 209.
 Beavertail Point, 110.
 Beetles, 261, 311, 336, 350.
 water, 268, 373.
 Belcher, Edward, 67.
 Bell, J. M., 82, 111.
 Bell, Robert, 75, 82.
 Beluga, 128.
Bernicla barnstoni, 306.
 Betula alaskana, 524.
 glandulosa, 524.
 nana, 51, 342, 343, 414, 418, 524.
 occidentalis, 524.
 papyrifera, 86, 418, 523-524.
 Big Cascade Rapid, 90, 110.
 Big Island, 100, 110.
 Birch, Alaska, 524.
 canoe, 86, 418, 523-524.
 dwarf, 342, 414, 418, 524.
 northern dwarf, 524.
 Birch Island, 104, 110.
 Birch Mountain, 19.
 Birds, 251-500.
 Bison, wood, 143-150.
 Bison bison athabascæ, 143-150, 553, 554.
 Bittern, 311.
 Blackbird, Brewer, 412.
 rusty, 410-412.
 yellow-headed, 408.
 Bloody Fall, 54.
 Blueberry, 220, 221, 222, 224, 338, 342, 533.
 Bluebird, mountain, 499-500.
 Bluefish, 511.
 Bog-bean, 98.
 Boiler Rapid, 89, 110.
 Bombycilla cedrorum, 458-459.
 garrula, 457-458.
 Bompas, W. C., 111.
 Bonasa umbellus umbelloides, 52, 340-342, 537.
 Botaurus lentiginosus, 311.
 Brant, black, 307-309.
 white-bellied, 307.
 Branta bernicla glaucogastra, 307.
 canadensis, 304-306.
 canadensis hutchinsi, 306-307.
 nigricans, 307-309.
 Brass, William, 71, 74.
 Brents, 308.
 Brooks. (See Rivers.)
 Brulé Rapid, 89, 110.
 Bubo virginianus saturatus, 374.
 virginianus subarcticus, 372-374.
Bucephala islandica, 288.
 Buffalo Jones, 81.
 Buffalo, wood, 146.
 Buffaloberry, 86, 177.
 Canadian, 530.
 Buffalo-bird, 407.
 Buffle-head, 288-289.
 Bufo lentiginosus woodhousei, 501.
 Bullhead, Bear Lake, 514.
 six-horned, 514.
 Bunting, lazuli, 449.
 snow, 23, 421, 422, 423, 424.
 Buteo borealis calurus, 355-356.
 platypterus, 357.
 swainsoni, 356-357.
 Butterfly, mourning cloak, 40.
 Ca-ca-wee, 290.
 Calcarius lapponicus, 50, 423-425.
 lapponicus alascensis, 423, 424, 425.
 pictus, 50, 425-426.
 Calidris, 50.
 leucophæa, 324-325.
 Calla palustris, 98, 115.
 Callospermophilus (subgenus), 166.
 Calypso bulbosa, 41.
 Camsell, J. S., 71.
 Canachites canadensis, 337-339, 537.
 canadensis osgoodi, 338.
 franklini, 339-340.
 Canadian zone, 52, 53.
 Canis familiaris borealis, 543.
 familiaris lagopus, 543.
 latrans, 214-215.
 nubilus, 212.
 occidentalis, 211-213.
 occidentalis albus, 213-214.
 occidentalis griseus, 543.
 Cannibal bird, 449.
 Canvasback, 284-285.
Caprimulgus americanus, 389.
 Caribou, Barren Ground, 22, 50, 137-143.
 eastern woodland, 135-136.
 mountain, 136-137.
 Caribou Basin, 81.

- Caribou Mountains, 34.
 Carp, 503.
 Carpodacus purpureus, 415-416.
 Cary, Merritt, 15.
 Cassiope, four-angled, 531.
 Cassiope tetragona, 50, 531.
 Castalia tetragona, 98.
 Castor, 51.
 canadensis, 194-195.
 Catbird, 483.
 Cathartes aura septentrionalis, 351.
 Catotrophorus sempalmatus inornatus, 328.
 Catostomus catostomus, 503.
Ceophlaus. (See *Phlebotomus*.)
 Cepphus mandti, 260.
 Certhia familiaris montana, 484.
 Cervus canadensis, 129-130.
 Ceryle alcyon, 378-379.
 Chætura pelagica, 390.
 Chamædaphne, 105, 114.
 calyculata, 532.
 Chamænerion, 90.
 Charadrius, 50.
 dominicus, 333-334.
 Charitonetta albeola, 288-289.
 Chaulelasmus streperus, 278-279.
 Chen, 50.
 cærulescens, 301.
 hyperborea, 297-300.
 hyperborea nivalis, 298, 300-301.
 rossi, 297, 301-302.
 Cherry, black-fruited, 529.
 red, 528-529.
 Chickadee, Hudsonian, 488-489.
 long-tailed, 485-487.
 mountain, 487.
 Siberian, 487.
 Chinook winds, 19, 25, 35.
 Chipmunk, gray-headed, 169.
 Liard River, 167-169.
 Chokecherry, 529.
 Chondestes grammacus strigatus, 430.
 Chordeiles virginianus, 389-390.
 Chorophilus, northern, 502.
 Chorophilus septentrionalis, 502.
 Cinclus mexicanus unicolor, 482.
 pallasii, 62.
 unicolor, 482.
 Cinquefoil, shrubby, 527.
 Circus hudsonius, 351-352.
 Cistothorus palustris plesius, 484.
 Citellus cinerascens, 166-167.
 columbianus, 164-165.
 franklini, 165-166.
 parryi, 161-162, 163.
 parryi kennicotti, 162-164.
 plesius, 164.
 tridecemlineatus, 166.
 Clangula clangula americana, 287-288.
 islandica, 288.
 Clarke, Lawrence, 71, 74.
 Climatology Mackenzie Basin, 16-49.
Civicola. (See *Riparia*.)
 Cloudberry, 526.
Coccothraustes. (See *Hesperiphona*.)
 Colaptes auratus luteus, 386-388, 389.
 cafer collaris, 386, 388-389.
 Collinson, Richard, 68.
 Colobotis (subgenus), 161, 162, 164.
Colymbus arcticus, 256.
 auritus, 253, 254.
 glacialis, 255, 256.
 holbelli, 251-252.
 nigricollis californicus, 254.
 Coney, 508-509.
Contopus. (See *Myiochanes*.)
 Coot, 315.
 Coregonus, 502, 505-507.
 kennicotti, 505, 507.
 quadrilateralis, 505.
 richardsoni, 505.
 Cormorant, double-crested, 274.
 Cornel, 220, 530.
 Cornus canadensis, 86, 530.
 stolonifera, 86, 220, 530.
Corvus americanus, 406.
 brachyrhynchus, 406-407.
 corax principalis, 403-405, 556.
 Corylus rostrata, 523.
 Cottus cognatus, 514.
 Coturnicops noveboracensis, 314-315.
 Couesius plumbeus, 504.
 Cougar, Rocky Mountain, 208-209.
 Cowbird, 407-408.
 Coyote, 214-215.
 Cranberry, 220, 337, 338, 532-533.
 Cranberry tree, 533.
 Crane, little brown, 312-313.
 sandhill, 313.
 whooping, 311-312.
 Creeks. (See *Rivers*.)
 Creeper, Rocky Mountain, 484.
Cricetus talpoides, 537.
 Cristivomer naymacush, 510-511.
 Crooked Rapid, 90, 110.
 Crops, 52, 97.
 Crossbill, American, 416.
 white-winged, 416-417.
 Crow, 22, 23, 406-407.
 Crowberry, 121, 181, 298, 343, 497, 529.
 Crowfoot, 114.
 Cryptogramma acrostichoides, 98, 115, 338.
 Culex annulatus, 40.
Cuniculus torquatus, 183.
 Curlew, Eskimo, 332.
 Hudsonian, 331.
 long-billed, 331.
 Currant, fetid, 526.
 northern black, 526.
 red, 526.
 Cyanocitta cristata, 400.
Cyanospiza. (See *Passerina*.)
 Dañla acuta, 283-284.
 Dall sheep, 50.
 Dasiphora fruticosa, 527.
 Dawson, G. M., 75.
 Dease, P. W., 64.
 Deer, black-tail, 129.
 mule, 128-129.
 plains white-tail, 128.
 Delphinapterus catodon, 128.

- Delta. (See Rivers.)
- Dendragapus obscurus richardsoni*, 336-337.
- Dendroica aestiva*, 468-470.
atricapilla, 473-474.
auduboni, 471.
castanea, 472-473.
coronata, 470-471.
magnolia, 52, 472.
palmarum, 474-475.
striata. (See *D. atricapilla*.)
tigrina, 468.
townsendi, 474.
virens, 474.
- Desmarais Islands, 99.
- Dicrostonyx*, 50.
hudsonius alascensis, 182-183.
- Dipper, northern, 482.
- Distances along rivers, 110.
- Dogbane, spreading, 91.
- Doré, 514.
- Dovekie, 260.
- Dowitcher, 319.
 long-billed, 319.
- Dragon fly, 261.
- Drummond, Thomas, 60.
- Dryas drummondii*, 103, 528.
integrifolia, 103, 108, 121, 527-528.
- Dryobates*, 383.
pubescens nelsoni, 380-381.
villosus leucomelas, 379-380.
- Dryopteris fragrans*, 98, 115.
- Ducks :
- baldpate, 279-280.
 Barrow golden-eye, 288.
 big black, 294.
 black, 278, 295.
 blue-winged teal, 281-282.
 buffle-head, 288-289.
 canvasback, 284-285.
 dusky, 278.
 eider, 308.
 gadwall, 278.
 golden-eye, 287-288.
 green-winged teal, 280-281.
 harlequin, 291-292.
 hooded merganser, 277.
 king eider, 293-294.
 lesser scaup, 285-286.
 mallard, 277-278.
 merganser, 275-276.
 northern eider, 292.
 old-squaw, 289-291.
 Pacific eider, 292-293.
 pintail, 283-284.
 red-breasted merganser, 276-277.
 redhead, 284.
 ring-necked, 286-287.
 ruddy, 297.
 scaup, 285.
 shoveler, 282-283.
 spoonbill, 282-283.
 surf scoter, 295-296.
 white-winged scoter, 294-295.
 wood, 284.
- Dumetella carolinensis*, 483.
- Dytiscus dauricus*, 268, 373.
- Eagle, bald, 358, 360-361.
 golden, 358-360.
- Ectopistes migratorius*, 351.
- Eel pout, 378.
- Eider, king, 293-294.
 northern, 292.
 Pacific, 292-293.
- Elæagnus argentea*, 86, 530.
- Elk, 129-130.
- Empetrum*, 332.
nigrum, 51, 121, 181, 221, 298, 306, 331, 343, 401, 529.
- Empidonax flaviventris*, 395.
hammondi, 398.
minimus, 52, 396-398.
obscurus, 398.
pusillus traillii, 396.
tralli alnorum, 395-396.
- Equisetum*, 188, 221, 341, 342, 464.
- Eremophila cornuta*, 399.
- Erethizon, 51.
dorsatum, 197.
epixanthum, 197-198.
- Ereunetes pusillus*, 323-324.
- Erignathus barbatus*, 242.
- Erimatura jamaicensis*, 297.
- Ermine, 233.
- Esox lucius*, 513.
- Euphagus carolinus*, 410-412.
cianocephalus, 412.
- Eutamias borealis*, 167-169.
borealis caniceps, 167, 169.
felix, 168.
- Euvanessa*, 40.
- Evotomys*, 51.
dawsoni, 51, 180-181, 365, 367, 555.
gapperi, 178, 179, 553.
gapperi athabascæ, 178-180, 370.
rutilus, 181.
- Expeditions (for names of vessels see Voyages) :
- Amundsen, 68.
 Anderson and Stewart, 69.
 Back, 63.
 Belcher, 67.
 Bell, J. M., 82, 111.
 Bell, Robert, 75, 82.
 Biological Survey, 79.
 Bompas, 111.
 Collinson, 68.
 Dawson, 75.
 Dease and Simpson, 64.
 Franklin (1819), 57.
 Franklin (1825), 58.
 Franklin (1845), 64.
 Hanbury, 83.
 Hearne, 54.
 Jones, 81.
 Kellett, 69.
 Kennicott, 70.
 Loring, 79.
 MacFarlane, 71.
 Mackenzie, 55.
 Macoun, 76.
 M'Clintock, 67.

Expeditions—Continued.

- McClure, 68.
 McConnell, 75, 76.
 Ogilvie, 75, 77.
 Parry, 58.
 Petitot, 14, 74, 111.
 Pike, 76.
 Pullen and Hooper, 66.
 Rae (1851), 65.
 Ross, 62.
 Russell, 78.
 Schwatka, 75.
 Selwyn, 74.
 Seton, 85.
 Simpson and Dease, 64.
 Spreadborough, 81.
 Stewart and Anderson, 69.
 Stone, 82.
 Taylor, 77.
 Tyrrell, 77, 78, 84.
 Whitney, 79.

Explorations (see Expeditions), 54-85.

- Falco* *æsalon*, 364.
columbarius, 363-364.
columbarius richardsoni, 364.
gyrfalco sacer, 361.
islandicus, 361.
peregrinus anatum, 361-363.
rusticolus gyrfalco, 361.
sparverius, 364-366.
Felis hippolestes, 208-209.
 Fern, 91, 98, 115, 338.
 Fiber, 51.
zibethicus hudsonius, 192.
zibethicus spatulatus, 191-193.

Finch, purple, 415-416.

Fir, balsam, 86, 518-519.

Fisher, 238-239.

Fishes, 502-515.

Flett, Andrew, 71.

Flicker, northern, 386-388.

red-shafted, 388-389.

Flycatcher, alder, 395-396.

least, 396-398.

Hammond, 398.

olive-sided, 393-394.

yellow-bellied, 395.

Food of:

- Acanthis hornemanni exilipes*, 418.
Alces americanus, 133.
Aquila chrysaëtos, 359.
Arenaria interpres morinella, 335.
Asio flammeus, 368.
Asio wilsonianus, 367.
Astur atricapillus, 354.
Bartramia longicauda, 328.
Bonasa umbellus umbelloides, 340-342.
Botaurus lentiginosus, 311.
Branta canadensis hutchinsi, 306.
Bubo virginianus saturatus, 374.
Bubo virginianus subarcticus, 372, 373.
Canachites canadensis, 338.
Canis occidentalis, 212.
Canis occidentalis albus, 214.
Ceryle alcyon, 378.

Food of—Continued.

- Chen hyperborea*, 298.
Citellus franklini, 165.
Colaptes auratus luteus, 388.
Dafla acuta, 283.
Dendragapus obscurus richardsoni, 337.
Eutamias borealis, 167, 168.
Evotomys dawsoni, 181.
Falco peregrinus anatum, 362.
Falco sparverius, 365.
Fiber zibethicus spatulatus, 192.
Glaux funerea richardsoni, 370.
Gulo luscus, 162, 240.
Lanius borealis, 460.
Lagopus lagopus, 342, 343.
Larus brachyrhynchus, 268.
Lepus americanus, 199, 201.
Loxia leucoptera, 417.
Lynx canadensis, 209, 211.
Marila marila, 285.
Microtus drummondi, 187.
Microtus xanthognathus, 188.
Numenius hudsonicus, 331.
Nyctea nyctea, 375.
Ovibos moschatus, 154.
Pediœcetes phasianellus, 349.
Pediœcetes phasianellus columbianus, 350.
Perisoreus canadensis, 401.
Pinicola enucleator alascensis, 414, 415.
Planeesticus migratorius, 497.
Putorius cicognanii richardsoni, 231, 232.
Sciurus hudsonicus, 170, 171.
Scotiaptex nebulosum, 369, 370.
Squatarola squatarola, 332.
Stercorarius parasiticus, 261.
Surnia ulula caparoch, 376, 377.
Ursus americanus, 220, 221, 222.
Ursus richardsoni, 224, 225.
Ursus horribilis, 224.
Vulpes innuitus, 219.
Vulpes alascensis abietorum, 217.

Forts:

- Anderson, 70, 72.
 Arctic Red River, 108.
 Athabaska Landing, 86.
 Beren's House, 92.
 Big Island, 70, 100.
 Chipewyan, 23, 55, 92-93, 110.
 Churchill, 54.
 Confidence, 64, 124.
 Dunvegan, 26.
 Enterprise, 57.
 Fond du Lac, 92.
 Fond du Lac (Mackenzie), 76.
 Fork Fort, 56.
 Franklin, 59, 123.
 Good Hope, 107, 110.
 Good Hope (old), 108, 110.
 Henry House, 79, 80.
 Hay River, 99.
 Hislop and Nagle post, 112.
 Jasper House, 79, 80.

Forts—Continued.

- Lac du Brochet, 22.
 La Pierre House, 109.
 Liard, 101.
 Little Red River, 91.
 MacKay, 92, 110.
 McLeod, 56.
 McMurray, 90.
 McPherson, 109.
 Moose Deer Island, 57, 97.
 Mountain Island, 99.
 Nelson, 101.
 Norman, 105, 110.
 Norman (old), 110.
 Old Establishment, 56.
 Peel River, 70.
 Pelican Narrows, 393.
 Pierre au Calumet, 92, 110.
 Prince of Wales, 54.
 Providence, 100, 110.
 Providence (old), 98.
 Rae, 99.
 Reliance, 63.
 Resolution, 97.
 Riviere Rouge, 92.
 Rocky Mountain House (old), 102.
 Simpson, 101, 110.
 Smith, 95, 101, 110.
 Smith Landing, 94.
 St. John, 26.
 The Forks, 90, 101.
 Wedderburn, 92.
 Wrigley, 103, 110.
- Fox, Alaska red, 215-216.
 Arctic, 50.
 black, 216, 217.
 blue, 218, 219, 220.
 British Columbia red, 217.
 Continental Arctic, 217-220.
 cross, 216, 217.
 silver, 216, 217.
- Franklin, John, 57, 58, 64.
 Franklin Bay, 73.
- Fringilla leucophrys*, 432.
pennsylvanica, 435.
socialis, 438.
vespertina, 61.
- Frog, 23, 311.
 leopard, 501.
 northern chorophilus, 502.
 northern wood, 501-502.
- Frost, depth, 38, 39, 45.
Fulica americana, 315.
 Fulmar, 274.
Fulmarus glacialis, 274.
 Gadwall, 278-279.
 Gale, sweet, 114, 523.
Galeoscoptes. (See *Dumetella*.)
Gallinago delicata, 317-319.
Garrulus brachyrhynchus, 402.
Gasterosteus concinnus, 513.
 Gaudet, C. P., 71, 74.
Gavia adamsi, 256-257, 552.
 arctica, 257.
 immer, 254-256.
 lumme. (See *G. stellata*.)
- Gavia pacifica*, 257-258.
 stellata, 258-259.
Gentiana acuta, 37.
 Geothlypis. (See also *Oporornis*.)
Geothlypis trichas occidentalis, 478.
Glauca acadica, 371.
funerea richardsoni, 370-371.
Glis canadensis, 159.
 Goat, mountain, 158-159.
 Godwit, Hudsonian, 325.
 Golden-eye, American, 287-288.
 Barrow, 288.
 Goldeye, 505.
 Goose, black, 308, 309.
 blue, 301.
 brent, 307, 308.
 Canada, 23, 304-306.
 Eskimo, 309.
 greater snow, 300-301.
 husky, 309.
 Hutchins, 306-307.
 lesser snow, 297-300.
 Ross snow, 301-302.
 snow, 23.
 white-fronted, 302-304.
 Gooseberry, northern, 525.
 Gopher, Saskatchewan pocket, 195-196.
 Goshawk, 353-355.
 Grackle, bronzed, 412-413.
 Grand Cache Valley, 80.
 Grand Detour, 96, 110.
 Grand Rapid, 88, 110.
 Grand View, 110.
 Grasshopper, 328.
 Grayling, Arctic, 511-513.
 Grebe, eared, 254.
 Holboell, 251-252.
 horned, 253.
 pied-billed, 254.
 Grizzly Bear Mountain, 43, 121.
 Gros Cape, 97.
 Grosbeak, Alaska pine, 414-415.
 eastern pine, 414.
 evening, 413-414.
 pine, 51.
 Rocky Mountain pine, 414.
 rose-breasted, 448-449, 480.
 Ground squirrel (see also *Spermophile*), 240.
 Columbian, 164-165.
 Lake Bennett, 164.
 Richardson, 166.
 Grouse, Columbian sharp-tail, 350.
 Franklin, 339-340.
 gray ruffed, 340-342.
 Hudsonian spruce, 337-339.
 Richardson, 336-337.
 ruffed, 354, 377.
 sharp-tail, 348-350.
Grus americana, 311-312.
 canadensis, 312-313.
 canadensis, 313.
 mexicana, 313.
 Guillemot, Mandt, 260.
 Gull, black-headed, 270.
 Bonaparte, 269-270.
 California, 267.

- Gull, glaucous, 263-264.
 herring, 264-266.
 Iceland, 264.
 ivory, 262-263.
 ring-billed, 267.
 rosy, 270.
 Sabine, 271.
 short-billed, 268-269.
 silvery, 266.
 slaty-backed, 264.
- Gulo luscus, 239-241, 543.
 Gyrfalcon, 361.
 Gyrophora, 124.
 Haliaetus leucocephalus alascanus, 360-361.
- Hanbury, D. T., 83.
 Hardisty, W. L., 71, 74.
 Hare, Baffin Land Arctic, 206-207.
 British Columbia varying, 205-206.
 Hudson Bay varying, 199-205.
 Keewatin Arctic, 207-208.
 MacFarlane varying, 205.
 Polar, 50.
 varying, 354, 356, 359, 373, 374, 375.
- Harelda hyemalis, 289-291.
 Hawk, American rough-legged, 357-358.
 American sparrow, 364-366.
 broad-winged, 357.
 Cooper, 353.
 duck, 361-363, 449.
 marsh, 351-352.
 pigeon, 363-364.
 sharp-shinned, 352-353.
 Swainson, 356-357.
 western red-tailed, 355-356.
- Hazelnut, 523.
 Head of the Line, 100, 110.
 Hearne, Samuel, 54.
 Hedysarum americanum, 104, 343.
 Helminthophila celata, 52, 464-465.
 celata lutescens, 465.
 peregrina, 52, 465-468.
 rubricapilla, 464.
- Helodromas solitarius, 327, 328.
 solitarius cinnamomeus, 327-328.
- Heron, great blue, 311.
 Herring, Great Bear Lake, 507-508.
 Hesperiphona vespertina, 413-414.
 Hesperocichla. (See Ixoreus.)
 Hierofalco candicans, 361.
 Hiodon alosoides, 505.
 Hirundo erythrogastra, 453-454.
 lunifrons, 452.
- Histrionicus histrionicus, 291-292.
 Hoary marmot, 50.
 Honeysuckle, 534.
 Horn Mountains, 32.
 Hudsonian zone, 51-52, 53.
 Hudson's Bay Company, 15.
 Hummingbird, ruby-throated, 390.
 rufous, 390, 391.
- Hydrochelidon nigra surinamensis, 274.
 Hylocichla alicia, 491-492.
 fuscescens salicicola, 491.
 guttata, 494.
 guttata pallasi, 52, 494-495.
- Hylocichla ustulata swainsoni, 52, 492-494.
 Ice, breaking up, 22, 29, 31, 35, 36, 40, 41, 45, 46, 49.
 drift, 20, 21, 37.
 ground, 39.
 setting fast, 21, 23, 29, 31, 36, 37, 38, 45, 49.
- Ictidomys (subgenus), 165.
 Inconnu, 508-509.
 Iridoprocne bicolor, 455-456.
 Ixoreus naevius meruloides, 498-499.
 Jackfish, 513.
 Jaeger, long-tailed, 262.
 parasitic, 98, 261-262.
 pomarine, 260.
 Jay, Canada, 400-403.
 blue, 400.
 Jones, C. J., 81.
 Jones, H. W., 15.
 Jones, Strachan, 71, 74.
 Jumping mouse, Hudson Bay, 196.
 Rocky Mountain, 197.
 Saskatchewan, 197.
- Junco, Montana, 442-443.
 Shufeldt, 442.
 slate-colored, 440-442.
- Junco hyemalis, 440-442.
 hyemalis connectens, 442.
 hyemalis montanus, 442-443.
 oreganus shufeldti, 442.
- Juniper, creeping, 519.
 low, 519.
- Juniperus nana, 86, 519.
 sabina, 86, 519.
- Kalmia glauca, 531.
 Keith Bay, 43.
 Kellett, 69.
 Kennicott, R., 70, 503.
 Killdeer, 334.
 King, R., 63.
 King, W. C., 71.
 Kingbird, 391-392.
 Kingfisher, belted, 378-379.
 Kinglet, golden-crowned, 489.
 ruby-crowned, 489-490.
- Kittiwake, 263.
 Knot, 320.
- Labrador tea, 114, 530-531.
 narrow-leaved, 531.
- Lagopus albus, 345.
 lagopus, 50, 342-346, 347.
 leucurus, 51, 348.
 rupestris, 50, 347-348.
- Lakes:
 Artillery Lake, 27.
 Athabaska Lake, 21, 110.
 Athapuscow Lake, 55.
 Aylmer Lake, 27.
 Beechey Lake, 76.
 Black Lake, 21.
 Brochet Lake, 111.
 Clinton-Colden Lake, 27.
 Dawaso Necka Lake, 113.
 Faber Lake, 113.
 Fabre Lake, 115.
 Gray Goose Lake, 123.

Lakes—Continued.

- Great Bear Lake, 42-45.
 Great Slave Lake, 26-29.
 Hardisty Lake, 116.
 Hislop Lake, 112.
 Lesser Slave Lake, 19.
 Lily Lake, 85.
 Little Lake, 100.
 Mackay Lake, 27.
 Marian Lake, 28, 111.
 Marten Lake, 28, 44.
 Mazenod Lake, 113.
 Nagle Lake, 113.
 Rae Lake, 114.
 Reindeer Lake, 22.
 Rendezvous Lake, 73.
 Rey Lake, 116.
 Rosamond Lake, 114.
 Sarahk Lake, 113.
 Seguin Lake, 114.
 St. Croix Lake, 114.
 Theitaga Lake, 78.
 Two Lakes, 86.
 Walmsley Lake, 27.
 Wollaston Lake, 21, 22.
- Lampetra aurea*, 503.
Lamprey, 503.
Lanius borealis, 459-460.
 ludovicianus excubitorides, 460.
Lanivireo solitarius, 52, 463.
Larix laricina, 86, 516-517.
 Lark, Alaska horned, 399.
 Hoyt horned, 398-399.
Larus, 453.
 argentatus, 264-266.
 bonaparti, 270.
 brachyrhynchus, 268-269.
 californicus, 267.
 canus, 269.
 delawarensis, 267.
 glaucescens, 264.
 hyperboreus, 263-264.
 leucopterus, 264.
 philadelphia, 269-270.
 rossii, 270.
 schistisagus, 264.
 La Saline, 91.
Lasionycteris noctivagans, 250-251.
Lasiurus cinereus, 251.
 Laurel, swamp, 531.
 Leadbeater collection, 61.
 Leatherleaf, 114, 532.
 Ledum, 105, 114.
 grœnlandicum, 530-531.
 palustre, 51, 531.
 Leith Point, 43, 121.
 Lemming, Back, 181-182.
 Point Barrow, 182-183.
 tawny, 182.
 Lemming vole, Dall, 185-186.
 northern, 183-185.
 Lemmus, 50, 51.
 helvolus, 182.
 hudsonius, 182.
 trimucronatus, 181-182, 183.
Lepargyræa canadensis, 86, 177, 200, 341,
 342, 530.
- Lepus americanus*, 51, 199-205, 373, 374,
 375.
 americanus columbiensis, 205-206.
 americanus macfarlani, 205, 554.
 arcticus, 206-207.
 arcticus canus, 207-208.
 glacialis, 206.
 princeps, 537.
Lestris parasiticus, 262.
 richardsoni, 261.
Leucosticte tephrocotis, 51, 417.
Leucosticte, gray-crowned, 417.
 Life zones, 49-53.
 Lily, water, 98.
 Limestone Point, 110.
Limosa hæmastica, 325.
Linaria minor, 419.
 Little Cascade Rapid, 90, 110.
 Lobipes, 50.
 lobatus, 316.
 Lobstick, 94.
 Loche, 514-515.
 Lockhart, James, 71, 74.
 Long Rapid, 90, 110.
 Longspur, Alaska, 425.
 Lapland, 398, 423-425.
 McCown, 426-427.
 painted, 425-426.
 Loncera, 86.
 glaucescens, 534.
 involutrata, 534.
 Loon, 254-256.
 Pacific, 257-258.
 red-throated, 258-259.
 yellow-billed, 256-257.
Lophodytes cucullatus, 277.
 Loring, J. Alden, 79.
Lota maculosa, 378, 514-515.
 Lower Ramparts, 33, 108, 110.
Loxia curvirostra minor, 416.
 leucoptera, 416-417.
Lupinus arcticus, 108.
 Lutra, 51.
 canadensis, 228-229, 543.
 Lutreola, 51.
 ingens, 230.
 vison energumenos, 229-230.
 Lymnæa, 285.
 palustris, 283, 338.
 Lynx, 51.
 canadensis, 209-211, 543.
 canadensis mollipilosus, 211.
 MacDonald, R., 71.
 MacFarlane, Roderick, 71-74.
 Mackenzie, Alexander, 55.
 Mackenzie Basin, 16-17.
 Mackenzie Province, 125.
 MacKinlay, James, 13, 15.
 Macoun, J. M., 76.
 Macoun, John, 74.
 Macrorhamphus, 50.
 griseus, 319.
 scolopaceus, 319.
 MacTavish Bay, 43.
 Magpie, American, 400.
 Mairania alpina, 532.

- Mallard, 277-278.
 Mammals, 126-251.
 Manito Islands, 122.
 Maple, ashleaf, 529.
 mountain, 529.
Mareca americana, 279-280.
 Maria, 514-515.
Marila affinis, 285-286.
 americana, 284.
 collaris, 286-287.
 marila, 285, 453.
 vallisneria, 284-285.
 Marmot, 224.
 hoary, 50, 160-161.
Marmota calligata, 51, 160-161.
 monax canadensis, 159-160, 359.
 Marten, Alaska, 234-238.
 Martin, purple, 451.
Matteuccia struthiopteris, 91.
 M'Clintock, C. L., 67.
 M'Clure, Robert, 68.
 McConnell, R. G., 75, 76.
 McConnell Islands, 96, 110.
 McDougall, James, 71.
 McDougall Pass, 75.
 McKenzie, A., 71, 74.
 McLean, W. J., 71.
 McLeod, Murdo, 71.
 Meadow lark, western, 410.
Meles labradoria, 229.
Melospiza georgiana, 52, 445-446.
 gouldii, 443.
 lincolni, 52, 444-445.
 melodia, 443-444.
Menyanthes trifoliata, 98.
Mephitis hudsonica, 227-228.
Merganser. (See *Mergus*.)
Merganser, American, 275-276.
 hooded, 277.
 red-breasted, 276-277.
Mergus americanus, 275-276.
 serrator, 276-277.
 Merlin, Richardson, 364.
Merula. (See *Planesticus*.)
Merula migratoria, 499.
 wilsoni, 493.
 Methye, 514-515.
Microsorex alnorum, 249.
 eximius, 248-249.
 hoyi, 249.
Microtus (subgenus), 186, 188, 190.
Microtus, 184, 211, 234, 248.
 aphorodemus, 187.
 cautus, 190.
 drummondii, 186-188, 190, 191, 365,
 367, 368, 370, 372, 374, 377.
 macfarlani, 190, 554.
 minor, 191.
 mordax, 190.
 operarius, 190.
 richardsoni, 190-191.
 vellerosus, 190.
 xanthognathus, 186, 188-190, 234.
Mictomys (subgenus), 183, 185.
 bullatus, 183, 185, 555.
Micropalama himantopus, 319-320.
 Middle Rapid, 90, 110.
 Mills, J. W., 15.
 Miller's thumb, 514.
 Mink, 229-230.
 Minnow, flat-headed, 504-505.
 Mission Island, 96.
Mniotilta varia, 463-464.
 Moberly Rapid, 90, 110.
Molothrus ater, 407-408.
 Mollusks, 283, 285, 338.
 Monodon monoceros, 127-128.
 Moose, 130-135.
 Mountain Rapid, 90, 110.
 Mountain sheep, 155-156.
 northern, 157-158.
 Stone, 156-157.
 Mount Charles, 125.
 Mount Clark, 33, 124.
 Mount Tha-on'-tha, 102.
 Mouse, arctic white-footed, 174-176.
 Athabaska red-backed, 178-180.
 Dawson red-backed, 180-181.
 Hudson Bay jumping, 196.
 meadow (see also *Vole*), 377.
 Rocky Mountain jumping, 197.
 Saskatchewan jumping, 197.
 white-footed, 370, 372.
Moxostoma lesueurii, 504.
 Murre, Brünnich, 260.
Mus empetra, 159.
 leucopus, 175.
 Mushroom, 171, 343.
 Muskeg, 18.
 Musk-ox, 50, 150-155.
 Muskrat, 191-193.
 Mustela, 51.
 americana, 543.
 americana actiuosa, 234-238.
 borja, 236, 237.
 caurina, 237.
 erminea, 232, 233.
 pennanti, 238-239, 543.
 richardsoni, 232.
Myadestes townsendi, 491.
Myiochanes richardsoni, 394.
Myodes hudsonicus, 183, 549.
 obensis, 181.
Myotis lucifugus, 249-250.
 subulatus, 250.
Myoxus drummondii, 537.
 Myriapods, 350.
 Myrica gale, 114, 523.
 Nahanni Mountains, 32.
Nannus hiemalis, 484.
 hiemalis pacificus, 484.
 Narwhal, 127-128.
 Natshuk, 242.
 Ndu-cho Island, 120.
Neosorex palustris, 247-248.
 palustris navigator, 248.
Neotoma drummondii, 176-177.
Nettion carolinense, 280-281.
 Nighthawk, 389-390.
 Nonne, 360.
 Northern Arm (Great Slave Lake), 27.
 Northwest Company, 55, 92.
 Northwest passage, 68.
Nucifraga columbiana, 407.

- Numenius americanus*, 331.
borealis, 50, 332.
hudsonicus, 50, 331.
 Nutcracker, 407.
 Nuthatch, Canada, 485.
 red-breasted, 485.
 slender-billed, 484.
 white bellied, 484.
Nuttallornis borealis, 52, 393-394.
Nyctala. (See Glaux.)
Nyctea nyctea, 374-376.
Ochotona princeps, 198-199.
Odobæus obesus, 241.
 rosmarus, 241.
Odocoileus hemionus, 128-129.
 virginianus macrourus, 128.
 Ogilvie, W., 75, 77.
Oidemia deglandi, 294-295.
 perspicillata, 295-296.
Obiorchilus. (See Nannus.)
 Old-squaw, 289-291.
Olor buccinator, 310.
 columbianus, 309-310.
Oncocottus hexacornis, 514.
Oncorhynchus nerka, 509-510.
Oporornis philadelphia, 477.
 tolmiei, 477.
Oreamnos montanus, 158-159.
Osmerus dentex, 513.
 Osprey, American, 366-367.
Otocoris alpestris arctica, 399.
 alpestris hoyti, 398-399.
 alpestris leucocoloema, 399.
 Otter, Canadian, 228-229.
 Ouzel, water, 482.
 Oven-bird, 475-476.
Ovibos moschatus, 150-155, 554.
Ovis canadensis, 155-156.
 canadensis dalli, 551.
 canadensis liardensis, 156.
 dalli, 50, 82, 157-158.
 fannini, 157.
 montana, 156, 157, 541.
 stonei, 156-157.
 Owl, American hawk, 376-378.
 Arctic horned, 372-374.
 dusky horned, 374.
 great gray, 51, 368-370.
 hawk, 51.
 long-eared, 367.
 Richardson, 370-371.
 saw-whet, 371.
 short-eared, 367-368.
 snowy, 374-376.
 white, 3 6.
Oxycoecus oxycoecus, 51, 533.
Oxyechus vociferus, 334.
Pagophila alba, 262-263.
Pandion haliaëtus carolinensis, 366-367.
 Panther, 209.
Parnassia palustris, 98.
 Parry, W. E., 58.
 Partridge, spruce, 338.
 white, 22.
Parus. (See *Penthestes*.)
Parus cinctus obtectus, 547.
 hudsonicus, 488.
Passerculus savanna, 428.
 sandwichensis alaudinus, 427-428.
Passerella iliaca, 446-448.
 iliaca schistacea, 448.
Passerina. (See also *Plectrophenax*.)
Passerina amœna, 449.
Pedicularis euphrasioides, 103.
Pediocetes kennicottii, 350.
Pediectes phasianellus, 348-350.
 phasianellus columbianus, 350.
Pedomys (subgenus), 191.
Pelecanus erythrorhynchos, 275.
 Pelican, white, 93, 275.
 Pelican Portage, 87, 110.
 Pelican Rapids, 88.
Pelidna alpina sakhalina, 323.
Penthestes atricapillus septentrionalis, 485-487, 489.
 cinctus alascensis, 487, 547.
 gambeli, 487, 489.
 hudsonicus, 488-489.
Perisoreus canadensis, 400-403.
Peromyscus arcticus, 174-176, 370, 372.
 oreas, 174, 176.
 Petitot, E., 14, 74, 111.
 Petrel, fulmar, 274.
Petrochelidon lunifrons, 372, 451-453.
Petromyzon fluvialis, 503.
 Pewee, western wood, 394.
Phalacrocorax auritus, 274.
Phalarope, northern, 316.
 red, 315-316.
 Wilson, 316.
Phalaropus (See also *Lobipes*, *Steganopus*), 50.
Phalaropus fulcarius, 315-316.
 platyrhynchos, 315.
Phenacomys, 184.
 intermedius, 178.
 mackenzii, 177-178, 555.
 orophilus, 178.
 orophilus, 178.
Phenacomys, Kamloops, 178.
 Mackenzie, 177-178.
Philohela minor, 317.
Phlœotomus pileatus abieticola, 385-386.
Phoca groenlandica, 242.
 hispida, 242.
 vitulina, 241-242.
Phoebe, 392-393.
 Say, 393.
 Physical Geography, 16-49.
Pica pica hudsonia, 400.
Picea canadensis, 86, 93, 102, 338, 438, 517-518.
 mariana, 86, 518.
 Pickerel, 514.
Picoides americanus, 548.
 americanus dorsalis, 382.
 americanus fasciatus, 382-384.
 arcticus, 52, 381-382.
 hirsutus, 383.
Picus pubescens, 381.
 tridactylus, 383.
 villosus, 380.
 Pierre au Calumet, 92, 110.
 Pigeon, passenger, 351.

- Pika, Rocky Mountain, 198-199.
 Pike, 513.
 wall-eyed, 514.
 Pike, Warburton, 76.
 Pike's Portage, 84.
 Pine, Banksian, 51, 86, 102, 199, 338, 516.
 Pinguicula vulgaris, 103.
Pinicola canadensis, 415.
 enucleator alascensis, 414-415.
 enucleator leucura, 51, 414.
 enucleator montana, 414.
 Pintail, 283-284.
 Pinus divaricata, 51, 86, 102, 338, 484, 516.
 Pipilo maculatus arcticus, 448.
 Pipit, American, 481-482.
 Piranga ludoviciana, 449-450.
 Pisobia bairdi, 321-322.
 fuscicollis, 321.
 maculata, 320-321.
 minutilla, 322-323.
 Planesticus migratorius, 495-498.
 Platygobio gracilis, 504-505.
Plectrophanes lapponica, 424.
 pictus, 426.
 Plectrophenax, 50.
 nivalis, 420-423.
 Plover, American golden, 322, 333-334.
 black-bellied, 332-333.
 killdeer, 334.
 ring, 335.
 semipalmated, 335.
 Pocket gopher, Saskatchewan, 195-196.
 Podilymbus podiceps, 254.
 Point Brulé (Alberta), 89.
 Point Brulé (Mackenzie), 96, 110.
 Point Ennuyeux, 96, 110.
 Point La Biche, 88, 110.
 Polygonum, 114.
Poaetes gramineus, 481.
Poaetes gramineus confinis, 427.
 poplar, aspen, 86, 100, 102, 520.
 balsam, 30, 51, 86, 102, 170, 171, 340,
 519-520.
 Poplar Point, 92, 110.
 Populus balsamifera, 30, 41, 51, 86, 170,
 342, 343, 519-520.
 tremuloides, 85, 86, 100, 102, 342, 520.
 Porcupine, Canada, 197.
 yellow-haired, 197-198.
 Porzana. (See also Coturnicops.)
 Porzana carolina, 313-314.
 Potentilla, 98, 114.
 nivea, 93.
 Preble, Alfred E., 15.
Progne purpurea, 451.
 subis, 451.
 Providence Rapids, 100.
 Prunus pennsylvanica, 528-529.
 virginiana, 529.
 Ptarmigan, 23, 354, 361.
 rock, 347-348.
 white-tailed, 348.
 willow, 22, 342-346.
Pteromys alpinus, 174, 537.
 sabrinus alpinus, 173.
 Pullen, 66.
 Pulsatilla, 93.
 Putorius arcticus, 232-233.
 arcticus imperii, 232.
 cicognanii, 230-231.
 cicognanii richardsoni, 230, 231-232.
 longicauda, 233.
 rixosus, 234.
 vison, 543.
 vulgaris, 234.
 Pygosteus pungitius, 513-514.
 Querquedula discors, 281-282.
 Quiscalus quiscula aeneus, 412-413.
 versicolor, 413.
 Rabbit, 369.
 white, 199-205.
 Rae, John, 65.
 Rail, sora, 313-314.
 yellow, 314-315.
Rallus noveboracensis, 62, 315.
 Rampart Rapid, 106.
 Ramparts, 33, 106, 110.
Rana cantabrigensis, 501.
 cantabrigensis latiremis, 501-502.
 pipiens, 501.
 Rangifer arcticus, 137-143.
 caribou, 51, 135-136.
 caribou montanus, 136-137.
 Ranunculus reptans, 114.
 Raspberry, arctic, 526-527.
 red, 220, 527.
 Rats, medicine, 176.
 Raven, northern, 403-405, 406.
 Recurvirostra americana, 317.
 Red-backed mouse, Athabaska, 178-180.
 Dawson, 180-181.
 Redhead, 284.
 Redpoll, 418-419.
 hoary, 417-418.
 Holbøll, 420.
 Redstart, 479-480.
 Redwing, northern, 408-409.
 Regulus calendula, 489-490.
 satrapa, 489.
 Reid, John, 71, 74.
 Reptiles, 500-502.
 Rhododendron lapponicum, 50, 108, 531.
 Rhodostethia rosea, 270.
 Rhynchophanes mccowni, 426-427.
 Ribes, 86, 93, 113.
 hudsonianum, 526.
 oxyacanthoides, 41, 525.
 prostratum, 119, 526.
 rubrum, 119, 526.
 Riparia riparia, 456-457.
Rissa septentrionalis, 269.
 tridactyla, 263.
 Rivers:
 Anderson River, 71.
 Arctic Red River, 33, 108, 110.
 Ark-i-linik River, 47.
 Athabaska River, 17.
 Athabaska River (delta), 24.
 Back River, 63.
 Baptiste River, 17.
 Bear River, 44, 124.
 Beaver River, 110.
 Beghula River, 71.
 Big Mouth Brook, 18, 87, 110.

Rivers—Continued.

Black River, 21.
 Blackwater River, 104, 110.
 Bluefish Creek, 101.
 Buffalo River, 28.
 Calling (Quito) River, 18, 87.
 Camsell River, 83.
 Chipman River, 21.
 Clearwater River, 18, 110.
 Cree River, 21.
 Dease River (British Columbia), 30.
 Dease River (Mackenzie), 44.
 Deep Creek, 86.
 Finlay River, 23.
 Fort Nelson River, 30.
 Frances River, 30.
 Grand Cache River, 80.
 Grandin River, 28, 112.
 Gravel River, 33, 104, 110.
 Hanbury River, 83.
 Hareskin River, 33, 108.
 Hay River, 28.
 Hoarfrost River, 27.
 Hood River, 57.
 Horn River, 100, 110.
 House River, 18, 88, 110.
 Iroquois River, 71.
 Kazan River, 78.
 La Biche River, 18, 87, 110.
 La Martre. (See Marten River.)
 Lesser Slave River, 17.
 Liard River, 30–31.
 Little Buffalo River (Alberta), 89, 110.
 Little Buffalo River (Mackenzie), 28.
 Little Smoky River, 80.
 Lockhart River, 27, 71.
 Loon River (Mackenzie) 108, 110.
 Mackenzie River, 32.
 Mackenzie River (delta), 34, 110.
 MacFarlane River, 47.
 Marten River, 28, 112.
 Martin River, 102, 110.
 McLeod River, 17.
 Nahanni River, 32, 102, 110.
 Onion River, 72.
 Parsnip River, 23.
 Peace River, 23, 110.
 Peace River (delta), 24.
 Peel River, 34, 109.
 Pelican River, 18, 88.
 Pembina River, 18.
 Quatre Fourches River, 24, 94.
 Quito (Calling) River, 18, 87, 110.
 Rabbitskin River, 100, 110.
 Red River, 91.
 Red River, Arctic, 33.
 Red Rock River, 33, 104, 110.
 Rocher River, 24, 94.
 Root River, 103, 110.
 Salt River (Mackenzie), 110.
 Salt River (Slave region), 25, 95, 110.
 Sandy Creek, 86.
 Siccanle Chief River, 77.
 Simonette River, 80.
 Slave River, 24, 110.
 Slave River (delta), 25.
 Smoky River, 24.

Rivers—Continued.

Spence River, 100.
 Steep Bank River, 91, 110.
 Stony Creek, 86.
 Sturgeon River, 85.
 Thelon River, 47.
 Towattinow River, 86.
 Trading River, 110.
 Trout River, 100.
 Unjigah River, 56.
 Vermilion Creek, 86.
 Willow River, 100, 110.
 Willow Lake River, 103, 110.
 Wilmot Horton River, 47.
 Yellowknife River, 28, 98.
 Roach, 505.
 Robin, 23, 387, 459, 495–498.
 Roche Carcajou, 106.
 Roche Trempe-l'eau, 103, 110.
 Rock by the Riverside, 103.
 Rodent Valley, 81.
 Rosa, 86, 168.
 acicularis, 118, 528.
 Rose, wild, 86, 528.
 Rose-hips, 341.
 Rosemary, wild, 342, 532.
 Ross, B. R., 71, 74.
 Ross, James Clark, 63.
 Ross, John, 62.
 Rubus, 86.
 arcticus, 526–527.
 chamaemorus, 526.
 strigosus, 113, 118, 220, 527.
 Russell, Frank, 78.
 Sagebrush, pasture, 534.
 Saint Albert, 79.
 Salix, 341, 342.
 alaxensis, 102, 121, 521–522.
 anglorum, 522.
 arbusculoides, 522.
 hebbiana, 343, 522.
 chlorophylla, 522.
 fluviatilis, 521.
 glaucoops, 522.
 lutea, 521.
 myrtillifolia, 102, 337, 521.
 myrtilloides, 521.
 niphoelada, 523.
 nuttallii, 521.
 padophylla, 520–521.
 pseudo-myrsinites, 521.
 reticulata, 121, 125, 342, 343, 523.
 seemannii, 522.
 Salmo mykiss, 511.
 Salmon, sockeye, 509–510.
 Salpinctes obsoletus, 483.
 Salt Plains, 95.
 Salvelinus malma, 511.
 Sanderling, 324–325.
 Sandpiper, least, 322–323.
 Baird, 321–322.
 Bartramian, 328–329.
 buff-breasted, 329.
 pectoral, 320–321.
 purple, 320.
 red-backed, 323.
 sanderling, 324–325.

- Sandpiper, semipalmated, **323-324**.
 spotted, **329-331**.
 stilt, **319-320**.
 western solitary, **327-328**.
 white-rumped, **321**.
- Sans Sault Rapid, **33, 106, 110**.
- Sapsucker, yellow-bellied, **384-385**.
- Saskatchewan Province, **125**.
- Saxicola oenanthe leucorhoa, **499**.
- Saxifraga, **98**.
- Sayornis phœbe, **392-393**.
 saya, **393**.
- Scented Grass Hills, **43**.
- Schwatka, Frederick, **75**.
- Sciuropterus, **51**.
hudsonius, **172**.
sabrinus, **172**.
sabrinus alpinus, **172, 173-174**.
- Sciurus, **51**.
hudsonicus, **169-172, 372**.
quadrivittatus, **168**.
- Scolecophagus*. (See Euphagus.)
- Scops asio*, **367**.
- Scoter, surf, **295-296**.
 white-winged, **294-295**.
- Scotiaptex nebulosum, **51, 368-370**.
- Seal, **224**.
 bearded, **242**.
 Greenland, **242**.
 harbor, **241-242**.
 harp, **242**.
 ocean, **242**.
 rough, **242**.
- Seasonal events:
 Fort Anderson, **49**.
 Fort Chipewyan, **23**.
 Fort Franklin, **45**.
 Fort Liard, **31**.
 Fort McMurray, **21**.
 Fort Nelson, **31**.
 Fort Norman, **36**.
 Fort Rae, **29**.
 Fort Simpson, **36, 37-41**.
 Fort St. John, **26**.
 Lac du Brochet, **22**.
 Mackenzie River, **37, 41-42**.
- Seiurus aurocapillus, **475-476**.
novaboracensis, **477**.
novaboracensis notabilis, **476-477**.
- Selasphorus rufus, **391**.
- Selwyn, A. R. C., **74**.
- Serviceberry, **86, 93, 528**.
- Seton, E. T., **85**.
- Setophaga ruticilla, **479-480**.
- Sheep, black, **158**.
 mountain, **155-156**.
 northern mountain, **157-158**.
 saddle-backed, **157**.
 Stone mountain, **156-157**.
- Shees, **508**.
- Shiner, northern, **504**.
- Shoveler, **282-283**.
- Shrew, **369, 372, 373**.
 common eastern, **242-244**.
 marsh, **247-248**.
 Richardson, **245-246**.
- Shrew, Rocky Mountain, **244-245**.
 Rocky Mountain marsh, **248**.
 tundra, **246-247**.
- Shrike, northern, **459-460**.
 white-rumped, **460**.
- Shrubs, **515-534**.
- Sialia arctica*, **500**.
currucoides, **499-500**.
- Sibbiston, James, **71, 74**.
- Siffleux, **164**.
- Silverberry, **530**.
- Simpson, Thomas, **64**.
- Siskin, pine, **420**.
- Sitta canadensis, **485**.
carolinensis aculeata, **484**.
- Skunk, northern plains, **227-228**.
- Smelt, **513**.
- Smith Bay, **43**.
- Smith Landing, **94, 110**.
- Smith Portage, **95**.
- Smith Rapids, **24, 94**.
- Snake, northern garter, **500-501**.
- Snipe, Wilson, **317-319**.
- Snowberry, **534**.
- Snowbird, **420**.
- Snow-bunting, **23, 421, 422, 423, 424**.
- Snowflake, **420-423**.
- Solitaire, Townsend, **491**.
- Somateria mollissima, **293**.
mollissima borealis, **292**.
spectabilis, **293-294**.
v-nigra, **292-293**.
- Sora, **313**.
- Sorex forsteri*, **244, 537**.
obscurus, **244-245**.
personatus, **242-244, 248, 372**.
richardsoni, **245-246, 247**.
sphagnicola, **246**.
tundrensis, **246-247**.
- South Edmonton, **79**.
- Sparrow, Brewer, **440**.
 clay-colored, **439**.
 fox, **441, 446-448**.
 golden-crowned, **433**.
 Harris, **430-431**.
 hooded, **430**.
 intermediate, **431-433**.
 Leconte, **429**.
 Lincoln, **444-445**.
 Nelson, **429**.
 slate-colored, **448**.
 song, **443-444**.
 swamp, **445-446**.
 tree, **51, 435-436**.
 western chipping, **437-439**.
 western lark, **430**.
 western savanna, **427-428**.
 western tree, **436-437**.
 western vesper, **427**.
 white-crowned, **431**.
 white-throated, **433-435**.
- Spatula clypeata, **282-283**.
- Spermophile, **224**.
 Franklin, **165-166**.
 Hudson Bay, **161-162**.
 Mackenzie, **162-164**.

- Spermophile, northern mantled, **166-167**.
 thirteen-lined, **166**.
- Spermophilus barrowensis*, 162, 163.
lateralis, 166.
hoodii, 166.
- Sphyrapicus varius, **384-385**.
- Spinus pinus, **420**.
- Spizella breweri, **440**.
monticola, 437.
 monticola, 51, **435-436**.
 monticola ochracea, **436-437**.
 pallida, **439**.
 passerina arizonæ, 52, **437-439**.
socialis, 438.
- Spoonbill, **282-283**.
- Spreadborough, W., 81.
- Spruce, 438.
 black, 86, **518**.
 white, 86, 93, 102, 170, 417, **517-518**.
- Squatarola, 50.
 squatarola, **332-333**.
- Squirrel, Hudson Bay flying, **172**.
 Hudson Bay red, **169-172**, 372.
 mountain flying, **173-174**.
- Steganopus tricolor, **316**.
- Stenodus mackenzii, 503, **508-509**.
- Stercorarius longicaudus, **262**.
 parasiticus, **261-262**.
 pomarinus, **260**.
- Sterna caspia, **271-272**.
cayana, 271.
 hirundo, **272**.
 paradisæa, **272-273**.
- Stewart, James G., 69.
- Stickleback, nine-spined, **513-514**.
- Stizostedion vitreum, **514**.
- Stone, A. J., 82.
- Stone Island, 98.
- Stony Rapid, 90, 110.
- Strathcona, 79.
- Streptilas collaris*, 336.
interpres, 336.
- Strix tengmalmi*, 371.
- Sturnella neglecta, **410**.
- Sucker, gray, **504**.
 northern, **503**.
- Sulphur Prairie, 80.
- Surnia ulula caparoch, 51, **376-378**.
- Swallow, bank, 451, **456-457**.
 barn, **453-454**.
 cliff, **451-453**.
 tree, **455-456**.
 western violet-green, **456**.
- Swan, trumpeter, **310**.
 whistling, **309-310**.
- Swift, chimney, **390**.
 purple, 451.
 white-throated, **390**.
- Swift Current Rapid, 87, 110.
- Sylvania*. (See *Wilsonia*.)
- Sylvia ananthe*, 499.
- Sylvicola petechia*, 475.
- Symphemia*. (See *Catoptrophorus*.)
- Symphoricarpos, 86.
 occidentalis, **534**.
 racemosus, **534**.
- Synaptomys, 211.
 borealis, **183-185**.
 borealis dalli, **185-186**.
 bullatus, 183, 185, 555.
- Tachycineta. (See also *Iridoprocne*.)
- Tachycineta thalassina lepida, **456**.
- Tamarack, 88, 102, 122, **516-517**.
- Tamias* (subgenus), 168.
Tamias asiaticus, 167.
asiaticus borealis, 167.
quadrivittatus, 168.
- Tanager, Louisiana, 362, **449-450**.
- Taxidea taxus, **229**.
- Taylor, Elizabeth, 77.
- Taylor, Nicholas, 71.
- Tea, Labrador, 114, **530-531**.
- Teal, blue-winged, **281-282**.
 green-winged, **280-281**, 286.
- Telmatodytes palustris iliacus, **484**.
- Temperature tables, 19.
 Athabaska Landing, 20.
 Barren Grounds, 49.
 Edmonton, 20.
 Fort Chipewyan, 23.
 Fort Dunvegan, 26.
 Fort Franklin, 44.
 Fort Good Hope, 35.
 Fort McPherson, 35.
 Fort Simpson, 34, 40.
 Hay River, 28.
 Herschel Island, 35.
 Stuart Lake, 25.
 various stations, 53.
- Tern, Arctic, **272-273**.
 black, **274**.
 Caspian, **271-272**.
 common, **272**.
- Tête Jaune Cache, 81.
- Tetrao franklini*, 537.
richardsoni, 337, 537.
saliceti, 345.
sayi, 337.
umbelloides, 537.
- Thalarectos maritimus, **225-227**.
- Thamnophis sirtalis parietalis, **500-501**.
- Thomomys talpoides, **195-196**.
- Thrush, Alaska hermit, **494**.
 eastern hermit, **494-495**.
 gray-cheeked, **491-492**.
 northern varied, **498-499**.
 olive-backed, **492-494**.
 willow, **491**.
- Thymallus signifer, **511-513**.
- Toad, western, **501**.
- Tomtit, 440.
- Totanus. (See also *Helodromas*.)
- Totanus flavipes, **326-327**.
 melanoleucus, **325-326**.
- Towhee, Arctic, **448**.
- Tree limit, 46-48.
- Trees, **515-534**.
- Tringa (see also *Arquatella*, *Pelidna*, *Pisobla*), 50.
- Tringa canutus, **320**.
 variabilis, 323.

- Trochilus colubris*, 390.
Troglodytes. (See also *Nannus*, *Telmato-*
dytes.)
Troglodytes aedon, 483.
aedon parkmani, 483.
palustris, 484.
Tropidinosus sirtalis, 501.
Trout, Lake, 510-511.
speckled, 511.
Trout Mountain, 32.
Tryngites, 50.
subruficollis, 329.
Tullibee, 507.
Turnagain Point, 57.
Turnstone, ruddy, 335-336.
Two Islands, 110.
Tyrannula pusilla, 396.
Tyrannus tyrannus, 391-392.
Tyrrell, J. B., 77, 78.
Tyrrell, J. W., 84.
Ugyuk, 242.
Uria brunnichii, 260.
grylle, 260.
lomvia, 260.
Ursus americanus, 220-222, 543.
arctos, 224, 543.
horribilis, 223-224, 543.
maritimus, 543.
richardsoni, 224-225.
Vaccinium, 86, 222, 224.
canadense, 220, 533.
uliginosum, 45, 51, 105, 118, 221, 338,
343, 533.
Vermivora celata orestera, 465.
Vespertilio subulatus, 250.
Vetch, 342, 343.
Viburnum, few-flowered, 220, 534.
Viburnum pauciflorum, 41, 86, 118, 220,
349, 534.
opulus, 86, 220, 533.
Viola albertina, 41.
Violets, 41.
Vireo. (See *Vireosylva*, *Lanivireo*.)
Vireo, blue-headed, 463.
Philadelphia, 461-462.
red-eyed, 460-461.
solitary, 463.
western warbling, 462-463.
Vireosylva gilva swainsoni, 462-463.
olivacea, 460-461.
philadelphica, 461-462.
Vitisidæa, 41, 343.
vitisidæa, 51, 220, 221, 337, 338, 532-
533.
Vole, 373, 374.
chestnut-cheeked, 188-190.
Dall lemming, 185-186.
Drummond, 186-188.
least upland, 191.
long-tailed mountain, 190.
MacFarlane, 190.
meadow, 370, 372.
northern lemming, 183-185.
red-backed, 51, 365, 370.
Richardson, 190-191,
Voyages (names of vessels):
Assistance, 67.
Enterprise, 68.
Erebus, 64.
Fox, 67.
Fury, 58.
Gjøa, 68.
Griper, 58.
Hecla, 58.
Intrepid, 69.
Investigator, 68.
Lady Franklin, 66.
North Star, 69.
Pioneer, 69.
Plover, 66.
Prince Albert, 66.
Resolute, 69.
Sophia, 66.
Terror, 64.
Victory, 62.
Vulpes alascensis, 215-216.
alascensis abietorum, 217.
fulvus, 543.
lagopus, 543.
lagopus innuitus, 217-220.
Vulture, northern turkey, 351.
Walrus, Pacific, 241.
Atlantic, 241.
Wapiti, Canadian, 129-130.
Warbler, Audubon, 471.
bay-breasted, 472-473.
black and white, 463-464.
black-poll, 473-474.
black-throated green, 474.
Canadian, 479.
Cape May, 468.
magnolia, 472.
mourning, 477.
myrtle, 470-471.
Nashville, 464.
orange-crowned, 464-465.
palm, 474-475.
Tennessee, 465-468.
Tolmie, 477.
Townsend, 474.
Wilson, 478-479.
yellow, 468-470.
yellowrump, 471.
Water-thrush, 476-477.
Wavey, gray, 302, 303.
horned, 302.
scabby-nosed, 301.
white, 297.
Waxwing, Bohemian, 61, 457-458.
cedar, 458-459.
Weasel, Bonaparte, 230-231.
least, 234.
long-tailed, 233.
Richardson, 231-232.
tundra, 232-233.
Wenusk, 159.
Whale, black, 126.
Greenland, 126-127.
white, 128.
Wheatear, Greenland, 499.

- Whisky jack, 63.
 Whitefish, 505-507.
 broken nose, 507.
 herring, 507-508.
 White-footed mouse, Arctic, 174-176.
 Whitney, Caspar, 79.
 Willet, western, 328.
 Willow, 342, 343, 520-523.
Wilsonia canadensis, 479.
 pusilla, 478-479.
 pusilla pileolata, 479.
 Wolf, Barren Ground, 213-214.
 black, 212.
 gray, 211-213.
 prairie, 214.
 timber, 211.
 Wolfberry, 534.
 Wolverine, Hudson Bay, 239-241.
 Wolverine Rock, 33, 106, 110.
 Woodchuck, Canadian, 159-160.
 Woodcock, 317.
 Woodpecker, Arctic three-toed, 381-382.
 banded-backed, three-toed, 382-384.
 Nelson downy, 380-381.
 northern hairy, 379-380.
 northern pileated, 385-386.
 yellow-bellied, 384, 385.
 Wood-rat, Drummond, 176-177.
 Wren, prairie marsh, 484.
 rock, 483.
 western house, 483.
 winter, 484.
Xanthocephalus xanthocephalus, 408.
Xema sabini, 271.
 XY Company, 92.
 Yellowberry, 526.
 Yellow-legs, greater, 325-326.
 lesser, 326-327.
 Yellow-throat, western, 478.
Zamelodia ludoviciana, 448-449.
Zapus hudsonius, 196.
 princeps, 197.
 princeps minor, 197.
 Zone, Arctic, 50, 53.
 Arctic-Alpine, 50-51.
 Canadian, 52, 53.
 Hudsonian, 51-52, 53.
 Zones, Life, 49-53.
Zonotrichia albicollis, 52, 433-435.
 coronata, 433.
 gambeli, 433.
 leucophrys, 431.
 leucophrys gambeli, 431-433.
 leucophrys intermedia, 433.
 querula, 430-431.

