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BIRDS AND MAMMALS OF THE STIKINE
RIVER REGION OF NORTHERN BRITISH
COLUMBIA AND SOUTHEASTERN ALASKA

BY
H. S. SWARTH

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Young of the Bohemian waxwing (*Bombycilla garrula pallidiceps*) just out of the nest. Figured from specimens collected near Telegraph Creek, July 5, 1919. Upper, female; lower, male. The young bird possesses the same wing and tail markings as does the adult, with the yellow areas more vivid; the inside of the mouth is brilliantly colored.

BIRDS AND MAMMALS OF THE STIKINE
RIVER REGION OF NORTHERN BRITISH
COLUMBIA AND SOUTHEASTERN ALASKA

BY

H. S. SWARTH

(Contribution from the Museum of Vertebrate Zoology of the University of California)

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H. S. SWARTH

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INTRODUCTION

In years past the Museum of Vertebrate Zoology has conducted several expeditions to the coast of southeastern Alaska, covering in all a large part of that district, and one to Vancouver Island, British Columbia, nearby and of somewhat similar character.¹ As one result of this field work the Museum has obtained a representative collection of the birds and mammals of this strongly characterized northwestern coast region of North America. Of the closely adjacent interior of British Columbia, however, the Museum contained no specimens whatever.

In a general way it has been understood that the faunas of the coast and of the interior are markedly different, that the boundary between the two is sharply defined, and that this boundary lies very near to the coast. It is obvious that collections could be made over a relatively limited area and still include a strip of country extending from the one region to the other. Such an expedition would supply series of specimens of species new to the Museum collections or but scantily represented therein, and would also provide valuable data regarding distribution, especially with respect to the behavior of animal forms at the margins of their habitats.

The valley of the Stikine River seemed to satisfy all requirements. It crosses the boundary between the two faunal areas, and, piercing the formidable barrier of mountains that intervenes, affords a feasible route from one region to the other. Furthermore, we already had extensive series of birds and mammals from the country about the mouth of the river, to supplement whatever collections might be made farther up stream. Dr. J. A. Allen (1903) had published a report upon a collection of mammals from the upper Stikine region, made by A. J. Stone and M. P. Anderson, but this collection had been gathered to the eastward of the debatable strip that we especially desired to explore.

The expedition thus outlined was made possible through the generous provision by Miss Annie M. Alexander, founder of the Museum of Vertebrate Zoology, of a sufficient sum to defray the cost, this in

¹ Previous field work on the northwest coast has been prosecuted as follows: in 1906 on the Kenai Peninsula; in 1907 in the Sitkan district; in 1908 in the Prince William Sound region; in 1909 in the Sitkan district; and in 1910 on Vancouver Island.

addition to her regular yearly appropriation for the maintenance of the Museum. Miss Alexander had long been especially interested in the natural history of Alaska and British Columbia and had herself personally participated in previous field work carried on in those regions by this Museum.

Our party consisted of two, the writer and Mr. Joseph Dixon, Economic Mammalogist of the Museum. Mr. Dixon collected most of the mammals and took entire charge of the photographic work, making this an important feature of the trip. He also supplied most of the notes regarding the nesting activities of various species of birds. The writer collected most of the birds, and worked with the mammals enough to enable him to better understand local conditions. The material collected consists of 534 mammals, 638 birds, 24 sets of birds' eggs (mostly with nests), 70 amphibians, 195 photographic negatives. The present report is concerned with the mammals and birds; the amphibians are not included.

In treating the birds I have followed the nomenclature of the American Ornithologists' Union *Check-List* (1910) and its supplements (1912, 1920), with some modifications. I have made no attempt to be "up to date" in the adoption of the scores of changes proposed of recent years, not yet acted upon by the Committee and regarding which I have no new facts to offer or upon which I cannot form an independent opinion. There are certain cases, however, dealing mostly with matters of ornithology rather than nomenclature, where the presentation of new facts or a new point of view, or the conviction of the correctness of the course of some previous writer, at variance with the *Check-List*, impels me to the use of names not included in that standard. This, it seems to me, is proper. These changes are thus formally presented for consideration, but their general adoption by others prior to action of the Committee is not expected, any more than I, myself, expect at once to adopt other changes regarding which I can have no personal knowledge. I have endeavored in every case at variance with the *Check-List* to indicate my reason for adopting the name in question. With mammals there is no such standard, and the opinion of the latest monographer of a group is usually accepted.

My sincere acknowledgments are due to a number of institutions and individuals for aid of one sort or another. For the prosecution of the field work I was generously granted by the following authorities permission to collect specimens of birds and mammals: the United States Biological Survey and the Dominion Parks Branch, Department

of the Interior, Canada, for the taking of migratory birds; the United States Department of Agriculture, for game mammals in Alaska; the United States Department of Commerce, for fur-bearing mammals in Alaska; Mr. F. Kermode, Director of the Provincial Museum, Victoria British Columbia, for game and non-game birds and mammals in British Columbia.

I am under obligations to the Bureau of Biological Survey of the United States Department of Agriculture, through its chief, Dr. E. W. Nelson, for the loan of specimens, for the identification of certain species, and for the determination of the contents of bird stomachs. In this connection particular mention should be made of the identification of the shrews of the genera *Sorex* and *Microsorex* by Dr. Hartley H. T. Jackson, who examined all my material except four specimens in alcohol; and of the examination of a considerable number of birds' stomachs by Mr. Charles C. Sperry.

From the Victoria Memorial Museum, Ottawa, through Mr. P. A. Taverner, and from the Provincial Museum, Victoria, British Columbia, through the director, Mr. F. Kermode, I received the loan of specimens of various species of birds.

The plant names used in this report were supplied by Dr. F. J. Smiley, of the University of California Herbarium, based upon specimens collected on this expedition that have been deposited in the Herbarium.

Advice and information was received from Mr. Ernest P. Walker, an employee of the United States Bureau of Fisheries who was stationed at Wrangell, Alaska, at the time we were pursuing our field work in that region. Mr. Walker supplied data on certain species from the vicinity of Wrangell, and he has presented to the Museum of Vertebrate Zoology specimens of birds and mammals from the same region that are desirable additions to the Museum collection.

I take pleasure in expressing my gratitude to Mr. W. H. Dodd, government agent at Telegraph Creek, for assistance and advice during our stay in the region over which he has jurisdiction.

ITINERARY AND DESCRIPTIONS OF LOCALITIES

From Berkeley we proceeded directly to Telegraph Creek, the head of navigation on the Stikine River. There we made arrangements with the Barrington Transportation Company whereby their river boat, running on fairly regular schedule, deposited us at various selected camp sites. Our collecting stations were carefully chosen, both with regard to their location on the river, and to the accessibility of stretches of surrounding territory. The last item is of importance in a wilderness as generally impenetrable as are the forests of the lower Stikine.

Our itinerary, in detail, was as follows: left Berkeley, May 14; left Wrangell, Alaska, May 21; arrived Telegraph Creek, B. C., May 23; The Junction, May 25 to June 6; Telegraph Creek, June 6 to 26; Glenora, June 27 to July 8; Doch-da-on Creek, July 8 to 26; Flood Glacier, July 26 to August 8; Great Glacier, August 8 to 16; Sergief Island, August 17 to September 7; Mitkof Island, August 26 to 29; arrived Berkeley, September 15.

TELEGRAPH CREEK

The town of Telegraph Creek is on the north bank of the Stikine River, about 130 miles from, and 540 feet above, tidewater (Brooks, 1906, p. 49). It is about 160 miles from the general line of the coast at the mouth of the river, following the course of the stream; less than half that distance in an air line from the nearest point on the coast. Telegraph Creek, the stream, flowing from the north, empties into the river at this point. Near the town the river banks rise steeply on either side to a series of terraces beyond. At many points these enclosing walls are sheer cliffs of basaltic rock, several hundred feet high, with long steep taluses extending below, sometimes to the river's edge. Telegraph Creek, for the last mile or two of its course, flows along a narrow cañon, the steep walls rising abruptly to the level terraces above. In its upper reaches it follows a cañon the walls of which are not particularly steep. The stream has its source in a string of lakes at "the Summit," some twelve miles north of the point where it empties into the Stikine, at an altitude of about 2600 feet. The mountains rise to a much greater height on either side. About two miles northwest of the town of Telegraph Creek is Sawmill Lake, about a mile long. Four or five miles farther west lies the much larger Alkali Lake.

In the Telegraph Creek region the principal feature of the vegetation is the poplar woods. Poplars grow everywhere in the lowlands, sometimes in almost pure stands with but a sprinkling of other trees, and for miles in extent. In swampy places willow thickets form dense growths that are hard to penetrate. On some of the drier ridges these willows form open woods that are quite easy to traverse, composed of rather large trees, widely spaced and with little brush below. At some points there are stretches of dry, gravelly benches, with a sparse growth of small lodgepole pines (*Pinus contorta*) and here and there a few cottonwoods, birches, and poplars, with very little undergrowth and all together very park-like in appearance.

Fig. B. Looking down the Stikine River from a point about a mile below Telegraph Creek, just above the junction of the First South Fork. The Stikine today follows the same general course to the sea as it did before the present coastal ranges were elevated; the river valley was cut deeper and deeper during the slow uplift of the mountain barrier. In the Telegraph Creek region, here shown, the valley consists of a series of sharply defined terraces, rising step by step from the river to the bases of the mountains on either side. These terraces presumably indicate the level of the river at different periods of its history. Photograph taken June 24, 1919.

The valley on the north side of the river, extending west and south at least as far as Glenora, is relatively level with a few low hills and ridges here and there, stretching from the abrupt banks that border the river up to the higher mountains some miles to the northward. This rolling country is nearly all covered with forest of poplar, willow, cottonwood, and birch, and a few scattered pines. In places the woods are quite dense, sometimes fairly open; some of the hills and ridges are

quite destitute of trees. There are occasional small lakes, and here and there marshes and small streams.

On the drier slopes and ridges two species of juniper occur, *Juniperus communis* var. *sibirica* and *Juniperus horizontalis*, both to be seen in abundance from the river bank up to the Summit. Both species grow as rather low, rounded bushes. On the higher mountain slopes are groves of spruce and balsam fir, extending downward in cool, shaded cañons, as along Telegraph Creek, or occurring sometimes as

Fig. C. East end of Sawmill Lake, near Telegraph Creek. Mammals that especially frequent the grass and bushes about the shores of the lake are shrews (*Sorex personatus personatus* and *S. obscurus obscurus*), Drummond meadow mouse, and Stikine jumping mouse. Birds that nest amid the same surroundings are the spotted sandpiper, alder flycatcher, rusty blackbird, rusty song sparrow, and Forbush sparrow. The lesser yellowlegs was seen feeding about the shores of the lake, but apparently was not nesting there. Grebes, loons, and ducks were seen daily upon the lake during June and probably were nesting. Photograph taken June 20, 1919.

small, isolated clumps on some north-facing slope well down in the poplar forest.

Of low-growing shrubbery, a conspicuous plant of the drier slopes is *Shepherdia canadensis* (locally known as soapberry), which forms dense thickets of considerable extent. The berries are an important bird food. The wild cherry (*Prunus demissa*) was another noticeable plant, forming dense thickets along the banks of the stream near the town, the bushes from three to six feet high and, by the middle of June, a mass of white flowers. The service berry (*Amelanchier florida*) grows abundantly, forming bushes from four to ten feet high,

and also blooms before the middle of June. Wherever land had been cleared and allowed to go back to a wild state, there were dense growths of lupine.

THE JUNCTION

Years ago a road led from Glenora, skirting the base of the hills and joining the trail from Telegraph Creek at the Junction, four miles from the Stikine, up Telegraph Creek. The old road has long been in disuse, and most of it is now a poorly defined trail, used by moose

Fig. D. Type of country seen in the lowlands of the Telegraph Creek region. The terraces extending from the Stikine River northward to the mountains are covered mostly with poplar woods. Here and there clumps of spruce occur, with occasional groves of lodgepole pine. At the time this photograph was taken, May 26, 1919, and at the point shown, near the base of the hills, the poplars had not yet leaved out, though four miles to the westward, near the river, the trees were green with foliage. Telegraph Creek, the stream, flows along the bottom of the narrow cañon in the foreground.

This is the habitat of moose, bear, and red squirrel, among mammals, of Hammond flycatcher, Cassiar junco, robin, hermit thrush, and long-tailed chickadee, among birds.

and other wild animals, but seldom by man. At the Junction there is a small meadow by the side of the stream, and there we camped. Just above this point the hills begin to rise rather abruptly.

The Junction was our first collecting station. In some respects we would have done better to have stayed near the river, for though the distance was short and the altitude at the Junction but little higher, there was an appreciable difference in temperature between the two places, which was reflected in the plant life and in the birds. While

the air was warm on the Stikine, and most of the trees and bushes well leaved out, at the Junction the temperature was below freezing each night, and the deciduous trees and shrubbery were all bare or just beginning to show bursting leaf buds. Still higher, at the Summit, the lakes were almost entirely ice covered, and there were deep snow-drifts on all sides. The snow was melting in the daytime, however, and the meadows as a result were nearly all flooded.

Fig. E. Looking up the river from Glenora, fifteen miles below Telegraph Creek. Here there are extensive tracts of open meadow land, much of it covered with grass and wild strawberries, parts of it densely grown up with lupine and fireweed. Bordering river and meadows are rows of tall cottonwoods rising above thickets of alder and willow. Poplar is the predominant tree of the drier ground. The mountains immediately to the eastward are low and rounded, in striking contrast to the high, jagged peaks of the coast range, which rise but a short distance west of this point. Photograph taken July 6, 1919.

GLENORA

Fifteen miles down stream from Telegraph Creek, on the west side of the river, lies Glenora, a deserted village. Years ago this was the metropolis of the region, but circumstances caused the entire population to move to Telegraph Creek. The houses were mostly of logs, material that could not be moved, and they stand there today, slowly succumbing to decay, a refuge for white-footed mice and bushy-tailed wood rats.

Glenora occupies a strip of flat ground several hundred yards in width, extending for perhaps a mile along the river, the stream in front, steep banks behind, two or three hundred feet high, rising to a

series of terraces above. This low-lying strip is but slightly above the normal high water mark of the river.

There are extensive tracts of open meadow land, some of it grass covered, other parts densely grown with lupine and fireweed (*Epilobium angustifolium*). The fireweed in particular grows densely and to a great height everywhere about the houses. There are places acres in extent covered solidly with wild strawberry plants. Bordering the meadows and along the river banks are rows of tall cottonwoods

Fig. F. The Stikine River just above Grand Rapids, about fifty miles below Telegraph Creek and about 110 miles from the mouth of the river. Here the Stikine begins its passage through the Coast Range, the mountains rising steeply and to great heights on either side. Coastal conditions begin to be apparent, more in the character and density of the vegetation than in the animal life. On the west bank of the river, shown in the photograph, coniferous woods extend down to the water's edge. On the east side poplar and birch prevail, trees that do not extend much farther down stream. Photograph taken July 20, 1919.

(*Populus trichocarpa*), in the wet places are thickets of alder, and elsewhere mixed woods, just as about Telegraph Creek.

Glenora Mountain lies north of the town, rising abruptly from the terraces bordering the river. It is a long ridge, rather than a peak, much of the summit ascending well above timber line.

DOCH-DA-ON CREEK

Some thirty miles south of Glenora is Doch-da-on Creek, flowing into the Stikine from the southeast, just above Grand Rapids. Here is the ranch of Mr. and Mrs. Frank Jackson, where we made our camp.

Doch-da-on Creek emerges abruptly from steep rocky walls at the base of a mountain, then, before reaching the river, flows for about a

mile along a broad, gravelly, rock-strewn wash. Half a mile to the northward, a branch of the Stikine nearly as wide as the main stream enters from the east. This branch is the outlet of a slough that begins some miles farther north and passes behind a series of islands. The Jackson ranch thus occupies a peninsula between the creek and the slough, a low-lying flood plain resulting from the deposits of the creek.

Fig. G

Fig. H

Fig. G. Poplar woods along shore of Sawmill Lake, near Telegraph Creek. Poplars grow quite densely and sometimes in nearly pure stands, though there is often an admixture of willow. Bird species that particularly frequent this type of woods are the ruffed grouse, northern flicker, western warbling vireo, yellow warbler, Tolmie warbler, American redstart, and olive-backed thrush. Photograph taken June 19, 1919.

Fig. H. The spruce woods of the middle altitudes on the mountain sides are made up of large sized trees and occupy a well defined area above an altitude of about 1500 feet. In the woods here shown we saw the goshawk, western winter wren, short-tailed chickadee, ruby-crowned kinglet, Alaska hermit thrush, and northern varied thrush. At the upper edge of the timber the Fleming grouse was seen. Photograph taken on mountain above Doch-da-on Creek, July 23, 1919.

On the east side of the river the mountains lie back a mile or more from the stream, rising by alternate stretches of rather gentle slopes and much steeper pitches, to ridges far above timber line, probably 4000 feet altitude and higher. On the west side of the Stikine, just

opposite, rocky walls rise abruptly from the water's edge; exposed granite cliffs and steep, forested slopes reach to a height of perhaps 1500 feet, then a stretch of gentler slopes ascends to the base of the higher mountains beyond.

Vegetation here is of the interior, but the underbrush is much denser than we found it farther up the river. Alder thickets cover large areas of the bottom lands and poplar groves the lower slopes of the hills. Fir (*Abies amabilis*) grows in abundance down to the level of the river, forming groves of considerable extent, mixed with

Fig. I. Stikine Valley from Flood Glacier; view toward the river from the front of the glacier. The opening in the foreground, the present terminal moraine, owes its snowy appearance to the white, glacier-polished rocks with which the ground is strewn; there was no snow at that level. The ridge in the middle distance is on the far (east) side of the Stikine. On the upper slopes of the distant mountains there is a series of hanging glaciers, with running streams descending from each one. Photograph taken August 1, 1919.

some spruce. There are also cottonwood, willow, and birch, all growing to large size, and, of smaller trees, mountain ash (*Sorbus sitchensis*) and maple (*Acer douglasii*).

On the mountainside above we found a well defined belt of spruce timber of large size, above that a belt of scrubby and prostrate balsam (*Abies lasiocarpa*), and still higher an area that is destitute of any trees or bushes, given over to heather, moss, and grasses.

FLOOD GLACIER

Flood Glacier is on the west side of the Stikine, approximately fifteen miles below the Little Cañon, and about seventy miles from the coast. Its terminal moraine is about two miles back from the river. Our camp here was below the southern end of the glacier, on a knoll by the river frequently used as a camp site and locally known as "the barley cache." We found ourselves here amid conditions very similar to those on the seacoast, in a dense forest of spruce and hemlock, with thickets of alder and devil's-club in the wet places and of

Fig. J

Fig. K

Fig. J. Clearing through the forest below Flood Glacier. The woods here are so dense as to be all but impassable. Immediately below the glacier, however, there are several straight, open lanes, extending down nearly to the river's edge, apparently ploughed through the woods by descending masses of ice or rocks. These lanes are used as avenues of travel by moose and bear, as indicated by the tracks. We also found far more small birds in such openings than in the surrounding woods. Photograph taken August 1, 1919.

Fig. K. Mountain opposite Great Glacier at its southern extremity. This point, some thirty miles from the sea, is in the heart of the Coast Mountains; the peaks and ridges here seen form the very backbone of the range. The higher crests, jagged and unworn, apparently never were glacier-covered. The sheet of ice may be seen today, below the summit of the range, extending for many miles as a series of disconnected hanging glaciers, all at about the same level. (See also fig. I.) According to Indian legend, an ice bridge extended across the Stikine at the point here shown at a not very remote time. Photograph taken August 9, 1919.

huckleberry in the drier woods. The only open ground was found in some long, narrow lanes extending down from below the glacier, where apparently strips of forest had been swept away by avalanches of ice or rocks.

The moraine consists of huge, angular rocks massed in ridges and is largely hidden by forest growth, which extends close to the glacier. Large spruce and hemlock trees grow between the rocks, and devil's-club, salmonberry, and other shrubbery cover the surface of the boulders. Most of the depressions were flooded by beaver ponds, with surrounding borders of alder.

Fig. L. Mouth of Stikine River at low tide. The ocean tides ascend many miles up stream. At low water extensive sand bars are exposed at the river's mouth; the channel is then broken up into numerous small, shallow passages, impassable to even a very small boat. Photograph taken at Sergief Island, Alaska, September 5, 1919.

GREAT GLACIER

The fanlike front of the Great Glacier, four or five miles across, issues from the mountains on the west side of the Stikine about fifteen miles above the British Columbia-Alaska boundary line. Our camp site was below the southern end of the Glacier. The river bank at that point is rather high and abrupt, cut through a deep layer of gravel that extends back to the terminal moraine of the glacier. This dry, well drained strip is not of a nature to support such forest growths as we found below Flood Glacier, and the woods were fairly open. There are extensive areas grown with scattered thickets of alder and a few scattered spruce and cottonwoods, the open ground between being

covered everywhere with thick, soft lichens, carpet-like in their effect. On strips of damper ground nearby the spruce forest had secured a foothold, with the accompanying tangle of devil's-club and alder underneath.

Immediately below the glacier, fed by the melting ice, a string of little ponds extends, barren of vegetation and surrounded by low, rounded hills of gravel and rocks. Streams issuing from these ponds flow over gravelly beds to the river, a mile or more distant.

SERGIEF ISLAND

This islet lies at the mouth of the Stikine, about eight miles north of the town of Wrangell. The main rocky mass of the island is about a mile in its greatest diameter. On the north and east sides, toward the river, there is a flat belt of sandy soil, half a mile or more across, that lies at a level above even the highest stage of river or tide at the present time. This strip has some timber upon it, cottonwood, spruce, alder, and willow, but is mostly grown with tall grass and pea vines. The river flows close to the island. There are no mud flats on the east side, but extensive sand bars are exposed at low tide. The rocky backbone of the island rises abruptly from the surrounding marsh, and is covered with the dense forest growth characteristic of the Sitkan district. Spruce is predominant in the woods, with tangled undergrowth beneath, in which devil's-club is most prominent. At the edge of the woods is a fringe of alder, these bushes diminishing in size and density as salt water is approached. At the upper edge of the tidal flats the alders give way to scrubby willows, which extend far out on the marshes, over much of the ground that is not regularly inundated by the tides. Alders and willows together form a relatively narrow strip surrounding the island, and beyond the last straggling bush the grass-covered marsh land extends. Part of this marsh land is covered by salt water every day, part of it only by the highest tides. Large areas are covered by the marsh grass to the exclusion of all other vegetation; in places it grows taller than a man's head. Toward the higher ground, where there is much fresh water, this tall, coarse grass is absent, and there is a covering of shorter growths, composed of a number of different plants. This higher area is dotted with small ponds, some surrounded by reeds. Beyond the margin of the marsh grass are the bare mud flats, exposed only at low tide. The marshes throughout are intersected by numerous channels, of varying depth and width, extending upward from the low water mark in many cases clear to the rocky center of the island.

Sergief Island is the home of Mr. W. E. Parrott, who has cleared a small tract of land and for some years has successfully raised garden vegetables and ginseng. We established our camp in a cabin in the woods about a mile from his place. From Sergief Island, Dixon, in company with Mr. Parrott, made a four days' trip to Blind Slough, Mitkof Island, ten or twelve miles to the westward.

Fig. M. Sand flat at eastern end of Sergief Island, Alaska. On that side of the island, deposition of sediment from the Stikine has resulted in the building up of a strip of sandy soil that now lies above the level of the highest stage of river or tide. This strip is grown up with tall grass and pea vines. At the landward margin there are bordering thickets of alder and willow, and groves of cottonwood. Beyond, steep slopes arise, covered with spruce. The tall grass was the haunt of the rusty song sparrows. The bordering thickets at the time of our visit harbored numbers of migrants, such as the golden-crowned sparrow, Oregon junco, lutescent and Townsend warblers, dwarf hermit thrush, north-western robin, and varied thrush. Photograph taken August 20, 1919.

TOPOGRAPHY OF THE REGION AND ITS BEARING UPON ANIMAL LIFE

The Stikine River rises in northern British Columbia east of the Coast Range and flows southerly and westerly to the Pacific. Its headwaters interlock with those of the Liard and with streams that flow into the Yukon. Thus, the height of land that traverses northern British Columbia serves as a divide between several great river systems. The Liard flows northeastward through the Rocky Mountains to the Mackenzie, which flows into the Arctic Ocean; the Yukon flows north-

westward to Bering Sea; on the west, the Taku, Stikine, and Skeena rivers follow parallel courses westward through the Coast Range to the Pacific. Headwaters of all these streams rise from nearby points in northern British Columbia.

For some distance from its source the Stikine flows from east to west, following fairly closely the 58th parallel of latitude, and receiving from time to time tributaries of considerable size. In the Telegraph Creek region the river gradually turns, first toward the southwest, then almost due south. Some twenty miles from the coast, about at the British Columbia-Alaska boundary, it bends sharply to the westward once more, and reaches salt water near the town of Wrangell, amid the network of islands forming the Alexander Archipelago.

A tributary of importance to the upper Stikine is Clearwater Creek, entering from the northwest some thirty miles below Telegraph Creek. Near the Boundary there is a small stream that is locally called "Clearwater Creek," and there is apt to be confusion between the two if the facts are not known.

Our work did not take us above the middle Stikine Valley, with its uppermost limit at Telegraph Creek. In this section, from Telegraph Creek down stream nearly to Doch-da-on Creek, the valley is rather broad, the mountains rising at a distance on either side. Just south of Doch-da-on Creek the Stikine begins its passage through the Coast Range. The valley, already much narrowed, becomes still more constricted; some five miles below Doch-da-on Creek the river is hemmed in between the rocky walls of Kloochman Cañon, the uppermost of the two narrow gorges through which the Stikine passes in the lower part of its course. The mountains from this point on become much higher and more precipitous. From Doch-da-on Creek looking northward and eastward the valley is broad in extent and the mountains are relatively low and rounded. Many of the summits are bare of snow during the summer months. To the southward and westward a jumbled mass of jagged peaks and ridges arises, forbidding in the extreme, and pressing closely in upon either side of the river.

Where the Stikine passes through the mountains, the river valley is exceedingly rough and covered with a forest that is virtually impenetrable. In this connection it is of interest to quote some statements of Emmons (1911, pp. 9-10) in his description of the country of the Tahltan Indians, who occupy the region of the upper Stikine.

The lower valley of the Stikine from just below Glenora to the coast, a direct distance of about eighty miles, is included within the coastal range and constitutes a region of great humidity, with leaden skies and an annual precipitation

equalling if not exceeding that of the coast which reaches a mean of eighty-six inches. The snowfall thereabouts is excessive, and accounts for the extensive glaciers that fill the valleys; and long after spring has opened in the colder interior the lower river flats are covered with their burden of snow and ice Forests of spruce, fir, cedar and hemlock cover the mountain slopes to the limit of tree growth, while in the river valleys cottonwoods grow to considerable size, and groves of alder and willow, with the devil's club and berry bushes, form an almost impenetrable barrier. . . . It may be pertinent to remark here, that this region which may be characterized as the wet belt has never been inhabited by either Tahltan or Tlingit in the sense that they have permanently occupied it and it is scarcely more popular as a hunting ground owing to its poverty and inaccessibility.

At the mouth of the river and in the channel beyond there are numerous small rocky islands. Surrounding these centers there are miles of meadow, marsh land, and mud flats, resulting from the deposition of silt by the river. During the period of high water in mid-summer the stream is gray and opaque with silt carried in suspension, and this silt has been dropped in the channels immediately beyond the river's mouth until they are well-nigh filled.

A conspicuous forest tree of the lower Stikine is the cottonwood. This tree covers all the low ground near the water, grows densely and to a large size. It finds a foothold on sand bars and aids in the building up of such areas into more stable bottom land. Consequently, there are hundreds of acres of cottonwood in almost pure stands but slightly above the level of the river or even submerged at the highest water. East of the Coast Range, cottonwood is much less conspicuous than along the lower river, though still persisting in considerable numbers.

In the country in general at the mouth of the Stikine, the Sitka spruce is the dominant tree. This tree, with other associated conifers, extends some distance up stream, forming an evergreen forest that covers all but the unstable bottom land where the quick-growing cottonwoods occur. Where rocky slopes rise abruptly from the river's bank, the conifers range down to the water's edge. The higher ground back from the first bottom is covered densely with woods of spruce and hemlock, and with undergrowth of devil's-club, alder, and huckleberry. Such woods extend with but slight breaks to a point a little above the Little Cañon. Farther inland the spruce woods ascend higher and higher on the mountain sides, until at Doch-da-on Creek the lower limit of this belt lies at an altitude of about 2000 feet. Somewhere below Doch-da-on Creek the Sitka spruce of the coast gives way to other conifers of the interior, but just where this happens we did not ascertain. On the upper Stikine, poplar becomes the dominant growth of the valley, mixed, here and there, with groves of conifers or of cottonwood.

The Sitkan district of southeastern Alaska is characterized by excessive humidity and by relatively equable temperature. The annual rainfall at many points is 100 inches or more, the number of rainy days per year around 200. There is a great deal of foggy and cloudy weather. The winters are not extremely cold nor are the summers very warm. The vegetation of this region is comprised mostly of an extremely dense growth of coniferous forest trees, and, beneath the trees, underbrush almost tropical in its luxuriance. The Sitkan district is here considered as including the islands between Cross Sound and Dixon Entrance, together with a narrow strip of the adjacent mainland coast. Its eastward limits are sharply defined by the towering and precipitous range of mountains that, rising abruptly from the shore, parallels the coast. To the eastward of this Coast Range, in the interior of British Columbia and Alaska, is a region of widely different character. I have not exact meteorologic data for this section, but certain general facts are obvious. Dawson (1889, pp. 58*b*–59*b*) remarks on this subject as follows:

It may be stated here, as showing the broad general contrast, that while the annual precipitation at Wrangell, at the mouth of the Stikine, is over sixty inches, that in the vicinity of Telegraph Creek on the inland side of the mountains, is so small that it is necessary to irrigate cultivated land. Nor does this comparison of rain-fall sufficiently mark the great diversity which actually obtains between the two climates, the prevalence of clouded skies in the coast region being accompanied by a saturated state of the atmosphere, while precisely opposite conditions are found on the eastern side of the mountain belt, at not more than eighty miles inland from the general line of the coast.

The country east of the mountains is subject to far greater extremes of temperature than the coast region, with hot summers and with extremely cold winters. The forest covering includes a considerable proportion of conifers, but there is also a still larger proportion of deciduous timber. The animal life in these two regions, the Sitkan district of the coast and the adjacent interior, is widely different.

The valley of the Stikine forms a highway between the two faunal areas, otherwise separated by physical barriers and sharply contrasted in nearly all particulars, though lying in close juxtaposition. The presence of this channel of communication affords excellent opportunity for observation of the geographic behavior of the many animal species that by this means are permitted an outlet in either direction. Certain contrasted species and subspecies occupying comparable positions in each of the two faunal areas are brought together, and thus into competition; others with no such direct rival in the adjacent area are brought into contact with climatic conditions, adverse in that they are unaccustomed.

The Stikine is one of several large rivers of the northwest that break through the Coast Range at right angles to the lines of those mountains, their valleys thus lying transverse to the main lines of the range. In a published report upon the geology of Alaska, A. H. Brooks (1906) makes the following statement regarding the Copper, Alsek, Taku, and Stikine rivers: "These, together with the other large rivers of British Columbia, seem to traverse the coastal mountain barrier along valleys determined by antecedent conditions. Their lower valleys at least have the same direction as before the present coastal mountains were elevated, and the streams maintained their courses across the barrier during the slow uplift" (p. 286). Again: "The valleys of the Stikine and Taku rivers, . . . which lie transverse to the Coast Range, have probably inherited their courses from a former mature drainage system which was developed on the old peneplain" (*loc. cit.*, p. 287).

In this connection it is worth while to note the appearance of the river valley of the upper Stikine in the Telegraph Creek region. There, and for many miles down stream from that point, the stream is bordered by series of terraces, rising step by step to the base of the mountains beyond. Viewed from some overlooking height the course of any one of these terraces may be traced for a long distance. It seems obvious that they represent the level of the river valley at different periods of its history. (See fig. B.)

The evidence of the geologist goes to show that, diverse as the coast region and the interior are, as regards fauna and flora, the two have not been absolutely separated by the Coast Range at all times in the past any more than they are at present. A channel of communication through the mountains has been there continuously from very remote geologic times, save for a period when it must have been blocked by ice.

Presumably all animal life was swept from both regions when the whole country was glacier-covered. Presumably, too, conditions in the areas on either side of the Coast Range permitted the return of animals and plants from the southward when the mountains between were still mostly ice. Even now the range is glacier-covered over a large portion of its area. The higher peaks and ridges protrude, steep and serrated, far above the ice. From the jagged, unworn appearance of these higher crests they apparently never were covered. The sheet of ice as seen today lies below the summit of the range, and can be traced as a series of hanging glaciers appearing and re-appearing for many miles at about the same level, visible from the river below. In certain cañons and valleys, tongues of this glacial covering extend downward

far below the general level, some of them to within a mile or two of the river. It cannot be such a very long period of time since ice blocked the entire valley. In fact, there are today legends among the Tahltan Indians of a time when an ice bridge still extended across the Stikine at the Great Glacier, connecting ice masses that are now perhaps four or five miles apart. Of course, as remarked by Dawson (1889, p. 53*b*) about this same tale, it is impossible to determine whether "this is a remembered fact or a fancied inference." (In this connection see also Emmons, 1911, p. 15.)

The hypothesis of a glacial blockade of communication between the interior and the coast would imply the separate derivation of the animal life of each. That is, that there was invasion from the southward on either side of the coast range, of the same or of different species, as the case might be. Doubtless, at a still later period, there was invasion of certain species from the northward as well. Among birds in particular detailed comparisons may be made (see fig P), and upon comparing the avifauna of the interior and of the coast in the Stikine region, it will be seen that not only are comparable ecologic niches on either side of the mountains usually filled by different species rather than subspecies, but that frequently the species are not especially closely related. Furthermore, among the few cases where two subspecies of a species do occur abundantly on either side of the mountains, there is hardly an instance where we were able to trace intergradation along the connecting valley of the Stikine. In some few cases where the birds were abundant enough for us to ascertain the fact, it was evident that certain subspecies, at this particular point, met as distinct species. All this argues for invasion from the southward, on either side of the Coast Range, of bird species and subspecies that met at a much later period along such channels as the Stikine Valley.

The intrusion of a range of high mountains was productive of diverse climatic conditions in the two regions. This, in turn, resulted in differences in the reestablished plant and animal life to a far greater extent than would follow from the mere presence of a physical barrier such as a mountain mass. Differences of temperature and of humidity arose, so that at the present time the two areas, east and west of the Coast Range, respectively, form strongly contrasted faunal areas (dependent upon relative humidity), and they are somewhat different zonally (dependent upon temperatures).

At a considerably later period than that at which the regions on either side of the mountains became habitable, conditions in certain

of the river valleys traversing the barrier (as the Stikine) became such as to permit the existence of animal and plant life, and various species extended their ranges up or down such channels of communication, as circumstances permitted. One factor that may be of present importance in limiting the use of the Stikine Valley as such a channel, so far as birds are concerned, is the late advent of summer conditions on the lower Stikine compared with the regions on either side, a seasonal tardiness that unquestionably prevents the nesting of many species in this intermediate strip at the time of their arrival from the south. (In this connection see Dawson, 1889, p. 59b; Emmons, 1911, pp. 9-10.)

The general hypothesis outlined seems to accord with conditions as we now see them. Among birds it may be pointed out that it is consistent with the manner of occurrence of forms like *Hylocichla ustulata ustulata* and *H. u. swainsoni*, closely related subspecies of one species but behaving at this point like two distinct species. It is consistent with the extension inland a certain distance of forms like *Sphyrapicus varius ruber* and *Passerella iliaca fuliginosa*, and toward the coast of *Piranga ludoviciana* (see Swarth, 1911, p. 95) and *Empidonax trailli alnorum*, and it is consistent with the restriction on one side or the other of such distinct and sharply delimited forms as *Bombycilla garrula pallidiceps* and *Cyanocitta stelleri stelleri*.

In this connection, certain facts regarding the present-day migration of birds in the region should be considered. If there were any general travel between the interior and the coast such river valleys as the Stikine would be the highways most generally followed. Our work in the region shows pretty clearly that such is not the case. It seems evident that the birds of the interior travel north and south almost entirely east of the coast ranges. Some of them, it is well known, even pass east of the Rocky Mountains as they get farther south. Birds of the coastal region remain west of the mountains.

We found many characteristic inland species of birds, some breeding, others, perhaps, merely migrants, as far down stream as Great Glacier, some thirty miles from the coast. The species seen there include *Penthestes atricapillus septentrionalis*, *Setophaga ruticilla*, *Hylocichla ustulata swainsoni*, and *Vireosylva gilva swainsoni*, none of which has been taken on the coast. *Dendroica aestiva* was an abundant migrant, though almost entirely absent at the mouth of the river. The Stikine in its passage through the Coast Range travels almost due south, and it is natural that birds from the headwaters should migrate in numbers along this valley. It is not so clear why

they should not arrive at the mouth. However, a short distance below the Great Glacier, about at the boundary, the stream turns sharply to the westward. Just above this bend is the mouth of the Iskut, a tributary of the Stikine that is nearly as large as the main stream. At the point of junction the broad valley of the Iskut enters from the southeast and its course is east and west for some distance. A perfectly feasible outlet is thus afforded for migrating birds from the northward at just the point where the Stikine Valley would lead them astray. I do not know that this is the course that is actually followed, but it may very well be, and if so it serves to explain the absence at the mouth of the river of species that were migrating southward in numbers at a point some thirty miles up stream.

There are, however, certain inland species that appear to migrate regularly coastward, though doubtless in lesser numbers than go directly south. *Dendroica coronata hooveri* has been taken in the fall near the mouth of the Taku River (Swarth, 1911, p. 99), and we obtained it at the mouth of the Stikine, each time in sufficient numbers to appear to be of regular occurrence. *Sialia currucoides* has been found near the mouth of the Taku under similar circumstances (Swarth, *loc cit.*, p. 112), and while we, ourselves, did not meet with this species at the mouth of the Stikine, specimens have been taken there.

The question arises as to the migration of such species as *Melospiza melodia rufina* and *Passerella iliaca fuliginosa*, coastal forms primarily but breeding far inland up the Stikine. Whether or not they ascend and descend the river in their travels is not clear, and the facts will be difficult to ascertain.

The casual occurrence at the mouth of the Stikine in the spring of such species as *Myadestes townsendi* and *Sialia currucoides* (see pp. 301, 309) is noteworthy. Such wanderers in the fall might be explained as individuals that had mistakenly followed the river to its mouth. In the spring, they can not be regarded as having gone astray. The fact that they had reached this point is evidence that they were confidently traveling to a definite goal, though along a path not usually followed by their kind.

At high water, quantities of drift are carried down the river. It is probable that small mammals living in the bottom lands often take refuge in fallen trees or in masses of brush that are suddenly floated away, and are thus transported far down the river. This may be one factor tending toward the more general extension coastward of inland species as compared with the sharper restriction of coastal forms (see fig. Q).

Thus there are certain species of birds and mammals for which the valley of the Stikine River acts as a channel of communication between interior and coast. There are none to which it acts in the opposite rôle, as a barrier to farther distribution, north or south. It would not to birds, of course, in any event. As regards mammals, conditions here are very different from what, for example, they are in the valley of a stream like the Colorado River, of the southwestern United States. In that region, not only the river itself but also the wide strips of adjacent bottom lands absolutely prevent the passage of certain desert mammals, so that there are a number of species and subspecies restricted to one side or the other (cf. Grinnell, 1914).

In the Stikine Valley no local conditions ("associations") exist that tend to keep certain groups of animals either close to or far distant from the river banks, and the same forms range unhindered from the water's edge well up the mountain sides. For a period of months the river is frozen over quite to its mouth, and there is no doubt that at that season individuals of many species of mammals cross from one side to the other.

ZONAL AND FAUNAL POSITION OF THE STIKINE VALLEY

The Sitkan district of southeastern Alaska has been generally considered to be mostly of the Canadian life zone. The areas that extend above timber on the higher mountains afford a strip of Alpine Arctic of considerable extent, and a drawback to the recognition of the lower altitudes as Canadian is the absence of any well defined intervening strip of Hudsonian. Some birds and mammals that occur elsewhere in the Canadian zone do occur in the lowlands of the Sitkan district, but on the other hand species generally regarded as indicative of the Hudsonian zone are found throughout the whole region. Altogether it seems as though all the Sitkan district below Alpine-Arctic should be considered as of the Hudsonian zone, with a strong infusion of Canadian in the southern part at least. Certainly this coastal strip is of a higher life zone than the adjacent interior.

In the country immediately east of the Coast Range there has not been sufficient work to permit detailed mapping of the life zones. The most recent zonal map covering that section is the one published in the A. O. U. *Check-List* (1910, pl. 1) and is on too small a scale to permit of much detail. On that map the Hudsonian zone covers practically all of northern British Columbia, extending considerably farther southward there than in southern Alaska, to the westward, or

in northern Alberta, to the eastward. The adjacent coastal strip of southeastern Alaska is indicated as Canadian, and there are narrow strips of Canadian extending inland along certain river valleys, of which the Stikine is one. The interior is thus regarded as of a higher zone than the coast. This is not in accordance with our own findings. One of the rules upon which life zones are based is as follows: "The northward distribution of terrestrial animals and plants is governed by the sum of the positive temperatures for the entire season of growth and reproduction" (Merriam, 1898, p. 54). Exact figures are lacking for the region we visited, but there can be no doubt that the summer temperature of the country immediately east of the mountains is appreciably higher than on the coast. In further illustration of the relative zonal positions of the two regions, the following lists of some characteristic summer birds of the lowlands should be considered.

COAST	INTERIOR
<i>Dendragapus obscurus sitkensis</i>	<i>Bonasa umbellus umbelloides</i>
<i>Cyanocitta stelleri stelleri</i>	<i>Buteo swainsoni</i>
<i>Nannus hiemalis pacificus</i>	<i>Nuttallornis borealis</i>
<i>Regulus satrapa olivaceus</i>	<i>Spizella passerina passerina</i>
<i>Regulus calendula grinnelli</i>	<i>Vireosylva gilva swainsoni</i>
<i>Ixoreus naevius naevius</i>	<i>Setophaga ruticilla</i>

Furthermore, in the course of our work the interesting fact was developed that certain species of birds that occur commonly at sea level on the coast occur inland at constantly increasing elevations. Ascending the Stikine it is noticeable, at a point about a hundred miles inland, that the characteristic spruce forest found at sea level on the coast and on the banks along the lower reaches of the river, here begins to ascend the mountain sides, its place in the valley being taken by the poplar woods. In the Telegraph Creek region we found the spruce belt at an altitude of perhaps 1500 to 2000 feet, and found therein the bird species to which reference is made. It is an additional complication that whereas certain subspecies extend unchanged from the coast to the interior as inhabitants of this spruce belt, some species are represented by different subspecies at the two extremes. *Nannus hiemalis pacificus* and *Regulus satrapa olivaceus* belong in the first mentioned category. In the second, *Dendragapus obscurus sitkensis*, *Regulus calendula grinnelli*, and *Ixoreus naevius naevius*, of the coast, appear to be replaced in the interior by *Dendragapus obscurus flemingi*, *Regulus calendula calendula*, and *Ixoreus naevius meruloides*. Among mammals, *Marmota caligata* is one conspicuous species that occurs at sea level on the coast (*M. c. caligata*) and at high elevations inland (*M. c. oxytona*). It is a matter for regret that we were unable to give

more study than we did to the fauna of the spruce belt of the interior mountains, for our data are admittedly scanty; but at any rate it is evident that the bird population, at least, of that region contains a large proportion of forms that are characteristic of lower levels at the coast. The presence of the several animal and plant species noted serves for the recognition of a strip of Hudsonian zone on the mountain

Fig. N

Fig. O

Fig. N. Ascending the mountains, the poplar woods are gradually left behind while spruce and fir, appearing first as scattered thickets on north-facing slopes or in cool cañon beds, gradually become the dominant forest growths. This, the Hudsonian zone, is the home of the Canada jay, pine grosbeak, golden-crowned sparrow, and golden-crowned kinglet. Photograph taken in the upper reaches of Telegraph Creek, looking toward the Summit, June 28, 1919.

Fig. O. Above the spruce woods is a strip of dwarfed and prostrate balsam fir; still higher, Alpine-Arctic slopes and ridges extend that are bare of trees but well covered with grass, heather and moss. This timberless area is the home of the mountain goat and marmot, among mammals; of white-tailed ptarmigan, pallid horned lark, Hepburn rosy finch and pipit, among birds. Photograph taken on the mountain above Doch-da-on Creek, July 23, 1919.

sides, as distinguished from the Canadian zone of the valley below. There are certain birds, apparently all of high altitudes inland, of which we learned regrettably little regarding their relationship to the coast fauna. They are as follows: *Canachites canadensis osgoodi* is believed to be mainly a bird of the spruce belt on the mountains.

Perisoreus canadensis canadensis was quite through nesting when we reached the region, but presumably does not breed in the valley near the river. *Pinicola e. flammula* appeared to belong to the spruce belt, but this is doubtful. *Zonotrichia coronata* is in this latitude unquestionably a high mountain species, reaching its greatest abundance in the scrubby balsam at timber line. The unsettled question concerns its extension coastward. In the coast region it does not occur in the lowlands, but may occur on the mountains. *Spizella monticola ochracea* is a high mountain bird in the Telegraph Creek region, probably near the southern limit of the bird's distribution.

We ourselves did not get far back from the Stikine Valley at any point, and it might be argued that our finding there of certain species not extending into the Hudsonian is no more than corroborative of the narrow line of Canadian extending along the Stikine Valley, shown in the zone map cited. However, recent work has been done in the interior at Hazelton and at Atlin, which shows the general distribution of the bird species to which reference is made; on this basis it seems altogether likely that northern British Columbia should be regarded as predominantly of the Canadian life zone rather than of the Hudsonian.

It seems worth while to make such comparisons as are possible of the results attained by the other ornithological work recently done in northern British Columbia. Taverner (1919) has reported upon a collection of birds from Hazelton, and E. M. Anderson (1915a) upon a collection from Atlin. The three points, Atlin, Telegraph Creek, and Hazelton, are about the same distance inland. Atlin is about 150 miles north of Telegraph Creek, near the head of the Taku drainage, Hazelton about 225 to the southward, on the upper Skeena. The three localities are thus very similarly placed as regards their relation to the coast.

Species common to Atlin, Telegraph Creek, and Hazelton:

1. *Bonasa umbellus umbelloides*
2. *Falco sparverius sparverius*
3. *Colaptes auratus borealis*
4. *Chordeiles virginianus virginianus*
5. *Selasphorus rufus*
6. *Nuttallornis borealis*
7. *Myiochanes richardsoni richardsoni*
8. *Empidonax hammondi*
9. *Empidonax wrighti*
10. *Perisoreus canadensis canadensis*
11. *Euphagus carolinus*
12. *Spinus pinus pinus*

13. *Zonotrichia leucophrys gambeli*
14. *Spizella passerina passerina*
15. *Tachycineta thalassina lepida*
16. *Dendroica aestiva aestiva*
17. *Penthestes atricapillus septentrionalis*
18. *Hylocichla ustulata swainsoni*
19. *Hylocichla guttata guttata*
20. *Planesticus migratorius migratorius*
21. *Sialia currucoides*

Species common to Atlin and Telegraph Creek, probably finding their southern limit near Telegraph Creek:

1. *Spizella monticola ochracea*
2. *Junco hyemalis connectens*
3. *Dendroica coronata hooveri*

Species common to Hazelton and Telegraph Creek, probably finding their northern limit near Telegraph Creek:

1. *Dryobates villosus monticola*
2. *Cypseloides niger borealis*
3. *Chaetura vauxi*
4. *Melospiza melodia rufina*
5. *Piranga ludoviciana*
6. *Vireosylva gilva swainsoni*
7. *Oporornis tolmiei*
8. *Setophaga ruticilla*

Species found at Atlin and not at Telegraph Creek, probably finding their southern limit between these points:

1. *Surnia ulula caparoch*
2. *Dendroica striata*
3. *Penthestes hudsonicus hudsonicus*

Species found at Hazelton and not at Telegraph Creek, probably finding their northern limit between these points:

1. *Cyanocitta stelleri annectens*
2. *Junco oreganus shufeldti*
3. *Stelgidopteryx serripennis*
4. *Vireosylva olivacea*
5. *Dendroica auduboni auduboni*
6. *Dendroica magnolia*
7. *Geothlypis trichas occidentalis*

In this discussion of the life zones of the regions involved, so much more information was forthcoming from the birds than from the mammals that more stress is necessarily given to evidence derived from them. A large percentage of the mammals of the interior are of species of which it is difficult to obtain specimens, especially in summer. A number of species we failed to meet with at all, though possibly they

occur in fair abundance, and of others but an unsatisfactory representation was obtained.

As faunal areas, the Sitkan district and the country east of the mountains are strongly contrasted. Differences of humidity are as striking as those of temperature, and these differences are reflected in the mammal, bird, and plant life of the two regions. The peculiarities of the Sitkan district are well known, and the accepted boundaries well defined. Of the country east of the mountains, as typified in the Telegraph Creek region, the peculiarities are equally well marked. This district, of undetermined extent, save where it impinges upon the Sitkan district, appears worthy of a name as a recognizable faunal area, for the sake of convenient reference, at least, and I would suggest the adoption of Cassiar district, a name applied to it as a political division.

The birds of the two regions are more widely different than are the mammals, that is, there are more distinct types in each region. The two mammal faunas are distinct enough, and there are certain conspicuous species in each district that are not found in the other, but in many cases closely related species or subspecies replace one another on either side of the dividing line. Certain species of which a large representation was obtained (*Peromyscus* and *Microtus*) exhibit intergradation between related forms along the river to an extent far beyond anything found among the birds.

The two accompanying tables (figs. P, Q) serve to show the relationships of the bird and mammal faunas of the two regions, and the nature of the occurrence of the various species in the Stikine Valley, as observed by us. Certain generalizations may be drawn from these tables. (1) There are, as previously remarked, more distinct types of birds in the two contrasted regions than there are of mammals. (2) There are more bird forms in the interior than on the coast. (In addition, it may be said that bird life, as regards number of individuals, is far more abundant in the interior than on the coast.) (3) In the Stikine Valley, at least, there are a number of species of the interior that extend far toward the coast, while very few coastal races extend any distance inland; the fauna of the Sitkan district is closely confined to the region west of the Coast Range. In certain respects these tables are imperfect. It would take many seasons of field work to fill in gaps in our knowledge that are here apparent. Also, in the case of some species there are differences of altitude concerned (implying zonal differences) as well as those of linear distance, and such distinctions could not be made in this table.

¹Known to occur on the coast of southeastern Alaska, but not encountered on the lower Stikine by this expedition.

Fig. P. Showing manner of occurrence in summer of certain land birds of the Stikine region. Species and subspecies primarily of the coast are listed in the left-hand column; those of the interior in the right-hand column. The intervening columns indicate collecting stations of the 1919 expedition, from the coast toward the interior reading from left to right, with the approximate distance of each place from the coast. Arrow indicates direction and extent of dispersal of each species from the center of abundance. Broken line indicates occurrence as migrant beyond the breeding limits.

¹Known to occur on the coast of southeastern Alaska, but not encountered by this expedition.

Fig. Q. Showing manner of occurrence of certain mammals of the Stikine region. Species and subspecies primarily of the coast are listed in the left-hand column; those of the interior in the right-hand column. The intervening columns indicate collecting stations of the 1919 expedition, from the coast toward the interior, reading from left to right, with the approximate distance of each place from the coast. Arrows indicate direction and extent of dispersal of each species from the center of abundance.

The 127 species and subspecies of birds treated in this report probably form a fairly complete representation of the summer avifauna of the region. It seems curious, though, that we should have seen no three-toed woodpeckers (*Picoides*), no magpies (*Pica*), and no yellow-throats (*Geothlypis*).

Numerous species of the mammals known to occur in the region we did not meet. We caught glimpses of bats on two occasions, but got no specimens. A coyote (*Canis*) is said to range this far north, but we neither saw nor heard one. *Vulpes*, *Martes*, *Gulo*, and *Lynx* are fur bearers that are regularly trapped throughout the region. Whether or not there are seasonal differences affecting local distribution we did

not learn, but we did not come in contact with any of these species. Sheep (*Ovis stonei*) occur in the neighboring mountains, of course; we were not within their territory. Flying squirrels (*Glaucomys*) occur, we were told by trappers, but we saw none. *Phenacomys constablei* was described from Telegraph Creek, but our trapping did not produce a single specimen.

CHECK LIST OF THE MAMMALS

1. *Sorex personatus personatus* I. Geoffroy
2. *Sorex obscurus obscurus* Merriam
3. *Sorex obscurus longicauda* Merriam
4. *Neosorex palustris navigator* Baird
5. *Microsorex eximius* (Osgood)
6. *Ursus*, species?
7. *Ursus americanus americanus* Pallas
8. *Canis occidentalis* Richardson
9. *Mustela cicognani richardsoni* Bonaparte
10. *Mustela vison energumenos* (Bangs)
11. *Phoca richardi richardi* (Gray)
12. *Peromyscus maniculatus borealis* Mearns
13. *Peromyscus maniculatus macrorhinus* (Rhoads)
14. *Neotoma cinerea saxamans* Osgood
15. *Synaptomys borealis wrangeli* Merriam
16. *Evotomys dawsoni dawsoni* Merriam
17. *Evotomys wrangeli* Bailey
18. *Microtus drummondi* (Audubon and Bachman)
19. *Microtus mordax mordax* (Merriam)
20. *Ondatra zibethica spatulata* (Osgood)
21. *Mus musculus musculus* Linnaeus
22. *Zapus saltator* Allen
23. *Erethizon epixanthum nigrescens* Allen
24. *Marmota caligata caligata* (Eschscholtz)
25. *Citellus plesius plesius* (Osgood)
26. *Eutamias borealis caniceps* Osgood
27. *Sciurus hudsonicus hudsonicus* (Erxleben)
28. *Sciurus hudsonicus picatus* Swarth
29. *Castor canadensis canadensis* Kuhl
30. *Lepus americanus macfarlani* Merriam
31. *Odocoileus columbianus sitkensis* Merriam
32. *Alces americanus gigas* Miller
33. *Rangifer osborni* Allen
34. *Oreamnos montanus columbianus* Allen

GENERAL ACCOUNTS OF THE MAMMALS

Sorex personatus personatus I. Geoffroy. Masked Shrew

Obtained only in the vicinity of Telegraph Creek and at Great Glacier. Seven taken at Telegraph Creek and five at the nearby station of the Junction (nos. 30527, 30535, 30554–30559, 30561, 31052–31054). Seven specimens from Great Glacier (nos. 30544, 30562–30567), though referred to *Sorex personatus personatus*, show intergradation toward *S. p. streatorii*. These determinations, as well as those of the other forms of *Sorex* and *Microsorex* here treated, were made by Dr. Hartley H. T. Jackson, of the United States Biological Survey.

Sorex obscurus obscurus Merriam. Dusky Shrew

Seven specimens taken at the Junction, five at Telegraph Creek, three at Glenora, two at Doch-da-on Creek, and one at Flood Glacier (nos. 30522–30526, 30528–30534, 30536–30541). Shrews were nowhere abundant.

Sorex obscurus longicauda Merriam. Long-tailed Shrew

Ten from Great Glacier and two from Sergief Island (nos. 30542, 30543, 30545–30551, 31055). The series from Great Glacier is intermediate between *Sorex obscurus obscurus* and *S. o. longicauda*, but on the whole is nearer *longicauda*.

Neosorex palustris navigator Baird. Water Shrew

An adult male (no. 30568) was trapped near Telegraph Creek on June 22, in a bit of swampy land near the stream. Allen (1903, p. 567) has referred the water shrew of this region to *Neosorex palustris alaskanus* (Merriam), but our one specimen does not exhibit the characters ascribed to that race (cf. Merriam, 1900, p. 18). As compared with Californian examples of *navigator*, the Telegraph Creek specimen is exactly similar in general size and in skull characters, but is of slightly more grayish coloration.

I have seen one specimen of *Neosorex* from the coast of southeastern Alaska (in the collection of E. P. Walker), taken at Rudyard Bay, about one hundred miles south of the Stikine River, and this animal does exhibit the cranial peculiarities ascribed to *alaskanus*. It seems likely that the latter is confined to the coastal region.

Microsorex eximius (Osgood). Osgood Shrew

A single *Microsorex* (no. 30560) was trapped at the east end of Sawmill Lake, near Telegraph Creek, on June 16. The skull was crushed, debarring definite specific identification, but the specimen has been provisionally referred to the species *Microsorex eximius* by Dr. Jackson.

Ursus, sp.? Grizzly Bear

Grizzlies are still numerous in the Stikine region. We ourselves saw fresh sign at many points, though no animal was encountered. The most obvious indication of their presence was, of course, footprints, but other evidence was frequently found, such as rotten logs ripped to pieces by the bears for the insect food they contained. At Dochda-on Creek an unoccupied cabin in the woods was entered by a bear several times during the two weeks we spent at that place, and more or less damage done. At this point we saw grizzly tracks in the snow at timber line, about 4000 feet altitude.

At Hyland's store, Telegraph Creek, we examined ten grizzly skins, killed the previous fall, all from about the same place, on the Klappan River (a tributary of the Stikine) about 100 miles east of Telegraph Creek. Of these we purchased a skin with the skull of an old male (no. 31015) and a skin alone of a smaller animal, apparently a female (no. 31016). These specimens, both skins and skull, answer fairly well to the description of *Ursus stikeenensis* given by Merriam (1914, p. 178; 1918, p. 88).

There are no less than seven species of big bears accredited to this general region by Merriam (1918). Whether or not I have ascribed our specimens to the correct form, I think there is no doubt that all the skins in the above mentioned series belonged to one species, for there was really remarkable uniformity in color and markings in the lot. Subsequently the skin of another bear was examined, a huge male killed on Clearwater Creek, and it again was of exactly the same type. The noticeable color features are the general dark coloration, the yellowish or grayish grizzling on the shoulders and along the back, and the black feet, legs, and lower parts. The tanned skin of the male specimen, an animal that, from the appearance of the skull was evidently past maturity, measures from tip of nose to base of tail approximately 1680 millimeters; the one from Clearwater Creek, above mentioned, was very much larger. The claws are short for a grizzly, the longest claw on the male obtained measuring, with dividers, 55 millimeters. They appear to be much worn.

Ursus americanus americanus Pallas. Black Bear

Black bears occur in some abundance throughout the whole of the region we traversed. They are frequently seen from the river boat in its travels up and down the Stikine. On June 5 one was seen not far from our camp at the Junction, rooting about under some rotten logs near the trail. Fresh tracks or other sign of the recent presence of black bears were seen practically everywhere we went except on Sergief Island.

Five black bear skulls were purchased from Mr. A. M. Vickery, of Telegraph Creek, the animals having been killed by him while he was patrolling the telegraph line to the southward of that place. One of these (no. 31017) is an old male, killed 122 miles south of Telegraph Creek, on May 25, 1919. The others are an old female and three small cubs (nos. 31018-31021) killed on June 17, 1919, 31 miles south of Telegraph Creek.

The two adult skulls from the Telegraph Creek region present certain evident points of difference from those of the black bear (*U. a. pugnax*) from the islands of southeastern Alaska. In the former the frontal region is relatively high and rounded, in the latter it is noticeably low and flat. In *pugnax* the whole skull is more angular in appearance. In *pugnax*, too, the teeth are large, as compared with those of bears from the interior, especially the last upper molar. This last character is one that persists in black bears from all the islands off the coast of southern Alaska and British Columbia. It is conspicuous in *pugnax* of the southern islands of the Alexander Archipelago, which has a large, squarely built, low browed skull. It is one of the characters of *carlottae*, from the Queen Charlotte Islands (cf. Osgood, 1901, p. 30), which has an elongate skull. It appears again in the black bear of Vancouver Island, which, judging from the several specimens at hand, is a smaller animal than *carlottae* or *pugnax*, with a rather high, rounded skull, and with the teeth of large size, especially the last upper molar.

There is very little material at hand from the mainland coast of southeastern Alaska. One rather young male from Bradfield Canal (a short distance south of the Stikine River) has the enlarged last upper molar of *pugnax*, and is apparently to be referred to that form. Thus it may be that *pugnax* occupies a narrow strip of coast on the mainland of southeastern Alaska as well as the islands, and that the type of black bear found in the Telegraph Creek region is confined to the territory east of the coastal range of mountains.

Of the available material, the Telegraph Creek skulls are most nearly of the type of those from the Kenai Peninsula and Yakutat Bay, Alaska. It may be that the name given to the black bear of the Kenai region by Allen (1910, p. 115), *Ursus americanus perniger*, should also be applied to the bears of the Stikine section, but at present it seems best to use the name *americanus* for the Stikine specimens. A revision of the group is necessary to determine, among other things, the applicability of the name *Ursus americanus* Pallas, and the characters pertaining to the form to which that name should be subspecifically restricted. In the present connection the main interest lies in the apparent occurrence of two different forms of the black bear in the Stikine region, *americanus* at the headwaters of the river, and *pugnax* in the coastal region near its mouth.

Canis occidentalis Richardson. Timber Wolf

Wolves, from all accounts, occur in some numbers throughout the interior of northern British Columbia, along the length of the Stikine Valley, and along the adjoining Alaskan coast and on the nearby islands. We saw none, nor any fresh sign, until we reached Sergief Island. There fresh wolf tracks were seen in the sand of the river bank, and on several occasions, when shooting out on the marsh, the reports of our guns started wolves howling in the forest nearby. On August 20 two of the animals were seen, and investigation showed that the place was the home of a wolf family, as it probably had been since the young were born, two or three months earlier. The two we saw were pups, not yet full grown, and they were probably awaiting the parent's return from a foraging expedition. Certain areas in the grass had been trampled flat, for beds, and a large flat rock nearby furnished an ideal lounging place. This rock rose above the marsh grass, and thus afforded an excellent observation station. Some cracks in the granite gave foothold to two scrubby spruce trees, arching over the rocky platform, and the rock below was covered with a deep layer of spruce needles, affording a dry, soft bed. This shelter had been occupied so much that the wolf smell clinging to it was apparent even to the duller olfactories of a human being. Broad trails led away through the grass over the marshes in various directions and into the impenetrable fastnesses of the spruce woods on the adjoining hillside. The trampled grass showed here and there bunches of feathers or a few crushed bones of ducks and geese; water fowl were evidently a staple food.

There were apparently three pups and one adult in this family. Two of the young were taken, and the old wolf then removed the survivor, evidently to some distance; no trace of the two was found anywhere about the island. The parent had been seen several times before the two young were caught.

Mr. W. E. Parrott, living upon Sergief Island, gave us the skin of an adult male wolf that he had shot on July 20. He was sitting at breakfast when his cat rushed into the house for protection from the wolf, which had chased the cat through the garden. Looking through the window, he saw the wolf, leisurely retreating toward the beach, and shot the animal. It was no new experience for the cat. Whenever his owner went to town a ladder was left leaning against the house, as a refuge in case of such pursuit, and apparently there was not infrequent occasion to use it.

The wolf thus obtained may have been the male parent of the family we encountered. In color this adult and the two pups are very much alike. The adult is rather dark, though not so black as some from this region. There is a good deal of black on the upperparts from the eyes to the tip of the tail, produced by black tipplings to long hairs that are yellowish or reddish basally, the muzzle is reddish, the legs decidedly reddish, and the underparts a somewhat paler brown. It is not a gray appearing animal at all. The two pups are somewhat duller colored, with the black not so intense, and the reddish areas paler. In life, however, the young wolves looked quite dark.

There is at hand an adult male wolf from Prince of Wales Island, Alaska (southwestward from Sergief Island), that is almost entirely black. Another specimen from the interior, the Yukon region, is also black, so that evidently dark color alone can not be considered as distinguishing the wolves of either of these two regions. Two skulls of fully adult wolves from Iskut Summit, sixty miles southeast of Telegraph Creek, do not present any obvious points of difference from the above mentioned adult from Prince of Wales Island. The latter has been recorded by the present writer (Swarth, 1911, p. 136) as *Canis pambasileus* Elliot, in the belief that that name was applicable to a coastal subspecies. The Prince of Wales specimen presents characters of size and color such as are ascribed to *pambasileus* (Elliot, 1905, p. 79). Whether or not the name *pambasileus* may properly be used for a local race from the type locality, the Mt. McKinley region, it does not seem that any distinction can be made as between the wolf

of the coast of southeastern Alaska and the wolf of the adjoining interior. In the light of our limited material, and with the lack of a systematic revision of this group of mammals, it is safer to consider them as all one form, to which the name *Canis occidentalis* Richardson seems applicable.

The material obtained by us in the Stikine region consists of the following specimens: skulls and limb bones of two adults (nos. 31042, 31043) taken at Iskut Summit, sixty miles southeast of Telegraph Creek, the gift of an acquaintance at Telegraph Creek; an adult male (apparently not quite full grown), skin only (no. 31009), shot at Sergief Island, July 20, 1919; and two young females (about half-grown), skins and skulls (nos. 31010, 31011), taken at Sergief Island on August 24 and August 25, 1919.

***Mustela cicognani richardsoni* Bonaparte. Richardson Weasel**

Weasels undoubtedly occur throughout the region traversed, though we ourselves did not see one during the summer. At a trapper's cabin a few miles from Telegraph Creek a pile of desiccated weasel carcasses, his catch of the previous winter, yielded a series of nineteen skulls (nos. 31023-31041), with complete skeletons in most cases. These skulls, in comparison with a series from the coast of southeastern Alaska, exhibit the differences stated by Merriam (1896, pp. 11-13) to distinguish the two subspecies, *Mustela c. richardsoni* of the interior and *M. c. alascensis* of the coast. The Telegraph Creek skulls, as is claimed for *richardsoni*, are perceptibly narrower between the orbits and across the muzzle, and there is a slight difference in the shape of the zygomatic arches in the two lots.

Allen (1903, p. 563) has described *Putorius microtis* from Shesley, British Columbia, near the headwaters of the Stikine, but our series of skulls from Telegraph Creek are evidently all of one species, *Mustela c. richardsoni*.

***Mustela vison energumenos* (Bangs). British Columbia Mink**

One trapped at Doch-da-on Creek on July 19 (no. 31002), and a skeleton preserved that was picked up near Telegraph Creek (no. 31022). The species occurs, probably in fair abundance, throughout the whole Stikine region. The one skin obtained is notably dark colored as compared with specimens of *Mustela v. nesolestes* from certain islands of the Alexander Archipelago, and we were told that the mink

from the Stikine were all dark. The skull pertaining to this specimen has the small sized last upper molar that is supposed to distinguish *energumenos* from *nesolestes*, but in the skull from Telegraph Creek this tooth is as large as in most examples of the latter subspecies. There is at hand a mink from near the mouth of the Taku River and one from Wrangell, both of which are of the same dark color as our Stikine River specimen. Thus the specimens available suggest the existence of a dark colored mainland form extending toward the coast at least along the larger rivers, and reaching some of the islands lying nearest the mainland, and a lighter colored subspecies existing upon most of the islands of the Alexander Archipelago. There is not sufficient material available, however, to verify this surmise.

At any rate, the mink of the upper Stikine Valley is a relatively small form, and not the large *ingens* of the nearby Yukon drainage. At present it seems proper to use for this race the name *Mustela vison energumenos* (Bangs), originally applied to the mink of southern British Columbia. Our one specimen is very similar in appearance to an example of *energumenos* from the vicinity of Seattle.

***Phoca richardi richardi* (Gray). Harbor Seal**

Seals were observed as far up the Stikine River as Doch-da-on Creek, at times in considerable numbers. On May 21, as we began our trip up the river, they were seen in veritable herds over the first thirty miles. At one place there were at least a hundred in sight at once. Farther up stream they became less and less abundant. No specimens were obtained, and the identification here accorded the animals seen is purely inferential.

***Peromyscus maniculatus borealis* Mearns. Northern White-footed Mouse**

***Peromyscus maniculatus macrorhinus* (Rhoads). Rhoads White-footed Mouse**

One hundred and thirty-eight specimens of white-footed mice were preserved, as follows: The Junction, 24 (all adults); Telegraph Creek, 29 (24 adults and 5 young); Glenora, 27 (23 adults and 4 young); Doch-da-on Creek, 27 (15 adults and 12 young); Flood Glacier, 28 (10 adults and 18 young); Great Glacier, 2 adults; Sergief Island, 1 young. (Museum numbers 30569-30705, 31050.)

A series of white-footed mice collected at and near Telegraph Creek in 1902 has been reported upon by Allen (1903, p. 540) under the name *Peromyscus arcticus* (Mearns) (= *Peromyscus maniculatus borealis* Mearns [1911, p. 102]). What is undoubtedly the same series of specimens is listed by Osgood (1909a, p. 49) under *Peromyscus maniculatus arcticus* (Mearns). Therefore, though this museum possesses no examples of *Peromyscus maniculatus borealis* other than our series from the Telegraph Creek region, I feel justified, on the grounds above mentioned, in assuming this series to be representative of the subspecies *borealis*. The chief interest attaching to the Telegraph Creek form in the present connection lies in its relationship to the subspecies *Peromyscus m. macrorhinus*, from the region adjacent to the mouth of the Stikine River. Of *macrorhinus* this museum possesses an abundant representation from various points in southeastern Alaska.

Before proceeding with a discussion of the specimens we collected, certain features of the problem should be stated, in the interest of a clear understanding of conditions. Osgood (1909a) in his comments upon *arcticus* (= *borealis*) and *macrorhinus* makes no direct comparison between the two; at that time there were no specimens extant to show that these forms came together at any point. From his "key" and descriptions, however, certain contrasting characters of these subspecies may be summarized as follows:

Peromyscus m. macrorhinus. General size larger; hind foot, 24 to 25 mm. Tail longer than head and body; usually more than 90, often more than 100 mm. Coloration darker.

Peromyscus m. borealis. General size smaller; hind foot, 19 to 21 mm. Tail about equal to or shorter than head and body; usually less than 90 mm. Coloration paler.

On the Alaskan coast just north of the habitat of *macrorhinus* is the subspecies *hylaesus*. Between *hylaesus* and *borealis*, in the region north of Telegraph Creek, is the subspecies *algidus*, "the interior representative of the dark coast form *hylaesus*" (Osgood, 1909a, p. 56). According to Osgood (*loc. cit.*), *algidus* and *borealis* occur together in places within the general range of the former, and maintain their distinctness. *Algidus*, compared with *borealis*, is a long-tailed form; it differs from the latter in this respect just as *macrorhinus* does. Allen (1903, p. 544) records as *Peromyscus oreas* a single mouse taken in the Cheonnee Mountains (near Telegraph Creek), where *borealis* also was secured. This same specimen, presumably, is recorded by Osgood (*loc. cit.*) as *algidus*. The Cheonnee Mountains are a short distance

southeast of Telegraph Creek; if *algidus* occurs in that range it should be at Telegraph Creek also.

We obtained several long-tailed specimens of *Peromyscus* at and near Telegraph Creek, and supposed that they were examples of *algidus*. Study of the series as a whole, however, inclines me to another explanation of the variation, that seems more satisfactory, namely, that there is continuous distribution of *Peromyscus* along the Stikine Valley, from the habitat of *borealis* in the interior to that of *macrorhinus* on the coast, that there is intergradation between these two subspecies in the Stikine Valley, that Telegraph Creek is about the easternmost point to which intergrades with *macrorhinus* extend, and that the variants obtained by us at that point are all the results of intergradation.

The long-tailed individuals from the Telegraph Creek region, aside from this peculiarity, are not notably different in color or otherwise from the general run of specimens obtained there. At any rate, they could not be grouped together as presenting an aggregation of characters justifying their separation as a distinct subspecies. Neither were they obtained under circumstances that would tend to establish the belief that two different races were concerned.

The *Peromyscus* taken at the Junction are lighter colored than *macrorhinus* of the coast, and they are smaller and shorter tailed. This station is some five miles north of the Stikine River; presumably these mice are more nearly typical of *borealis* than any others we obtained. In this series there is one aberrant individual with an exceedingly long tail; otherwise there is great uniformity in the lot. At the town of Telegraph Creek we obtained more long-tailed mice, and noted a slight increase in general size, as compared with the series from the Junction. Descending the Stikine River from Telegraph Creek, the *Peromyscus* collected at our various stations were progressively larger and darker colored as the coast was approached.

The accompanying diagrams (figs. R, S, T) show variation in hind foot, length of tail vertebrae, and ratio of tail vertebrae to total length, in the white-footed mice taken at our various collecting stations in the Stikine region, as compared with *macrorhinus* of the Alaskan coast. Color and general size vary in about the same way as the characters illustrated. Barring the series from the Junction, which are probably close to true *borealis*, the Stikine River *Peromyscus* are typical of neither *borealis* nor *macrorhinus*. They form a series of intergrades between the two. It is not possible to draw a hard and fast line as a

boundary, both on account of the gradual change in the entire *Peromyscus* population of the intermediate territory and because of individual variation, which brings typical examples of each far within the margin on either side of the debatable strip. Allowing for such variation, however, it seems proper, though an arbitrary division, to consider as *borealis* the mice from the upper Stikine, as far down as Glenora, *macrorhinus* extending up stream as far as Doch-da-on Creek.

Fig. R. Diagram showing individual and geographic variation in length of hind foot of adult white-footed mice (both sexes). Figures at left of the vertical lines indicate numbers of specimens measured; length of lines shows range of individual variation; points connected by lines mark positions of averages.

White-footed mice were found in abundance about human habitations. Usually they were uncommon elsewhere. At the Junction the trapping was done along a stream and in poplar woods, miles from houses, and white-footed mice, while perhaps more abundant than any other small mammal, were not at all numerous. At Telegraph Creek most of our specimens were caught in the house in which we were staying; a few were taken in our several trap lines a mile or more from town. The rows of empty houses at Glenora formed a haven for white-footed mice, and they swarmed there in almost incredible numbers. At Doch-da-on Creek white-footed mice were abundant in the

weed-grown bottom lands, much more so than we found them to be on any other wild land. At Flood Glacier we had difficulty in getting specimens, and at Great Glacier, though some small mammals were more abundant than we found them elsewhere, only two white-footed mice were obtained. At Sergief Island they were extremely scarce; only one specimen was taken.

Fig. S. Diagram showing individual and geographic variation in length of tail of adult white-footed mice (both sexes). Figures at left of the vertical lines indicate numbers of specimens measured; length of lines shows range of individual variation; points connected by lines mark positions of averages.

At the Junction, May 25 to June 6, all *Peromyscus* taken were adult. Most of the females contained embryos, four or five in number; one or two were nursing young. At Telegraph Creek the first week in June young mice began to get into the traps. From the third week in June, on during the rest of the summer, the dark coated juvenals formed the greater part of the catch. At Glenora two *Peromyscus* were caught which had their cheeks filled with a mass of small seeds. The cheeks were distended to the utmost, just as is so often seen in

chipmunks and ground squirrels. This, I believe, is an unusual action for a *Peromyscus*. At the same place an adult female was trapped that had lost one hind leg at the knee and all of the tail. These mutilations were evidently of long standing and the animal was in good condition otherwise. It may be doubted, however, whether it could have survived them in other surroundings; the old cabins here occupied by the mice probably afforded exceptional shelter from many dangers.

Fig. T. Diagram showing individual and geographic variation in ratio of length of tail vertebrae to total length in adult white-footed mice (both sexes). Figures at left of the vertical lines indicate numbers of specimens measured, length of lines shows range of individual variation; points connected by lines mark positions of averages.

Neotoma cinerea saxamans Osgood. Northern Bushy-tailed Wood Rat

Fourteen specimens collected at the following points in the upper Stikine Valley: Telegraph Creek, six adults, two young; Glenora, one adult, four young; mountain above Doch-da-on Creek, one adult. (Museum nos. 30706-30719.) At Telegraph Creek specimens were taken in the talus at the base of certain rocky cliffs that rise back of the town. The rats were not numerous, and after one or two had been caught at a place the traps usually remained undisturbed. The old houses of the abandoned town of Glenora afforded shelter to the wood rats, but apparently not more than one or two families occupied any one cabin. From several of the cabins the rats had well worn trails leading into the surrounding thickets. There they cut quantities of green vegetation, some to be carried into the houses and eaten at once, some apparently to be dried for later use. Most of the old cabins had the doors and windows boarded up, and in the gloom of the interior the rats and mice were active all day.

The cabins and warehouses with their miscellaneous contents, long abandoned, formed a veritable wood rats' paradise, and they gave their imagination full swing in the lines of nest building and the accumulation of useless objects, for which their tribe is famous. In one place a storeroom full of snowshoes had been entered, and of the contents there was little but the wooden frames left. The leather thongs were hanging in shreds. In an old barn, round masses of baling wire had been filled out with horse manure and grass to form extraordinary globular nests.

The one specimen of *Neotoma* from the vicinity of Doch-da-on Creek was taken on the mountain side at an elevation of about 2000 feet. This was the farthest down stream that we found the species, but I was told by a trapper that he had occasionally seen wood rats near the mouth of the Iskut River, which empties into the Stikine a little above the British Columbia-Alaska boundary line.

A young one taken at Telegraph Creek on June 9 was about one-third grown. Others were trapped at Glenora three weeks later, of about the same size. Three adult females caught at Telegraph Creek on June 9 contained embryos; two had three each, one had four.

Fig. U. Basaltic cliff at Telegraph Creek. The talus beneath is a favorite habitat of the bushy-tailed woodrat. At the upper edge of the loose rocks in particular, many sticks and other rubbish accumulated by these rats were to be seen between the larger boulders. Photograph taken June 12, 1919.

Synaptomys borealis wrangeli Merriam. Wrangell Lemming Mouse

Found at but one place on the river, at Great Glacier. Three specimens obtained (nos. 30752-30754), all males, taken on August 10, 13, and 14, respectively. Just one, the largest and the only one that is fully mature, shows the gray patches over the hip glands. All three were trapped in alder thickets, in places frequented by *Evotomys*.

There have been available for comparison three specimens of lemming mice (in the E. P. Walker collection), from Wrangell, Alaska, the type locality of *Synaptomys wrangeli*, ten from mainland points in southeastern Alaska, ranging from Boca de Quadra to Port Snettisham, and nine from the Prince William Sound region, Alaska. I also received, as a loan from the United States Biological Survey, six typical specimens of *Synaptomys borealis dalli*, three from points near the base of the Alaska Peninsula, two from the Kuskokwim drainage, and one from the Yukon.

As far as I can see, the specimens from the coast of southeastern Alaska, island and mainland, are all alike. They are all *wrangeli*. Furthermore, the differences between *wrangeli* and *dalli* are slight, and as these differences in the series here assembled are bridged by individual variation and to some extent by geographic variation, I consider the two forms as subspecies of one species, *Synaptomys borealis*. (For the use of this name, see Preble, 1908, pp. 183-186. See also Hollister, 1912, p. 19.)

The skull of *dalli*, compared with *wrangeli*, is somewhat larger, and rather more angular, and more heavily built. Otherwise, I can see no differences in the two lots. Some of those from the Prince William Sound region incline toward *dalli* in their larger size, as compared with more southern specimens, indicating, perhaps, intergradation between *wrangeli* and *dalli* at what is probably the northern limit of the form *wrangeli*. Externally, four specimens of *dalli* are appreciably more reddish than any in the *wrangeli* series. The two remaining *dalli* are of the same coloration as the mode of *wrangeli*.

Thus, instead of *wrangeli* being an insular species, confined to Wrangell Island, my conception of it is as being a rather wide ranging form, and a coastal subspecies, contrasted with *dalli* of the interior. Its range is the coast of southeastern Alaska, from Prince William Sound south at least to Boca de Quadra. It has been taken upon two islands, Hinchinbrook Island, Prince William Sound, and Wrangell Island, both but slightly separated from the mainland.

Another species, *Synaptomys andersoni*, has been described by Allen (1903, p. 554), based upon a single specimen from Level Mountain, near the headwaters of the Stikine River. In all likelihood, therefore, mice of this genus occur throughout the entire length of the Stikine Valley. At present, however, with the few specimens extant in collections, it is not possible to form an opinion as to whether or not there are two species or subspecies in existence, at the head of the river, and toward its mouth, respectively.

***Evotomys dawsoni dawsoni* Merriam. Dawson Red-backed Mouse**

An adult female (no. 30720) was taken at the Junction, June 4, trapped during the day on a dry, poplar-covered hillside. It is apparently a typical example of *Evotomys dawsoni dawsoni*. The next obtained (no. 30721) was caught at Doch-da-on Creek, July 17, in a tangle of alders, grass, and nettles bordering a slough. This specimen is a male, not fully mature but evidently referable to *dawsoni*. Somewhere in the section of the river between Doch-da-on Creek and Flood Glacier lies the dividing line between *dawsoni* and *wrangeli*. It would be of interest to find if the two occurred together at any point.

***Evotomys wrangeli* Bailey. Wrangell Red-backed Mouse**

Thirty specimens taken (nos. 30722-30751), three at Flood Glacier, twenty-three at Great Glacier, and four at Sergief Island. Of this series there is one old male (no. 30735, Great Glacier), with conspicuous gray patches over the hip glands, and showing rooted molars with deeply worn surfaces. There are eleven more that may be termed adult, as being in the adult pelage (though none of these has the gray flank patches more than faintly indicated). The remainder are young at various stages of growth.

The red-backed mice from these three stations are all *E. wrangeli*, indistinguishable from specimens at hand from Wrangell Island. The range of that species is thus carried far inland up the Stikine Valley, very close to the habitat of *dawsoni*, if in fact the two do not meet. The four specimens from the uppermost station, Flood Glacier, show no appreciable departure from the mode of *wrangeli*; there is no indication here of intergradation toward the nearly adjacent *dawsoni*.

The two species, however, resemble each other so closely in form, and in some pelages in color also, that *wrangeli* would seem to be a coastal offshoot of *dawsoni*, bearing somewhat the same relation to that

species as *Microtus admiraltiae*, of Admiralty Island, does to *M. drummondi* of the adjacent mainland. The two *Microtus*, however, are less widely separated than the *Evotomys* have become. Further, it may be assumed that *Evotomys phaeus*, of the Alaskan mainland south of the habitat of *wrangeli*, is of a different line of descent, it differs so markedly from both *dawsoni* and *wrangeli* in its combination of large size, pale coloration, and long tail. Much remains to be learned regarding the distribution and relationships of the red-backed mice of the northwest.

TABLE I

Measurements in millimeters (average, minimum and maximum) of adult *Evotomys wrangeli* from Wrangell, Alaska; measurements taken by Ernest P. Walker

	Total length	Tail vertebrae	Hind foot	Ear
10 adult males.....	141 (130-159)	35.7 (31-42)	18.2 (18-19)	11.8 (10-13)
10 adult females.....	131.4 (127-152)	32.4 (28-40)	17.9 (17-18)	11.9 (10-13)

TABLE II

Measurements in millimeters of adult *Evotomys* from the Stikine River

<i>Evotomys wrangeli</i>				Length	Tail vertebrae	Hind foot	Ear
30724	♂	Flood Glacier	Aug. 4, 1919	135	34	19	11
30735	♂	Great Glacier	Aug. 13, 1919	145	39	20	11
30751	♂	Sergief Island	Aug. 24, 1919	135	34	20	11
30726	♀	Great Glacier	Aug. 11, 1919	140	33	20	11
30728	♀	Great Glacier	Aug. 12, 1919	147	34	19	11
30732	♀	Great Glacier	Aug. 13, 1919	125	33	20	11
30749	♀	Sergief Island	Aug. 22, 1919	148	36	19	11
<i>Evotomys dawsoni dawsoni</i>							
30720	♀	4 mi. N. Telegraph Creek	June 14, 1919	120	29	17	12
30721	♂	Doch-da-on Creek	July 17, 1919	129	28	18	11

***Microtus drummondi* (Audubon and Bachman).**

Drummond Meadow Mouse

Fifty-five specimens taken (nos. 30755-30809), from the following points: Sawmill Lake, near Telegraph Creek, 16; Glenora, 20; Doch-da-on Creek, 18; Sergief Island, 1.

Around Telegraph Creek we found this species at but one place, in the immediate vicinity of Sawmill Lake. Some parts of the lake shore were grown with tall grass, partly flooded, and strewn with logs and other drift. Here the Drummond meadow mice had their homes; their runways traversed the moss-grown logs, and, in the intervals between, they evidently traveled through very deep water when necessary.

Allen (1903, p. 550) comments upon the capture of but a single specimen of *M. drummondi* at Telegraph Creek, compared with an abundance of *M. mordax*, as indicative of the two species having different centers of abundance, but from our own experience there seems to be demonstrated merely a preference for different sorts of surroundings. *Microtus mordax*, about Telegraph Creek, was mainly caught along stream sides, the kind of habitat it is known to frequent in other parts of its range, and none was taken in any of the semi-aquatic runways where *M. drummondi* was obtained.

At Glenora the two species occurred in exactly the same places, runways used commonly by both traversing the weed-grown meadows about the old houses. At Doch-da-on Creek also they were found together in the bottom lands.

We took no Drummond meadow mice at either Flood Glacier or Great Glacier, but the capture of a single specimen at Sergief Island may be taken as indicative of the occurrence of the species over the entire length of the river. There are probably times when *drummondi* is abundant at Sergief Island, but our visit there was during a period of scarcity.

Half-grown young were taken at Telegraph Creek the middle of June, and a little later young not more than two-thirds the bulk of adults were breeding. Embryos in gravid females ranged from four to ten in number.

***Microtus mordax mordax* (Merriam). Cantankerous Meadow Mouse**

Found at every collecting station except Sergief Island, but not equally numerous at all places. One hundred and one specimens taken (nos. 30810–30909, 31051), from the following points: The Junction, 12; Telegraph Creek, 16; Glenora, 38; Doch-da-on Creek, 21; Flood Glacier, 12; Great Glacier, 2. At the Junction, May 25 to June 6, specimens came in slowly. There was a little meadow at that point that showed signs of having been populated by meadow mice during the winter months, but the animals had since moved into the nearby woods. Those we obtained were taken along the streams or in wet places among the trees. They were apparently rather solitary in their habits and there were no well defined runways in use. At Glenora meadow mice were extremely abundant. The open meadow land was not frequented to any extent, but there were extensive clearings, since grown up with fireweed, that were intersected in every direction with

much-traveled runways. The shelter afforded by rail fences and the sides of the crumbling houses was also taken advantage of, and traps placed in such situations yielded mice night after night. A great many more were caught at that station than the thirty-eight that were preserved.

At Doch-da-on Creek, this meadow mouse was not especially abundant. Most that were caught were taken in weed-grown bottom lands. At Flood Glacier, well defined runways, with many little piles of freshly cut green stuff, gave an appearance of an abundance of meadow mice, but despite the plentiful sign, specimens were taken but slowly. Apparently one full-grown *Microtus* can establish and operate an elaborate system of runways. One weed-grown area some fifty feet square, intersected with well used paths in which were found fifteen or twenty little piles of freshly cut green weed stems, yielded just one adult meadow mouse. At Great Glacier but two specimens were trapped.

The occurrence of a meadow mouse of the *longicaudus* group over the entire length of the Stikine River is of interest as bearing upon the relationship of *Microtus mordax* of the interior and *M. macrurus* of the coast. The two forms are closely related, and though heretofore recognized as distinct species, the differences between them are comparable to what is found among subspecies of some one species in other sections of the genus. The main differences between the two are of coloration and of length of tail. There are skull differences also but not trenchant ones. *Macrurus*, like other coastal species, is of dark brownish coloration, quite reddish-brown dorsally; *mordax* is distinctly gray. *Macrurus* has a longer tail than *mordax*, longer in actual measurement and longer in relation to total length. Both *macrurus* and *mordax* in the northern parts of their respective ranges (southeastern Alaska and northern British Columbia) are somewhat smaller than they are at their southern limits.

We obtained long-tailed meadow mice at various points on the Stikine River down as far as Great Glacier, and I have at hand several additional specimens (from the collection of E. P. Walker) taken at Clearwater Creek, just below the British Columbia-Alaska boundary line. There are also available specimens from Wrangell and Mitkof islands (near the mouth of the Stikine), and from various points on the mainland short distances north and south of the mouth of the river. *Macrurus* is abundantly represented in the collection of this Museum from various points in the Alexander Archipelago.

Macrurus, as represented by specimens from the more western islands of the Alexander Archipelago, is a very different looking animal from *mordax* of the interior. The brown coloration of the one, and the gray of the other, correlated with the differences in size and length of tail, render the two series absolutely unlike. Meadow mice from Mitkof and Wrangell islands, however, are, in color, about midway between the extremes indicated, and the few specimens at hand from the lower Stikine tend still further to bridge the gap. As regards color, it is possible to arrange specimens with regard to geographical position, so as to produce a graded series of changes from one extreme to the other, with no abrupt break at any point. The same is true of general size, and of skull characters. The accompanying diagram (fig. V)

Fig. V. Diagram showing individual and geographic variation in ratio of length of tail vertebrae to total length in adult long-tailed meadow mice (both sexes). Figures at left of the vertical lines indicate numbers of specimens measured; length of lines shows range of individual variation; points connected by lines mark positions of averages.

shows the manner in which ratio of length of tail to total length acts between one extreme and the other. There is a gradual lengthening of tail as the lower river is approached. On these grounds I believe that *macrurus* should be treated as a subspecies of *Microtus mordax*. *Microtus mordax mordax* may be regarded as occurring along the Stikine River at least as far down as a point (Clearwater Creek) some twenty miles from the mouth of the river.

Microtus vellerosus was described by Allen (1899, p. 7) from the Liard River, and specimens from Telegraph Creek were referred by the same writer (1903, p. 548) to that form, regarded as a subspecies, *Microtus mordax vellerosus*. Bailey, in his revision of the genus *Microtus* (1900, p. 48, footnote), denies recognition to this race, regarding it as inseparable from typical *Microtus mordax mordax*. Comparing our Telegraph Creek specimens with series of *mordax* from northern California, I am unable to distinguish between them, consequently I follow Bailey in the use of the name *mordax* for the northern animal.

TABLE III

Measurements in millimeters (average, minimum and maximum) of adult *Microtus* from the Stikine region and from southeastern Alaska

<i>Microtus mordax mordax</i>	Total length	Tail vertebrae	Hind foot
10 adults, The Junction, Stikine River	170.6 (155.0-180.0)	55.3 (50.0-62.0)	20.9 (20.0-22.0)
10 adults, Telegraph Creek, Stikine River	182.5 (170.0-197.0)	60.8 (51.0-70.0)	21.0 (20.0-22.0)
10 adults, Glenora, Stikine River	192.2 (170.0-206.0)	66.7 (52.0-76.0)	21.4 (21.0-22.0)
8 adults, Doch-da-on Creek, Stikine River	184.1 (170.0-200.0)	62.9 (55.0-70.0)	21.0 (20.0-22.0)
7 adults, Flood Glacier, Stikine River	186.4 (180.0-200.0)	66.1 (62.0-70.0)	22.4 (22.0-23.0)
<i>Microtus mordax macrurus</i>			
5 adults, Mitkof Island, s.e. Alaska	174.2 (164.0-183.0)	70.4 (68.0-72.0)	21.8 (21.0-22.0)
10 adults, Prince of Wales Island, s. e. Alaska	189.3 (172.0-207.0)	73.3 (63.0-80.0)	21.1 (20.0-22.0)

***Ondatra zibethica spatulata* (Osgood). Northwestern Muskrat**

Taken at but one point, on Sergief Island. Six specimens were taken (nos. 30996-31001), on September 3, 4 and 5, of which three are adult and three young. Of one the skin was subsequently lost, leaving the specimen represented by a skull only. The muskrats frequented a series of little ponds just above the reach of the tides, where the grasses of the salt marsh gave place to clusters of reeds and thickets of alder and willow. These ponds were connected by well trodden trails through the grass, like large *Microtus* runways, paths that could be

Fig. W. Marsh at western end of Sergief Island, Alaska. The rocky backbone of the island, densely covered with spruce, rises abruptly from the surrounding swamps. At the base of this slope is a bordering fringe of bushes, mostly alder, red-berry elder and willow, with, underneath, tangles of salmon-berry and devil's club. The marshes farthest inland, as here shown, are mostly of fresh water, with growths of tules and other fresh-water plants. This pond and others nearby were frequented by muskrats. The surface of this pond was in part covered with floating tules that had been recently cut by these mammals. Birds seen in such surroundings were green-winged teal, pintail, mallard, pectoral sandpiper, and Wilson snipe. Black swifts were seen almost daily soaring over this marsh. Photograph taken September 5, 1919.

traced in the muddy bottom of shallow water and even across the deeper ponds, for the line of travel parted the floating moss and other aquatic vegetation and left just as distinctly marked a highway in the water as elsewhere. All along these trails there were signs of muskrat activities, masses of cut reeds floating in the ponds, and piles of coarse grass and other vegetation in the drier places. There were

no "houses" to be seen anywhere. Apparently the animals were living in the shallow banks bordering some of the ponds, but this must have been farther back in the alder thickets than we penetrated, for we found no occupied burrows.

Muskrats presumably occur the length of the Stikine River, but if so they are scarce, or else, perhaps, in widely scattered colonies that are easily overlooked. Fresh sign was found about a beaver pond at Flood Glacier, but evidently of but a few individuals. We were told of the occurrence of muskrats at Doch-da-on Creek, but we, ourselves, saw no evidence of their presence.

The specimens obtained present such marked peculiarities of appearance as may very well be indicative of an undescribed race from the coast of southeastern Alaska, but at present it does not seem advisable to affix a name to this isolated series. In color they are dark dorsally, and extremely gray elsewhere. *Spatulata*, as represented in this Museum by comparable specimens from various parts of its range to the northward of the Stikine, is decidedly reddish. Our Sergief Island specimens are closely similar to fall examples of *osoyoosensis* from the Puget Sound region. Some of the latter have an indication of cinnamon on the underparts and sides, which is seen in none of the Sergief Island specimens, but there are certain skins from the neighborhood of Seattle that are exactly like them in color. *Osoyoosensis*, however, is a large species, and the specimens in question are of small size, agreeing with *spatulata* in this respect. Thus the Sergief Island muskrats are like *osoyoosensis* in color, like *spatulata* in size. The skull is of the *spatulata* type, being relatively broad, with wide spreading zygomata.

There are five muskrats at hand (Mus. Vert. Zool., nos. 8353-8357) from Revillagigedo Island, Alaska, which lies south of the Stikine River, hence nearer the range of typical *osoyoosensis*. These specimens, according to Hollister (1911, p. 23), "while typical of *spatulatus* in size and color, show a slight approach toward *osoyoosensis* in the shape of the audital bullae and in the high, rounded jugals." It is obviously necessary that specimens be taken from various points along the coast between the known habitats of *spatulata* and *osoyoosensis* before the peculiarities of the series at hand from Revillagigedo and Sergief islands can be explained. In the meantime, while those from the latter point are not particularly like *spatulata*, I prefer to list them by that name, as the race they most nearly resemble, rather than apply a new one, based upon characters the meaning of which is not understood.

TABLE IV

Measurements in millimeters of adult *Ondatra*

		Total length	Tail vertebrae	Hind foot
30996	♀ ad. Sergief Id., Alaska	502	235	76
30998	♂ ad. Sergief Id., Alaska	520	225	74
31006	♂ ad. Sergief Id., Alaska	590	246	77
Average of 4 adults of <i>Ondatra z. spatulata</i> , northern British Columbia and Alberta ¹		530	232	74.5
Average of 10 adults of <i>Ondatra z. osoyoosensis</i> , from Oroville, Wash. ²		589	271	83

¹Hollister, 1911, p. 22²Hollister, 1911, p. 25**Mus musculus musculus** Linnaeus. House Mouse

One specimen preserved (no. 30910), an immature female caught at Sawmill Lake, June 12; several were trapped in a warehouse at Telegraph Creek. Allen (1903, p. 540) has recorded the occurrence of *Mus musculus* at Telegraph Creek in 1902, and it has probably been established there since a much earlier date, but from our experience it would seem not to be increasing in numbers or extending its range to any extent. It is an interesting fact that we did not obtain any at Glenora. House mice must have been there when the town was occupied by people. Apparently upon the withdrawal of the human population, the introduced *Mus musculus* was unable to compete successfully with the native *Peromyscus*, even under as favorable conditions as prevailed in the wooden houses of the abandoned city.

Zapus saltator Allen. Stikine Jumping Mouse

Found only near Telegraph Creek and at Glenora. The former is the type locality of this species (see Allen, 1899, p. 3) and a special effort was made there to get a series but the mice were not so numerous as at Glenora. Altogether, thirty-seven Stikine jumping mice were preserved (nos. 30911-30945, 31048, 31049), as follows: from The Junction, 1; Telegraph Creek, 7; Glenora, 29. All that were taken were adults. No young ones were seen and no gravid females were collected until June 30. After that date embryos, three to five in number, were found in most of the females taken.

At Telegraph Creek specimens were caught in traps set about the edge of Sawmill Lake, mostly in thickets or under logs. At Glenora the jumping mice were found using *Microtus* runways extensively,

in the tall grass and fireweed. They were evidently more or less active during the day, at least in the early morning. There is considerable color variation in the series we collected, about one-fourth of the specimens being notably grayish as compared with the rest, and with very little brown on the back or ochraceous on the sides.

Zapus saltator has been taken at the mouth of the Skeena River (Preble, 1899, p. 32), and at the mouth of the Taku River (Swarth, 1911, p. 135). It would seem therefore that it might also range the entire length of the Stikine River, and I believe it to be very possible that it does so, despite our failure to obtain specimens along the lower part of that stream.

***Erethizon epixanthum nigrescens* Allen. Dusky Porcupine**

Porcupines occur throughout the whole of the region we traversed, but they are apparently not abundant. We saw very few. On June 12 one was taken a few miles west of Telegraph Creek. On July 11 one was seen on the mountain side above Doch-da-on Creek, and on July 17 one entered our camp at the same locality. These were all that were encountered during the summer. The one obtained (no. 31001), a male, is not much more than half the bulk of an ordinary adult porcupine, but aside from its small size there is little about the animal to suggest immaturity. It must have been born the preceding year at least. It was badly infested with tapeworms, the abdominal cavity containing packed masses of the parasite in almost incredible amount, and this condition might, perhaps, explain the poor physical development of the host. The general coloration of this animal is pale yellow, the long overhairs being extensively tipped with this color and the quills being mostly yellowish. The basal portion of the body hairs is dull brownish, as is also the entire face. The two other porcupines that were seen, apparently normal adults, were extremely dark colored.

***Marmota caligata caligata* (Eschscholtz). Northern Hoary Marmot**

Apparently a timber-line species in the upper Stikine region, and descending to sea level at the coast. Whether or not it also occurs at high altitudes in the coastal region I do not know. We saw none in the immediate vicinity of Telegraph Creek, though the species doubtless occurs in the surrounding mountains. An acquaintance who climbed Glenora Mountain on July 2 told us of seeing a marmot on the heights above the timber. We ran across more or less sign on the bare ridges above Doch-da-on Creek in July; on July 23 one of the animals was

seen there, far above the timber, too wary for a near approach. On Kirk's Mountain, some miles north of Doch-da-on Creek, Dixon heard a number of marmots whistling.

At Flood Glacier some marmots were residing in rock piles at the base of the mountain, several miles back from the river but at a not much higher altitude. Dixon shot two here on August 1, an adult male (no. 31005) and a young one, perhaps a quarter grown (no. 31004). The species was not encountered farther down the river.

The marmots of the mountains about Doch-da-on Creek and Glenora may well be *Marmota caligata oxytona* Hollister. This would be at about the western limit of that subspecies. The adult male from Flood Glacier has a large skull, well within the limits of *oxytona*, and exhibiting the characters of that race as detailed by Howell (1915, p. 63), but in external measurements this animal is no larger than coastal specimens of the subspecies *caligata*. The young male from Flood Glacier is at the same stage of growth as a young *caligata* at hand from the mouth of the Chickamin River, Alaska, and the two are indistinguishable in appearance. The peculiarities of the skull in the adult may be an indication of intergradation between *caligata* and *oxytona* in the middle reaches of the Stikine, but the material at hand does not suffice to settle that point.

Citellus plesius plesius (Osgood). Bennett Ground Squirrel

On June 4 two ground squirrels were taken at the Summit (nos. 30994, 30995), and one other was seen. This same place was visited on May 29 and again on June 5 without any animals being encountered. It was still quite wintry at that altitude, with much snow on the ground and ice on the lakes, and it seemed likely that most of the ground squirrels were still in hibernation. M. P. Anderson had found them in abundance at the Summit in July and August, 1902 (Allen, 1903, p. 534). The species occurs in the Stikine region only on the mountain slopes above timber line; it is found nowhere in the lower valleys.

The three animals seen were all observed within a radius of two hundred yards. There were a number of fresh looking burrows at the same place. These holes were scattered, though sometimes there were two or three fairly close together; some were amid thickets of low bushes, others out in the open meadows. They were small, considering the size of the animal, and there were no noticeable mounds of earth at the entrances. Of the two animals collected, the stomachs

were well filled with masticated moss and lichens. The female contained four small embryos. Anderson (Allen, *loc. cit.*) in 1902 collected young squirrels "one-fourth to one-half grown" at the same place on July 31.

When we were at Glenora two acquaintances who were camped nearby made a trip to the summit of Glenora Mountain, which rises just north of the town. They reported an abundance of ground squirrels on the slopes above the timber. We kept a careful lookout for the species on the mountains above Doch-da-on Creek where the surroundings were apparently ideal, but saw none of the animals nor any burrows or other certain sign of their presence.

***Eutamias borealis caniceps* Osgood. Gray-headed Chipmunk**

Of general distribution in the region about Telegraph Creek and Glenora; not abundant but apt to be encountered anywhere in the lowlands. At Doch-da-on Creek chipmunks were noticeably less abundant, and the species was not seen at all farther down the river. While apparently mostly at low altitudes, chipmunks were sometimes found well up the mountain sides. On July 11 one was seen at timber line (about 3000 feet) above Doch-da-on Creek.

Dandelions were a favorite food. Toward the end of June and in July these were going to seed, and chipmunks were constantly seen stripping the fluffy heads. Individuals had certain favorite spots for eating, and at such places there were heaps of dandelion fuzz and parts of the blossoms.

Twenty-eight specimens were collected (nos. 30946-30973), as follows: Telegraph Creek, fifteen adults; Glenora, five adults; Doch-da-on Creek, two adults and six young.

The chipmunk of the Telegraph Creek region was identified as *Eutamias caniceps* by Allen (1903, p. 533). Preble (1908, p. 169) considers *caniceps* as a subspecies of *Eutamias borealis*, and I am here following his opinion. No topotypes of *caniceps* nor any examples of *borealis* have been available for comparison.

***Sciurus hudsonicus hudsonicus* (Erxleben). Northern Red Squirrel**
***Sciurus hudsonicus picatus* Swarth. Northwest Coast Red Squirrel**

Red squirrels were not abundant at any point visited by us in the upper Stikine Valley, though seen in small numbers almost everywhere. About Telegraph Creek and Glenora from five to ten individuals might

be encountered in the course of a day's walk. At Doch-da-on Creek they were less numerous, due perhaps to their having been incidentally killed by the systematic trapping that had been carried on during the previous winter over much of the ground we covered at that point. At Flood Glacier and Great Glacier, red squirrels were extremely scarce. We realized, of course, the fact that this species occurred as two different geographic races, at the mouth of the Stikine and at the head of the river, respectively, and that there was probably continuous distribution of the species for the entire length of the stream. We

Fig. X. Thicket of wild cherry (*Prunus demissa*) at Telegraph Creek. This shrub grows in abundance in that region; by the middle of June the bushes are covered with white flowers. The gray-headed chipmunk was characteristically found in such surroundings as are here shown, on rather broken ground that was grown up with bushes of this sort. Photograph taken June 15, 1919.

realized also that in all probability somewhere near Flood Glacier or Great Glacier was the critical point where the two subspecies meet, and for that reason we bent every effort toward getting specimens from those stations. However, not more than two or three were seen at each place. At Sergief Island, too, red squirrels were scarce.

Altogether we collected twenty specimens (nos. 30974-30993), fifteen adults and five young, from the following localities: Telegraph Creek and vicinity, ten; Glenora, two adults and one young; Doch-da-on Creek, three full-grown young; Flood Glacier, one; Great Glacier, one; Sergief Island, one adult and one young. The Telegraph Creek speci-

mens were taken at various points between that town and the Summit, twelve miles to the northward. Six specimens from Telegraph Creek were submitted to Mr. E. A. Preble, of the United States Biological Survey, for subspecific determination. His conclusion is that these squirrels are "virtually identical with *Sciurus h. hudsonicus*. In some respects, notably in the color of the back, they show some slight approach to *S. h. petulans* of the coast. They agree, however, with *hudsonicus* as regards the color of the fringe of the tail." The Glenora and Doch-da-on Creek specimens are clearly in the same category as the Telegraph Creek specimens; they are all *S. h. hudsonicus*. The squirrels from Flood Glacier, Great Glacier, and Sergief Island are just as unequivocally *S. h. picatus*.

As between *hudsonicus* and *picatus*, there are differences of color and of the skull. Red squirrels from Doch-da-on Creek (three full-grown young) are in both respects typical of *hudsonicus* and they represent the farthest point down stream at which this subspecies was taken. Our next collecting station was Flood Glacier, some forty miles down the river, and, as noted, there was taken at that point but the one red squirrel, typical of *picatus*, both as regards color and skull. Whether there actually is a stretch of country in this intermediate region where red squirrels are as scarce as our experience seems to indicate, or whether we were merely unlucky in the necessarily limited areas our field work covered at Flood Glacier and Great Glacier, remains still to be determined. It may be, of course, that there is actually a notable scarcity of the animals throughout this intermediate region, that there is some attribute of the country that is unfavorable to the red squirrel, and hence serves to keep apart these two subspecies. (For the use of the name *Sciurus hudsonicus picatus* see Swarth, 1921*b*, p. 92.)

We gained but little information regarding the life history of the red squirrel in the region explored. Near the Junction individuals were several times seen to enter holes in the ground, holes that, from their appearance, evidently served as homes. Squirrel nests were sometimes seen in the trees, but they were not numerous. Females collected May 25 and 26 contained embryos, four and five in number, and about 30 millimeters long. A young male shot at Glenora, July 2, is about two-thirds the length of an adult, and about a quarter the weight. The three young ones from Doch-da-on Creek, taken July 14, 17, and 22, respectively, are nearly full-grown, being but slightly below adults in measurements and weight.

The first red squirrel collected near Telegraph Creek, on May 26, had almost completely finished the molt into the summer pelage. Others shot during the next two weeks are either in the winter pelage throughout or else variously advanced in the change, showing ragged patches of the old coat. Those taken farther down the river are all in summer pelage.

An adult female taken at Glenora July 4 (no. 30986) has the incisors of both jaws malformed so that they could not meet, the two lower teeth passing together to the left of the upper ones. All four had grown to abnormal length, but not so much so as to endanger the animal's life. They were evidently worn down somewhat by the friction sideways; the teeth are beveled, but not on the same plane as in normal individuals. This squirrel was in good condition, in fact there was some fat under the skin. A western goshawk collected at Flood Glacier contained in its stomach the remains of a red squirrel; doubtless all the hawks of the region prey upon this species to some extent.

TABLE V

Measurements in millimeters of *Sciurus* from the Stikine Region and from southeastern Alaska

<i>Sciurus hudsonicus hudsonicus</i>				Total length	Tail vertebrae	Hind foot	Ear
30975	♂	Telegraph Creek, B. C.	May 29, 1919	330	130	47	17
30976	♂	Telegraph Creek, B. C.	May 29, 1919	315	125	48	17
30977	♂	Telegraph Creek, B. C.	May 29, 1919	330	127	47	17
30978	♂	Telegraph Creek, B. C.	May 29, 1919	332	122	48	16
30982	♂	Telegraph Creek, B. C.	June 18, 1919	330	125	50	18
30983	♂	Telegraph Creek, B. C.	May 27, 1919	330	133	50	19
30987	♂	Doch-da-on Creek, B. C.	July 22, 1919	300	120	48	17

Sciurus hudsonicus picatus

30991	♂	Great Glacier, B. C.	Aug. 10, 1919	310	122	47	14
30993	♂	Sergieff Id., Alaska	Sept. 4, 1919	300	115	45	13

Average measurements of 8 males from southeastern Alaska

312.37 125.37 50.75

Sciurus hudsonicus hudsonicus

30974	♀	Telegraph Creek, B. C.	May 26, 1919	320	120	50	16
30979	♀	Telegraph Creek, B. C.	May 30, 1919	320	125	47	16
30980	♀	Telegraph Creek, B. C.	May 31, 1919	325	125	46	16
30984	♀	Glenora, B. C.	July 1, 1919	320	130	44	14
30986	♀	Glenora, B. C.	July 4, 1919	295	127	44	17

Sciurus hudsonicus picatus

30990	♀	Flood Glacier, B. C.	July 31, 1919	293	109	47	16
30992	♀	Sergieff Id., Alaska	Sept. 2, 1919	300	114	48	14

Average measurements of 8 females from southeastern Alaska

308.25 123.0 51.25

Lepus americanus macfarlani Merriam. Mackenzie Varying Hare

We were told that some years rabbits occurred in abundance in the country about Telegraph Creek, but we were there during a period of scarcity, and they were all but totally absent. As evidence of former abundance we found scattered through the woods many crumbling rabbit skeletons, bleached and weathered, which had lain there for a year at least, perhaps longer. On June 18 fresh rabbit tracks were seen in the dust of a trail some five or six miles west of Telegraph Creek, and on July 7 a young rabbit about two-thirds grown (no. 31003) was taken near the Stikine River opposite Glenora. No others were seen, nor any indication of their presence, at any other point.

Castor canadensis canadensis Kuhl. Beaver

An abundant species on the lower Stikine, where the many miles of flooded bottom lands, the mazes of winding channels and sloughs, and the abundant forest growth, all combine to make conditions that are well-nigh ideal for the beaver. Above "the Cañon" the species is scarce. There are undoubtedly many obscure little ponds hidden in the woods and blind sloughs and channels running back from the river that still shelter small and scattered colonies, but the beavers have been so nearly extirpated in this region that trapping is no longer profitable.

A few miles from Telegraph Creek there were beaver ponds, some of considerable size, but we were told that the beavers had long been wiped out. At Glenora, one evening, the resounding "plop" of a beaver's tail in the water near the river's edge gave evidence of one survivor, at least. Near Doch-da-on Creek, several miles back from the river, there was a series of ponds, all occupied by beavers, though so many had been caught there during the several years immediately preceding our visit that there were probably but few still left.

At Flood Glacier and at Great Glacier beavers were seen, and also abundant evidence of recent activities. At Farm Island, just above Sergief Island, at the mouth of the river, Dixon found a colony of some size, and on September 5 he trapped two at that point. These two specimens (nos. 31013, 31014), immatures, probably born the preceding year, were the only ones taken.

This material is too scanty to definitely determine the subspecific position of the beaver of the Stikine region, but it may be said that the two animals obtained are appreciably paler in coloration than *phaeus*, of Admiralty Island, or even than *leucodonta*, of Vancouver Island.

We saw trappers' skins, also, from various points on the Stikine, and they all appeared to be paler colored than *phaeus*. It seems safe to assume that but one subspecies of beaver occurs over the entire length of this river, and apparently it is a relatively pale-colored form. There are probably beavers on the mainland coast of southeastern Alaska wherever conditions are suitable, and also on most of the islands. From this whole general region, however, specimens are available only from Admiralty Island, where the dark colored *Castor c. phaeus* occurs. Whether this form occupies a habitat more extensive than this one island, and the extent of the area on the coast of Alaska that is occupied by the paler colored subspecies of the Stikine region, are points that still remain to be ascertained.

***Odocoileus columbianus sitkensis* Merriam. Sitka Deer**

No deer nor any sign of their presence was seen until we reached the mouth of the river. At Sergief Island the fresh tracks of one individual were seen on the beach during the first week in September. Deer are fairly numerous on the nearby Farm Island, but they seldom cross over to Sergief. Dixon spent several days (August 26-29) on a trip to Mitkof Island. Deer are abundant there, as on most of the islands of the Alexander Archipelago, and on August 28 three were shot. One of these (no. 31012), a spike buck, was preserved as a specimen.

***Alces americanus gigas* Miller. Alaska Moose**

The most important game mammal of the region and the main source of fresh meat for the residents of the country. We were told that twenty or thirty years ago moose were scarce in the Telegraph Creek region and almost unknown farther down the river, and that they had steadily increased in numbers since that time. At present they are abundant. We saw fresh sign everywhere we went, in the immediate vicinity of each of our camps (including points within two miles of the town of Telegraph Creek), and as far down the Stikine as the Great Glacier. Moose are known to occur regularly even farther down stream, and we were told of one being killed at the river's mouth some years ago. On the mountains above Doch-da-on Creek fresh moose tracks and droppings were seen just above timber line, at about 4000 feet elevation.

At the Junction, on May 27, Dixon was going quietly through the poplar woods in search of birds when a cow moose suddenly burst forth from a clump of alders some thirty yards away and charged viciously upon him with mouth open and neck bristles all on end. When she was within fifteen yards and still coming, he fired a load of dust shot, whereupon she swerved to one side and went off through the trees. A search of the bushes from which she had emerged disclosed a newly born calf, still unable to do more than totter about on its long and very wobbly legs.

Dixon's observations upon this animal read in part as follows:

When first found, on the very spot where it was born, the calf was not frightened but came up to me, whining like a puppy dog. Later this low whine was found to be a usual call note of the youngster. The moose characters of large ears, overhanging nose, high shoulders, low rump, and long legs, were all conspicuous. The face and particularly the ears, were much lighter colored than the body. An incipient mane of black hairs showed as a narrow line from the back of the head to a point just back of the shoulders. The metatarsal glands were conspicuously colored by a patch of whitish hairs covering an area one inch long by one-half inch wide. The body was clothed with thick warm hair, plumbeous at the basal half, then brown, and with a faint tipping of black. In walking on level ground the young moose stood 30 inches high at the shoulder and 27 inches at the rump. The distance from the nose to the tip of the tail in life was 30 inches.

The sense of hearing was most keen, sight second, and smell last. A cracking twig always startled her violently. The upper eyelid had eyelashes over an inch long, which helped to keep the myriad mosquitoes out of the eyes. A swarm of these bloodthirsty pests were sucking blood from the helpless youngster when first discovered.

In attempting to nibble grass the little moose knelt down on her front legs, and in this position was able to bite off the tender grass with her eight sharp lower incisors, well developed even in this 24 hour old calf. Attempts were also made to nibble budding willow twigs. In lying down she knelt on her front legs first, then the posterior was lowered and the long hind legs tucked up under or to one side of the body. In getting up, the animal rose to its knees on its front legs, and then the hind quarters were raised. By mid afternoon the young moose followed me about the camp so that I had difficulty in keeping far enough away to use the camera.

Rangifer osborni Allen. Cassiar Caribou

We ourselves were at no time in caribou territory, and my only reason for including the species here is to place on record information received regarding the distribution of this animal. Telegraph Creek is the outfitting place of hunters who visit the region each fall, and many caribou are killed by them, but the mountains where the hunting is usually done are reached by long pack trips to the northward and eastward.

We were told by the caretaker at Mr. Callbreath's farm, across the river from Glenora, that a band of ten or twelve caribou had spent the previous winter on the unforested summit of Glenora Mountain, where he had often watched them with a field glass. This may represent the extreme western point reached by the species in this region. Twenty-five miles farther down the river there are other mountains with extensive areas rising above timber line, which have been hunted over for many years past by Captain A. B. Conover, residing at the mouth of Clearwater Creek. He told us that he had never seen any caribou there, nor any sign of their presence.

Fig. Y. Young Alaska moose (*Alces americanus gigas*), twenty-four hours old. The long legs of the adult moose is a feature that is much accentuated in the calf, giving an appearance of extreme ungainliness to the short-bodied animal, whether standing upon these stiltlike members or lying down with the legs awkwardly folded underneath. Photograph taken near Telegraph Creek, May 27, 1919.

Oreamnos montanus columbianus Allen. **Columbian Mountain Goat**

Mountain goats are probably of general distribution on the higher mountains from Telegraph Creek west to the coast. Our own experiences were limited to three localities. At Glenora, on July 3, an acquaintance ascended the mountain that rises behind the town, and he told us that he saw two goats near the summit. On July 11 and 23 we climbed the mountain just south of Doch-da-on Creek. As soon as the belt of upright timber was passed, goat sign was seen on all sides. Broad, well-beaten trails wound through the thickets of prostrate

balsam, to split again and again and finally become indistinguishable on the open grass-covered slopes above. The balsam branches along the trails were decorated with streamers of long white hair, caught from the shedding animals as they passed along. Recently occupied beds could be distinguished at many points, and numerous footprints and droppings all attested to the presence of mountain goats in some numbers. We saw none here, however, though on the 11th, when we started to descend the mountain toward evening, fresh tracks were seen at one point where a goat had crossed our trail since morning.

Four days, July 16 to 19, were devoted by Dixon to a hunt on the mountain above Kirk's Creek, some eight or ten miles north of Dochda-on Creek. He saw a number of the animals and shot an adult male (no. 31008). Several were in sight at once when this one was killed, and Dixon's observations on the behavior of the remainder of the band include some interesting items. His notes read in part as follows:

While we were skinning our specimen another goat came back, and after grazing about awhile laid down against a granite boulder, where, with head propped up against a stone, he watched us as we worked. Although we were in plain sight and only 150 yards away, he lay there placidly observing us. As soon as I started to sneak down out of sight, in an attempt to approach near enough to get a photo, the goat got up and went over the ridge and across a narrow ravine, where he stood waiting, watching me as I came over the crest of the ridge 100 yards away. I followed him over the next ridge and saw him disappear down a snow slide toward a hanging valley below. From this latter point I searched the cliffs above me with the binoculars, and saw a goat lying in a niche in the cliff, high above me. This animal lay motionless with outstretched neck, watching me intently. Going around the ridge out of sight at one side of the cliff, I worked my way up to a level with him, then edged around the cliff so that when I stepped out in sight I was less than thirty feet distant. The goat bounded to his feet, then slowly and deliberately jumped from niche to niche along the face of the cliff until a slide was reached. Here he bounded and slid down, scattering the rocks as he went. The spot where he had been resting, about the center of the cliff, was like the eyrie of a golden eagle, and about as difficult of access. It seemed incredible that so large an animal could ever have reached it along the face of the cliff. A man certainly could not have done so.

His tracks led across a snow slide to a cavity at the south side of a large boulder. The snow melting away from the rock left a hole about six feet long, three feet wide and four feet deep, and in here the goat had lain down, resting on the snow and peering at me over the brink. Only the dark eyes and horns could be seen, the otherwise white coloration blending perfectly with the snow. I walked down to within 100 feet of the animal and took two photos while he lay perfectly still. Then I crawled to the edge of the snow bank, too steep for me to cross, and threw rocks at him. Arising, at first he stood his ground, stamping his fore feet or making feints at charging me. I finally struck him with a stone and he jumped to the edge of the snow bank, where he stood with arched neck and tail erect as though in challenge. Then he started down the

snowslide. With hind legs flexed and spread well apart, and front legs rigid, almost on his haunches, he slid and wriggled in safety down the dangerous slide, which at the bottom dropped over a precipice. At the top of this cliff he crossed to the solid rock beyond, and then turned to see if I was coming.

The goat taken was a male, fully mature but not of great age. His weight was estimated at two hundred pounds. This animal has almost none of the long shaggy covering with which we usually associate the species. It is white, just as in winter, but the hair is extremely short. Over much of the body there is no more than a scanty covering of tightly curled wool, which presumably would develop later into a dense body covering, completely hidden by the long straight hairs of the winter coat.

Oreamnos montanus columbianus was described from the Shesley Mountains, in the same general region and some sixty or seventy miles north of the place where our specimen was taken (see Allen, 1904, p. 20). Mountain goats occur on the mountains along the mainland coast of southeastern Alaska directly to the westward of this region, and with very little doubt at all suitable places between. Whether or not the subspecies *columbianus* extends westward to the coast we have not the material to decide, though the specimens at hand suggest otherwise. There are three specimens available from the coast of southeastern Alaska, an adult female and two young males. The old female has horns that are nearly as widespreading as in a female *Oreamnos kennedyi*, from Cook Inlet, of about the same age. They are more widespreading than in our adult male from the Telegraph Creek region. These are the only comparisons that it is feasible to make. This material thus suggests the possibility at least of the existence of a coastal race, *kennedyi*, as distinct from *columbianus* of the interior. In all probability *kennedyi* should be regarded as a subspecies of *Oreamnos montanus*, rather than a distinct species. There is with little doubt sufficiently continuous distribution of mountain goats along the Alaskan coast to insure intergradation between the several described forms, and the goat occurring on the mainland of the Sitkan region may well prove to be referable to *kennedyi*, though perhaps not exhibiting the characters of that race in their extreme.

CHECK LIST OF BIRDS

1. *Colymbus holboelli* (Reinhardt).
2. *Colymbus auritus* Linnaeus.
3. *Gavia immer* (Brünnich).
4. *Larus philadelphia* (Ord).
5. *Sterna paradisaea* Brünnich.
6. *Mergus americanus* Cassin.
7. *Anas platyrhynchos* Linnaeus.
8. *Nettion carolinense* (Gmelin).
9. *Spatula clypeata* (Linnaeus).
10. *Dafila acuta* (Linnaeus).
11. *Marila*, sp.?
12. *Glaucionetta islandica* (Gmelin).
13. *Histrionicus histrionicus* (Linnaeus).
14. *Oidemia deglandi* Bonaparte.
15. *Branta canadensis occidentalis* (Baird).
16. *Ardea herodias fannini* Chapman.
17. *Gallinago delicata* (Ord).
18. *Pisobia maculata* (Vieillot).
19. *Pisobia minutilla* (Vieillot).
20. *Totanus melanoleucus* (Gmelin).
21. *Totanus flavipes* (Gmelin).
22. *Tringa solitaria cinnamomea* (Brewster).
23. *Actitis macularia* (Linnaeus).
24. *Oxyechus vociferus vociferus* (Linnaeus).
25. *Dendragapus obscurus flemingi* Taverner.
26. *Dendragapus obscurus sitkensis* Swarth.
27. *Canachites canadensis osgoodi* Bishop.
28. *Canachites canadensis atratus* Grinnell.
29. *Bonasa umbellus umbelloides* (Douglas).
30. *Lagopus leucurus leucurus* (Swainson).
31. *Zenaidura macroura carolinensis* (Linnaeus).
32. *Circus hudsonius* (Linnaeus).
33. *Accipiter velox* (Wilson).
34. *Astur atricapillus atricapillus* (Wilson).
35. *Astur atricapillus striatulus* Ridgway.
36. *Buteo borealis calurus* Cassin.
37. *Buteo swainsoni* Bonaparte.
38. *Aquila chrysaëtos* (Linnaeus).
39. *Haliaeetus leucocephalus alascanus* C. H. Townsend.
40. *Falco peregrinus pealei* Ridgway.
41. *Falco columbarius columbarius* Linnaeus.
42. *Falco sparverius sparverius* Linnaeus.
43. *Asio flammeus* (Pontoppidan).
44. *Cryptoglaux funerea richardsoni* (Bonaparte).
45. *Bubo virginianus*, subsp.?
46. *Glaucidium gnoma*, subsp.?
47. *Ceryle alcyon caurina* Grinnell.
48. *Dryobates villosus monticola* Anthony.
49. *Sphyrapicus varius varius* (Linnaeus).

50. *Sphyrapicus varius ruber* (Gmelin).
51. *Colaptes auratus borealis* Ridgway.
52. *Chordeiles virginianus virginianus* (Gmelin).
53. *Cypseloides niger borealis* (Kennerly).
54. *Chaetura vauxi* (J. K. Townsend).
55. *Selasphorus rufus* (Gmelin).
56. *Sayornis sayus* (Bonaparte).
57. *Nuttallornis borealis* (Swainson).
58. *Myiochanes richardsoni richardsoni* (Swainson).
59. *Empidonax difficilis difficilis* Baird.
60. *Empidonax trailli alnorum* Brewster.
61. *Empidonax hammondi* (Xantus).
62. *Empidonax wrighti* Baird.
63. *Otocoris alpestris arctica* Oberholser.
64. *Cyanocitta stelleri stelleri* (Gmelin).
65. *Perisoreus canadensis canadensis* (Linnaeus).
66. *Corvus corax principalis* Ridgway.
67. *Corvus brachyrhynchos caurinus* Baird.
68. *Euphagus carolinus* (Müller).
69. *Pinicola enucleator flammula* Homeyer.
70. *Carpodacus purpureus purpureus* (Gmelin).
71. *Loxia curvirostra bendirei* Ridgway.
72. *Loxia curvirostra sitkensis* Grinnell.
73. *Loxia leucoptera* Gmelin.
74. *Leucosticte tephrocotis littoralis* Baird.
75. *Spinus pinus pinus* (Wilson).
76. *Calcarius lapponicus alascensis* Ridgway.
77. *Passerculus sandwichensis savanna* (Wilson).
78. *Passerculus sandwichensis alaudinus* Bonaparte.
79. *Zonotrichia leucophrys gambeli* (Nuttall).
80. *Zonotrichia coronata* (Pallas).
81. *Spizella monticola ochracea* Brewster.
82. *Spizella passerina passerina* (Bechstein).
83. *Junco hyemalis connectens* Coues.
84. *Junco oreganus oreganus* (J. K. Townsend).
85. *Melospiza melodia rufina* (Bonaparte).
86. *Melospiza melodia caurina* Ridgway.
87. *Melospiza lincolni gracilis* (Kittlitz).
88. *Passerella iliaca unalaschensis* (Gmelin).
89. *Passerella iliaca fuliginosa* Ridgway.
90. *Piranga ludoviciana* (Wilson).
91. *Petrochelidon lunifrons lunifrons* (Say).
92. *Hirundo erythrogaster* Boddaert.
93. *Iridoprocne bicolor* (Vieillot).
94. *Tachycineta thalassina lepida* Mearns.
95. *Riparia riparia* (Linnaeus).
96. *Bombycilla garrula pallidiceps* Reichenow.
97. *Vireosylva gilva swainsoni* (Baird).
98. *Vermivora celata orestera* Oberholser.
99. *Vermivora celata lutescens* (Ridgway).
100. *Vermivora peregrina* (Wilson).
101. *Dendroica aestiva aestiva* (Gmelin).

102. *Dendroica coronata hooveri* McGregor.
103. *Dendroica townsendi* (J. K. Townsend).
104. *Seiurus noveboracensis notabilis* Ridgway.
105. *Oporornis tolmiei* (J. K. Townsend).
106. *Wilsonia pusilla pileolata* (Pallas).
107. *Setophaga ruticilla* (Linnaeus).
108. *Anthus rubescens* (Tunstall).
109. *Nannus hiemalis pacificus* (Baird).
110. *Certhia familiaris occidentalis* Ridgway.
111. *Sitta canadensis* Linnaeus.
112. *Penthestes atricapillus septentrionalis* (Harris).
113. *Penthestes gambeli abbreviatus* Grinnell.
114. *Penthestes rufescens rufescens* (J. K. Townsend).
115. *Regulus satrapa olivaceus* Baird.
116. *Regulus calendula calendula* (Linnaeus).
117. *Regulus calendula grinnelli* W. Palmer.
118. *Myadestes townsendi* (Audubon).
119. *Hylocichla ustulata ustulata* (Nuttall).
120. *Hylocichla ustulata swainsoni* (Tschudi).
121. *Hylocichla guttata guttata* (Pallas).
122. *Hylocichla guttata nanus* (Audubon).
123. *Planesticus migratorius migratorius* (Linnaeus).
124. *Planesticus migratorius caurinus* Grinnell.
125. *Ixoreus naevius naevius* (Gmelin).
126. *Ixoreus naevius meruloides* (Swainson).
127. *Sialia currucoides* (Bechstein).

GENERAL ACCOUNTS OF THE BIRDS

Colymbus holboelli (Reinhardt). Holboell Grebe

A pair was nesting on Sawmill Lake in June. They kept far out on the lake, but with binoculars we were able to determine their specific identity.

Colymbus auritus Linnaeus. Horned Grebe

Small grebes were seen on Sawmill Lake several times during June, always at a great distance, and on June 12 a pair was seen on Alkali Lake.

Gavia immer (Brünnich). Common Loon

At least one pair on Sawmill Lake. The birds were quiet and unobtrusive, never being heard calling at that point. Another pair, encountered in a small lake near Doch-da-on Creek, was more noisy, and our arrival at the lake shore was invariably heralded by an outburst of sound from both birds. At that time, the middle of July, they were caring for two young, apparently about a third grown. The four birds were almost always seen together.

***Larus philadelphia* (Ord). Bonaparte Gull**

One or two flocks were seen just after we passed Dixon Entrance, going north, on May 19. They were apparently migrating, the only migrants in evidence at that time, and were traveling in a manner characteristic of the Bonaparte gull, but different from most of our other species. The flocks were in compact formation and flying swiftly, more like large waders than gulls in appearance; there was no soaring whatever, and no lingering.

A single Bonaparte gull was seen on Sawmill Lake, June 17. A small gull seen flying up stream past our Flood Glacier camp on August 4 was probably of this species.

***Sterna paradisaea* Brünnich. Arctic Tern**

On our trip up stream, May 21 to 23, terns believed to be of this species, were seen at intervals up to within thirty miles of Telegraph Creek. On July 14, at Doch-da-on Creek, several were flying about over some sand bars in midstream; from then on they were noted at various times and places, always far out over the river.

***Mergus americanus* Cassin. American Merganser**

On May 21, mergansers were seen in fair abundance at the mouth of the Stikine; they lessened in numbers as we went up stream, and finally disappeared, none being observed above "the cañon." Those that came near enough for identification were all *M. americanus*.

Later in the summer, at Flood Glacier, at least two different broods of mergansers were seen, but of what species could not be ascertained. On July 29 a family of ten or twelve plunged into the stream opposite our camp, hotly pursued by a bald eagle. The eagle was very much in earnest, but it was curious to see, once the water was reached, the indifference with which the mergansers regarded their formidable pursuer. None took the trouble to dive, even, except the one specifically selected as a victim. Then, at the last moment, that particular individual disappeared easily beneath the water, leaving the eagle floundering and gathering himself for another try at the flock. He soon gave up the task, and the mergansers swam down stream out of our sight.

Anas platyrhynchos Linnaeus. Mallard

A single bird, seen June 12 in a beaver pond some five miles west of Telegraph Creek, was the only indication we had that this species might be breeding in the upper Stikine Valley. Ducks are quiet and retiring during the nesting season, however, and we spent but little time in places where we would be apt to find them, so that our negative results are no proof of the actual scarcity of this and some other species.

At Sergief Island, August 17 to September 7, mallards were present in considerable numbers. All that we shot proved to be young birds.

Nettion carolinense (Gmelin). Green-winged Teal

A pair was seen June 12 in a beaver pond some five miles west of Telegraph Creek. At Sergief Island, toward the end of the summer, teal were present in abundance, usually in flocks of ten or twelve individuals. Two specimens were preserved, an immature male taken on September 2 (no. 39705), and an adult female, September 5 (no. 39706).

Spatula clypeata (Linnaeus). Shoveller

A single bird was seen at close range in a slough on Sergief Island on August 29. A Peale falcon shot at the same locality on September 1 had the remains of a shoveller in its stomach.

Dafila acuta (Linnaeus). Pintail

Seen only at Sergief Island. There, during the whole of our stay, pintails were present in fair abundance, usually in flocks of ten or twelve individuals. These small flocks were, presumably, each a single family.

The three common fresh-water ducks here were the mallard, green-winged teal, and pintail. Of none of these species, seen almost daily from August 17 to September 7, and in considerable numbers, were any male birds seen in the normal adult winter plumage. Presumably the old males were still in the eclipse plumage, but our efforts to obtain any failed; those birds that we shot proved to be young of the year, with one or two old females.

Marila, sp.? Scaup Duck

Flocks and single birds were several times seen on Sawmill Lake during June. Most of them were males (on June 11 a flock was noted

consisting of ten males and one female), suggestive of the possibility that the females were sitting on eggs nearby. The birds were seen at close enough range to identify them as scaups, but whether *Marila marila* or *M. affinis*, or both, would, of course, have required the capture of specimens for determination.

***Glaucionetta islandica* (Gmelin).** Barrow Golden-eye

Seen at various points within ten or twelve miles of Telegraph Creek: at the Summit, June 4 and 5, a flock of five females and several single birds, both male and female; at Sawmill Lake, occasionally during June; and on a small stream south of Telegraph Creek. Two females were shot at the Summit, June 5, and one of them was preserved (no. 39707). These two birds were evidently not breeding.

The species encountered was apparently *Glaucionetta islandica*. The identity of the one specimen saved was determined mainly through a study of the characterization of the two forms, *americana* and *islandica*, as given by Brooks (1920, p. 356). This decision, though, is also influenced by the fact that the adult males seen were unquestionably *islandica*, the triangular white facial patch being plainly discernible with the binoculars. This is a curious instance, in which the identity of a specimen in hand (a normal adult female) is confirmed by sight identification of others not obtained.

***Histrionicus histrionicus* (Linnaeus).** Harlequin Duck

Not seen along the lower Stikine River, but fairly common along the upper part of the stream. Frequently observed at close range from the river boat, always seen in swift water, flying up when approached too nearly, or perhaps swimming fearlessly through a swirl of rapids alongside, paying little heed either to the boat from whose path it just withdrew, or to the rocks and snags between which it picked its way. Seen as far up the river as Telegraph Creek.

***Oidemia deglandi* Bonaparte.** White-winged Scoter

Undoubtedly nesting on Sawmill Lake, where varying numbers were seen during the month of June. Twenty or more of both sexes were noted on June 17, and lesser numbers on many other occasions. Not met with elsewhere.

***Branta canadensis occidentalis* (Baird).** White-cheeked Goose

We were told of the occasional, though rare, occurrence of geese as far up the river as Telegraph Creek, but it seems doubtful that birds seen so far inland should be *occidentalis*. In our ascent of the Stikine River, May 21 and 22, flocks of geese, presumably of this subspecies, were seen at intervals about as far up as Great Glacier. None was seen by us during the summer any farther inland. When we camped at Great Glacier in August, we found an abundance of old "sign" of the presence of geese, many droppings on the sand bars about some shallow ponds, and the marks of webbed feet in sticky mud that had since remained undisturbed. The geese themselves had probably not visited the place for many weeks. These ponds, in a sheltered location, apparently received a maximum of sunshine early in the summer, and were correspondingly attractive to the birds at that time.

In our descent of the river, the first white-cheeked geese were seen at the boundary, August 16. From there on down an occasional small flock was noted, but not until the mouth of the river was reached were they seen in any numbers. At Sergief Island they were abundant. Flocks of large size frequented the marshes at that point, changing their feeding ground as the tides advanced and receded. These local movements covered but a few miles at most, and, of course, were gone through with daily as regularly as the tides. Aside from this hourly shifting, which kept some flocks on the wing practically throughout the day, there was no appearance of migration. Flocks of white-cheeked geese were never seen to depart in a manner suggestive of the beginning of a long flight, nor were any seen arriving as though from a distance.

During the last two weeks in August the geese were still molting extensively. In some the breast and belly were almost entirely devoid of feathers, only the down remaining, and nearly all were renewing the tail feathers. Flight feathers were fully grown, or at any rate sufficiently so for flying. Presumably the birds would not gather upon these open and exposed marshes until they could fly; nesting and the beginning of the molt, including loss of the remiges, probably takes place in more sheltered localities.

Five specimens of white-cheeked geese were preserved, an adult male and adult female saved entire (nos. 39708-39709), and two males and a female (nos. 39710-39712), of which head and neck only were preserved. Four of the five specimens preserved have more or less

indication of a black line on the chin separating the white cheek-patches. In one case this bar is fairly well defined, though as each separate feather is narrowly edged with white and has a white base, a mottled effect is produced. In three the black is not continuous, merely a string of disconnected black spots, and in one the white patch extends uninterruptedly from cheek to cheek. Usually in the geese of this region there is either a string of disconnected spots, as in the specimens just described, or else a beginning of such a line extending forward and backward on the center of the throat but not meeting. Very rarely the black dividing line is continuous, broad, and well defined. I, myself, have seen two such specimens, but in neither case was there absolute assurance that they were birds breeding in the Sitkan district. Such birds might occur as migrants from a more northern region, where intergradation of *occidentalis* and *minima* might result in the occasional appearance of such a marking.

***Ardea herodias fannini* Chapman.** Northwest Coast Heron

Only two seen during the entire summer. One observed on a sand bar in the Stikine River some eight miles below Telegraph Creek on July 5 may or may not have been of the coast subspecies, *fannini*. One was seen flying overhead on Sergief Island, September 5.

***Gallinago delicata* (Ord).** Wilson Snipe

Seen only at Sergief Island. At that point, during the whole of our stay, August 17 to September 7, Wilson snipe were abundant on the marshes, not generally distributed, but always to be found about certain favored spots, generally near fresh-water ponds. While the usual manner of occurrence was for a single bird to be flushed, or perhaps two or three within a few square yards, there were times when snipe were noted in small flocks, almost like sandpipers in their actions. Groups of ten or twelve individuals were seen circling about through the air, in close formation and wheeling or turning in perfect unison. At such times almost the only thing to betray the identity of the birds was the call note, uttered at frequent intervals. At no time, however, did birds flushed from the ground depart in flock formation. Eight specimens were collected (nos. 39713-39720), taken on dates ranging from August 18 to September 1.

***Pisobia maculata* (Vieillot). Pectoral Sandpiper**

Seen only at Sergief Island. Upon our first visit to the marshes, on August 18, pectoral sandpipers were seen in small numbers, just a few single birds, or, at most, two or three together. They increased in numbers daily, and by September 1 flocks of from twenty to thirty individuals were frequently encountered. Like the Wilson snipe, they favored the fresh-water ponds, and there they could be seen walking about through the short grass, the flocks loosely spaced so that the individual birds were from ten to twenty feet apart. They were tame and unsuspicious, usually permitting a near approach. Three specimens preserved (nos. 39721-39723).

***Pisobia minutilla* (Vieillot). Least Sandpiper**

Seen only at Sergief Island, where it was present in fair abundance. The small size of the least sandpiper kept it out of the grassy areas frequented by some of the other waders, and it was usually found on the bare mud banks or sand bars. There were places, however, where the flocks of geese had trampled down the tall marsh grass, sometimes acres in extent, and the least sandpipers were fond of feeding in such spots, where they could run about freely over the prostrate grass. One specimen collected (no. 39724).

***Totanus melanoleucus* (Gmelin). Greater Yellowlegs**

Seen only at Sergief Island. Not abundant, but a few single birds and sometimes two together were encountered at various times from August 19 to September 2. One specimen collected (no. 39725).

***Totanus flavipes* (Gmelin). Lesser Yellowlegs**

Seen during June about Sawmill Lake and some smaller ponds near Telegraph Creek. Probably nesting somewhere within a few miles, but apparently not in the immediate vicinity of these lakes. Occasionally one was seen coming down from a great height in the air, evidently to feed on the shores of one or another of the lakes. It seemed likely, from the birds' actions, that the nesting grounds might have been in meadow land high up in some of the nearby mountains. Four specimens preserved, all adults (nos. 39726-39729).

***Tringa solitaria cinnamomea* (Brewster).** Western Solitary
Sandpiper

This species might be expected to breed throughout the region in which we were working, but we failed to find it doing so. It was met with but once during the summer, an immature male (no. 39730) being secured at Flood Glacier on August 7. This individual, a fully grown bird of the year, was, of course, a migrant, and might have traveled a long distance.

***Actitis macularia* (Linnaeus).** Spotted Sandpiper

Fairly common in the upper Stikine Valley. A nest with four eggs was discovered at Sawmill Lake, June 14, placed in a bank of sawdust on the site of the long abandoned sawmill. At Glenora a set of four eggs (no. 1806) was collected on July 3. The nest in this case was in a grassy meadow near an abandoned building. Another nest was found at Glenora, on a sand bar at the edge of the river. At least one brood was hatched near our camp at Doch-da-on Creek. No spotted sandpipers were seen farther down the river, but there is no reason to doubt that the species occurs the whole length of the Stikine. It is known to be a summer visitant on the coast of southeastern Alaska. One specimen collected (no. 39731), an adult female taken at Glenora with the set of eggs previously referred to.

***Oxyechus vociferus vociferus* (Linnaeus).** Killdeer

On the evening of August 22, Dixon heard the unmistakable notes of a killdeer from a mud bank in the river near our camp at Sergief Island. Search the next day, and for several days thereafter, failed to bring the bird to our sight, but the call note is so distinctive that a person familiar with the species could not mistake it for any other.

***Dendragapus obscurus flemingi* Taverner.** Fleming Grouse

In summer, at least, this species is restricted to high altitudes in the mountains of the upper Stikine region. We met with it at but one point, at timber line, in the mountains above Doch-da-on Creek. A female with a brood of small young was seen there, at about 4000 feet elevation, on July 11. On July 23, two broods were found near the

same place, the young ones the size of mountain quail (*Oreortyx*), strong on the wing, and apparently well able to care for themselves. On July 11 a cock bird was flushed from the heather at the edge of a snow bank, far above the timber. Another was seen by Dixon at the upper edge of the timber on Kirk's Mountain on July 17. No males were heard hooting at any time.

Of the two broods seen on July 23, one consisted of three young, the second of but one. These birds were found in open, grassy patches, close to dense and extensive thickets of prostrate balsam fir, that afforded shelter from almost any enemy. The parent of the brood of small young seen on July 11 was extremely solicitous for their safety. She was not aggressive in her solicitude, however, as is the ruffed grouse under similar circumstances, nor did she feign a broken wing or other disability. She simply sat on the top of a thicket, obviously greatly worried, clucking nervously to the chicks until they had reached what she considered a safe distance, when she followed after through the bushes. The larger young ones seen on July 23 were evidently expected to look after themselves to a great extent; they were as wary and resourceful as their parents.

Five specimens were secured (nos. 39732-39736), two adult females and a male and two females in juvenal plumage. These birds appear to belong to the subspecies *Dendragapus obscurus flemingi*, described by Taverner (1914, p. 385), from Teslin Lake, one hundred and forty miles north of the Stikine. This form is most nearly related to *D. o. richardsoni*; it is widely different from *fuliginosus* and *sitkensis*, the coastal subspecies. *Richardsoni* and *flemingi* are not "hooters." The call note of the male bird is not the loud, far-reaching hoot that is so characteristic of *fuliginosus* and *sitkensis*, and also of the California race, *sierrae*. In these latter subspecies the male bird has on each side of the neck an area of bare skin that is brilliant yellow, greatly thickened, and capable of wide distention, part of the hooting apparatus and not highly developed in the non-hooting forms. (See Brooks, 1912, p. 252.) This is a structural difference of sufficient importance to warrant the specific separation of these groups of grouse. Whether or not *D. o. obscurus* of the southern Rocky Mountains is a hooter I do not know, and any changes of nomenclature would hinge upon this fact.

Flemingi is described as differing from *richardsoni* in darker general coloration and in having the tail rounded, not truncate. Both are described as lacking a terminal tail band. The general dark coloration

tion, including extension of dark areas and restriction of light ones, is evident in the Stikine birds, as in topotypes of *flemingi* loaned me by the Victoria Memorial Museum, and is sufficiently marked to justify the recognition of *flemingi*. It is doubtful whether the tail characters are valid. The sharply truncate tail of the male *richardsoni* is a feature that is not acquired until the second year at least. The young male, the first year, has the whole tail rounded, and the individual tail feathers are narrow and rounded as compared with the broad, truncate feathers of the old bird. Also, *richardsoni* can hardly be said to lack entirely a terminal band on the tail. An indication, at least, of this marking is always present.

***Dendragapus obscurus sitkensis* Swarth. Sitka Grouse**

On May 21, on the trip up the river from Wrangell, we stopped at the Canadian custom house, just above the Alaska-British Columbia boundary, and while anchored there heard a grouse hooting in the nearby woods. Presumably this was the coast subspecies. The only specimen collected during the summer was an adult female (no. 39737) taken by Dixon at the southern end of Mitkof Island, during a three days' hunt for deer which he made to that point, August 26 to 29. A number more were seen at the same place. (For the use of the name *Dendragapus obscurus sitkensis* see Swarth, 1921a, p. 59.)

***Canachites canadensis osgoodi* Bishop. Alaska Spruce Grouse**

***Canachites canadensis atratus* Grinnell. Valdez Spruce Grouse**

From the reports we heard it is to be inferred that the spruce grouse is of general distribution in the region we visited, and in fair abundance though locally restricted to suitable surroundings. We were informed that about Telegraph Creek this grouse was usually found in the spruce forests on the hillsides well up above the river valley. We, ourselves, met with the species at but two points. Late in the evening of July 5, as we were returning to our camp at Glenora, a young spruce grouse flew up into a tree by the road and was taken. It was still partly in the natal down, too young to be supposed to be shifting for itself, but neither the parent nor any other of the brood was seen.

At Flood Glacier an adult female and one chick were taken on August 4, an adult male on August 7. No others were seen. These birds were collected in dense spruce woods, in the bottom lands between the river and the glacier. The old male was feeding on huckleberries.

Of the specimens collected, the adult male (no. 39740, August 7) had virtually completed the annual molt. There are partly grown feathers over various parts, but the old plumage is all discarded. The adult female (no. 39739, August 4) is still mostly in the worn, last year's plumage, though feather renewal is in progress in some tracts. The two young (no. 39741, male, Glenora, July 5; no. 39738, female, Flood Glacier, August 4) are at precisely the same stage of development, though taken just a month apart. The natal down persists upon head, throat and belly, and the juvenal feathers clothe the back, breast, flanks, and wings.

The two adults are noticeably different from examples of *Canachites c. osgoodi* from points in the interior. Of the latter I have had for comparison specimens from various points in northern British Columbia, Yukon, and Alaska. *Osgoodi*, described from Lake Marsh, some 250 miles north of Telegraph Creek, is a grayish colored bird, compared with other races of *C. canadensis*, a character that becomes more and more accentuated to the northward. Birds from the Kowak River region reach the extreme of differentiation in this regard (see Grinnell, 1900, p. 30). Our Flood Glacier adults are extremely dark colored, matching exactly examples of the coastal race, *Canachites c. atratus*, from Prince William Sound, Alaska (Grinnell, 1910, p. 380). *C. c. atratus* was not admitted to the *Check-List* by the A. O. U. Committee (1912, p. 385), its characters being deemed "insufficient for recognition," but it seems to me to be a recognizable form. The inference resulting from the capture of our Stikine birds is that that race of spruce grouse will prove to be of continuous distribution in the coastal district between the Stikine River and Prince William Sound.

The two young birds, from Glenora and Flood Glacier, respectively, are somewhat different in appearance. The Glenora bird is more grayish in coloration, the Flood Glacier specimen more rufescent and with more extensive black areas upon individual feathers. These differences might pass unnoted, perhaps, were it not for the peculiarities of the Flood Glacier adults as compared with typical adult *osgoodi*. As it is, I believe the observed differences in the juvenals to be of significance, for they are just the sort of differences that would be expected to distinguish the young of *atratus* and *osgoodi*. The Glenora juvenile may be an example of *Canachites c. osgoodi*. This indicates the possible presence of two forms of *Canachites canadensis* in the Stikine Valley (as is the case with so many other species of birds), *C. c. osgoodi* of the interior extending westward at least to Glenora, *C. c. atratus* of the coast extending inland at least to Flood Glacier.

Bonasa umbellus umbelloides (Douglas). Gray Ruffed Grouse

Fairly common in the poplar forests of the upper Stikine Valley. We ourselves saw none below Doch-da-on Creek, but the species undoubtedly ranges farther down stream, regularly. We were told of its occasional occurrence at the mouth of the river, but whether breeding or merely in winter I do not know.

During the first week in June single birds were several times seen at the Junction. Three that were shot at this point were all males; the females were undoubtedly sitting on eggs at that time. On June 12 the first young were seen, two broods being encountered near Telegraph Creek. The young of one brood were still unable to fly. Our first knowledge of their presence was derived from the mother bird, who burst forth from the bushes and charged us furiously. She kept tail and ruff widely spread, the head crest depressed. She was mewling in a very catlike fashion, and also hissing from time to time. There was an occasional faint *peep* from the grass nearby, and once I caught a glimpse of a yellow chick slipping away through the shrubbery, but the young were too agile to be captured.

The young of the second brood were somewhat larger and able to fly. This second mother tried to toll us away from the chicks by feigning a broken wing; the noise she made was not unlike the whining of a small puppy. Her actions, all together, gave the impression that she was frightened rather than angry. However, if frightened, she still did not desert her trust, but remained nearby, dragging herself back and forth across the road, with wings drooping and all her feathers pressed closely against her body. Her tail was not spread nor were her ruffs displayed at any time, all in striking contrast to the behavior of the first bird met that morning.

From later observations it appeared that these two parents were fairly typical of their kind in such an emergency. The mother either charged the intruder viciously, in an apparent attempt to frighten him, or else she endeavored to distract attention from the chicks to herself by feigning injury and inviting pursuit. On one occasion the parent of a brood came charging at me through the woods from a distance of fifty yards.

At Doch-da-on Creek, July 8 to 26, ruffed grouse were seen on many occasions. On July 15 an adult male was shot that proved to be in the midst of the molt; only one or two of the old rectrices were left and the body was covered with pin feathers. On July 18 the last drumming was heard.

The series collected comprises four adult males, one adult female, one in juvenal plumage, and one in natal down (nos. 39742-39747). These birds are relatively gray colored, but not so ashy as *Bonasa umbellus yukonensis*, from the Yukon region (see Grinnell, 1916, p. 166). I have had for comparison three specimens of *Bonasa u. umbelloides* from points on the Saskatchewan and Athabasca rivers, Alberta, practically topotypes of that form, loaned me by the United States Biological Survey. The Stikine River birds are of exactly the same type of coloration.

Of our series of five adults, three are in the gray phase, two in the red. Apparently these color phases occur throughout the entire range of the species *Bonasa umbellus*. The point arises as to whether the confusion that exists between the subspecies *umbelloides* and *togata* (cf. A. O. U. Committee, 1910, p. 140), a relatively gray race and a relatively reddish one, is not largely due to a misunderstanding of the color variation within any one subspecies. No attempt has been made by me to go thoroughly into this question, but it may be said that the reddest *umbelloides* examined is a very different looking bird indeed from the few grouse I have seen from eastern Canada, the habitat of the reddish colored *togata*.

The crop contents of two ruffed grouse from the Stikine region (determined at the United States Biological Survey) are as follows:

No. 39742, adult male. Percentage of vegetable matter, 100. Contents of crop: 1 pupa of plant louse, many leaves and a few stems of *Populus trichocarpa* (75 per cent), leaves, stems, etc., of *Galium triflorum* (25 per cent), 1 leaf of *Artemisia*, sp., and bits of leafy moss.

No. 39748, adult male. Percentage of vegetable matter, 100. Contents of crop: 105 leaves of *Populus tremuloides* and a few bud scales of the same (90 per cent), 9 berries and a leaf of *Viburnum pauciflorum* (10 per cent), bits of vegetable debris.

Lagopus leucurus leucurus (Swainson). White-tailed Ptarmigan

Met with at but one place, on a mountain above Doch-da-on Creek. Here, on the heather covered slopes above the timber, two broods were seen on July 11. Of one, the entire family was obtained, the adult female and three downy young (nos. 39749-39752). The second lot, a female with seven or eight young, escaped.

While we were camped at Glenora an acquaintance climbed Glenora Mountain, nearby, and informed us that he saw a single ptarmigan

on the summit during the day. This same man had spent several winters trapping on the Iskut River some miles above the junction of the latter with the Stikine, and he told us that at times ptarmigan were plentiful there during the winter months. He described them as of two species, one smaller and entirely white (obviously *leucurus*), the other larger and with black feathers in the tail. The latter was evidently either *rupestris* or *lagopus*; both species may occur there.

The three young taken on July 11 are in the natal down throughout, save that the wing feathers had grown out to a slight extent. They could fly a little, skimming down hill a few inches above the ground.

The crop contents of these birds (determined at the United States Biological Survey) are as follows:

No. 39749, adult female. Percentage of vegetable matter, 100. Contents of crop, fragments of mosses, a few leaves of *Geranium*, sp., 24 flowers of *Dryas octopetala* (25 per cent), many leaves, stems, etc., of *Salix*, sp. (75 per cent).

No. 39750, young. Percentage of animal matter, 30; of vegetable, 70. Contents of crop: 1 *Scymnus*, sp., at least 1 *Sciara*, sp., about 50 plant lice (including *Psylla*, sp.) (30 per cent); vegetable matter, including *Myrica gale*, unidentified leaf buds (probably *Salix*, sp.), and *Ranunculus*, sp. (70 per cent).

No. 39751, young. Percentage of vegetable matter, 100. Contents of crop: fragments of several leaf buds, probably *Salix*, sp.

No. 39752, young. Percentage of animal matter, 60; of vegetable, 40. Contents of crop: 12 plant lice and several unidentified leaf buds, probably *Salix*, sp.

***Zenaidura macroura carolinensis* (Linnaeus). Eastern Mourning Dove**

On June 17 a mourning dove was seen near Telegraph Creek. Mr. W. H. Dodd, who has been government agent at that point for some years past, informed me that the species occurs in the fall with a fair degree of regularity. That is, one or two of the birds might be expected to appear each year.

On September 3 an adult female (no. 39753) was collected on Sergief Island, at the mouth of the Stikine River. Mr. Fred H. Gray, of Wrangell, a deputy of the Bureau of Fisheries, and a man who has observed and collected birds for many years, informed me that he had

seen mourning doves in and about Wrangell on several occasions. Mr. Allen Hasselborg, of Juneau, once informed me of seeing a dove near that city, in November, 1911. Straggling individuals have been recorded from Metlakatla, British Columbia (Kermode, 1904, p. 28), from Sitka, September 14 (Willett, 1914, p. 81), and from Hydaburg, Prince of Wales Island, September 1 (Willett, 1917, p. 22).

The bird I took was flushed from tall marsh grass, at a point that was regularly covered by the tides. In many places on the marsh this grass was beaten down by rain or wind, and it was from one of these flattened patches that the dove was flushed.

If southeastern Alaska is an unusual point of occurrence for the species, at any rate this individual reached the place without suffering any undue hardships, for it was excessively fat. The crop contents of this bird were as follows: percentage of animal matter, 1; of vegetable, 99; of gravel, etc., a trace. Contents of crop: 16 Oribatid mites and 2 young *Polygyra*, sp., 1 per cent; 9 *Carex*, sp., 4 per cent; 388 *Alsine*, sp., 20 per cent; 221 *Impatiens*, sp., 75 per cent.

The Sergief Island specimen, compared with examples of *Zenaidura macroura marginella* from California, is darker colored throughout, with richer brown coloration on scapulars, and with larger black spots upon the latter. It is not *marginella*. It bears closer resemblance to the eastern form, *Zenaidura macroura carolinensis*, and for the present may remain under that name. There is not enough material available to demonstrate whether the birds that occasionally reach southeastern Alaska really are examples of the eastern race, extending northwestward into northern British Columbia and sometimes to the coast, or northern strays of the coastal subspecies, *Z. m. caurina*, described by Ridgway (1916, p. 348) from Oregon.

Circus hudsonius (Linnaeus). Marsh Hawk

First noted at Sergief Island on September 3, when two brown immatures appeared, beating over the marsh. A number more were seen during the next few days.

Accipiter velox (Wilson). Sharp-shinned Hawk

Not seen until the close of the nesting season. First noted at Flood Glacier, August 3, next on August 6, and thereafter almost daily. At Great Glacier, on August 11, a Steller jay was shot and wounded, and, being retrieved, screamed loudly. Almost instantly a sharp-shinned hawk appeared, evidently drawn by the cries of distress, and lit in a tree as near by as he dared to come.

Two specimens collected, an immature male at Great Glacier, August 11 (no. 39754), and an immature female at Sergief Island, August 22 (no. 39755).

Astur atricapillus atricapillus (Wilson). Eastern Goshawk

Astur atricapillus striatulus Ridgway. Western Goshawk

Goshawks doubtless occur in summer throughout the region east of the coast ranges, but apparently in widely scattered pairs. We saw them at various localities, single individuals encountered at considerable intervals of time. At our camp at the Junction, the end of May, a recently dropped wing quill was evidence of the passage of one of the birds. One was seen flying overhead at the Summit, May 29, another at Glenora, July 7. On July 11 an adult male was shot at the upper limit of timber (about 3000 feet altitude) on the mountain above Doch-da-on Creek. On August 4 an immature female was taken at Flood Glacier. This bird contained in its stomach the remains of a red squirrel.

The adult male collected (no. 39756) is referable to the eastern subspecies, *Astur atricapillus atricapillus*, and is, I assume, representative of the form that inhabits the entire region east of the coast ranges. The young bird taken at Flood Glacier (no. 39757) may or may not have been hatched in that immediate neighborhood. No other goshawks were seen there, and other species of hawks (pigeon hawks and sharp-shinned hawks) were at that time beginning to appear, apparently migrating. At any rate, this individual appears to be an example of the western subspecies, *A. a. striatulus*. It is closely matched by four young of *striatulus* from their nesting ground in the Warner Mountains, California, and it is quite unlike a series of six immatures of *atricapillus* from the Yukon region. Compared with the Yukon series the Flood Glacier bird is darker colored throughout, it is more heavily marked below, and the brown edgings to the feathers dorsally are broader and of a darker brown. Specimens of *striatulus* taken on the coast of southern Alaska during the migrations are closely similar to the Flood Glacier bird.

Buteo borealis calurus Cassin. Western Red-tailed Hawk

Red-tailed hawks were seen at several points in the interior, but never in any numbers. Two or three were noted near Telegraph Creek at close enough range to enable their rufous tails to be distinguished; some dark colored hawks, supposed to be of this species, were seen at

a distance. At Glenora, July 1, an extremely dark individual was seen, the body almost black; this again was identified by means of the characteristic tail color. Others were observed at Doch-da-on Creek, during July.

All the birds of this species seen thus far had been either in the dark phase or else were light breasted birds that were not notably light colored otherwise. Then, at Flood Glacier, a family of extremely light colored individuals was encountered. On July 26, and on subsequent days, an adult red-tail was several times seen from our camp, sometimes perched in a tall spruce, sometimes flying past. The breast and belly of this bird appeared to be gleaming white, and the back seemed to have much white spotting.

On July 31 Dixon found this adult feeding two full-grown young ones in an opening in the forest; though the parent was too wary to be captured, he took both the immatures. These, like the old one, are extremely light colored. Chin, throat and breast are continuously white, the breast with a buffy suffusion, and the lower abdomen and lower tail coverts are white. In the spotted tract across the middle of the body below, and on the flanks, the dark spots are relatively small and separated by wide areas of white. The area immediately surrounding the eye, and between eye and bill, is white. In the feathers on the top of head and back of neck are small central spots of black or dusky, and extensive basal and marginal areas of white. Over the entire upperparts the feathers are extensively white spotted and with broad margins of white or pale buffy.

In a large series of young *calurus* from various parts of the western United States we have nothing at all like these birds. An immature male *borealis* from Wisconsin is like the Stikine River specimens in the uniformly white chin, throat, and breast, and in the restriction of the black spots below, but it is not so white on the head and upperparts. *Buteo borealis krideri* has been recorded from Alaska on the basis of a light colored bird taken at Eagle during the winter of 1903 (B. H. Bailey, 1916, p. 321). The red-tails, however, form a puzzling aggregation of geographical races and color phases, and it does not simplify matters in this case to assign to the subspecies *krideri* a range covering part of the habitat of *calurus*. The present writer is disinclined to regard the light colored birds just described as examples of *krideri*, thereby extending the range of that form far to the westward. Most of the red-tails seen throughout the Stikine region were of the recognized *calurus* type. Until the meaning of the diverse phases of

plumage seen is thoroughly understood it is safer to regard all the birds of that part of the country as of the one subspecies, *calurus*.

Of the two young birds collected, the female had crop and stomach filled to distention. In the partly digested mass there could be distinguished the remains of at least four mice and one toad. The mice could be identified as *Microtus mordax*. The male bird had its stomach filled with a mass of *Microtus* bones and hair. The meadow mice that the young hawks had eaten must all have been fed to them by their parents. While *Microtus mordax* was a fairly common species at that point, still it is noteworthy that a red-tailed hawk should be sufficiently agile to catch so many of them in as short a space of time as must have been the case. The mice in the river bottom, where the hawks were found, were in cover so dense that it was surprising to find a red-tail there at all. The hunting of the latter, may of course, have been done on the nearby mountain sides, above the denser timber, but even so it seems rather remarkable that they should find so little difficulty in catching these small rodents.

***Buteo swainsoni* Bonaparte. Swainson Hawk**

Seen only in the vicinity of Telegraph Creek. A number of dark colored hawks were observed thereabout, some of which were identified as red-tails, while others of lighter build were assumed to be of the present species. Dixon shot one on June 1, but was unable to find the bird until two days later, when it was unfit to preserve as a specimen. One wing, one leg, and the tail were preserved (no. 39760) to make identification certain. The birds seen were undoubtedly nesting near-by.

***Aquila chrysaëtos* (Linnaeus). Golden Eagle**

One seen at fairly close range near Telegraph Creek on June 22, another at Glenora, July 7.

***Haliaeetus leucocephalus alascanus* C. H. Townsend**

Northern Bald Eagle

In all probability bald eagles extend inland much farther than the points where we were collecting, dependent perhaps upon local conditions, but we ourselves did not see any farther up the river than Doch-da-on Creek. Here, the latter part of July, they were noted on several occasions. On July 23 two were seen circling above the mountain tops, at about 5000 feet altitude. Descending the Stikine from Doch-da-on Creek, bald eagles were seen at various points.

On our trip up the river in early May, many nests were noted along the lower parts of the stream, easy to see at that season as the trees were still bare of leaves. On our return trip in August the abundant foliage hid most of the structures, but one at least was noted (on August 16) with a young bird still sitting on the edge of the nest. At Sergief Island bald eagles were seen daily.

Falco peregrinus pealei Ridgway. Peale Falcon

One shot on the marsh at Sergief Island on September 1. This bird, an immature of the year, differs appreciably from the mode of young *anatum*, as represented by specimens from various parts of North America. The main difference consists in the Sergief Island specimen being more heavily marked beneath, in its almost totally lacking the cinnamon tinge below that is so characteristic of *anatum*, and in the lack of paler edgings to the feathers of the upperparts. This falcon contained in its stomach the remains of a shoveller (*Spatula clypeata*).

Falco columbarius columbarius Linnaeus. Pigeon Hawk

Not seen until the latter part of the summer, when the migration had begun. If the species breeds throughout the region we were exploring, it is to be supposed that the birds are few in numbers and in widely scattered pairs. First seen at our Flood Glacier camp, August 1, next, on our way down the river to the Great Glacier, August 8. On Sergief Island, the latter part of August and the first week in September, pigeon hawks were seen almost daily, but they were wary and seldom came within shooting distance.

Two specimens were secured, a female at Great Glacier, August 14 (no. 39762), and a male (no. 39763) at Sergief Island, September 2. Both are immatures. The Sergief Island bird is an average example of *columbarius* at that stage. The Great Glacier specimen is darker colored. Below, it is indistinguishable from *columbarius*, but dorsally it is about as dark as examples of immature *suckleyi* from Vancouver Island. On the whole, it is best referred to *columbarius*.

Falco sparverius sparverius Linnaeus. American Sparrow Hawk

Seen from time to time in the vicinity of Telegraph Creek, generally not far from the river. There were probably several pairs nesting within a few miles of the town. At Doch-da-on Creek, in July,

sparrow hawks were seen several times. On July 11 one was observed at about 3000 feet altitude, sitting on a tall dead stub on a burnt-over hillside. On July 23 an adult female was secured at the upper limits of timber, about 4000 feet. At Flood Glacier, August 5, a sparrow hawk was seen several times swooping at a bald eagle that spent that day moping in the rain on the top of a dead tree near our camp. At Sergief Island, sparrow hawks were noted on several occasions. The only previously reported occurrences of this bird in southeastern Alaska seem to have been the capture of one on the lower Taku River, September 16, 1909 (Swarth, 1911, p. 63), and the observation of two at Craig, Prince of Wales Island (Willett, 1921, p. 128), but it is probable that the sparrow hawk is of fairly regular occurrence in the fall at some points on the southern Alaskan coast.

The bird taken at Doch-da-on Creek (no. 39764), an adult female, is essentially like the Taku River specimen referred to, also a female. They are both noticeably dark colored, as compared with California birds, with broader black cross bars on the dorsal surface, and with the rufous areas of a darker shade.

It seems safe to say that the sparrow hawk, as occurring in this general region, is a bird of the interior, and that a few individuals find their way to the coast in the dispersal that takes place in the late summer or early fall. Such migrants would be likely to wander down some large river valley that extends from one region to the other, and it is near the lower ends of such valleys that most of the birds thus far recorded have been seen.

***Asio flammeus* (Pontoppidan). Short-eared Owl**

One seen on the marshes of Sergief Island on September 2, presumably a migrant from some other place. As these same marshes had been assiduously hunted over for two weeks previously without seeing any of this species, it is fair to assume that the bird noted represented the arrival of its kind at this point on the southward flight.

***Cryptoglaux funerea richardsoni* (Bonaparte). Richardson Owl**

One specimen, a young bird, molting into first winter plumage, obtained in dense spruce woods at Flood Glacier, July 28. This species, presumably of general distribution throughout northern British Columbia, is a bird of the interior, not known to occur in the humid coast belt, and our specimen may be assumed to have been taken at the extreme western limit of its range in this region.

Bubo virginianus, subsp.? Horned Owl

Horned owls occur throughout the country we were visiting, but apparently not in abundance, at least during the summer months. We were told of their presence at Telegraph Creek, but we saw none, nor did we hear any hooting. At Doch-da-on Creek we were shown the desiccated remains of one that had been killed the previous winter. On Sergief Island, August 31, I found a horned owl's feather in the marsh, far from the timber. At the latter point, the subspecies present is doubtless *Bubo v. saturatus*; I had no means of ascertaining the subspecific identity of the horned owl of the upper Stikine River.

Glaucidium gnoma, subsp.? Pigmy Owl

One seen at Doch-da-on Creek on July 14, sitting on a dead tree in a clearing. I had a good enough view of the bird to be certain of its specific identity, but it was too wary to permit a near approach. On July 22 one was heard calling at about the same place.

There is available a specimen of *Glaucidium* (no. 41193), a mounted bird, taken at Wrangell, Alaska, date of capture and sex unknown. This bird is not an example of the extremely dark colored *Glaucidium gnoma swarthi* of Vancouver Island, a coastal form that might be supposed to range northward into Alaska. It is closely similar to a specimen of *G. g. grinnelli* from Humboldt Bay, California (no. 24851), an individual that is not of the rufescent coloration usually seen in this subspecies, but of a decidedly duller brown.

The available information, scanty as it is, indicates the occurrence of *Glaucidium* in the upper Stikine Valley and on the Alaska coast at the mouth of the same river. There is little doubt that it ranges through the territory intervening between those two points. Whether or not two subspecies are represented in the two regions on either side of the coastal mountains is something that can be determined only by the capture of specimens.

Ceryle alcyon caurina Grinnell. Western Belted Kingfisher

Kingfishers were unaccountably scarce. The region might be supposed to be a favorable one for the species, but it was encountered on just two occasions: one bird seen at Doch-da-on Creek, July 17, and another at Flood Glacier, July 28.

Dryobates villosus monticola Anthony. Rocky Mountain Hairy
Woodpecker

The only species of woodpecker that was at all common in the region. About Telegraph Creek there were but few of the birds seen in May and in early June, but by the middle of June, when the young were beginning to fly, hairy woodpeckers were encountered rather frequently. Farther down the river they were decidedly scarce. A few were seen at Doch-da-on Creek. At Flood Glacier, one bird was taken and one other was heard calling.

Two occupied nests were found near Telegraph Creek. One, discovered June 11, contained nearly full-grown young, which could be seen at the entrance calling for food. This nest was in a partly dead poplar, about twenty feet from the ground. The second, found in an exactly similar situation on June 12, contained one young bird, which left at the first disturbance.

By the third week in June the nesting season seemed to be entirely over, and the young were flying about independently of their parents. An adult male shot June 19 was beginning to molt. New remiges have appeared at the junction of primaries and secondaries, and there are new feathers along the center line of the breast and abdomen.

Hairy woodpeckers may be expected to occur continuously along the Stikine River, thus bringing the subspecies *monticola* and *sitkensis* together. Unfortunately the birds are so rare along the lower river (as in the southeastern Alaskan coast region in general) that it is difficult to get enough specimens to ascertain the nature of conditions where the two meet. We failed to see any at all at the crucial point.

Sitkensis, in its relatively light ventral coloration, is intermediate between the extremely dark *harrisi* and the white-breasted *monticola*. The dark breasted type of coloration reaches its extreme development in *picoideus* of the Queen Charlotte Islands, interposed between the ranges of *harrisi* and *sitkensis*. Thus, while specimens of *sitkensis* as laid out in trays may be arranged to illustrate a step between *harrisi* and *monticola*, the geographical distribution of the several forms is not in accordance with this idea. The geographical chains appear to lie as follows: Starting with the white-breasted races of the interior of the northwest, *septentrionalis* and *monticola*, there is an extension westward on the coast of a slightly darker breasted race, *sitkensis*. Starting again with the dark breasted type, *harrisi*, of the Puget Sound region, and going northward, we reach the extremely dark

colored *picoideus*. Thus, *sitkensis* and *harrisi* are really far apart genetically, and the appearance of *sitkensis* as a seeming intergrade between *monticola* and *harrisi* must be explained on grounds other than those of such actual intermediate relationship. *Sitkensis*, as an offshoot of the white-breasted type of the interior, may have arrived at the humid coast at too recent a date to be yet affected by its surroundings to the extent that *harrisi* and *picoideus* have been; or it may be more resistant to such an environment. In either case the slight modification of the clear white breast of *monticola* produced by the humid surroundings would result in an apparent intergrade toward *harrisi*.

In this connection it may be remarked that the highly distinctive avifauna of the southeastern Alaskan coast is, for the most part, composed of species that occur on the Pacific coast farther south and extend northward along a narrow coastal strip, more or less modified in appearance. Most of these birds extend farther north than does the hairy woodpecker of the same region. *Cyanocitta stelleri*, *Penthestes rufescens*, *Junco oreganus*, and the coastal forms of *Melospiza melodia* are all birds of this type, and they all occur farther north than does *Dryobates villosus sitkensis*.

The latter apparently belongs to an aggregation of bird species that has more recently invaded the coast from the eastward along a few favorable avenues of approach. The northern limit reached in such cases would be governed by the chance terminus of the route that happened to open up from the eastward, with, of course, later extension from the new base. Other species in this same category are: *Dryobates pubescens*, *Piranga ludoviciana*, *Bombycilla cedrorum*, *Empidonax traillii*, and perhaps *Geothlypis trichas*. These birds are for the most part not nearly so abundant in the coastal region, nor are they so evenly distributed, as species of the first category listed.

Fourteen specimens of *Dryobates villosus monticola* were collected (nos. 39766-39779), eleven adults and three young. Twelve are from Telegraph Creek, one from Doch-da-on Creek, and one from Flood Glacier.

Sphyrapicus varius varius (Linnaeus). Yellow-bellied Sapsucker

On June 18 an adult male was taken. Immediately after this bird was shot its mate appeared and disclosed the location of the nest. On June 19 another male bird was taken within half a mile of where the first was shot. This was about five miles from Telegraph Creek. The nest referred to was twenty-five feet from the ground, in a dead birch

in rather open woods. The cavity appeared to be newly finished, and was empty. The two birds at the nest drew attention to their presence by their raucous call notes, screams worthy of a large hawk. The second specimen collected was traced through his noisy drumming upon a dead limb.

These three sapsuckers were the only ones that were seen near Telegraph Creek. The first one obtained (no. 39780) is close to typical *varius*. It has no red on the nape, and the red chin and throat patch is separated from the white subauricular stripe by a strip of black, these characters being just as in *varius*. It has less white on the back than most eastern examples of *varius*, but there is one specimen available from Illinois that resembles it closely. Taken by itself, this specimen would pass unquestioned as an example of *varius*. The mate of this bird was not obtained, but it was seen for a brief moment close enough to note that it had a great deal of red about the head, almost obliterating the black pectoral patch. The one collected on June 19 (no. 39781) has the red nuchal stripe, and the red of the chin and throat has obliterated the black malar stripe, invaded the white subauricular stripe beyond, and covers the entire black pectoral patch. In the latter marking the black feathers are tipped with red; the posterior border of this patch is sharply defined against the whitish belly. The dorsal region is but scantily spotted with white. It is just such a specimen as, taken in winter in California, would be defined as an example of *nuchalis* showing a decided leaning toward *ruber*.

Ridgway (1914) regards *varius* and *ruber* as specifically distinct. In the upper Stikine Valley the two forms do appear to meet as separate species, but intergradation through individual variation occurs elsewhere and by that criterion the two should be regarded as subspecies of one species. A parallel case in the Stikine region is found in the thrushes, *Hylocichla ustulata ustulata* and *H. u. swainsoni*. The facts derived from our specimens of *Sphyrapicus* are as follows: At Telegraph Creek we took one typical example of *varius*, and one bird that has more the appearance of a hybrid between two species (*varius* and *ruber*) than an "intergrade" between two such forms, regarded as subspecies. At Doch-da-on Creek, some fifty miles down the river, we collected specimens of *ruber*, specimens absolutely typical of that form (see *postea*, p. 220). We have here no series of intergrades, difficult of allocation and from an intermediate region. There are instead examples of two extremes, *varius* and *ruber*, nesting within a short distance of each other. The one doubtful specimen does not accord with

typical *nuchalis*, but has all the appearance of what a hybrid should be between two distinct species, *varius* and *ruber*. Presumably the form *nuchalis* does not occur this far north.

Sphyrapicus varius ruber (Gmelin). Red-breasted Sapsucker

Five specimens taken at Doch-da-on Creek during July, two adult males, one juvenal male and two juvenal females (nos. 39782-39786). Probably several pairs had nested within the area we covered in this region, for the birds were encountered at widely separated points. There were certain favored spots, one clump of willows and one large birch, in particular, where one or more sapsuckers were seen almost every time we passed. These trees showed large areas of scars, the results of assiduous work by the sapsuckers for a considerable period of time.

The five birds taken are typical examples of the dark colored northern race of the red-breasted sapsucker (*Sphyrapicus v. ruber*). This locality, Doch-da-on Creek, may be regarded as the easternmost limit of *ruber* in this region, yet the race persists in typical form to this extreme boundary. There is no indication of intergradation with *varius* or *nuchalis* at this margin of its habitat, such as might be expected to occur. The relationships of the three forms, *varius*, *nuchalis*, and *ruber*, present an unsolved problem, whether we regard them as species or subspecies. As between *ruber* and *daggetti*, however, there is gradual intergradation exhibited by specimens from intermediate points, such as we are accustomed to see in most geographic races, or subspecies.

Colaptes auratus borealis Ridgway. Boreal Flicker

Fairly common in the vicinity of Telegraph Creek, but so shy and wary as readily to elude observation. The call note was frequently heard, but days might pass during which none of the birds was seen. Usually they kept out of gunshot. The few obtained were taken in dense poplar thickets, where the birds were sometimes observed feeding on the ground.

On June 14 a nest was found containing one egg. On June 15 a female was shot with partly formed eggs in the ovary. None had been laid as yet. On June 17 a nest was found containing newly hatched young. This was in the broken stub of a dead birch, about ten feet from the ground.

A few flickers were seen in the woods about Glenora, perhaps one or two daily. At Doch-da-on Creek a few were seen, at long intervals. None was observed any farther down the river.

Three specimens were obtained (nos. 39787-39789), all adult females, two from Telegraph Creek and one from Glenora. Specifically, they are all purely of the yellow-shafted *auratus* type, as regards color and markings. None shows any admixture of *cafer* characteristics, though the breeding ground of the northwest subspecies of that species (*Colaptes cafer cafer*²) approaches this region very closely. No red-shafted flickers were seen by us at any point, though *cafer* may be expected to ascend the Stikine for some distance. Subspecifically the large size of these birds places them with the form *Colaptes auratus borealis* Ridgway (1911, p. 31).

TABLE VI

Measurements in millimeters of *Colaptes auratus borealis* from the upper Stikine Valley

No.	Sex	Wing	Tail	Culmen
39787	♀	162	106	37
39788	♀	163	105	32
39789	♀	160	106	33

***Chordeiles virginianus virginianus* (Gmelin).** Eastern Nighthawk

Abundant at Telegraph Creek. The first was heard calling the evening of June 8, the next day one was seen flying overhead, and soon after the birds became common. The species was about as numerous at Glenora; at Doch-da-on Creek it occurred in lesser numbers. None was seen farther down the river.

Three sets of eggs were taken (nos. 1807-1809). On June 20, a single fresh egg, an incomplete set, was found near Telegraph Creek, laid on the bare ground in open woods. The female, shot before the egg was found, contained a second egg, nearly ready to be laid. A set of two eggs, slightly incubated, was taken June 26 in the same tract of woods. This was an area that had been burned over, leaving a scattering growth of small lodgepole pines, with but little underbrush between. A third set was collected at Doch-da-on Creek, July 18. These were incubated within a few days of hatching. The eggs were placed on the bare ground in an open place in the woods. On all sides, some thirty or forty yards distant, there was dense brush, but the ground was open in the immediate vicinity of the eggs.

² For the use of this name for the northwestern flicker, see Palmer, 1916, p. 322.

The parent of the second set was extremely solicitous of their safety. She flew as we approached, coming toward us with a peculiarly halting and uncertain flight, with her tail depressed until it pointed almost straight down, and with her mouth open. Alighting near-by, she wallowed on the ground, thus luring us in pursuit for about twenty or thirty yards, then flew off in a circle through the woods. The parent of the set at Doch-da-on Creek acted quite differently. She left the eggs while the intruder was still some distance away, departing quietly and without any manifestations of solicitude. In just twenty minutes she returned, as secretively as she had left. This course of action was followed without variation on three different occasions.

Four specimens were collected (nos. 39790–39793), two adult males and two adult females. To my eye they are indistinguishable from specimens of *Chordeiles v. virginianus* from the eastern United States.

***Cypseloides niger borealis* (Kennerly). Black Swift**

A few seen about six miles from Telegraph Creek on June 12, circling overhead just out of gun shot. From this circumstance the species may be assumed to breed somewhere in that general region. One or two were observed at Glenora early in July. The next place the species was noted was at Great Glacier, where, on the morning of August 9, a flock of fifteen or more was seen.

At Sergief Island, August 17 to September 7, black swifts were abundant, though seen only in cloudy or rainy weather. Then large flocks appeared, as many as seventy-five or a hundred being in sight at once flying over the marshes, the individuals moving about in wide circles, and the flock as a whole moving in a definite path. The birds sometimes flew very low, occasionally skimming along just over the tall grass. A flock would appear, circle about overhead awhile, and then vanish. About fifteen or twenty minutes later, others, or perhaps the same flock, would come in sight again.

Compared with *Aeronautes* and *Chaetura*, the flight of *Cypseloides* (at least as seen thus feeding) is rather slow, a steady sailing with relatively little fluttering of the wings. A high rate of speed can be attained, however, so great that when individuals passed by in pursuit of one another the rush of their wings could be heard to a distance of two hundred yards or more. A weak, chattering note was uttered from time to time, but mostly the birds were silent.

Seventeen specimens were obtained at Sergief Island (nos. 39794–39810), five males and twelve females. It might be supposed that a

series of specimens taken when these birds were collected (August 19-30), would contain a large percentage of immatures, but if such young birds are included in the lot they possessed no features, either of internal anatomy or external coloration that enabled me definitely to recognize them as such. According to Drew (1882, p. 182) the young of this species is appreciably different from the adult in coloration, the dark feathers being extensively white-tipped, both above and below. Of the five males, two have extremely faint light colored tips to the feathers of the lower abdomen and on the lower tail coverts. One of the five has the tail very slightly forked, in the others it is deeply indented. Of the twelve females, one is uniformly dark colored; it has no trace of any whitish tips to the feathers of the lower parts. In the others such markings are present in varying degrees. The dark colored female has a truncate tail, just as do the others. In every individual, both male and female, the sexual organs were clearly visible. They were shrunk in size, as would be expected in adults at that season, but they were never difficult to see, as is so often the case with young birds. The birds collected had entirely finished the annual molt and were all in the new plumage.

***Chaetura vauxi* (J. K. Townsend). Vaux Swift**

On June 26 a single bird was noted some five miles from Telegraph Creek. At Doch-da-on Creek, the middle of July, a few were seen on several different days. At Flood Glacier, August 3 and 5, several were observed, flying low in the rain that was falling, and all traveling down stream.

Two specimens were collected (nos. 39811, 39812), an adult male and an adult female, taken at Doch-da-on Creek, on July 16 and 14, respectively.

***Selasphorus rufus* (Gmelin). Rufous Hummingbird**

Seen at every collecting station, but nowhere in abundance. The species was at Telegraph Creek at the time of our arrival, May 23; at that time it was restricted to the near vicinity of the river, where there were already some flowers in bloom. On the higher slopes the vegetation was not so far advanced, and the hummingbirds were absent.

A nest found at Doch-da-on Creek, July 10, was in a clump of large timber, built near the tip of a spruce limb, about five feet from the ground. The outer surface of the structure was well covered with

lichens. Attention was drawn to this nest by the sudden flight of the two young birds it contained, when approached too closely.

During the second week in July a female hummingbird was repeatedly seen in the vicinity of our camp. On the 14th a male bird was seen going through his courtship flight, associated with this same female, so nesting may have been going on at that date. In the courtship flight the male bird rose slowly to a height of about sixty feet, then swooped down and swung up again for a very short distance. A diagram showing the course of this evolution would be about the shape of a fishhook. When the lowest point was reached, three or four rasping notes were uttered. The evolution finished, he slowly arose once more and repeated the performance. This was done five or six times, when he lit on a nearby limb.

For a hummingbird to appear as a menace to a farm crop was a new rôle for a member of that family, but we heard one such complaint of damage done. Mr. W. E. Parrott, of Sergief Island, had a large strawberry patch, the fruit of which he marketed in the nearby town of Wrangell. Time and again, so he told us, he had seen a hummingbird dash at one of the bright red berries, apparently under the impression that it was a flower, and the bird's bill would be thrust through the fruit, which, of course, was ruined. He had found a number of berries pierced in this way, and was puzzled to account for the damage until he saw a hummingbird in the act.

Two specimens were preserved (nos. 39813, 39814). These are adult males taken at Glenora, June 29 and July 3, respectively.

***Sayornis sayus* (Bonaparte). Say Phoebe**

Several pairs seen on the upper Stikine River. At Telegraph Creek at least two pairs were domiciled on different houses in the town. On June 6, one pair was seen at work nest building on a beam over the entrance to Hyland's store. At Glenora, June 29, a nest with young was found in one of the deserted houses of the Hudson's Bay Company. A day or two later the birds were gone and search of the adjoining fields failed to disclose their presence; evidently the brood had at once traveled some distance.

On August 21 an immature female was collected on Sergief Island, perched on some drift far out on the marshes. This, I believe, is the first time the species has been reported from the coast of southeastern Alaska. It is, of course, a transient, perhaps no more than a straggler into that region. The bird collected on Sergief Island had probably wandered there from the interior along the Stikine River.

Sayornis sayus yukonensis was described by Bishop (1900b, p. 115) from Glacier, White Pass, Alaska, as a northern form, differing from *S. sayus sayus* in darker coloration and in certain structural details. The subspecies was denied recognition by the A. O. U. Committee (1901, p. 312), nor has it been generally recognized since that time. Grinnell (1909a, p. 206) uses the name *S. s. yukonensis* for a specimen from Forty-Mile, Yukon, which is shown to exhibit the characters claimed for the race by Bishop. The young bird (no. 39815) collected by myself differs appreciably from juvenals from the southwest. It is of darker coloration and has much less rufous on the upperparts, thus agreeing with Bishop's (*loc. cit.*) description of the juvenal plumage of *yukonensis*. Thus the two northern specimens of *Sayornis sayus* in this Museum are of a character to justify the recognition of *S. s. yukonensis*, but the material is so scanty that, rather than formally affix that name to these two individuals, I prefer to let the description of their peculiarities rest as evidence for use at some future time when additional material has been acquired.

Nuttallornis borealis (Swainson). Olive-sided Flycatcher

There were a few pairs in the more open wooded country about Telegraph Creek. The birds were extremely shy, not permitting a near approach, and their habit of perching in the tops of tall trees also aided in keeping them out of gun shot. Seen at but the one collecting station.

Myiochanes richardsoni richardsoni (Swainson)

Western Wood Pewee

Fairly common about Telegraph Creek. First seen on May 27; a few days later present in numbers. A female shot at Glenora on July 7 had laid part of its set. None seen farther down the river than Glenora, though, as the species is known to occur in summer at some points on the coast of southeastern Alaska (Swarth, 1911, p. 75), it might be expected to range through the entire Stikine Valley.

The birds were extremely shy. They were partial to more sparsely wooded areas, especially burnt-over tracts, where they perched upon dead trees affording a wide outlook. In such places they could seldom be approached to within a hundred yards.

Three specimens collected (nos. 39816-39818), one adult male and two adult females. Besides these birds there are in the Museum collection, specimens from the coast of southeastern Alaska and from

Vancouver Island. A northern race of this species has been designated by Bishop (1900*b*, p. 116) as *Contopus richardsoni saturatus*. Certain of the characters ascribed to this race may be discerned in some of the specimens from the several points indicated, but these features seem all to be too inconstant to serve in differentiating a northern subspecies.

Empidonax difficilis difficilis Baird. Western Flycatcher.

Seen nowhere along the upper Stikine, and the call note is sufficiently loud and characteristic to render it unlikely that we should have overlooked the bird, if present. One specimen, an immature male (no. 39819) taken on Sergief Island, August 19.

Empidonax trailli alnorum Brewster. Alder Flycatcher

Occurs in some numbers in suitable willow and alder thickets as far down the river at least as Doch-da-on Creek. One heard calling near Telegraph Creek, May 23. None seen at the Junction, but at Sawmill Lake there were several pairs in the dense thickets bordering the water. Here, at Glenora and at Doch-da-on Creek, our experience was the same. The birds could be heard calling, and occasionally one could be seen in flight through the bushes, but their habitat was so impenetrable and the birds were so shy and wary that they were almost impossible to approach.

After leaving Doch-da-on Creek the alder flycatcher was seen on but one occasion. On Sergief Island, September 3, an immature female was collected in a tangle of alders. The capture of this bird, of course, is no proof that the species breeds on that island, though it has once been recorded from another point on the coast of south-eastern Alaska under circumstances apparently indicative of nesting (Swarth, 1911, p. 76).

Two specimens were collected, an adult male near Telegraph Creek, June 18 (no. 39820), and the young bird above mentioned (no. 39821). The adult somewhat resembles *Empidonax t. trailli* in its large bill and short wing, but in general coloration and in character of wing bars, it is clearly *alnorum*. The young bird appears to be a typical example of *alnorum*.

Empidonax hammondi (Xantus). Hammond Flycatcher

Abundant on the upper Stikine, where it is largely a bird of the poplar woods. Near Telegraph Creek many were seen during the last

week in May, usually sitting high up in the leafless poplars and conspicuous from their frequently reiterated, sharp *che-bec*. Like the other small flycatchers of the region, they were extremely shy, but, through peculiarities of habit and habitat, Hammond flycatchers were more easily collected than some of the other species. The olive-sided flycatcher and wood pewee, perched upon isolated lookout points, could not be approached unawares. The alder flycatcher was in tangled thickets not to be penetrated save with much labor and with the accompaniment of threshing branches and broken boughs. The Hammond flycatcher was mostly in woods that could be traversed with fair ease, but which yet afforded some cover to the hunter.

The species was quite abundant at Telegraph Creek and at Glenora, and in lesser numbers at Doch-da-on Creek. Several were seen at Flood Glacier, though whether the species breeds at that point we had no means of telling. One was collected at Great Glacier, August 10.

A female shot near Telegraph Creek, May 27, was incubating a set of eggs. One collected June 1 had laid part of its set. An adult male taken at Glenora, June 30, shows the beginning of the molt. An adult female from Flood Glacier, July 27, had renewed a large part of its plumage. Two specimens in juvenal plumage were taken at Flood Glacier, August 3 and 6. A young bird from Great Glacier, August 10, shows the beginning of the molt into the first winter plumage.

It is strange that the Hammond flycatcher has not yet been found on the coast of southeastern Alaska south of Skagway. It is abundant in the interior and approaches the coast quite nearly at some points. It is also abundant in the coastal region farther south, as on Vancouver Island. Consequently it is hard to understand the cause of its exclusion from the southern Alaskan coast.

We collected ten specimens (nos. 39822-39831), seven adults and three juvenals.

***Empidonax wrighti* Baird. Wright Flycatcher**

Three specimens taken near Telegraph Creek. This species was not to be distinguished from *E. hammondi* in life; in fact it was not until our return from the field, when the entire collection was brought together, that both species were found to be included in the series of small flycatchers collected. Consequently if there is any difference in local habitat between the two we failed to distinguish it. The three birds taken were obtained at points where examples of *hammondi* were also collected.

These specimens are a male (no. 39832), taken at The Junction, May 28; a female (no. 39833), from Sawmill Lake, June 11, not yet laying; a female (no. 39834), taken four miles west of Telegraph Creek, June 18, containing eggs nearly ready to be laid. These facts point to a somewhat later time of nesting than is the case with *hammondi*.

The species has been reported from Wilson Creek, near Lake Atlin, about 150 miles north of our station, and as far as I know the northernmost point of record (E. M. Anderson, 1915a, p. 13). The specimens we took are typical examples of the species, presenting all the characters of measurements and proportions that distinguish *wrighti* from *hammondi*. No equivocal specimens were collected, that is, none that could not be referred without question to one species or the other.

Otocoris alpestris arcticola Oberholser. Pallid Horned Lark

Seen in small numbers on the mountain tops above Doch-da-on Creek. There, on July 11 and again on July 23, they were found on the open, moss-covered slopes above timber line, associated with rosy finches and pipits. This station is, in a straight line, not more than sixty miles from the coast, farther to the westward than horned larks have been found in this region heretofore. From the mountain we were on, however, we could see many similar peaks and ridges far to the westward, where the species would probably be found could these summits be reached. These mountains are so steep and rough, with such impenetrable forests at the lower levels, and, toward the coast, so frequently encircled by glaciers, that their ascent at most places is extremely difficult. Horned larks may well occur at favorable points but a few miles back from the coast, but the circumstances are such that it is doubtful if this possible habitat will soon be invaded by any collector.

We collected four specimens (nos. 39835-39838), two adult males, one adult female, and one juvenal male. The two adult males, taken July 23, are beginning the annual molt, shown mostly in the wing coverts. The young bird, taken July 23, is in juvenal plumage throughout. Compared with the young of various of the southwestern subspecies of *Otocoris alpestris*, it is extremely dark colored. Ground color of the upper parts is blackish, throat and lower belly are white, and there is hardly a trace of rufous or vinaceous anywhere.

Cyanocitta stelleri stelleri (Gmelin). Steller Jay

Closely restricted to the coastal region. On our way down stream we saw the first Steller jay at Flood Glacier, some forty miles up the river from the boundary. At that point one was noted on July 26, another on August 1. At Great Glacier, about ten miles above the boundary, two were observed together on August 11, and proved to be both adult males. The species is sufficiently conspicuous and noisy to draw attention to itself when present, and as the above records constitute all of our observations on the upper river, it is obvious that this jay is of relatively uncommon occurrence in that region.

At Sergief Island many were seen, sometimes under circumstances suggesting migration. They were frequently in small gatherings, seven or eight together, and often on the tidal marshes, far from timber, apparently traveling in a definite direction. When thus seen they were flying by easy stages from one drift log to another, in a southerly direction.

An adult female (no. 39839) taken at Flood Glacier, August 1, is in the midst of the annual molt. Two adult males taken at Great Glacier, August 11 (nos. 39840, 39841), are in the new plumage throughout. Two immatures from Sergief Island (nos. 39842, 39843) obtained on August 23 and 31, respectively, are likewise through the molt, and have fully acquired their first winter plumage. These birds are all typical *stelleri*. Those taken the farthest inland evidently represent extreme points of dispersal from the coast. There is no evidence that *Cyanocitta stelleri stelleri* in this region extends inland to the habitat of *C. s. annectens*, with intergradation between the two forms. *Annectens* probably does not range so far north in British Columbia.

Perisoreus canadensis canadensis (Linnaeus). Canada Jay

When we arrived at Telegraph Creek, the fourth week in May, this species was through with its nesting. It was not a common bird nor was it ordinarily noisy or conspicuous. Family groups, old and young together, were seen at several points between Telegraph Creek and the Summit, and single individuals were occasionally encountered slipping quietly through the woods.

This jay was one of several species that appeared to be restricted during the breeding season to a higher zone than that immediately bordering the Stikine River. None was seen nearer the river than The Junction, a point four miles north of Telegraph Creek, several

hundred feet higher in altitude, and about two weeks later in the development of the vegetation. On June 4 at the Summit, a gathering of jays was encountered composed of at least two broods. The old birds were busily engaged in feeding the young, though the latter were also foraging a little for themselves.

We did not see the species either at Glenora or Doch-da-on Creek, but it can hardly be doubted that it occurs at both places. There was at least one brood in the woods about our camp at Flood Glacier. The forest at that point is not of the type most favored by this species, being almost entirely dense spruce woods such as are seen along the coast, and it is questionable whether the occurrence there of this family of *Perisoreus* can be assumed to represent a breeding record. None was seen farther down the river.

Individuals taken the last week in May and the first week in June had in several cases already begun the annual molt. Two adults taken at Flood Glacier on July 28 were in the midst of this molt. Two young birds taken at the same place July 28 and August 6 are molting from the juvenal into the first winter plumage.

There have been available for comparison a series of adult *Perisoreus canadensis canadensis* from Minnesota, and old and young of *P. c. fumifrons* from the Kotzebue Sound and Yukon River regions, Alaska. The Stikine River adults are similar to *fumifrons* in general body color, but have more white on the crown. They resemble *canadensis* in head markings but are rather darker colored. The young birds from the Stikine region are distinctly darker colored, more of a slaty black, as compared with the juvenals from Kotzebue Sound and the Yukon River. This dark type of coloration is a character ascribed to the young of *P. c. canadensis* by Ridgway (1904, p. 366). On the whole, the Stikine River series may be assigned to the subspecies *Perisoreus canadensis canadensis*, though showing a tendency toward *P. c. fumifrons*.

We collected thirteen specimens of the Canada jay (nos. 39844-39856), five adults and four juvenals from points within twelve miles of Telegraph Creek, and two adults and two juvenals from Flood Glacier.

***Corvus corax principalis* Ridgway. Northern Raven**

Probably occurs throughout this whole region, but, judging from our observations, not abundant at any point. We were at Telegraph Creek three weeks before we saw one. The first was noted on June 17, and afterwards others were seen on several occasions. At Doch-da-on

Creek ravens were occasionally observed, and at Great Glacier several were seen. There were a few at Sergief Island, seen from time to time, or heard croaking in the distance.

***Corvus brachyrhynchos caurinus* Baird.** Northwest Crow

Seen only at Sergief Island. Here, during the latter part of August and the first week in September, crows were fairly abundant, usually in small flocks. Young birds were still being cared for by their parents, and the gatherings seen were apparently family groups, though sometimes two broods may have joined forces. This bird is strictly a "beach comber," apparently not venturing inland any distance whatever. We saw none above the mouth of the river. No specimens were taken. This form appears in the A. O. U. *Check-List* as a distinct species, but it should be regarded as a subspecies of *Corvus brachyrhynchos* (cf. Rhoads, 1893, pp. 18-21; Ridgway, 1904, p. 272; Oberholser, 1919a, p. 84).

***Euphagus carolinus* (Müller).** Rusty Blackbird

Breeding in the vicinity of Telegraph Creek. There were several pairs nesting about Sawmill Lake, at different points, not in any one gathering or colony. A female shot June 11 was incubating eggs. At Doch-da-on Creek the species was seen about some swampy meadows and lakes during the latter part of July, when young birds, full grown, though still in the juvenal plumage throughout, were being cared for by their parents. The young sat in the willows, while the adults were foraging through the swamps for the food that was hurried back to the squalling youngsters as rapidly as it was found.

Seen at one other collecting station. On Sergief Island, September 5, a single bird passed over my head, out of gun shot, while I was out on the marsh.

Ten specimens collected (nos. 39857-39866), an adult male and female from Telegraph Creek, and eight in juvenal plumage from Doch-da-on Creek. There is an appreciable difference in appearance in the two sexes in juvenal plumage. The young male is much more black beneath the prevailing rusty or yellowish hue of the feather tips.

***Pinicola enucleator flammula* Homeyer.** Kadiak Pine Grosbeak

Apparently rather rare in summer in the upper Stikine Valley. We saw single birds or pairs at scattered points and at long intervals of time; they were always shy and it was with difficulty that specimens were taken.

At The Junction, single red-colored males were seen May 27, 29, and 31. Another was noted some five miles west of Telegraph Creek, June 12. At Doch-da-on Creek, a mated pair was taken July 9, apparently preparing to nest. On July 17, at the same place, a flock of seven or eight was encountered, feeding near the ground in some thick bushes; on July 14 a brilliant red male was seen; on July 22 a dull-colored male was secured. The last mentioned was in full song; it was beyond doubt a breeding bird. On August 2, at Flood Glacier, a red male was seen singing in a tree top near camp.

Five specimens collected (nos. 39867-39871), two adult males from The Junction, May 29 and 31; the mated pair from Doch-da-on Creek, July 9 (the male in the female plumage); a dull-colored male from Doch-da-on Creek, July 22. These were identified as *Pinicola enucleator flammula* by Dr. H. C. Oberholser, of the United States Biological Survey.

***Carpodacus purpureus purpureus* (Gmelin). Eastern Purple Finch**

We had collected during most of the month of June in the vicinity of Telegraph Creek without once encountering this species. Then on July 5, in a section we had previously worked most thoroughly about a mile from Telegraph Creek, we encountered several small flocks of purple finches. Three were taken (nos. 39872-39874), a male and two females, all birds that apparently were just through breeding. The male is in the streaked female plumage, with just one pink feather on the breast. Both females show some reddish on the rump.

These birds are unequivocally of the subspecies *purpureus*, and their capture at this point constitutes, I believe, a material extension of range northwestward. The species probably breeds somewhere within a few miles of where the birds were collected.

***Loxia curvirostra bendirei* Ridgway. Bendire Crossbill**

During the latter part of June a few red crossbills were seen flying overhead in the vicinity of Telegraph Creek. On June 22 a small flock was encountered, apparently a single family, and four birds were collected (nos. 39876-39879), an adult male and three juvenals. It is of interest to note that these birds are of the subspecies *bendirei*, widely different in appearance from the form inhabiting the nearby coastal region of Alaska. This would indicate that the range of the small sized, red crossbill of the Pacific slope of British Columbia and

southeastern Alaska is entirely cut off from that of *Loxia curvirostra minor* of eastern North America through the intervention of the form *bendirei*. The Alaskan bird has been named *Loxia curvirostra sitkensis* by Grinnell (1909b, p. 223), based largely on color characters in the adult male. Birds from Vancouver Island do not exhibit the same sort of differentiation from *minor*, in fact to my eye they are indistinguishable. Nevertheless it seems evident that the Vancouver Island birds also occupy part of the territory that is separated from *minor* by the habitat of *bendirei*. The proper nomenclatural treatment of such a form as the Vancouver Island race of *Loxia curvirostra* is an open question. It seems evident that genetically it is as far from *minor* as is *bendirei*; yet, since the birds from the Pacific and Atlantic regions are indistinguishable in appearance, we call them all by the same name.

The characters ascribed to *L. c. bendirei* by Ridgway (1901, p. 50) are as follows: "Similar to *L. c. minor*, but decidedly larger; adult male averaging rather lighter or brighter in color, the adult female slightly lighter and grayer." These characters are well borne out by the specimens of *bendirei* in the collection of this museum. In addition, the young birds from Telegraph Creek, all in the streaked juvenal plumage, exhibit well defined features of size and color. They are appreciably larger than comparable examples of *sitkensis* and *minor*, and are grayish toned. Juvenals of the small coastal race are much more greenish and olivaceous in general body color.

***Loxia curvirostra sitkensis* Grinnell. Sitka Crossbill**

On Sergief Island, during August and September, a few red crossbills were seen at various times. On August 28 an adult female was collected (no. 39875). This bird was evidently incubating a set of eggs, judging from the bare breast and the condition of the oviduct. It seems curious that nesting should have been going on at that season, when we had taken full-grown juvenals of *bendirei* at Telegraph Creek in June.

***Loxia leucoptera* Gmelin. White-winged Crossbill**

First positively identified at Glenora, July 4, and near Telegraph Creek, July 5, though small flocks had been seen several days before that were suspected to be this species. During the first three weeks in July flocks were seen daily, in rapidly increasing numbers. Then,

at Doch-da-on Creek, July 21, a male bird was shot that was one of a pair. Several pairs were seen there subsequently, and the flocks appeared to be breaking up. At Flood Glacier, July 26 to August 8, the species was present in great numbers, and breeding. No nests were discovered, but several females were shot that had laid parts of their sets. The birds were fairly numerous at Great Glacier, August 9 to 16, several were seen about the custom house at the boundary, August 16, and they were frequently observed at Sergief Island up to the time of our departure.

It was a surprise to me to find this crossbill nesting so late in the summer. That this is not the invariable custom of the species is shown by Grinnell's (1900, p. 45) account of their habits in the Kotzebue Sound region, where eggs were found in May. Their actions in the Stikine country may have been influenced by food conditions, for in 1919 throughout the region there was a tremendous crop of spruce cones, which were ripening at the time of the appearance of these birds.

At Glenora the crossbills were feeding on the seed pods of the cottonwoods, as they were also in some degree at Doch-da-on Creek, but farther down the river, and a little later in the season, the spruce cones had their undivided attention.

The song of the white-winged crossbill was one of the most notable features of the bird life of the Stikine Valley. As the flocks broke up, the male birds sang more and more. During our stay at Flood Glacier they were at the height of their efforts, and the music was in our ears at all times. It was a continuous, rollicking, trilling song, lasting for minutes at a time without cessation, and loud enough to be heard several hundred yards. The singer was usually on some high perch, preferably the dead top of a tall spruce; frequently he would fling himself into the air on wide extended, slow beating wings, singing as he went, flying sixty or seventy yards, perhaps, to another perch. The song is somewhat suggestive of that of a caged canary; we also found it reminiscent of that of the California house finch (*Carpodacus mexicanus frontalis*). The song-flight especially is suggestive of a similar spring performance of the house finch.

Nine specimens collected (nos. 39880-39888), four adult males and five adult females, two from Glenora, two from Doch-da-on Creek, and five from Flood Glacier.

Leucosticte tephrocotis littoralis Baird. Hepburn Rosy Finch

Met with at but one locality, on the mountain tops above Doch-da-on Creek. We made two trips to the higher ridges above timber line, and saw rosy finches in some numbers each time. They appeared in view soon after we emerged from the upper edge of the forest (about 3500 feet) and they evidently inhabited all of the open country from there on upward. Upon our first visit to their territory (July 11) not many of the birds were seen, and they were mostly drifting about through the air by twos and threes, as horned larks do at times.

The next time we climbed the mountain, on July 23, we found them in much greater numbers. Just at the upper edge of the timber a flock of twenty or thirty was encountered, feeding in tall dry grass that had grown up in an area previously swept by fire. Many dead trees stood on this slope, and the rosy finches when startled flew to the tree tops. This entire flock was of adult birds; two males were collected, and my impression was that they were all males, beginning to flock together after the nesting season. A little farther on females and young were found, mostly near extensive snow banks. The young were all in juvenal plumage and were not quite full grown; that is, wing and tail feathers had not reached their full length. The old birds were assiduously feeding the young, and in the pursuit of this duty we several times saw them fly into the air to capture flying insects, which were then carried to the waiting offspring.

Twenty-one specimens collected, all taken July 23 (nos. 39889-39909), four adult males, seven adult females, six juvenal males, three juvenal females, and one juvenal with sex not ascertained.

The adults are all in worn breeding plumage, though the feathers are not so ragged as might be expected. Some are just beginning the annual molt. The main plumage variation concerns the gray coloration on chin and throat. In some the brown of the breast extends well up on the chin, in others there are scattered gray feathers extending downward from the throat on to the breast. The juvenals, as compared with the similar stage in *Leucosticte tephrocotis dawsoni* from the Sierras of California, are noticeably dark colored throughout.

The gullets and stomachs were preserved of sixteen birds, all that contained any food. From these it is evident that insects form a large part of the diet of both old and young during the summer months. Stomach contents (determined at the United States Biological Survey) in detail are as follows:

No. 39889, adult male. Contents: 1 Elaterid, 1 Ichneumonine, 1 Tipulid, fragments of many plant lice, about 370 seeds of *Potentilla*, sp., at least 58 seeds of Caryophyllaceae, about 200 small seeds (probably *Mollugo*), 1 *Polygonum viviparum*, some vegetable débris.

No. 39891, juvenal male. Contents: 2 *Lina interruptum*, 1 Scolytid, 1 Lampyrid, 1 Elaterid, 1 Anisotoma, sp., 1 small Jassid, bits of a caterpillar, fragment of a spider, several Tipulids, 6 Empids, 1 Anthomyiid, 1 Syrphid, about 30 Aphids, 1 *Camponotus*, sp., 1 *Leptothorax*, sp., about 750 Caryophyllaceae seeds (near *Silene*), about 152 *Polygonum viviparum* (small bulblets), and about 54 seeds of *Potentilla*, sp.

No. 39892, juvenal male. Contents: 1 plant louse, Hymenoptera fragments (including 1 Myrmicinae), Dipterous remains, including Tipulids, 1 Anthomyiid, 1 Mycetophilid, 9 Caryophyllaceae, several bulblets of *Polygonum viviparum*.

No. 39893, juvenal female. Contents: fragments of a Tipulid, a few Aphids, 216 stamens of *Pentstemon*, sp., 1 seed of *Potentilla*, sp., and 17 Caryophyllaceae (near *Silene*).

No. 39894, juvenal male. Contents: 1 Elaterid, 1 *Syneta*, sp., 1 *Haltica*, sp., 2 Scolytids, bits of a weevil, 1 *Pytho*, sp., 2 Aphids, fragments of Diptera, 33 *Potentilla*, sp., 22 seeds of *Carex*, sp., 1 *Arenetra*, 2 Ichneumonids, 1 *Protopanteles*, 1 Pteromalid, 3 Belytids, 1 *Aphidius*, 1 Nematine, 1 *Emphytina canadensis*, and 1 *Amauronematus*.

No. 39896, juvenal male. Contents: 1 *Megastigmus*, sp., 3 *Leptothorax*, sp., about 150 Aphids, 4 Empids, 1 *Plecopteron*, 18 stamens of *Pentstemon*, sp., 21 seeds of Caryophyllaceae (near *Silene*), and 20 small Dicotyledons.

No. 39897, juvenal, sex not determined. Contents: 1 Neuropterous insect, 214 stamens of *Pentstemon*, sp., 1 *Potentilla*, sp., 15 Caryophyllaceae (near *Silene*).

No. 39898, juvenal male. Contents: fragments of Diptera (including Tipulidae), 25 seeds of Caryophyllaceae (near *Silene*), about 24 stamens of *Pentstemon*, sp., 2 seeds of *Potentilla*, sp., and 1 small sedge seed.

No. 39899, juvenal female. Contents: 1 *Emphytina canadensis*, 3 Tipulids, several Aphids (including 2 *Psylla*, sp.), 19 Caryophyllaceae (near *Silene*), and 81 immature bulblets of *Polygonum viviparum*.

No. 39900, adult female. Contents: fragments of an Acridid nymph and about 300 seeds of Cyperaceae (probably *Carex*).

No. 39901, adult male. Contents: bits of a Carabid, 1 Bythosco-pinae, about 40 Aphids, Tipulid remains, 2 Acalyptrate flies, 3 Tenthredinids (*Pachynematus*), 1 Pteromalid, 1 Camponotus, 1 *Diaeretus rapae*, 1 *Ichneutes reunitor*, 1 Braconid, and 1 *Diplazon lactatorius*, 2 small bulblets of *Polygonum viviparum*, 18 Caryophyllaceae (near *Silene*), and 8 small Dicotyledonous seeds.

No. 39903, adult male. Contents: 1 Scarabeid (probably *Ataenius*), 1 *Camponotus*, sp., 1 *Stenomacrus*, 1 *Diaeretus rapae*, 1 Ephydrid, about 25 Aphids, 1 caterpillar, about 120 seeds of *Potentilla*, 7 sedge seeds, 10 stamens of *Pentstemon*, sp., 26 *Vaccinium*, sp., 2 seeds near *Mollugo*, sp., 8 Caryophyllaceae seeds (near *Silene*, sp.), and 3 small Dicotyledonous seeds.

No. 39904, adult female. Contents: 1 Pteromalid, 1 fly (Empidae), about 58 plant lice, 1 insect pupa (probably Lepidopterous), 1 immature bulblet of *Polygonum viviparum*.

No. 39905, adult female. Contents: 1 nymph of *Geocoris*, sp., head of a Microlepidoptera, 2 Lycosids, 2 Tipulids, 3 moths, 2 seeds of Cyperaceae.

No. 39906, adult female. Contents: fragments of 2 *Lina interruptum*, 1 Acalyptrate fly, 1 *Psylla*, sp., about 75 Aphids, bits of a spider.

No. 39907, adult male. Contents: 3 moths, 1 Tipulid, 225 seeds of *Carex*, sp.

TABLE VII

Percentage of animal and vegetable matter in stomachs of *Leucosticte tephrocotis littoralis*

No.	Sex	Age	Percentage of animal matter	Percentage of vegetable matter	Percentage of gravel, etc.
39891	♂	juv.	46	54	....
39892	♂	juv.	80	20	....
39893	♀	juv.	2	98	....
39894	♂	juv.	88	12	18
39896	♂	juv.	84	16	....
39897		juv.	1	99	trace
39898	♂	juv.	40	60	....
39899	♀	juv.	50	50	....
39889	♂	ad.	45	55	trace
39900	♀	ad.	....	100	....
39901	♂	ad.	95	5	....
39903	♂	ad.	60	40	....
39904	♀	ad.	99	1	....
39905	♀	ad.	99	1	....
39906	♀	ad.	100	....	....
39907	♂	ad.	55	45	....
Average			59	41	

TABLE VIII

Measurements in millimeters of adults of *Leucosticte tephrocotis littoralis*

All from mountains above Doch-da-on Creek, B. C., July 23, 1919

		Wing	Tail	Culmen	Depth of bill	Tarsus
39889	♂	104.	69.	11.5	7.5	20.
39903	♂	103.	68.	12.	8.	19.5
39901	♂	100.	65.	10.5	7.5	18.
39907	♂	103.	69.	11.	8.	20.5
39900	♀	95.	61.	11.5	7.5	19.5
39902	♀	98.	64.	11.	8.	18.5
39904	♀	96.5	64.5	11.	7.5	19.
39905	♀	96.	61.	11.5	7.5	19.
39906	♀	101.5	65.	11.5	8.	19.
39908	♀	97.	61.	11.2	8.	19.
39909	♀	93.	59.	11.8	7.5	19.

***Spinus pinus pinus* (Wilson). Pine Siskin**

Fairly common throughout the whole region traversed, and seen in flocks during the entire nesting season. At Telegraph Creek birds were seen carrying building material during the first week of June, and on June 20 a set of three eggs was taken. The extensive open fields at Glenora were thickly grown up with dandelions when we arrived there at the end of June, and the siskins were present in large flocks, feeding upon the dandelion seeds. At the same place they were seen about the log cabins picking at the plaster between the logs.

At Doch-da-on Creek, at Flood Glacier, and at Great Glacier, siskins were encountered daily, usually in small flocks. During our brief stop at the boundary, August 16, the pine siskin was one of the few species of birds noted. It was present at Sergief Island, but not numerous.

The one nest found (no. 1810), taken near Telegraph Creek, was in a small lodgepole pine in very open woods, the same tract where the Bohemian waxwings were nesting. It was about six feet from the ground, resting against the main stem and well-nigh hidden by the clusters of needles upon the small supporting branches. The structure is well built and compact, composed outwardly of small twigs and the white down from the fireweed; the lining, of grasses and some moss from the trees. The outside diameter of the nest is about 90 millimeters, depth, about 60; inside diameter, about 60, inside depth, 25 millimeters.

The eggs, three in number, were slightly incubated. They are a little paler than lichen green; in two cases there is a wreath of reddish

spots at the large end, in the third egg this wreath is reduced to a few minute spots. Seven specimens of this bird were collected, all adults (nos. 39910-39916). Four are from the vicinity of Telegraph Creek, one from Glenora, one from Doch-da-on Creek, and one from Flood Glacier. These birds are grayer in general coloration than most of the specimens in a comparable series from the Alaskan coast, but there are individuals in the coastal series not to be distinguished from those taken in the interior.

***Calcarius lapponicus alascensis* Ridgway. Alaska Longspur**

Seen only at Sergief Island, where it occurs merely as a migrant. First noted on September 3, and the two following days, our last in the field, small flocks appeared from time to time. All the birds seen were flying, passing overhead in a southerly direction.

***Passerculus sandwichensis savanna* (Wilson). Savannah Sparrow**

Seen only at Sergief Island. Upon our arrival there, August 17, Savannah sparrows were present though not abundant. Some days later they increased greatly in numbers, and at the end of August were found everywhere over the marshes. They kept mostly to the flooded grass lands, a much wetter habitat than that favored by the song and Forbush sparrows, also abundant at the same station.

Nine specimens were collected (nos. 39921-39929). The discovery that the subspecies *alaudinus* breeds but a short distance inland (see p. 240) was an incentive toward an accurate determination of the status of the quite distinct coastal subspecies. This coastal subspecies, formerly lumped with *Passerculus s. alaudinus*, has been latterly referred to *savanna*, of eastern North America, to which it bears a close resemblance (see Grinnell, 1909b, p. 227; Swarth, 1911, p. 85). There is no doubt, however, that the form occurring on the coast of southeastern Alaska is entirely cut off from the habitat of the eastern *savanna* by the intervention of the range of *alaudinus*. It is a local race that is probably confined almost entirely to the Alaskan coast, and with but a limited migration, one extending usually not much farther southward than the Puget Sound region. There is apparently no place where it approaches at all closely the habitat of the eastern *savanna*. A thousand miles or more must intervene. Nevertheless, despite the wide difference in habitat, birds from the two regions are so much alike in appearance that I am unable to detect any character whereby they

can be distinguished. It is a puzzle just what should be the proper nomenclatural treatment of these forms. In all probability the relationships of the two are not particularly close. It seems likely that there is continuous distribution of Savannah sparrows along the Pacific coast of North America, with probable intergradation between the Alaska forms and the darker colored California subspecies, and this, I believe, is the line of closest affinities.

I am willing to admit geographical distribution as one of the characters of a form, but to make distribution the *sole* character is farther than I care to go. So, on the ground of external resemblance, the Savannah sparrow of the coast of southeastern Alaska is here recorded as *P. s. savanna*, but with no belief that it is genetically the same as the eastern subspecies bearing that name. The case is closely paralleled by the red crossbills (*Loxia curvirostra sitkensis* and *L. c. minor*).

Passerculus sandwichensis alaudinus Bonaparte. Western Savannah Sparrow

Found at but one or two points in the upper Stikine Valley. On May 31, at the Junction, the mangled remains of one were found in a mousetrap, our first intimation of the arrival of the species. Several were seen at the Summit, June 4; a male bird collected at that time appeared to be breeding. At Glenora there were a few scattered through the weed-grown fields, and they were evidently nesting there. The males were uttering their wheezy trills from the tops of low bushes or from fences or stakes, and could be found at about the same spots day after day. Females collected were evidently incubating.

No Savannah sparrows were seen farther down the river than Glenora until we reached the coast, the habitat of another subspecies. There are not many places in the Telegraph Creek region that afford the needed surroundings for this bird, for extensive clearings supplying the open ground they favor are found in but few places. Where we saw them at the Summit is at about the upper limit of timber, and it may be that the species occurs commonly in such a habitat. We saw no Savannah sparrows, however, on the mountain top above Dochda-on Creek.

Four specimens collected (nos. 39917-39920), two adult males and two adult females. These are obviously different from *P. s. savanna* of the coastal region. Compared with the latter the Telegraph Creek birds are of grayer coloration, have a longer wing, and a more slender

bill. They are apparently the same as the form occurring in the uplands of west central and southern California in winter, to which the name *Passerculus s. alaudinus* has been applied (see Palmer, 1918, p. 123).

***Zonotrichia leucophrys gambeli* (Nuttall). Gambel Sparrow**

Fairly common in the river valley at Telegraph Creek. This may be taken as near the western limit of the summer habitat of this subspecies in this region, for although the birds were numerous in and about the town of Telegraph Creek, they became notably scarce a very few miles farther down the river. In our two weeks' collecting at Glenora but one bird was seen, and none was observed farther down stream, with the exception of one at Sergief Island after the fall migration had begun.

Several nests were found near Telegraph Creek. On June 6 a bird was seen carrying building material. On June 11 and 14 three nests were discovered on certain slopes near Sawmill Lake where most of the timber had been removed. They were much alike in site and construction, placed on or near the ground under the piles of brush left from the trees that had been cut away. Each contained newly hatched young, three and four in number. The parent bird, when frightened by our near approach, did not fly direct from the nest, but skulked through the brush for ten or twelve yards before flying.

Two specimens collected, an adult male at Telegraph Creek (no. 39930), and an immature female (no. 39931), taken at Sergief Island, September 4, the only one seen at that point.

***Zonotrichia coronata* (Pallas). Golden-crowned Sparrow**

The closely related golden-crowned and Gambel sparrows occupied different local habitats, although both occurred commonly in the same general region. Presumably Telegraph Creek is near the eastern limit of the habitat of *coronata*, just as it is at the western confines of the summer home of *gambeli*. Their segregation apparently is due to zonal limitations. The golden-crowned sparrow is a bird of a higher zone than the Gambel sparrow, consequently, in the Stikine region, confined to higher altitudes. No *coronata* was seen near the town of Telegraph Creek (altitude 540 feet), where *gambeli* was common, but on the trail to the Summit (twelve miles north of town and at about 2700 feet altitude) they appeared in some numbers where the timber

became dwarfed and scattered. The birds were in full song during the first week in June. A female shot June 5 contained eggs just beginning to form.

As we went down stream the species was seen nowhere in the bottom lands, but it was encountered once more on the mountains above Doch-da-on Creek. There we found the birds at timber line, on July 11 and again on July 23. Dixon found them amid similar surroundings on a mountain a few miles north of Doch-da-on Creek ("Kirk's Mountain") on July 16, and saw two bobtailed young. At these several points they were at the extreme upper limit of timber, at about 3000 to 4000 feet altitude, and mostly in dense thickets of prostrate "mountain balsam" (*Abies lasiocarpa*). From these shelters could be heard a sharp, far-reaching *chip*, a note that was difficult to locate, but was finally traced to the golden-crowned sparrow. The birds were undoubtedly nesting in the balsam thickets. Probably they had young at the time, but careful search failed to reveal any except the two that Dixon saw while stalking a mountain goat. On July 23 the birds were noticeably fewer in numbers than they had been on our first visit to their habitat on July 11, and it seemed probable that they had already begun to leave.

It seems likely that the timber-line habitat of *coronata* extends westward nearly or quite to the Alaskan coast. With field glasses we were able to see, at various points down the Stikine, ridges and mountain tops that appeared to be much like the high altitudes we reached from the upper river. Near the coast, however, the mountains are in most places extremely hard to ascend, and the fauna of their summits is as yet unknown. The golden-crowned sparrow is a species of high Hudsonian and Alpine-Aretic. It is a bird of the coastal region rather than of the interior, but, except at the northern end of its habitat, is apparently restricted to high altitudes during the summer months.

During the migrations this sparrow is abundant at sea level. At Sergief Island the first one appeared on September 1. The next day the species was present in considerable numbers. Seven specimens collected (nos. 39932-39938), three at the Summit, June 4 and 5, one on the mountain above Doch-da-on Creek, July 23, and three on Sergief Island, September 1 to 5.

***Spizella monticola ochracea* Brewster. Western Tree Sparrow**

Seen at but one place. At the Summit, some twelve miles north of Telegraph Creek and at about 2600 feet elevation, several pairs of western tree sparrows were seen on May 29, June 4 and 5, evidently

nesting there. The birds were seen feeding on the ground at the edges of marshy meadows, usually near the shelter of thickets of scrubby willow brush. The three specimens collected (nos. 39939-39941) are not to be distinguished from examples at hand from the Yukon and Kotzebue Sound regions, Alaska. I have seen a specimen collected by E. P. Walker at Wrangell, January 16, 1919. This capture may indicate the occasional passage of the species down the Stikine Valley.

***Spizella passerina passerina* (Bechstein).** Eastern Chipping Sparrow

Abundant at low altitudes in the upper Stikine Valley. Many seen near Telegraph Creek, in sparsely wooded sections, the males frequently singing from some low perch. Two nests were found here, on June 19 and 24. Each was in a lodgepole pine sapling, some ten feet from the ground, and in each case the tree was too slender to be climbed. The species was likewise abundant at Glenora and at Doch-da-on Creek. It was not seen farther down the river. Seven specimens collected, all adults (nos. 39942-39948). These, and others from northern British Columbia, in color and measurements are much nearer to eastern *passerina* than to typical *arizonae* from Arizona.

***Junco hyemalis connectens* Coues.** Cassiar Junco

We collected forty-four specimens of this junco, as follows: vicinity of Telegraph Creek (between that point and the Summit), twenty-eight (fourteen adult males, twelve adult females, and two juvenals); Glenora, seven (one adult male, three adult females, and three juvenals); Doch-da-on Creek, three (one adult male, two juvenals); Flood Glacier, six adult males. (Museum nos. 39949-39988, 39990, 39993, 39998, 39999.)

The systematic status of the junco of the Stikine region is a matter of more than ordinary interest to both the taxonomist and the student of geographic distribution and evolution. Any treatment accorded this form would doubtless arouse criticism from some direction, but it seems to me desirable that the race be accorded formal subspecific status. This junco is, in my opinion, a "good subspecies," a geographic race, in the sense that the birds over a certain area (of undetermined extent but undoubtedly a considerable stretch of country) exhibit a combination of characters distinguishing them from other described forms, and they remain true to these peculiarities within as close limits as do most recognized subspecies.

The outstanding characteristics of the Cassiar junco are as follows: Most nearly related to *Junco hyemalis hyemalis*. Males of the two subspecies are very closely similar, differing in minor particulars as detailed beyond. The average female of *Junco h. connectens* is quite unlike female *hyemalis*. It has ordinarily more or less pink on the sides and brown on the back; the head is of a darker color and is sharply cut off from the brownish back above and from the pink sides and white belly below. The general appearance of the female is like that of the female *Junco oreganus shufeldti*, from which it differs in having usually less brown on the back and less pink on the sides.

Now, as regards the name to be used for this form. My first impression was that here was an undescribed subspecies, a "new" race that required a new name. It was evident, however, that this was a migratory form, and that individuals must have been collected in their more southern winter home, even though the summer habitat had not heretofore been explored. There was at least a chance that a winter-taken specimen had served as the basis of a description at some time. A search through junco synonymy disclosed one name that seemed to require investigation, *Junco hiemalis connectens* Coues (1884, p. 378), which has been applied in various ways. Two specimens, the one upon which this name was based, together with another like it, females collected at Colorado Springs, Colorado, April 26 and 27, were described in some detail by Allen and Brewster (1883, p. 189) under the name *Junco hiemalis oregonus*. They are there considered as "intermediates between *hiemalis* and *oregonus*." Ridgway (1901, p. 276) lists Coues' *connectens* as a probable hybrid under the heading "*Junco hyemalis* x *Junco oreganus shufeldti*." In a footnote (*loc. cit.*) he makes the following comment:

This type specimen, which I have carefully examined and compared, is No. 7046 of Mr. Brewster's collection, and was taken by Mr. Brewster at Colorado Springs April 26, 1882. It is very nearly typical of *J. hyemalis*, with sides only slightly tinged with cinnamonaceous and the back slightly brownish. It may be a young female, of the preceding year, of *J. hyemalis*; at any rate it has nothing to do with the form of *J. oreganus* (*J. o. shufeldti*), to which the name *connectens* was unadvisedly applied by action of the A. O. U. Committee in 1896.

Dwight (1918, p. 289) remarks as follows:

This is perhaps an appropriate place to discuss briefly and to dispose of the "*Junco hyemalis connectens*" of Coues. The original description (1884, Key North Amer. Birds, 2d ed., p. 378) is a curious mixture of fact and fancy but, fortunately, the type is extant in the collection of Mr. Wm. Brewster (No. 7046,

♀, April 26, 1882, Colorado Springs, Colo.). I have examined it and, as correctly stated by Mr. Ridgway (1901, *Birds North and Middle Amer.*, Pt. 1, p. 276, footnote), it is clearly a specimen of *hyemalis*, and shows the characters common to sex and season.

The American Ornithologists' Union Committee (1897, p. 128; 1910, p. 266) follows Coues (1897, p. 94) in applying the name *connectens* to the form named *Junco hyemalis shufeldti* by Coale (1887, p. 330) and re-named (as I believe) *Junco oregonus couesi* by Dwight (1918, p. 291).

It is thus seen that the two men (Ridgway and Dwight) who have most carefully studied the genus *Junco* in recent years unite in the belief that *connectens* is not a recognizable form. It is after some hesitation that I offer a contrary opinion, but I believe that the new material at my disposal justifies my view. As to the treatment of the name *connectens* by the A. O. U. Committee, I am of the same opinion as Ridgway, that it is wrongly applied in the *Check-List* to the form that should be called *Junco oregonus shufeldti* Coale. The description by Allen and Brewster (1883, p. 189) of the Colorado bird that served later as the type of *connectens*, obviously a migrant or winter visitant at the point of capture, fitted so nearly my specimens from the Stikine region as to lead me to suspect them to be the same. This bird, as part of the Brewster collection, is now in the collection of the Museum of Comparative Zoology, at Cambridge. I have not examined it myself, but at the kind suggestion of Mr. Outram Bangs I sent him a selected series of the Stikine birds for comparison with the type of *connectens*, and, incidentally, with any other pertinent material. He remarks upon them as follows:

I have compared the skins most carefully with our very large series of eastern birds. . . . The very black, sharply marked off top of the head in your male birds I cannot match. The type of *J. connectens* Coues is a female taken at Colorado Springs, Colorado, Apr. 26, 1882. It is a counterpart of your no. 10945 (Mus. Vert. Zool., no. 39957). Indeed you would have difficulty in telling the two apart, except that the type of *connectens* is, although taken at an earlier date, in a little more worn plumage. I can't find spring females from the east just like these, but on the other hand, autumnal females much resembling them (probably young birds of the year?) are common in our series.

For comparison with *hyemalis*, the form to which I believe *connectens* is most nearly related, I have had an abundance of non-breeding birds from various places in the eastern United States, and a few from western points. No series of breeding birds of the eastern *Junco h. hyemalis* is available.

The adult male of *connectens* is very similar to *hyemalis*. At first glance, in the field, there was no doubt in my mind that *hyemalis* was the form encountered. Comparison with eastern birds, however, shows certain appreciable differences. *Connectens* is darker colored throughout, and, compared with the more uniformly slaty hued *hyemalis*, is seen to possess a blackish head, quite sharply defined at a line above the shoulders. Beneath, in *connectens*, the outline of the black breast is convex against the white belly, forming a sharp angle where it joins the gray sides. In eastern *hyemalis* the slaty breast and sides usually form a concave outline against the white belly. In most cases, a specimen of *connectens* viewed laterally is seen to possess a black head pattern above and below, just about as in *Junco oreganus*, though, of course, more obscurely indicated than in that species. These distinctions, as just detailed, would not amount to very much in a single bird, perhaps, but viewed in mass effect, with specimens of the three forms arranged in parallel rows, the differences are readily noticeable. The black-headed appearance of the male is a feature that is conspicuous in the live bird.

The female of *connectens* is, as a rule, more nearly like the female of a subspecies of the black-headed *Junco oreganus* group than like female *hyemalis*. The sides are more or less tinged with pink (often quite strongly so), and the back with brownish. The blackish head is sharply defined against the back and against the pink sides and white belly. Two among the fifteen females from Telegraph Creek and Glenora have no pink on the sides, though with brown on the back. These two birds are most nearly like *hyemalis*. Of the others it is safe to say that not one would be ascribed to *hyemalis* if taken in its winter home, with nothing but the appearance of the bird as a guide to its specific identity. There are certain winter specimens of *Junco oreganus shufeldti* at hand from southern Arizona, that, so far as color and markings are concerned, are indistinguishable from some Stikine River females. Arizona specimens of *shufeldti*, however, are distinctly longer winged.

Thus there is here a race in which the male bears a strong resemblance to one specific group (*Junco hyemalis*), and the female to another (*Junco oreganus*), this race occurring at a point where the boundaries of the two species mentioned come close together. Different authorities take different views regarding the relationship of the two forms, *hyemalis* and *oreganus*. In the A. O. U. *Check-List of North American Birds* (1910, p. 266) they are treated as two subspecies of

one species. Ridgway (1901, pp. 278, 283) regards them as specifically distinct, each divided into several subspecies. Dwight (1918, pp. 285, 291) also considers them as two species. Dwight, however, regards as of hybrid origin several forms of *Junco* that are accorded subspecific, or even specific, rank, by Ridgway and others. All "confusing plumages," found in the borderlands where different species of *Junco* come together, he regards as the result of hybridism.

In view of these different opinions, it is of interest to secure specimens and study conditions at places where two distinctly characterized forms meet. The upper Stikine Valley is such a place, and, with these points in mind, the junco of that region received special attention in our field work. Though anticipating some interesting discoveries in the distribution of the forms involved, it could hardly be foreseen that this borderland should be occupied by a race so curiously combining the characters of the eastern *hyemalis* and the western *oreganus*. With the ascertaining of this fact there now remains the proper application of it, and in this I fancy there will be difference of opinion.

First, is the occurrence of birds of this description (in a sense, intermediate between *hyemalis* and *oreganus*) to be taken as indicative of intergradation between the two? Are *hyemalis* and *oreganus* therefore to be regarded as two subspecies of the same species? I think not. There is no adult specimen in the *connectens* series that could for a moment be confused with the coastal junco (*Junco oreganus oreganus*), the subspecies geographically most closely adjacent to the upper Stikine race. There are no doubtful specimens as between these two forms, hence no intergradation. The measurements of *connectens* do not show intergradation between *Junco h. hyemalis* and *Junco o. oreganus* (see table, p. 254). The resemblance of the female *connectens* is toward *Junco o. shufeldti* (= *Junco h. connectens* of the A. O. U. Check-List), a pale colored form of *Junco oreganus* occurring to the southward. There may be intergradation between *connectens* and *shufeldti* farther south in British Columbia, but as yet we do not know that to be the case.

Then, as to the theory of hybridizing, used to a great extent in comparable cases by Dwight in his study of the juncos (1918). Such a decision in the present case (as in certain others so disposed of by Dwight) seems to me to distort the meaning of the word hybrid out of all recognition, and to apply it to facts and conditions it is not commonly called upon to cover. I am willing to admit that a name such as *Junco annectens* Baird may have been applied to an individual bird

actually of hybrid parentage in the usually accepted sense, in that particular case with one parent *Junco caniceps*, the other, *Junco mearnsi*; and I am willing to admit (see *postea*) that individual hybrids may occasionally occur between any species of *Junco* whose ranges adjoin. To consider as hybrids, however, all the birds (juncos in this instance) of a whole region, despite the facts that they comprise the only representative of the species in that region, that they all exhibit the same combination of characters over a wide stretch of country, and that they breed true, that is, transmit these same characters to their young, is an utterly misleading use of the term. The junco of the Stikine River should not be regarded as a hybrid.

As bearing upon the fact that it is the female of *connectens* that shows variation from the *hyemalis* type, attention may be drawn to the following statement by Dwight (*loc. cit.*, p. 289): "The variation in females of the three species [i.e., *hyemalis*, *oreganus*, and *mearnsi*] complicates the question still more, for the average females of the three differ much less from one another than do the males, and the hybrids between them would seem therefore to be much more numerous." I suppose the application of this to the present case (the junco of the Stikine region) would lead to the conclusion that here on a large scale is an example of sex-linked inheritance; that in the hybridization of *hyemalis* and *oreganus* the female offspring only show the *oreganus* characters. That such is not the case is shown by specimens collected at Flood Glacier (described farther on), where the race here designated *connectens* comes into actual contact with *oreganus*.

My own conclusions are as follows: The junco of the Stikine region is a recognizable form, apparently the same to which Coues applied the name *Junco hiemalis connectens*. It is most nearly related to *Junco hyemalis hyemalis*, and may be conceded to exhibit intergradation of a sort, as between *Junco hyemalis* and *Junco oreganus*. That is, the peculiarities of this subspecies undoubtedly have some bearing upon the relationship of those two aggregations of races. The intergradation exhibited, however, is apparently as between the two species *Junco hyemalis* and *Junco oreganus*, rather than between two adjacent subspecies, *Junco hyemalis connectens* and *Junco oreganus oreganus*. It is not of the sort that is usually found between two subspecies of the same species, and for the present it may well be disregarded as a subspecific criterion. It seems to me that this is a proper place for a somewhat arbitrary division, and that *Junco hyemalis* and *Junco oreganus* should still be regarded as separate specific groups. Then,

as previously shown, the junco of the Stikine region, although in a sense intermediate in appearance between *hyemalis* and *oreganus*, can not properly be considered as an aggregation of hybrid individuals. The only alternative left, therefore, is to consider this form as a distinguishable geographical race of the species it most nearly resembles, and apply a separate name, as I have done.

As we descended the Stikine, leaving the habitat of *connectens* behind and drawing nearer to that of *oreganus*, every effort was made to secure juncos. At Telegraph Creek and Glenora, juncos (*connectens*) were abundant. At Doch-da-on Creek, though in lessened numbers they were still fairly numerous, and all still of the same subspecies. Our next stop was at Flood Glacier, some forty miles down stream and about seventy miles from the coast. There we were in a region where either coast or inland species might occur, and the junco was one of several birds that we searched for especially at that point. Juncos were not numerous, however, and our two weeks of collecting there yielded but fifteen specimens. Of these, eight are adults, six males and two females. The two females are *Junco o. oreganus*, beyond a doubt. Of the male birds, one (no. 39999) is typical *connectens*. It is in extremely worn plumage but is evidently of exactly the same character as Telegraph Creek specimens. One bird (no. 39993), while not an average *connectens* (it shows some rusty on the back), can be matched by one variant taken at Telegraph Creek. Another (no. 39998) is somewhat more reddish on the back, though the sides are slaty. The remaining three adult males (nos. 39987, 39988, 39990), if taken farther south, in their winter home, would undoubtedly be considered as examples of *Junco oreganus shufeldti*. They are shorter winged than Arizona winter specimens of *shufeldti*, but they have the black head (a glossier black above than in *connectens*), brownish back, and pink sides of that race. However, despite their general appearance, I cannot believe that these birds are *shufeldti*. I do not believe it possible for the habitat of that subspecies to extend northward as a tongue inserted between the ranges of *connectens* and *oreganus*. Juncos can not be distributed uninterruptedly from the southward over the glacier covered mountains that constitute so large a part of this intermediate region. Their distribution must lie in narrow ribbons along the river valleys extending from the interior to the coast, such as the Stikine, and the affinities of birds taken at any one point in these valleys must lie with others immediately adjacent, above and below. Therefore, despite the superficial resemblance of these

Flood Glacier juncos to *shufeldti*, I decline to consider them as of that subspecies, or to call them by that name. This despite Dr. Dwight's belief that "we must name a bird by the plumage it is wearing not by the one that it ought to be wearing because it has been captured within the bounds assigned to another geographical race" (1918, p. 294).

Flood Glacier is close to the point where the change in the character of the country takes place, between the humid coast and the arid interior. It is the uppermost point on the river reached by certain coastal species of birds; very few indeed go any farther inland. Not many inland species extend farther down the river. We took here specimens of typical *connectens* and of *oreganus*, besides these intermediates. Forty miles up stream nothing but *connectens* was seen. Thirty miles farther down the river, at Great Glacier, nothing but typical *oreganus*.

In view of these facts it seems to me that these few specimens of indeterminate character, taken practically on the boundary line between the habitats of the two forms, may be regarded as veritable hybrids between the two. They are certainly not indicative of intergradation as it usually appears between closely related subspecies.

The seven juvenals from Flood Glacier naturally offer difficulties in their allocation such as are not encountered in adults. Young of *connectens* taken early in the season in the upper Stikine Valley, compared with the corresponding stage of *oreganus* from the coast, present certain obvious differences. As the juvenal feathers become faded and abraded, however, these distinctions are much less apparent, and the young birds from Flood Glacier had worn the juvenal plumage to the molting time. Those that do show specific peculiarities all lean toward *oreganus*, and one or two, otherwise indeterminable, were taken in company with an adult female *oreganus*. There are available but very few breeding specimens of slate-colored junco from Alaskan points. These specimens on the whole look more like eastern *hyemalis* than like Stikine River *connectens*. The only breeding females, one from Cordova Bay and one from Rapids, Yukon River, are quite unlike any females in the Stikine series.

I have had for examination a series of seventeen adult juncos, eight males and nine females, from the collection of the Provincial Museum, Victoria, British Columbia, taken at Atlin, during June and July, 1914. Atlin is at the northern boundary of British Columbia, about one hundred and fifty miles north of Telegraph Creek. For the

most part these birds are essentially like the Stikine specimens. One male (Prov. Mus., no. 3683) is much paler colored than the others, more of the slaty gray of eastern *hyemalis*, a variation that may be indicative of intergradation with *hyemalis* in Alaska, a little to the northward. One female of the lot (Prov. Mus. no. 3698, Wilson Creek, Atlin, B. C., June 29, 1914) is so very different in appearance from the rest of the series as to suggest its belonging to another species. It is appreciably larger than the others, actually so in length of wing and tail, and to all appearances in bulk also, as well as can be judged from prepared skins. It is faintly brownish on the back, and with a suggestion of pink on the sides. This bird may, perhaps, be an example of *montanus*, which has been recorded as occurring at Alaskan points not very far distant.

Altogether, the scanty material from Alaska, together with the British Columbian series, points to the restriction of the race *connectens* to a region mostly south of Alaska, and probably almost entirely in British Columbia. In this connection, attention should be drawn to a record by Bishop (1900a, p. 86) of the occurrence of "*Junco hyemalis connectens*, Shufeldt Junco," at White Pass City and Glacier, Alaska, a record that may, perhaps, pertain to *connectens* as here regarded. Osgood (1909b, p. 41) records *Junco hyemalis montanus* from points on the upper Yukon: "An adult female having vinaceous sides and pronounced of this form by Mr. Ridgway was collected by Hollister at Circle July 7. . . . Also a specimen collected by myself near Charlie Creek in 1899 appears to be of this form."

When we arrived at Telegraph Creek, May 23, juncos were abundant and in pairs; evidently nesting was well under way. The male birds at that time were fond of perching on some elevated position, a telegraph pole or a house in town, a dead tree top out in the woods, where, over and over again, they gave utterance to a brief, monotonous trill, hardly long enough or loud enough to merit being termed a song. The first nest was found on June 4, about midway between Telegraph Creek and the Summit, a region in which there was still much snow. This nest was placed in an overhung crevice in the dirt wall bordering the trail, and was discovered through the brooding bird's sudden departure. It contained four eggs with incubation just begun (see fig. Z). From then on, nests were found at intervals up to July 5. On that date two were discovered at Glenora, one with four fresh eggs, one with four young about five days old.

All nests discovered were on the ground, but in a variety of situations. Some were in the shelter of a bank or stump, others on open, level ground with little or no concealment. Five nests with sets of eggs were preserved (nos. 1811-1815), four sets of four eggs each, one of five. The nests are all much alike in structure, rather flimsily built, mainly of rather fine dry grass or weed stems, with occasionally some shreds of bark or coarser twigs or straws on the outside, and with finer grass or hair for lining.

Fig. Z. Nest of the Cassiar junco (*Junco hyemalis connectens*), placed under a fallen tree at the side of a trail. Photograph taken near the Junction, June 6, 1919.

The first young out of the nest was taken on June 14, hardly able to fly. Shortly after young birds began to appear in considerable numbers. Up to the third week in July they were still in the streaked plumage throughout, the post-juvenal molt had not yet begun; shortly after that time we left the territory of this subspecies, so that no specimens in autumnal plumage were collected.

This junco is mainly a bird of the valleys, mostly in rather open woods. A few were seen well up in the mountains, not in the dense spruce forests of the middle heights, but at the upper edge of the timber, where the trees were more scattered and of smaller size. This was at about 4000 feet elevation.

The male junco was sometimes seen making a display of his plumage. The tail was widely spread, so as to expose the white outer feathers, about the only sharply contrasting feature of the junco's

plumage. This was done, not on the ground, but up in the shrubbery; the tail was held stiffly spread and pointed straight downward, while the bird hopped from branch to branch about the female.

Young birds, just out of the nest, were several times found infested with parasitic larvae. The first bird in this condition was collected near Telegraph Creek, June 15. On picking it up after shooting it, a maggot dropped to the ground, and I noticed then a bare spot on the bird's head with a small hole where the larva had been attached. Upon skinning it, two more larvae were found, between the skin and skull, surrounded by a mass of yellow serum. Later on other young juncos were taken similarly afflicted, with the larvae always on the top of the head. The larvae were white in color, seven millimeters long and about three in diameter.

***Junco oreganus oreganus* (J. K. Townsend). Oregon Junco**

Twenty-seven specimens referable to this subspecies were collected at three different points, as follows: Flood Glacier, two adult females, four juvenal males, three juvenal females; Great Glacier, one adult male, one adult female, seven juvenal males, two juvenal females, one juvenal, sex not ascertained; Sergief Island, three males and three females, all immature birds in freshly acquired first winter plumage. (Mus. Vert. Zool. nos. 39989, 39991, 39992, 39994-39997, 40000-40019).

Specimens of *oreganus* in juvenal plumage from the coast of Alaska, compared with the same stage of *connectens* from the upper Stikine Valley, are much more buffy beneath and more reddish dorsally; the red dorsal patch of *oreganus* is clearly indicated in the young. Young *oreganus* is a ruddy appearing bird, young *connectens*, grayish. While these differences are apparent in fresh plumage, they are not so obvious when the feathers become worn. The young birds from Flood Glacier, at about the dividing line between the ranges of *oreganus* and *connectens*, are ready to discard the juvenal plumage, and in some specimens it is not possible to tell to which species they belong. However, those which do show specific peculiarities are apparently *oreganus*. Two young males, beginning the post-juvenal molt, are acquiring pink sides, and in one of them the new feathers on the head are distinctly blacker than in *connectens*. Young females, undeterminable in appearance, were taken in company with an adult female *oreganus*. For these several reasons I have assigned the entire series of streaked plumaged young from Flood Glacier to *oreganus*.

TABLE IX

Measurements in millimeters (average, minimum and maximum) of *Junco hyemalis hyemalis*, *Junco hyemalis connectens*, *Junco oreganus oreganus*, and *Junco oreganus shufeldti*

	Wing	Tail	Culmen	Depth of bill	Tarsus
Junco h. hyemalis					
10 males ¹	76.8 (74.0-80.0)	66.3 (63.5-70.0)	10.0	6.2 (6.0-6.5)	21.0 (19.8-21.5)
Junco h. connectens					
10 males ²	78.8 (77.0-80.0)	68.2 (66.0-70.0)	10.0 (9.8-10.2)	6.0	21.0
Junco o. oreganus					
10 males ³	74.3 (70.5-77.0)	64.3 (60.0-67.0)	10.4 (9.5-11.0)	6.0	20.9 (20.0-22.0)
Junco o. shufeldti					
10 males ⁴	77.5 (76.0-79.0)	68.1 (66.0-70.0)	10.1 (10.0-10.5)	6.2 (6.0-6.5)	20.5 (20.0-21.5)
Junco h. hyemalis					
10 females ⁵	71.6 (70.0-74.0)	62.3 (59.0-66.0)	9.6 (9.0-10.2)	6.0 (5.8-6.2)	20.6 (20.0-21.5)
Junco h. connectens					
10 females ⁶	72.6 (70.5-74.5)	63.5 (62.0-65.0)	10.0 (9.8-10.5)	6.1 (6.0-6.5)	20.5 (20.0-21.0)
Junco o. oreganus					
10 females ⁶	70.7 (68.5-73.0)	61.6 (58.0-64.0)	10.1 (10.0-10.5)	6.0	20.4 (20.0-21.0)
Junco o. shufeldti					
10 females ⁷	74.6 (72.0-76.0)	65.5 (60.0-69.0)	9.9 (9.5-10.0)	6.0 (5.5-6.5)	20.4 (20.0-21.0)

¹Connecticut, 2; New York, 1; New Jersey, 1; Virginia, 4; Indiana, 1; Iowa, 1.

²Telegraph Creek, British Columbia.

³Alaska: Admiralty Island, 1; Kuiu Island, 1; Warren Island, 1; Dall Island, 2; Revillagigedo Island, 1; Wrangell Island, 4.

⁴Hazelton, British Columbia, 5; Huachuca Mountains, Arizona, 2; Chiricahua Mountains, Arizona, 3.

⁵Connecticut, 2; New York, 1; New Jersey, 1; District of Columbia, 1; Illinois, 3; Minnesota, 2.

⁶Alaska: Mouth of Taku River, 4; Baranof Island, 2; Heceta Island, 1; Sergief Island, 2; Wrangell Island, 1.

⁷Hazelton, British Columbia, 1; Huachuca Mountains, Arizona, 3; Chiricahua Mountains, Arizona, 6.

Young birds taken a week or two later at Great Glacier are in most cases well advanced in the post-juvenal molt, and are clearly *oreganus*. The adult male from this station (no. 40002) may perhaps be of intermediate character, like some of the Flood Glacier birds previously described, but it is in the midst of the annual molt, and the duller red of the back may be an appearance that is largely due to this cause. The six specimens from Sergief Island, in fully acquired first winter plumage, are all typical *oreganus*.

Neither at Flood Glacier nor Great Glacier were juncos abundant, and it was only by the closest search that specimens were obtained. When we arrived at Sergief Island (August 17) there were no juncos to be seen anywhere. On August 23 two were obtained, the first noted, and a day or two later they became fairly numerous.

***Melospiza melodia rufina* (Bonaparte). Rusty Song Sparrow**

Song sparrows are rare in the upper Stikine Valley, or, rather, the species occurs in relatively few places. We found some birds around Sawmill Lake and about marshy spots near Telegraph Creek, and a few in similar surroundings between that town and Glenora. A female collected at Sawmill Lake on June 9 contained an egg that would have been laid in a day or two. A young bird just out of the nest was taken on June 18.

Near Doch-da-on Creek and a mile or two back from the Stikine there were certain marshy meadows where song sparrows were really abundant. Bordering the grassy areas were sloughs grown with reeds and surrounded by willows. Here the song sparrows had evidently been nesting, and at the time of our visit (July 8 to 26) were apparently engaged with their second broods. Full-grown young were more abundant than adults, and by the middle of July we found these young birds spreading out farther and farther away from the central swamps and down toward the river. The old birds remained closely within the more restricted meadows where we first found them, and those collected had every appearance of being engaged in nesting. These adults were extremely shy at all times, and specimens were obtained with difficulty.

At Flood Glacier there were a few song sparrows, seen mostly in patches of fireweed near the river. All taken were juvenals, apparently wandering from the nesting ground, as we had found them at Doch-da-on Creek. We found no place near Flood Glacier offering suitable

breeding grounds for song sparrows. None of the birds was seen at Great Glacier but one was noted near the custom house just above the boundary, August 16.

At Sergief Island song sparrows were abundant. They were mostly at the upper edge of the marsh land, just below the coniferous forest, where a bordering strip of dense underbrush (alder, willow, devil's-club, and other shrubbery) afforded shelter to many birds of similar habits. The song sparrows ventured some distance out onto the marshes, but always along narrow tidal channels where tall grass overhanging the sloughs made arched passageways beneath which the birds found concealment when need arose.

A large proportion of those seen at Sergief Island were young birds, and young and old were mostly in various stages of molt. A young male taken August 18 is in first winter plumage throughout. Most of the young birds seen at that time were still in juvenal plumage; one taken as late as September 1 had not yet begun the molt from that stage. Two adults shot August 18 and 22, respectively, had not yet begun to molt; another taken on September 1 had almost completed the change.

Forty-four specimens were collected (nos. 40020-40044, 40047-40065), as follows: Telegraph Creek, three adult males, two adult females, one juvenal female; Doch-da-on Creek, three adult males, ten juvenals; Flood Glacier, four juvenals; Sergief Island, two adult males, one adult female, five immature males (first winter plumage), thirteen juvenals.

I had anticipated that the song sparrow of Telegraph Creek would prove to be different from the coast bird, and that it would probably be *Melospiza m. inexpectata*, as a specimen ascribed to that race was recorded from Telegraph Creek by Riley (1911, p. 234) in his description of the subspecies. I am, however, unable to distinguish any points of difference between birds from the upper Stikine Valley and those from the coast. They seem to me to be all referable to *rufina*.

Upon first consideration it seems strange that in two regions with such diverse faunas in general, as is the case in the upper Stikine and the coast regions, the song sparrow, usually so variable, should be one of the few birds to remain the same in both places. This is by no means inexplicable, however, upon consideration of some of the factors involved. The species *Melospiza melodia* extends much farther north along the coast than it does inland; there is no subspecies of the interior that ranges nearly as far north as does *rufina* of the coast.

It follows that any song sparrow colony of an interior point closely adjacent to the coast (such as the Telegraph Creek region) must have been derived from the coast region.

Song sparrows in other sections are known to be influenced in their distribution by extent of riparian surroundings suited to their needs. They will follow a favorable water course through otherwise unsuitable surroundings, less regardful of faunal or zonal limitations than of the associations of plants and water. It therefore seems apparent that the occurrence of the song sparrow at the headwaters of the Stikine River represents an outpost of *rufina*, an overflow of birds that have penetrated to that point by ascending the river from the coast; not part of another race that is of general distribution throughout the interior. *Melospiza m. inexpectata* may be a recognizable race in the region of the type locality (Moose Lake, British Columbia), in south-eastern British Columbia, and southwestern Alberta (cf. Oberholser, 1918a, p. 187), but the song sparrow of northwestern British Columbia is unmistakably *rufina*.

Apparently the song sparrows of the inland regions are not completely enough isolated from the parent stock, or have not been for a sufficient length of time, to produce distinguishable differences. As to the length of time that they have been there we have no means of knowing. As to the completeness of isolation in the upper Stikine Valley, my impression, derived from the season's observations, is that there is practically continuous distribution of song sparrows along the river. Breeding colonies are doubtless scattered, and perhaps at rather wide intervals, but apparently migrating birds occur at any point.

There is an interesting point involved in the migration of the song sparrows at the upper end of the Stikine Valley. Do these birds travel north and south to the eastward of the coast range, as is the case with so many other species of that region, or do they follow the Stikine to and from the coast? Our own observations shed no light upon this question. It can hardly be solved save by some person who is permanently residing in the country.

In this connection it may be noted that Brooks (1912, p. 253) definitely cites the subspecies *rufina* as the form occurring at Okanagan, British Columbia, where the fauna otherwise is mostly of the interior. Also, Taverner (1919, p. 84) records *rufina* as the song sparrow at Hazelton, in the interior of British Columbia, some two hundred miles south of Telegraph Creek. I have seen some of Taverner's Hazelton specimens and agree with him in his determination.

The bird collection of this Museum contains sixty-three specimens of *rufina* from the islands and mainland of southeastern Alaska, representing many island localities and several points on the mainland. The largest series from any one place is that from Sergief Island. The Alaskan series as a whole displays considerable variation, in color, in general size, and in size and shape of bill. Whether these differences can be correlated with different habitats, island and mainland, or whether they are merely differences between individual specimens, cannot be settled with the material at hand; there are too few breeding birds from any one place. The variation is considerable, and it includes breeding birds that are just like the Telegraph Creek specimens. For the present, at least, the whole aggregation had best be left under the name *rufina*.

There is one kind of departure from the normal *rufina* that is comprehensible, and that is a variation illustrated in many individuals tending toward *caurina*, the subspecies breeding just north of the habitat of *rufina*. This trend is especially noticeable among the birds collected upon Sergief Island in August and September, birds which I believe were mostly migrants from the north. Typical *rufina* and *caurina* are widely different in appearance, in size, color, and shape of bill, but there are specimens at hand forming almost every link in a chain connecting one extreme with the other. The same individual, however, does not necessarily exhibit the same intermediate condition in all characters; there are various combinations in different specimens.

TABLE X

Measurements in millimeters (average, minimum and maximum)
of *Melospiza melodia rufina*

	Wing	Tail	Culmen	Depth of bill
10 adult males from the coast of southeastern Alaska ¹	68.4 (66.2-71.5)	64.8 (60.0-70.0)	12.2 (11.2-12.8)	6.7 (6.0-7.0)
6 adult males from the upper Stikine river ²	67.0 (65.0-71.0)	65.9 (62.0-70.0)	12.2 (11.5-12.8)	6.5 (6.0-7.0)

¹Glacier Bay, 1; Admiralty Island, 2; Chichagof Island, 1; Kuiu Island, 3; Prince of Wales Island, 1; Warren Island, 1; Sergief Island, 1.

²Telegraph Creek, 3; Doch-da-on Creek, 3.

During our stay at Sergief Island (August 17 to September 7) it was evident that there was more or less migratory movement of song sparrows. The numbers present fluctuated from day to day in a way that could not otherwise be explained. Typical examples of *caurina* were taken from time to time, as noted elsewhere in this report, which,

of course, were migrants, and the assumption is that those individuals of intermediate character that were taken at the same time were also migrating birds, presumably from some intermediate region near the northern limit of the habitat of *rufina*. Our experience on the upper Stikine leads me to believe that very young birds, even before the juvenal plumage is discarded, may wander many miles from the nesting ground.

***Melospiza melodia caurina* Ridgway. Yakutat Song Sparrow**

A fairly common migrant at Sergief Island, amid the same surroundings as *rufina*. One was seen the day of our arrival, August 17, and the birds were present in fluctuating numbers up to the date of our departure, September 7. The third week of August was the time of greatest abundance. Usually *caurina* and *rufina* could be told apart in life, the greater size and grayer color of the former serving to distinguish it ordinarily. There are, of course, equivocal specimens, as mentioned in this report under *rufina*, that are practically intermediate between the two subspecies, and difficult of determination even when in hand. There are also in the series of *caurina* from Sergief Island some specimens closely approaching the larger *kenaiensis* in appearance. As, however, the latter reach only the minimum measurements of that subspecies it seems best to place them all under *caurina*. There is thus in the available series of *caurina* a considerable range of variation exemplified, from small, reddish colored birds not widely different from *rufina*, to large, gray colored ones that could be inserted in a series of *kenaiensis* without violence.

There is one bird from Sergief Island (no. 40045, female, August 18) that I refer to *caurina* despite the fact that it is largely in juvenal plumage and was collected in the breeding range of *rufina*. Such of the first winter plumage as has been acquired is distinctly of the *caurina* type, and in the flesh the bulk of this bird was decidedly greater than that of the average *rufina*. Despite the youth of this individual, I believe it to be a migrant from the distant habitat of *caurina*. Juvenals of *rufina* also were found traveling far from the nesting ground.

Fourteen specimens of *Melospiza m. caurina* were taken at Sergief Island, on dates ranging from August 18 to September 5 (nos. 40045, 40046, 40066-40077). The series comprises one adult male, one adult female, five immature males, six immature females, and the juvenal female above described.

Melospiza lincolni gracilis (Kittlitz). Forbush Sparrow

Probably occurs throughout the upper Stikine Valley, but, judging from our experience, in small numbers and at widely scattered points. A female shot June 9 at Sawmill Lake had laid part of its set of eggs; just one other bird was seen at that locality. The species was next encountered at Doch-da-on Creek, where one pair, perhaps more, had nested in the tall grass of a meadow. A young bird caught in a mouse-trap at Flood Glacier was the only one seen at that station.

At Sergief Island the species was abundant. Many of the birds were there when we arrived on August 18, and they greatly increased in numbers within the next few days. At the upper margin of the marshes, that section which is but rarely inundated by the tides, there is much willow brush, increasing in density and size of the trees as the salt water is left behind. The lower edge of this strip, where the willow brush was about waist high and rather scattered, and with thick grass beneath, was the preferred habitat of the Forbush sparrow, and here the birds literally swarmed. I was accustomed to think of this species as being rather solitary in its habits, but here, whether or not the birds were in constantly associated flocks, their choice of surroundings brought hundreds of them closely together. In traveling through the willow brush one flushed them from every thicket. On August 22 I stopped to count those that hopped up into the branches of one small bush, preparatory to taking flight at my approach, and there were fifteen in sight at once. The species was still present at the end of our stay, September 7, but much fewer in number.

Fifteen specimens were collected: an adult female and an adult male from Sawmill Lake (nos. 40078, 40079), two adult females and two juvenals, male and female, from Doch-da-on Creek (nos. 40080-40083), one juvenal male from Flood Glacier (no. 40084), and eight specimens from Sergief Island, two adult females, five immature males, and one immature female (nos. 40085-40092). The young birds from Sergief Island have all completed, or nearly completed, the post-juvenal molt. An adult female taken August 18 is in the midst of the annual molt. The tail feathers are all gone, and the wings so nearly bereft of flight feathers that the bird could scarcely fly. The second adult female, taken August 22, has finished the molt.

The specimens from the upper Stikine Valley are to my eye indistinguishable from the coast birds, and I therefore consider them all of the subspecies *gracilis*. There is no question of the distinctness of

this northern race from the paler colored and more narrowly streaked form breeding in the high mountains of California which is regarded as *lincolni*, but just what relation either of these races bears toward typical *Melospiza lincolni lincolni* from eastern North America I do not know. I have no material available from any eastern points.

For the use of the name *Melospiza lincolni gracilis* (Kittlitz) rather than *M. l. striata* Brewster (as in the A. O. U. *Check-List*), see Oberholser, 1906, p. 42.

***Passerella iliaca unalaschcensis* (Gmelin). Shumagin Fox Sparrow**

Two fox sparrows taken upon Sergief Island, September 5, are referable to this subspecies, an immature female (no. 40107) and an immature male (no. 40108). The two birds were together, in an assemblage of song sparrows, golden-crowned sparrows, and hermit thrushes, feeding in a tangle of red-berry elder, alder, and devil's-club. The Shumagin fox sparrow is a migrant through this region, and it is probably of rare occurrence.

***Passerella iliaca fuliginosa* Ridgway. Sooty Fox Sparrow**

Among the most interesting of the season's discoveries were those relating to the manner of occurrence of *Passerella* in the region explored. Our first experiences were disappointing. I had confidently expected to find some form of this species in the Telegraph Creek region, either *P. i. iliaca* or *P. i. altivagans*, but failed to do so. It does not follow, of course, that one or the other of these birds does not occur locally somewhere in that general region, but if so I believe it will be found on the higher mountain slopes. I do not believe we could have overlooked the species had it been present in the lower valley.

Fox sparrows were first encountered at Doch-da-on Creek. On July 17 an adult male was obtained, first heard singing from its perch near the top of a small willow. A young bird was taken near-by the same day. Both were in brushy bottom land near a slough, a tangle of willows growing amid nettles, tall grass, and other shrubbery, not at all the kind of place that fox sparrows might be supposed to inhabit.

Later on, at Flood Glacier and again at Great Glacier, fox sparrows of the same subspecies were shot at various times. The birds were far from abundant, and it was only through the most assiduous search that specimens were obtained. They inhabited the densest

brush, where they remained out of sight for the most part, and there were neither songs nor call notes to draw attention to their presence. At Sergief Island one specimen referable to this subspecies was taken, on August 27.

In all, fourteen specimens were collected (nos. 40093-40106), as follows: Doch-da-on Creek, one adult male, one juvenal male; Flood Glacier, one adult female, one juvenal male, two juvenal females, one juvenal, sex undetermined; Great Glacier, one adult male, two adult females, two juvenal males, one male in first winter plumage; Sergief Island, one male in first winter plumage. The adults are all in worn breeding plumage or just beginning the annual molt. Of the young birds, some are in juvenal plumage throughout, some are partly through the post-juvenal molt, and two, from Great Glacier, August 10, and Sergief Island, August 27, respectively, are in first winter plumage throughout.

I had supposed that the form of fox sparrow that would be found inhabiting the mainland coast of this part of Alaska would necessarily be *P. i. townsendi*, which is known to occur much farther south on certain of the islands. Our Stikine birds, however, unquestionably are not *townsendi*; for the present, at least, they must be considered as *fuliginosa*. In my "Revision of the avian genus *Passerella*" (1920, p. 149), I have described a series of fox sparrows, winter visitants taken mostly in the vicinity of Berkeley, California, that I have referred to *fuliginosa*, although they are not typical of that form. The statement there made is that these birds are too unlike summer examples of *fuliginosa* from Washington and Vancouver Island to come from that region, and that they must be migrants from some other section. It was intensely interesting to discover that the Stikine River summer birds exactly matched the winter birds described from California.

As between Alaskan examples of *townsendi* and the Stikine River *fuliginosa*, we have in both series, for comparison, adults in similarly worn breeding plumage; also young in juvenal plumage, molting into first winter plumage, and in first winter plumage throughout. The color differences are apparent in every stage. The discovery of *fuliginosa* in this part of Alaska and British Columbia discloses certain departures from the distribution of that subspecies and of *townsendi* as given by me in the "Revision" above cited (Swarth, 1920, pp. 144, 149; map, fig. N). *Fuliginosa* evidently occurs from Puget Sound northward to the Stikine River, but, north of Vancouver Island, probably on the mainland only or perhaps on islands close to the British

Columbia coast. *Townsendi* occurs southward on various islands off the coast of southeastern Alaska, and on the Queen Charlotte Islands, British Columbia; its occurrence in summer on the mainland of southeastern Alaska is questionable. I know of no *breeding* records from that region. On the map above cited there is a cross indicating an occurrence at Helm Bay (south of the Stikine River), but the bird upon which that record is based was an August specimen and may have traveled some distance. I, myself, in 1909, collected many specimens of *townsendi* at Port Snettisham and the Taku River, Alaska (north of the Stikine River), and under circumstances that make it seem likely that those were breeding stations, but no nests were actually found. In field work of that same year at Boca de Quadra, the Chickamin River, and Bradfield Canal (on the mainland south of the Stikine River), and at Thomas Bay (a short distance north of the Stikine), no fox sparrows were seen (see Swarth, 1911, p. 93). There is a record of the occurrence of *townsendi* in June on Wrangell Island, near the mouth of the Stikine River (Swarth, 1920, p. 146).

The facts now indicate that the summer distribution of *fuliginosa* is from extreme northwestern Washington and Vancouver Island northward on the mainland only, at least to the Stikine River. On the latter stream it extends inland about a hundred miles, following the course of the river. Its extension inland elsewhere is unknown to me. In fact, I know of no records of *fuliginosa* from any mainland station between the two extremes of its range, Puget Sound and the Stikine River.

There is another point to be considered, namely, the possibility of subspecific difference between *fuliginosa* of the Puget Sound region and the bird I have called *fuliginosa* from the Stikine River, sufficient difference, that is, to be worthy of recognition in nomenclature. This is a contingency that may have to be met in the future. In another connection I have pointed out in some detail differences that appear to exist between the two lots (Swarth, 1920, pp. 149-150). Briefly, the series comprised of the Stikine River specimens and the winter birds from Berkeley differ from certain Vancouver Island specimens and from the type specimen of *fuliginosa* in being of a duller tone of brown, in having the lower tail coverts less tawny, and in the more stubby bill. The differences are real, as far as the series go, and appear to be fairly constant; the difficulty lies in the few specimens available of typical *fuliginosa*. Under the circumstances further subspecific division does not at present seem desirable.

Fall specimens of *townsendi* from Port Snettisham and the Taku River are notably dark colored, as compared with summer specimens of the same subspecies from the adjacent islands. While this may be due in some degree to seasonal differences of plumage, it may also be indicative of intergradation toward *fuliginosa* at those points.

***Piranga ludoviciana* (Wilson). Western Tanager**

A few seen in the vicinity of Telegraph Creek and Glenora, not more than seven or eight individuals in all. The first noted, a male, was encountered near Telegraph Creek on June 18. A nest was found at Four-Mile Creek, between Telegraph Creek and Glenora, in an alder in the rather dense vegetation that bordered the stream, about twenty-five feet from the ground and four feet from the main trunk. The female was seen on the nest July 5.

Two specimens of the western tanager were preserved, both adult males, and both taken at Glenora, on June 30 and July 4, respectively (nos. 40109-40110).

***Petrochelidon lunifrons lunifrons* (Say). Cliff Swallow**

There were a few pairs of cliff swallows breeding at Telegraph Creek, the only place where we saw the species. Nests, old and new, were placed on several houses in the town. One specimen collected, an adult female, on June 23 (no. 40111).

This specimen is of notably large size, as compared with breeding birds from California and from Illinois. Presumably it belongs to the northern subspecies that Oberholser (1919c, p. 95) has named *Petrochelidon albifrons hypopolia*. As far as it goes, this single bird substantiates the claim of larger size in the northern race. The color differences claimed for that form are not so apparent. The specimen measures as follows: wing, 114; tail, 52.5; exposed culmen, 7; tarsus, 13.

Without wishing to decry the probable existence of a recognizable northern race of the cliff swallow, the writer prefers, in this connection, to use the older name, pending a determination by the A. O. U. Committee on Nomenclature of the several questions involved.

***Hirundo erythrogaster* Boddaert. Barn Swallow**

Breeding in fair abundance in the town of Telegraph Creek. The species was already there at the time of our arrival, May 23, and the birds were occupied with nest building. Nests were seen only on

buildings, and the birds themselves rarely strayed far outside the town. One nest noted, which was placed upon a telephone insulator on the government agent's office, must have been used for some years, for it was built up to a height of six inches or more.

Flocks of migrating swallows that were seen in August at several points down the river were apparently of this species, but could not be satisfactorily identified. These flocks were invariably traveling up stream. In the harbor at Wrangell, August 16, were large numbers of barn swallows, mostly young, flying about and alighting on the shipping and wharves. On Sergief Island, during the next two weeks, the species was seen frequently, traveling southward in large flocks. The flocks diminished in numbers toward the end of the month; the last bird observed was a single individual on August 30.

Two specimens of the barn swallow were preserved, an adult male and an adult female, both taken at Telegraph Creek on June 11 (nos. 40112, 40113).

***Iridoprocne bicolor* (Vieillot). Tree Swallow**

Just one pair seen, at Sawmill Lake, near Telegraph Creek. They were nesting in an old woodpecker hole in a dead birch stub at the margin of the lake. A pair of mountain bluebirds were nesting in the same stub. The swallow's nest held three eggs on June 11; the complete set of seven, with the nest, was taken on June 17 (no. 1816). The nest was built largely of coarse grass and pine needles, mixed with some mammal hair, and was lined with large duck feathers. The two parent birds were taken (nos. 40114, 40115).

***Tachycineta thalassina lepida* Mearns. Northern Violet-green Swallow**

Abundant about Telegraph Creek. Nesting in crevices in the buildings and in a cliff overlooking the town from the northeast. The birds were settled in their nesting sites when we arrived (May 23), but individuals collected on June 8 had not yet laid their sets. The species was fairly abundant at Glenora. At Doch-da-on Creek, the latter part of July, violet-green swallows were seen frequently.

At Sergief Island, toward the end of August, the species was encountered on so many occasions that it seems probable that it is of regular occurrence as a migrant at some points, at least, on the coast of southeastern Alaska, despite the paucity of records. As far as I know, my own observations on the Chickamin River and at Thomas

Bay are the only ones from the region that pertain to this species (see Swarth, 1911, p. 96).

At Sergief Island small flocks were seen passing over the marshes in migration, usually in company with barn swallows, upon various dates, ranging from August 20 to September 2. On August 28 a flock of a hundred or more circled about over our camp for several hours. Last noted on September 2, when a single bird was taken, the only one observed. It is a question whether the individuals seen migrating at this point were travelers from points to the northward, or whether they had followed the Stikine River from the interior. I am inclined toward the first alternative, for, in our own leisurely descent of the river we had seen no indication of any such migration of these swallows.

Five specimens preserved, two adult females from Telegraph Creek, one adult male from Glenora, and two juvenal males from Sergief Island (nos. 40116-40120).

***Riparia riparia* (Linnaeus). Bank Swallow**

A few seen at Glenora, hovering over the fields or flying up and down the river, skimming low over the water. Probably nesting somewhere in the river banks nearby, but we failed to discover where. At Sergief Island a few were seen from time to time (August 18, 19, and 20), passing over the marshes in migration.

Two adults secured, male and female, taken at Glenora, July 2 and 6, respectively (nos. 40121, 40122).

***Bombycilla garrula pallidiceps* Reichenow. Bohemian Waxwing**

Found in the lowlands bordering the Stikine River, from Telegraph Creek down stream as far as Doch-da-on Creek. There was no obvious reason why the species should not extend still farther down the river, save that a few miles below this point those changes first begin to be apparent in the general character of the region that culminate in the thickly forested and humid conditions prevalent on the coast. Food conditions appeared ideal, for berries of various species, eaten freely by other birds, occur in abundance throughout this region. If it is solely the question of food that governs the erratic wanderings of the waxwing, as is so frequently contended in connection with its appearance in winter farther south, it would seem that the species should have been noted by us along the entire length of the Stikine. It seems evident, however, that there must be some barrier, more subtle

than that formed by the abundance or scarcity of food plants, that keeps the waxwing closely restricted to the upper part of the Stikine Valley.

Similarly, restriction to the lower altitudes near the river is probably significant of zonal limitation. We saw no waxwings at high elevations until July 23, when a flock of about twenty birds was encountered at timber line (about 4000 feet) on the mountain above Doch-da-on Creek.

During our first two weeks of field work, at the Junction, the species was not once observed. Presumably the slightly greater elevation at that point was enough of a barrier to keep the waxwing in the warmer section by the river. When we moved from the Junction to Telegraph Creek the birds were encountered at once, and they were found in some numbers thereafter at various nearby points.

A wood road, following the creek from which the town derives its name, turns abruptly aside some half a mile up stream, ascends the steep embankment on the west, and thus reaches a terrace that extends for several miles. Here waxwings were seen upon our first visit to the place, and it was later found to be a favorite resort.

On the morning of June 9 I had my first glimpse of the birds; my attention was attracted by the call note, and a moment later a flock of a dozen or more swung past and disappeared over the tree tops. Later in the day others were seen at almost the same place, two together at two different points. During the next ten days waxwings were seen continually in the same general locality, sometimes two together (mated pairs we supposed at the time), sometimes in small flocks. We shot a few, but mostly we watched them and followed the "pairs" about, hoping, but scarcely expecting, that they would lead us to a nest. The actions of these birds were extremely puzzling, for they seemed quite carefree, and many were in flocks. When we did obtain both birds of a "pair" they proved to be two males. Finally it began to dawn upon us that the waxwings were coming daily to a favorite feeding ground—nothing more; when disturbed they always disappeared in the same direction over some low hills to the westward; and our search was pursued in accordance with this suggestion, with satisfactory results.

The terrace or plateau above mentioned, of which so far we had merely skirted the eastern edge, extends westward a mile or more, is quite level, and but sparsely covered with forest growth. A year or more before our visit it had been swept by fire and a large part of the

timber destroyed. As we saw the place there was very little underbrush of any sort, a great many dead trees, mostly pines with some poplars, and a scattering growth of live trees that had escaped destruction. The conifers were the lodgepole pine (*Pinus contorta*), and were all small trees.

On June 19 we first saw evidence of nesting activities, though, as we afterward learned, the birds must have been busy for some time. On this occasion a pair of birds flew past, each with nest material in its bill, and disappeared in a clump of little pines a short distance away. A short search discovered the nest, just well started, in one of the pines, some six feet from the ground, and quite conspicuous to the view. A second nest was found a short distance away at a point where there had been an Indian wickiup, occupied by a solitary old witchdoctor. Several days before, this habitation had been destroyed by fire, and some of the surrounding trees, including the one with the nest, somewhat scorched. Apparently the fire, smoke, and noise had been too much for the parent waxwings, and they deserted the nest, which contained five newly hatched young. The young were pretty well dried up when found.

On June 22 the third nest was discovered. Two birds were seen in flight toward a pine a hundred yards or so distant. One, the male presumably, lit in the top of the tree, the other disappeared in the foliage below. Almost instantly the male flew high in the air, joined two others that were passing by, and all three went off together toward the slopes where we had previously found so many of the birds feeding. An inspection of the pine disclosed the waxwing's nest. The tree was only about twenty-five feet high, with straggly branches and little foliage. The nest rested upon limbs and against the trunk, about fifteen feet from the ground. It contained six eggs, almost ready to hatch.

During the next few days several other nests were found. A record was kept of each one, though they did not all yield sets of eggs. Following are the particulars of all the nests discovered:

No. 1 (Mus. Vert. Zool., no. 1819). Found June 19, nest just begun; June 21, nest completed; June 22, contained one egg; June 24, 3 eggs; June 25, 4 eggs; June 26, five eggs, set taken. Nest in lodgepole pine (tree about twelve feet high), six feet from the ground, resting on two small branches and against trunk. Greatest outside diameter about 230 mm.; inside diameter, 77; outside depth of main nest structure, 90; depth of nest cavity, 51. Material used: dead twigs

from pines and poplars, dry black moss from the trees, white, cottony plant fiber, and, for lining, dry grass and a few feathers. See figures AA, DD.

No. 2 (Mus. Vert. Zool., no. 1817). Found June 19; a recently abandoned nest containing five dead young, newly hatched. In situation a duplicate of the last: in a little pine, about six feet from the ground, and resting on two small limbs and against the trunk. Greatest outside diameter about 230 mm. (straggling twigs projecting farther); inside diameter, 95; outside depth, 77; depth of nest cavity,

Fig. AA. Waxwing on nest in small lodgepole pine; found near Telegraph Creek. Photograph taken June 25, 1919.

32. This was the only nest found with none of the black tree moss in its composition. There is relatively more of the white plant fiber. It is possible that nest no. 1 was built by the pair that abandoned this nest.

No. 3 (Mus. Vert. Zool. no. 1818). Found June 22, with six eggs, within a few days of hatching. Nest in a small lodgepole pine, about fifteen feet from the ground, on three small limbs and against the trunk. Greatest outside diameter about 230 mm.; inside diameter, 90; outside depth, 90; inside depth, 51. Material used: dead pine and poplar twigs, a great deal of black moss, white plant fiber and dry grass. See figure BB.

No. 4. Found June 22. In a little lodgepole pine, about seven feet from the ground. This was the merest beginning of a nest when

discovered. The birds were seen building rapidly on the morning of June 22, but on June 23 they were just as busily engaged carrying the same nest material elsewhere. The new nest was not found.

No. 5. Found June 23. In a dense grove of young pines. Nest much like the ones just described, but with a great deal of the moss and not much white fiber. Contained one fresh egg. The nest was deserted when we found it.

No. 6. Found June 24. In top of a slender pine, about 25 feet from the ground. Nest resting on limbs and against the trunk. Contained five young.

No. 7 (Mus. Vert. Zool. no. 1820). Found June 24. The only nest discovered that was not placed against the tree trunk. This nest was in a lodgepole pine of larger size than most in this locality, in the fork of one of the larger branches, about three feet from the trunk. Both birds were building here at 1 P.M. At 4 P.M. both birds were seen hard at work carrying the nest material elsewhere. When we ceased watching there was very little of the nest left. On July 5 we happened to pass this place and were surprised to see the nest intact and a bird upon it. It yielded a set of five eggs. This nest is not so bulky as some of the others. Outside diameter, 153 mm.; inside diameter, 77; outside depth, 77; inside depth, 45. Construction as usual, of twigs, moss, white plant fiber and dry grass.

No. 8. Found July 5, about half-finished. In the usual location: against the trunk of a small lodgepole pine, about ten feet from the ground. We were not able to return to this nest.

Waxwings were discovered nesting at Doch-da-on Creek, fifty miles down the river, under slightly different conditions from those at Telegraph Creek. On July 9 two occupied nests were found there, and two apparently of the previous year, all in the same patch of woods. This tract was composed mainly of balsam firs of rather large size, with an admixture of cottonwoods and poplars, and with but little underbrush. While these woods were thus fairly open, they were still much denser than those in which we found the waxwings nesting at Telegraph Creek. The two occupied nests were less than a hundred yards apart, were exactly alike in location and structure, and when found each contained one fresh egg. Each was near the top of a fir, about twenty-five feet from the ground, supported upon a branch and by surrounding twigs, and close to the trunk. On July 15 one of these nests was taken, together with a set of three eggs. The other contained two eggs, and was left undisturbed. No more eggs were laid in this nest, the female being still incubating the two eggs some days later.

The nest taken (no. 1821) is more compact than most of those found at Telegraph Creek, due to the firmer support given by the short, stiff fir twigs, closely encircling the structure, as compared with the sparse and slender branches of the lodgepole pine. It measures as follows: outside diameter, 178 mm.; inside diameter, 76; outside depth, 76; inside depth, 38 mm. The black moss enters into the construction of this nest to a greater extent than in any of the others. There is but the scantiest framework of twigs on the outside, lending support to the moss, which forms about nine-tenths of the entire structure. There is but very little of the white fiber that is so conspicuous in some of the others.

Fig. BB. Nest and eggs of waxwing found near Telegraph Creek; nest near the top of a small lodgepole pine. Photograph taken June 22, 1919.

It will be seen that the waxwings' nests were all very much alike in structure and location. All were in conifers, in rather open woods, and not far above the ground (six to twenty-five feet). The nests with one exception were against the trunk of the tree. The building material was always the same, an outer structure of dead twigs, lending support to a mass of black moss and white plant fiber. Dry grass was used as a lining sometimes but not always. The black moss was the one material that was used in the greatest amount, and it appears in all but one of the nests. This moss grows abundantly on the conifers of the region, depending from the branches in great masses, like coarse hair. The white plant fiber that is also so conspicuous in the nests is from the seed pod of the previous year's dead "fireweed" (*Epilobium angustifolium*).

There was one additional feature in which the nests were all alike, something that could not be preserved. Invariably there was a mass of stuff depending six or eight inches below the nest proper, so loosely attached as to seem on the verge of dropping away. This stuff was mostly the moss and the white plant fiber; usually additional tufts of these materials were adhering to nearby branches.

Fig. CC

Fig. DD

Fig. CC. Grove of small fir trees where waxwings were found nesting at Doch-da-on Creek. A nest may be seen in the tree in the center of the picture, near the top of the tree and close to the trunk. Photograph taken July 15, 1919.

Fig. DD. Grove of small lodgepole pines where waxwings were found nesting near Telegraph Creek. There is a nest in the tree at the left of the picture, about halfway up and against the trunk. Photograph taken June 20, 1919.

The nests seemed large for the size of the bird, and they were not well hidden. Usually they were conspicuous, once we had found them, and no difficulty was experienced in finding a nest we had reason to suppose was in a certain locality. It was surprising, though, how frequently we both walked past nests without seeing them, not having noted the birds, though once found we marveled how we could have overlooked them.

The Bohemian waxwing, that is, the subspecies *Bombycilla garrula pallidiceps*, has been discovered nesting at so few points in North America that it seems worth while to give a résumé of the findings of previous observers for comparison with our own.

The first North American breeding record was announced by Baird (1866, 406), as follows: "The only instances on record of their discovery in America are of a nest and one egg by Mr. Kennicott, on the Yukon, in 1861, and a nest and single egg on the Anderson River, by Mr. MacFarlane, both of which, with the female parents, are in the possession of the [Smithsonian] Institution."

Kennicott's nest was described by Brewer (in Baird, Brewer, and Ridgway, 1874, 398): "At Fort Yukon, July 4, Mr. Kennicott met with the nest of this species. The nest, which contained but one egg, was about eighteen feet from the ground, and was built on a side branch of a small spruce that was growing at the outer edge of a clump of thick spruces, on low ground. The nest was large, the base being made of small, dry spruce twigs. Internally it was constructed of fine grass and moose hair, and lined thickly with large feathers."

In 1901, Brooks discovered the waxwing breeding at 158-Mile House, in the southwestern corner of the Cariboo district, British Columbia.

I first noticed them there on 11th June, when I came across a small flock and shot one which proved on dissection to be a female about to lay. On returning to the same spot I found the Waxwings, consisting of a colony of five pairs of birds, still there, and soon discovered a nest in a Murray pine, near the end of a limb and about twenty-five feet up, this then (12th June) contained two eggs. On the 15th I took this set, which then consisted of four eggs. The nest was loose and bulky, composed of *Usnea* moss, dry grass and weed stems, and lined with fine material, with a few green aspen leaves in the lining, no doubt to render the eggs less conspicuous. On the 26th June I carefully looked over all the trees in the neighborhood with my binocular, and found three more nests, all in tall Douglas fir trees; two of these I was able to climb to; each contained four eggs within a few days of hatching. The nests were similar to the first but without the green aspen leaves, probably due to the fact that the nests were better concealed from above (Brooks, 1903, p. 283).

On June 10, 1908, R. M. Anderson found the species nesting near Fort Smith, at the boundary between Alberta and Mackenzie. In nearly all respects the circumstances were as we found them on the Stikine.

Soon I saw what appeared to be a nest, a moss-covered bunch near the top of a straight, slender jack-pine (*Pinus banksiana*), about 45 feet from the ground. The nest, however, was so artfully concealed and draped with mosses that I could not be sure that it really was a nest until I actually peered over the edge of it.

The nest contained six eggs, which proved to be almost fresh; incubation less than one day. . . .

The nest measured $6\frac{1}{2}$ inches in outside diameter, and $2\frac{1}{4}$ inside; depth (outside) 3 inches, (inside) $1\frac{1}{2}$ inches; composed externally of small, short, dead pine twigs loosely arranged and partially covered with pale green moss, and small bunches of white cottony vegetable fibres. The nest lining consisted of a few fine grasses, a few bunches of fine woolly black moss, and bunches of the soft white cotton.

The tree containing the nest was at least twenty feet from any other tree and had no limbs for at least twenty feet from the ground. The nest was placed close to the body of the tree and supported by two small nearly horizontal limbs and a few lateral supporting twigs from these (R. M. Anderson, 1909, pp. 11-12).

Fig. EE. Map showing the known breeding range of the Bohemian waxwing in North America. Circles indicate points where the species has been found nesting. 1. Fort Yukon, Alaska, July 4, 1861 (Baird, 1866, p. 406). 2. Fort Anderson (Baird, *loc. cit.*). 3. 158-Mile House, Cariboo District, British Columbia, June, 1901 (Brooks, 1903, p. 283). 4. Fort Smith, Alberta, June 10, 1908 (R. M. Anderson, 1909, pp. 11-12). 5. Atlin Lake, British Columbia, July, 1914 (E. M. Anderson, 1915*b*, pp. 145-148). 6. Telegraph Creek, British Columbia, June and July, 1919 (Swarth and Dixon, MS).

In July, 1914, Ernest M. Anderson found the Bohemian waxwing breeding on islands in Atlin Lake, in the extreme northwestern corner of British Columbia. On July 8 he took four sets of eggs (E. M. Anderson, 1915*b*, pp. 145-148). Without going into details, it may be said that in all essential respects of nest construction and location, his findings accord very closely with our own.

These few records, covering six localities in the Canadian northwest and Alaska, appear to be the only authenticated instances of the actual taking of nests and eggs of the waxwing in North America. In addition may be cited Riley's statement (1912, p. 69) of the probable nesting of the species at Moose, in southeastern British Columbia. Though he found no nests, the conditions under which he found the birds were sufficient proof of their breeding.

The nesting of the European subspecies (*Bombycilla garrula garrula*) was most carefully described by John Wolley (1857) in his memorable account of the first discovery of the nest and eggs of the Bohemian waxwing in Finland, and by Newton (1861) in a longer paper describing the same material. Wolley's description of the nest reads in part as follows:

" . . . the main substance [of the nest] is of the kind of lichen commonly called tree-hair. . . . This main substance of the nest is strengthened below by a platform of dead twigs, and higher up towards the interior by a greater or less amount of flowering stalks of grass, and occasionally pieces of equisetum." He also found a little reindeer lichen, green moss, willow cotton, and fiber of grass leaves in the structure; sometimes one or two feathers in the lining. The nests were ". . . built on the branch of a tree, not near the bole, and rather . . . standing up from the branch . . . , than supported by twigs touching it at the sides. . . . Of six nests, four were in small spruces, one in a good-sized Scotch fir, and one in a Birch—all placed at a height of from 6 to 12 feet above the ground . . . the nest seems generally much exposed. . . . In parts of the forest considerably open.

"Five seems to be the ordinary number of eggs; in one nest only there were as many as six.

"In the backward and cold spring of 1856, Waxwings had their full complement of eggs about the 12th of June" (Wolley, 1857, pp. 55-56).

The eggs of the four sets of the American subspecies obtained in 1919 on the Stikine River, and now in the Museum of Vertebrate Zoology, measure as follows:

Set no. 1818. 25.0×17.8 , 24.2×17.8 , 25.5×18.5 , 25.2×17.5 , 25.5×18.2 , 26.0×18.0 .

Set no. 1819. 24.2×17.0 , 27.0×17.0 , 27.0×17.2 , 26.0×17.5 , 26.2×17.2 .

Set no. 1820. 26.8×17.8 , 25.0×18.0 , 26.5×18.0 , 25.5×18.0 , 26.8×17.8 .

Set no. 1821. 24.8×18.0 , 23.5×17.5 , 24.0×18.0 .

In color, three of the sets are much alike, a pale glaucous blue, close to Ridgway's "pale dull glaucous-blue," but more washed out. This ground color is marked rather profusely with blackish dots and with a few fine, irregular lines, the dots mostly quite small and occurring over nearly the entire egg, though less numerous at the smaller end than elsewhere. There are also obscure underlying spots of bluish, but faintly seen. The fourth set (no. 1821) is more olivaceous, the ground color close to Ridgway's "mineral gray." The spots are fewer in number than in the other sets, larger, and more sharply defined.

As to plumage, the more conspicuous variable features in the waxwing's markings are the waxlike tips to the secondaries, the white and the yellow markings on primaries, primary coverts, and secondaries, and the yellow tips to the rectrices. The most elaborate study yet made of the plumage of this species is that written by Henry Stevenson (1882), based upon 144 specimens killed in England during the winter of 1866-67. Many of his statements are of interest in connection with the series of waxwings now in the collection of this Museum.

First, as regards the wax secondary tip, he gives the following table, including those birds of which the sex had been ascertained by dissection.

MALES	FEMALES
3 had 4 tips	*1 had 2 tips
7 had 5 tips	4 had 3 tips
14 had 6 tips	7 had 4 tips
14 had 7 tips	6 had 5 tips
3 had 8 tips	7 had 6 tips
—	2 had 7 tips
41	1 had 8 tips
	—
	28

* Sex uncertain.

A similar table of 38 specimens of the American subspecies in this Museum of which the sex has been ascertained is as follows:

MALES	FEMALES
2 have 3 tips	1 has no tips
6 have 4 tips	1 has traces of 2 tips
5 have 5 tips	2 have 3 tips
8 have 6 tips	2 have 4 tips
1 has 7 tips	2 have 5 tips
—	7 have 6 tips
22	1 has 7 tips
	—
	16

Besides those thus tabulated there are certain other variants. One male has a faint trace of a wax tip on a secondary on one side only. One female has two on one side, three on the other. One female has four on one side, two on the other. One female has five on one side, six on the other. Stevenson seemed to believe that such irregularities were due to accidents or wear, but in these birds there is no evidence to show that the unadorned secondaries had received any injury. One female is indicated in the table as having traces of two tips. They are so faint that they can be seen only by the most careful scrutiny, and are devoid of red color. Of all the adult specimens examined, forty-five in number, just one was found (a female) with absolutely no trace of the wax tips. In several cases these tips show a decided tendency to split up like feather barbs. It thus appears that these appendages are formed by the coalescing of barbs, and not by an enlargement of the tip of the central shaft, though the shaft, too, is involved in the general change. The ornamentation, in fact, may well have begun with the coloring of the shaft, spreading later over the adjoining feather barbs. The last stage would have been the coalescing of the barbs, forming the waxlike scale as it is now seen. Various steps of this hypothetical evolutionary development are supplied in the wing and tail feathers of different birds of this series.

The primaries of the waxwing have a white or yellow marking near the tip. This marking is sometimes confined to the outer web, and sometimes continued on to the inner web; the latter, producing a V-shaped marking, has been designated by Stevenson (*loc. cit.*) as the "return margin." In the brightest colored birds these markings are bright yellow on the inner primaries, becoming more and more white on the outermost ones. In the duller colored birds they are white throughout. The V-shaped character is invariably accompanied by

bright yellow outer margins, but the yellow color is not restricted to the individuals that have this "return margin." Some of the birds with the primary markings absolutely confined to the outer feather margins still have them of brilliant yellow. None of the birds with white primary spots have the "return margin."

There are several birds of both sexes at hand with more or less indication of red at the tips of the tail feathers. This is never at all conspicuous, and is usually confined to the shaft of the feather at the extreme tip. In one or two instances the color spreads out over the adjoining vane, but without any coalescing of the red colored barbs; not one bird in the series has any well defined wax tips to the tail feathers similar to those on the secondaries. There is some variation in the yellow tip to the tail feathers, both in intensity of yellow and in the breadth of the marking. There are also some specimens with one or more tail feathers longer or shorter than the rest and of a different tone of yellow, giving the appearance of having been held over from a previous plumage.

Stevenson (*loc. cit.*) after careful study of the extensive series of birds at his disposal was unable to discover any external character distinguishing male from female, though he was inclined to believe "that the assumption of the yellow tinge [on the primary markings] is probably more gradual in the female than in the male." The series before the present writer does not shed any additional light upon this question. Although there is considerable variation in the character of wing and tail markings, it appears to be purely individual. It so happens that the brightest colored bird of the lot is a female (Mus. Vert. Zool. no. 17437, sexed by C. I. Clay). In size (but not in number) of wax wing tips, in "return margins" of primaries, in yellow on primaries, and in size of white spots on secondaries, it is superior to any of the males. In this bird the wax secondary tips are 7 mm. in length, a size attained by only one or two males.

The brood of young birds we collected was naturally of more than ordinary interest. The nest was discovered on June 24, containing five young not more than two or three days old. On July 5 we returned. The nest was in a slender tree that swayed under the least pressure, and at the first disturbance the young birds fluttered to the ground. The brood was about two weeks old at this time. In two or three days more, at most, all would have left the nest voluntarily. The brood consisted of four males and one female.

These young waxwings presented a most striking appearance in life, for to my surprise they exhibited all the characteristic markings of the adult. Not only that, but the yellow tip to the tail was much brighter, more of an orange yellow, than it is in any of the old birds. The wax tips to the secondaries were present in each of the four males but not in the female. Two of the birds had four such tips, one had five, and one had seven, as many as are seen in any of the adults. These wax tips are as large as in many old birds. As rectrices and remiges were but partly grown out, the brightly colored tips occupied a much greater proportion of the whole than is the case in fully feathered birds. The resulting color effect was most bizarre. The young, with their remarkably vivid markings, looked utterly unlike the soberly colored adults.

The four young males are very much alike in color and markings, the only differences in appearance being those arising from the slight difference in stage of development. The marginal primary markings are present, sharply defined, and in each case bright yellow. In many adults these markings are white. In the young males the terminal tail band is orange-buff, the primary tips, light orange-yellow. In the brightest adult at hand the tail band is light cadmium, the primary tips, lemon chrome. In the young female the tail band is somewhat paler than in the males, though still more orange than in any adult. The primary tips are but slightly tinged with yellow.

A still more remarkable feature in the young males is the fact that in each one the rectrices are distinctly tipped with red. These red tips are not fully developed sealing-waxlike scales such as are on the secondaries, but are produced by red coloration of the terminal portion (4 or 5 mm. in length) of the feather shaft of the rectrix.

The female parent of this brood (the only one of the pair collected) is a highly plumaged bird. It has six secondaries of one wing, five of the other, with wax tips, the primary margins are bright yellow, the tail is broadly tipped with yellow, and there is a faint suggestion of red in one or two of the tail feathers.

As regards the young birds, it is seen that they possess all the peculiar markings of the most brightly colored adults except the "return margin" upon the primaries. This is not seen in any of the young. The yellow wing and tail markings are much brighter than in any adult at hand, even than in freshly molted birds with these feathers but partly grown. While the young birds possess all the markings of the adults, they are appreciably different in general body color. They

have a somewhat streaked appearance, though not as much so as in the young cedar waxwing, the whole body is of a duller, darker gray than in the adult, and the young bird has none of the vinous coloring about the head that is seen in the adult. The crest is present but only slightly developed. The young has a dull black line from the nostril to the eye and posteriorly on the head, in resemblance to that on the adult, but in our specimens of young there is just an indication of the black throat. This may be due to the fact that in these birds the feathers of chin and upper throat are but partly developed, but appearances would indicate that in the fully acquired juvenal plumage the throat is whitish, bordered on each side by a line of dull black. The middle of the belly is whitish, the under tail coverts a paler and duller chestnut than in the adult. One feature in which the young waxwings differ notably from the adults is the color of the inside of the mouth. This was a bright reddish (spinel pink of Ridgway) with a short, sharply defined streak of Mathews purple on each side, at the corner of the mouth. In adults the inside of the mouth is flesh color with but a suggestion of bluish at either side on the roof of the mouth. In the young birds the iris is dark. In adults there is a narrow but distinct red ring surrounding the black pupil.

Although the fact that the young Bohemian waxwing possesses practically all the distinctive markings of the most highly developed adult was a surprise to the writer when the birds were first encountered in the field, it is not new in ornithological literature. There have been a few juvenals collected, but although their appearance has been commented upon at the time of capture, apparently the compilers of the more general handbooks have never cited these scanty specimens as representative of the usual condition. Casual mention of an early streaked stage, "similar to that of the cedar bird," is the information usually given. Wolley's description of a young bird, in his account of the first discovery of the nesting of the European subspecies, is as follows:

A young bird caught on the 5th of August, as it fluttered from the nest, had a general resemblance to the adult, though all the colours were more dull. The wax-like ends to the wing-feathers, the yellow tip to the tail, the black patch between the eye and the beak are all there, whilst the rich mahogany of the under tail-coverts is of a quieter brown; the blooming vinous colour of the head and back has not yet emerged from a homely neutral, and the crest is but just indicated by the longish feathers of the crown. The most marked difference between the adult and young is in the throat and under surface generally. There is at present scarcely a trace of the deep black patch of the chin, and the delicate tint of the general under surface of the adult is replaced by mottled

neutral and white. This upon examination is found to owe its appearance to those longer webs, which arising towards the root of each feather, extend as far outwards as the webs which arise nearer its tip, being very pale or white, and thus relieving, on both sides, the last mentioned darker webs (Wolley, 1857, p. 56).

In Gould's "Birds of Great Britain" there is a colored plate figuring adult birds, a nest, and five young. Of the young, three show the back and wings, all with wax tips to the secondaries. These figures are from young taken by Dresser, July 4, 1858, but although five juveniles are figured, in the text the statement is made that four young were in the nest and just two were caught. (Gould, 1873, vol. 2, pl. 21.)

Bishop (1900*a*, p. 89) describes three fully fledged young from the Yukon region as having the waxlike appendages to the secondaries, but of a paler red than in the adult. One of these same young birds is described in detail by Ridgway (1904, p. 106). Evidently but few young birds of this species have been collected. Judging from those that have been taken, the waxlike secondary tips occur as frequently in the juvenal plumage as in the later stages. In fact, with respect to all the variable features in this species, wax tips, white or yellow wing markings, and yellow tail band, it is not possible to detect any correlation between the extent of these markings or the intensity of their color, and either age, sex, or season. We have, as described, birds in juvenal plumage as brightly marked as any adult. The fact that in the brood of five collected the four males have the wax tipping and the one female lacks these appendages, gives the appearance of this being a sexual feature. To offset this, the female parent of this brood had the wax tips fully developed. Then, the female parent of a set of five eggs, taken the same day, has the wax tips almost entirely lacking.

In commenting upon the Bohemian waxwing as a winter visitant to Montana, where they were abundant, Cameron (1908, p. 46) says:

Only a small proportion had yellow primary bands; in the great majority these were white. Most birds had no red sealing wax appendages visible and were presumably the young of the year. Others, besides showing white edging to the ends of all the primaries except the two first, had four wax tips on the secondaries. These may have been birds of eighteen months old which had moulted twice, having regard to the fact that the waxwing moults only once a year—in October. A few of the birds had brilliant yellow wing-bars and numerous vermilion appendages, and I concluded that this small minority were old birds.

Similar lines of reasoning have been followed regarding other birds than the waxwing; that is, different types of plumage have been taken as indicating different ages, rather than descriptions of plumages being based upon specimens whose ages had been definitely ascertained in other ways. There is probably hardly a species where it would seem a more obvious or safer thing to do than to judge the age of a waxwing from the number and size of the waxen wing tips, yet inspection of the juvenal plumage shows how unsafe such assumptions may be.

The most surprising statement in Cameron's account is the assertion that "most birds had no red sealing wax appendages visible." Of the forty-five adults examined in the present connection only one lacks any trace of such an appendage, and except for Cameron's comment I should have believed that it was unusual for a Bohemian waxwing to lack these ornaments. In the smaller cedar waxwing the case is different. An examination of the latter species as represented in this Museum discloses 36 specimens with more or less wax tips to the secondaries, and 41 without a vestige of such marking. Judging from the material at hand, therefore, this character seems to be much more fully developed in *Bombycilla garrula* than in *B. cedrorum*.

The flocking instinct is strong in the waxwing at all times. The nests we found, at two different localities, while not sufficiently close together to merit the term "rookeries," were gathered in close proximity, and to the exclusion of surrounding areas apparently just as well adapted to the purpose. The birds obviously prefer to nest in fairly close company. When a sitting bird left the nest for the short time necessary to feed each day, it was to join one or two others and do the foraging in company. While both birds of a mated pair work at nest construction, apparently all the labor of incubation falls upon the female. Her mate, thrown upon his own resources, usually joined some other unoccupied male. Usually two males fed together; occasionally there were more in company. Flocks were noted all through the breeding season, usually of not more than twelve or fifteen individuals; by the end of July gatherings were seen that were several times as large.

In nest building, male and female worked together. Dixon (MS) observed one pair at their labors for some time and made the following notes: After the observer had taken his station the female arrived with some white plant fiber. She put this fiber in place, and then, sitting in the nest, she turned around and around, shaping thus, with her breast, the nest cavity. Then the male arrived with more of the plant

fiber. He placed it within reach of the female, who proceeded to weave it into the structure. The birds worked so assiduously that the nest was nearly finished by noon of the second day after it was begun.

In approaching and leaving the birds were usually together. Instead of flying directly to the nest they generally lit in some nearby trees, then approached unobtrusively by several short flights through the thicket. In departing similar precautions were used. When perching they almost invariably chose a tree top or some elevated and projecting limb. This was especially noticeable in birds disturbed at their nests, and it was also the manner in which they perched when engaged in flycatching activities.

Different birds varied in the degrees of tameness they showed about the nests. The female of the first set taken remained upon the eggs until the collector's hand was within a few inches of her. Male and female together hovered about for a few minutes, occasionally uttering the usual call note, and raising and lowering the crest. Then they left and did not return at all in the two hours that we remained in the vicinity.

A sitting bird when closely approached invariably pointed the bill almost straight up, and kept the crest closely pressed to the head. The young birds frightened from the nest resorted to the same tactics. On one occasion one of a pair of waxwings, presumably the male, was seen strutting about and exhibiting his beauties to his mate. Considering that the two sexes are alike in every respect, it seemed rather a superfluous performance, but at any rate the one bird was hopping excitedly about from branch to branch, while the other sat still and looked on. The active performer kept the tail partly spread, wings drooping, and crest raised, and the whole body was held stiffly upright. After several minutes the other seemed to tire of the performance and flew away, followed at once by its mate.

Waxwings were seen feeding on insects and also on berries and other vegetable matter. About Telegraph Creek, the first week in June, they were usually seen perched on bare branches and making short sallies after flying insects in true flycatcher style. Early in July a berry-bearing shrub (*Shepherdia canadensis*) of general distribution in the region came into bearing, and the waxwings, as well as other species of birds, fed upon the berries of this plant to a great extent. The young waxwings we took from the nest had also been fed upon these same berries.

Under ordinary circumstances the only sound uttered by the waxwing is a sibilant call note much like that of the more familiar cedar

bird. While notes of the two species are of the same character, still they are distinguishably different. This difference may, perhaps, be indicated by describing the cedar bird's call as a hiss, the Bohemian waxwing's call as a buzz. The note of the latter is somewhat coarser; the listener has an impression of hearing a series of very slightly separated notes, rather than of a continuous sound such as the cedar bird utters. The call note has been commented upon by Cameron (1908, p. 47), who says: "When flying the birds keep up an incessant twittering, so that high passing flocks are immediately recognized by their call of *zir-r-r-r*—a sort of trill."

Griscom and Harper (1915, p. 369) make the following comments upon the waxwing's call: "Though similar in general form to the 'beady notes' of *B. cedrorum*, they are less shrill, are more leisurely uttered, and have a more noticeable rolling sound. They are also more distinct, there being a comparatively greater interval between each syllable in the series. The call has been represented by Seebohm as *cir-ir-ir-ir-re* (quoted in Sharpe's 'Hand-book to the Birds of Great Britain,' Vol. I, p. 177) and by Cameron as *zir-r-r-r* . . . , but neither rendering seems to express exactly the decided sibilant quality of each syllable."

E. M. Anderson (1915*b*, p. 146) makes a rather surprising statement regarding the voice of the waxwing. "While on the wing the birds uttered a short succession of high-pitched, screaming notes, closely resembling in character, though not in volume, the cries heard on nearing a Pigeon Guillemot rookery on the seacoast." As far as I am aware this is the only published statement that ascribes to the waxwing any note other than the well-known hissing sound.

A bird shot by the present writer, which fell to the ground wounded, uttered a loud, chattering noise, the only time I ever heard anything of the kind. The young birds we removed from the nest called a great deal. One of the five fluttered off into the bushes where he escaped observation, but he soon began calling and was thus discovered. According to Dixon's notes at the time, the call note of the young waxwing was much like that of a young California shrike.

The American waxwing was given the name *Bombycilla garrula pallidiceps* by Reichenow (1908, p. 191), with the type locality the Shesly River, northern British Columbia. The Shesly River, a tributary of the Inklin, which in turn empties into the Taku, has its source some twenty-five miles northwest of Telegraph Creek, its mouth, some sixty miles beyond. Thus for all practical purposes our Telegraph Creek specimens of the waxwing may be regarded as topotypes.

I had the opportunity of comparing a selection of these skins with European examples of *B. g. garrula* in the United States National Museum. The color differences distinguishing the two forms were readily apparent in the series thus brought together, and the differences appear to me to be sufficiently pronounced to justify the recognition of the American subspecies, *pallidiceps*. (Cf. Oberholser, 1917c, p. 333.)

We collected seventeen specimens of the waxwing, nine adult males, three adult females, four juvenal males, and one juvenal female (nos. 40123-40139).

***Vireosylva gilva swainsoni* (Baird). Western Warbling Vireo**

Common in the poplar woods of the upper Stikine Valley. First taken near Telegraph Creek on May 29; shortly after, the birds arrived in numbers. They were seen daily at Glenora and Doch-da-on Creek, undoubtedly breeding at both places. When we arrived at Flood Glacier, July 26, the species was present in some abundance; at the time of our departure, August 8, the birds were nearly all gone. Whether or not this vireo breeds at the last mentioned locality was not definitely ascertained, but I am inclined to think that it does, judging from the actions of certain individuals. On July 31 a pair of the birds spent nearly the whole day in an alder thicket near our camp, scolding continually at some disturber of their peace that I could not discover. Possibly an owl was roosting near-by. Anyway, the vireos acted much as though they were concerned over the safety of their brood.

At Great Glacier, August 10, two were seen. This was the latest date of occurrence, and Great Glacier the westernmost locality at which the species was noted. Our several points of record apparently constitute the farthest known extension of the range of this subspecies toward the northwest. It is not included by Anderson (1915a) in his list of birds from Lake Atlin, some two hundred miles north of Telegraph Creek. The occurrence at Great Glacier carries the range to within ten miles of the Alaskan boundary, and to within about thirty miles of the coast.

Five adult specimens were collected, two from the vicinity of Telegraph Creek, one from Doch-da-on Creek, one from Flood Glacier, and one from Great Glacier (nos. 40140-40144). These birds are in no wise to be distinguished from others from more southern points in the range of the subspecies, as in California.

Vermivora celata orestera Oberholser. Rocky Mountain Orange-crowned Warbler

Warblers of this species are rare in the upper Stikine Valley, or else they are so secretive during the nesting season as to avoid observation. Two males (nos. 40145, 40146) were taken near Telegraph Creek on May 27 and 31, respectively, probably migrants, and no more were seen for some time. At Doch-da-on Creek, July 18, when many birds were beginning to move about after the close of the nesting season, a female in juvenal plumage (no. 40147) was obtained. Another young bird, molting into first winter plumage (no. 40148) was taken at Great Glacier, August 11.

The two adults, compared with *Vermivora celata lutescens* of the coast region, are of greater size and duller coloration. Compared with *V. c. celata*, they are more yellowish, and lack the grayish tinge of that race. Thus they exhibit the characters ascribed to *Vermivora celata orestera* Oberholser (1905, p. 242; 1917b, p. 326). The juvenals may be distinguished from young *lutescens* by their gray juvenal feathers, yellow in the latter race.

Vermivora celata lutescens (Ridgway). Lutescent Warbler

An immature male just finishing the molt from the juvenal plumage (no. 40149) was taken at Great Glacier, August 11. At Sergief Island some were seen almost daily, evidently migrating and usually in company with other transient warblers and kinglets. Five specimens were taken, all immature, on dates ranging from August 18 to September 22 (nos. 40150-40154).

Vermivora peregrina (Wilson). Tennessee Warbler

Met with on but one occasion. On June 12, at a point some five miles southwest of Telegraph Creek, my attention was drawn to an unfamiliar, wheezy song, heard at the edge of a swamp. The singer was discovered flitting from one twig to another in rather slow, vireo-like manner, giving his song at frequent intervals. It proved to be an adult male Tennessee warbler, and was undoubtedly nesting near-by. This specimen (no. 40155) was the only one taken or observed, although I kept careful watch for the species from that time on.

***Dendroica aestiva aestiva* (Gmelin).** Eastern Yellow Warbler

A few seen near Telegraph Creek on May 26 were the first observed, but the species may have arrived some days earlier. The first week in June the birds were abundant and quite generally distributed through the lower valleys. The males were especially noticeable from their habit of perching at the tops of dead and leafless trees, and there singing. The loud song and brilliant color, with no concealing verdure round about, rendered them as conspicuous as such small birds could well be. On June 14 a set of three slightly incubated eggs was taken (no. 1822). The nest was in a cottonwood sapling, some twelve feet from the ground, at the edge of a dense thicket.

At Doch-da-on Creek, the latter part of July, yellow warblers were fairly numerous, and apparently on the move. At Flood Glacier, early in August, and at Great Glacier, about the middle of the month, they were seen frequently, though not in such numbers as had been present farther up the river.

Eighteen specimens of yellow warbler were collected at points on the Stikine River (nos. 40156-40173). The series comprises six adult males and three adult females from Telegraph Creek, three adult males from Glenora, one juvenal female from Doch-da-on Creek, and one adult female and four immature females from Flood Glacier.

Dendroica aestiva rubiginosa is commonly considered as occupying both the coast and the interior of Alaska and northern British Columbia (see A. O. U. Committee, 1910, p. 311; Ridgway, 1902, p. 514; E. M. Anderson, 1915a, p. 16), but on how extensive a representation of specimens these opinions were based I do not know. My Stikine River series is certainly sufficiently different from the coastal bird to forbid the two lots from being considered of the same subspecies. The series of *rubiginosa* in the collection of this Museum includes thirteen adult males from Vancouver Island and southeastern Alaska. These birds are distinguished in color from other North American races of *Dendroica aestiva* primarily by the combination of dark dorsal coloration, paler yellow underparts, and narrow and scanty chestnut streaking below. The Telegraph Creek birds do not fit into this category at all. In this series the underparts are more brilliantly yellow, and the chestnut streaks, are, in most of the specimens, numerous, broad, and conspicuous. As a series the lot fits in absolutely with *D. aestiva aestiva*, in regard to ventral coloration. In dorsal coloration they average somewhat darker than is the case in an equally extensive series of eastern examples of *aestiva*, though

selections can be made of closely similar specimens in the two series. The variation in dorsal coloration is, I believe, at least partly due to different degrees of wear and fading of the feathers. Specimens of the two series that were taken at approximately the same dates are practically indistinguishable. Measurements of the three lots are given below. They are of little diagnostic importance.

In my opinion the Stikine River birds should not be classed with *rubiginosa*. They present certain differences in appearance; and in habitat and migration they are as sharply set off from the coastal birds as is the case with practically all the other bird species of the region where they were taken. On our trip down the river I watched for yellow warblers carefully and purposely, and they are rather more conspicuous in migration than most small birds. The frequently uttered *zip-zip*, as they fly from bush to bush, attracts attention, and the yellow color is easily seen. At Doch-da-on Creek, at Flood Glacier, and at Great Glacier, yellow warblers were in evidence, obviously migrating, but below Great Glacier I could not see that there were any traveling down stream. My belief is that they find an outlet through the mountains to the southward, and that they do not reach the coast. When we reached Sergief Island, in the habitat of the coastal race (*Dendroica aestiva rubiginosa*), yellow warblers abruptly became scarce. We saw very few, whereas this island was directly in the line of travel down the river. During the first two weeks of our stay, the latter part of August, none was seen. On September 1 several were noted in company with other migrating warblers, and on September 2 a single bird was observed.

On both scores, of physical characters and of distribution, I regard the yellow warblers of the upper Stikine River as best referred to *Dendroica aestiva aestiva*, showing some variation toward *rubiginosa*. Females and immature birds do not show the subspecific characters as do the adult males, and such of the former as were collected at Flood Glacier and Great Glacier are ascribed to *aestiva* on the grounds of probability.

TABLE XI

Measurements in millimeters (average, minimum and maximum) of *Dendroica aestiva aestiva* and *Dendroica aestiva rubiginosa*

		Wing	Tail	Culmen
<i>Dendroica a. aestiva</i>	10 males ¹	62.3 (60.0-64.0)	43.9 (42.0-46.0)	9.6 (9.0-10.0)
<i>Dendroica a. aestiva</i>	9 males ²	62.4 (60.5-64.0)	44.5 (42.5-46.5)	9.3 (8.5-10.0)
<i>Dendroica a. rubiginosa</i>	10 males ³	61.5 (59.5-64.0)	43.6 (42.0-46.0)	9.7 (9.0-10.0)

¹Ontario, Canada, 4; Wisconsin, 4; Michigan, 2.

²Telegraph Creek, 7; Glenora, 2.

³Prince William Sound, Alaska, 2; Sitka, 1; Chickamin River, s.e. Alaska, 3; Vancouver Island, 4.

***Dendroica coronata hooveri* McGregor. Alaska Myrtle Warbler**

Apparently not common in this region, though some were seen at each collecting station. At the Junction the species was first seen on May 28. Two females taken on May 29 were evidently not breeding; from their actions, these birds and others seen the same day were as yet not even paired. To all appearances they had just arrived. None was seen in the immediate vicinity of Telegraph Creek, but a few pairs were encountered at scattered points some miles away. A few were seen at Glenora. At Doch-da-on Creek, July 8 to 25, small flocks occasionally appeared, sometimes a single family, sometimes evidently composed of two or more broods. The species undoubtedly nests at that point. Whether or not it nests at Flood Glacier, our next station down stream, is questionable, though I should think it likely that a few pairs might extend that far. Several specimens were taken there, and others were seen, some each day. At Great Glacier, August 9 to 16, Hoover warblers were seen frequently, migrating then and evidently traveling down stream. At the time of our arrival at Sergief Island, at the mouth of the river, on August 17, there were none of these warblers present. The first was obtained there on August 30, and in the next day or two the birds were arriving in considerable numbers.

We found no nests. Not many of the birds were seen under such circumstances that it seemed profitable to make search, and when we did attempt to watch individuals that were obviously nesting near-by the results were fruitless. For one thing, the suspects we selected invariably dropped all other interests in order to follow us about, and, each time, the warbler we were watching proved able to sit around doing nothing longer than we ourselves cared to.

The first young bird was collected on June 18, and others in juvenal plumage were taken at later dates, to July 10. One taken at Doch-da-on Creek, July 22, is well advanced in the molt into first winter plumage; another from Great Glacier, August 14, has just begun this change. One from Sergief Island, September 1, still retains much of the juvenal plumage. It is interesting to note that this bird probably traveled some distance from its birthplace while undergoing the molt. Another specimen taken at Sergief Island the same day has practically completed the change into first winter plumage.

Adults in various stages of wear were taken up to the end of July. A female taken July 26 is in extremely shabby and abraded plumage,

but with no new feathers as yet. A male shot August 2 shows the first indication of the postnuptial molt. This is evident only in the flight feathers, the first primary and the adjoining secondary of each wing being partly grown out. No adults were taken at a later date.

This species is one of the few that migrates coastward at the close of the breeding season. There is probably a movement directly southward east of the coast mountains also, but there is no doubt but that there is a regular late-summer line of travel down the Stikine River to the coast. The birds were noted traveling down stream, and the arrival of the species at Sergief Island was in sufficient numbers to warrant the movement being regarded as of regular annual occurrence. Similar conditions have been noted in the late summer at the mouth of the Taku River, another large stream flowing from the interior to the coast, and emptying about one hundred and fifty miles north of the mouth of the Stikine River (see Swarth, 1911, p. 99). There is no information at hand regarding a return in the spring through the same regions.

Twenty specimens were collected (nos. 40174-40193), the series comprising four adult males, seven adult females, six in juvenal plumage, and three in first winter plumage. These were assembled with other material in this Museum for comparison with the eastern *Dendroica c. coronata*. Comparable material in the two subspecies comprised, of *coronata*, 14 adult (summer) males, 10 adult (summer) females, 4 immature (first winter); of *hooveri*, 13 adult (summer) males, 15 adult (summer) females, 11 immature (first winter). There are also midwinter and juvenal specimens of *hooveri*, stages at which there are no comparable specimens of *coronata* available.

Judging from this material, the subspecies *Dendroica c. hooveri* is but faintly characterized. As claimed by the original describer (McGregor, 1899, p. 32), *hooveri* averages slightly larger than *coronata* (see table), but there is much overlapping in measurements. I, myself, am unable to perceive most of the differences of color and markings that have been said to characterize the two subspecies. McGregor (*loc. cit.*) claimed differences in measurements only. Bishop (1900a, p. 90) advanced certain color characters, found in a series collected by himself in Alaska, notably in the summer plumage of the adult male. He says: "Adult males average paler below than typical *D. coronata*, the black markings being narrower, thus giving an effect of broad longitudinal markings rather than black clouding on the chest." This statement is endorsed by Grinnell (1909b, p. 235).

Bishop (*loc. cit.*) claims further that there are color differences in the juvenal plumage. Oberholser (1918*b*, p. 465) upholds the validity of *hooveri*, asserting "that it differs from *Dendroica coronata coronata* not only in its larger size but in the coloration of male, female, and even young." Ridgway (1902, p. 548, footnote) and Riley (1912, p. 70) each refuse recognition to *hooveri*.

The series assembled by myself in the present connection demonstrates the average size differences claimed to exist. I fail to appreciate any differences whatsoever of color or pattern between adult males and females of the two lots. The juvenal plumages I have been unable to compare. As regards immatures in first winter plumage, examples of *hooveri* are slightly (but distinguishably) darker, more brownish, than comparable specimens of *coronata* (see in this connection Swarth, 1911, p. 99).

TABLE XII

Measurements in millimeters (average, minimum and maximum) of *Dendroica coronata coronata* and *Dendroica coronata hooveri*

Wing	Tail	Culmen	Length of white spot on outer tail feather
Dendroica coronata coronata, 14 males ¹			
72.4 (70.5-76.0)	56.8 (55.0-59.2)	8.9 (8.5-9.5)	20.8 (18.0-22.5)
Dendroica coronata hooveri, 12 males ²			
75.7 (73.5-79.0)	58.8 (57.2-60.0)	8.8 (8.0-9.2)	22.0 (20.0-25.0)

¹Massachusetts, 3; Connecticut, 1; New York, 1; New Jersey, 2; District of Columbia, 1; Virginia, 1; Indiana, 2; Illinois, 1; Wisconsin, 1; Minnesota, 1.

²Kowak River, Alaska, 4; Yukon River, Yukon and Alaska, 4; Stikine River, British Columbia, 4.

Dendroica townsendi (J. K. Townsend). Townsend Warbler

Very few seen at any point, and none under circumstances that would lead to the belief that the species was breeding east of the coastal mountains. First noted at Flood Glacier, where it may, perhaps, have been breeding, or where the birds seen may have wandered from nearer the coast. The first was taken on July 28 (no. 40194) and another on August 3 (no. 40195), both molting from juvenal to first winter plumage. Several more were seen. A male in first winter plumage throughout (no. 40196) was taken at Great Glacier, August 14, and others were observed at the same point. At Sergief Island but one or two were noted, the last on September 1.

Seiurus noveboracensis notabilis Ridgway. Grinnell Water-Thrush

At Glenora, July 7, an adult male was obtained that was undoubtedly nesting near-by. At Doch-da-on Creek, July 21, another adult male was taken.

Of these two birds, the Glenora specimen (no. 40197), as compared with the one from Doch-da-on Creek (no. 40198), is appreciably smaller, with smaller bill, is darker colored throughout, and is noticeably more yellowish below. This may represent individual variation toward the eastern subspecies, *Seiurus n. noveboracensis*. The two Stikine specimens, however, resemble each other more nearly than either one resembles any eastern example at hand.

Oporornis tolmiei (J. K. Townsend). MacGillivray Warbler

Abundant throughout the whole of the region we explored. First noted at the Junction, June 1, one bird seen and another heard singing. During the next few days they were evidently arriving in abundance, and thereafter the song was heard nearly everywhere we went. The first young out of the nest was seen July 13, at Doch-da-on Creek. A day or two later they were emerging in numbers, and as we went through the woods fussy parents in attendance followed us about. The species was noted in moderate abundance at each of our subsequent stations—Flood Glacier, Great Glacier, and Sergief Island. Last noted, a single bird on Sergief Island, September 3.

Nine specimens were collected (nos. 40199–40207). An adult male taken at Flood Glacier, August 4, is finishing the annual molt; the body plumage is practically renewed, but wing and tail feathers are but half-grown. Two young birds taken August 4 and 12, respectively, are in first winter plumage throughout.

Although the MacGillivray warbler is so abundant in the upper Stikine Valley, that region must be nearly the northern extreme reached by the species. It is not included in E. M. Anderson's (1915a) list of birds of the Atlin District, less than two hundred miles to the northward. I do not know whether this warbler should be considered primarily as a species of the interior or of the coast, or whether it is one of the few birds that occurs in equal abundance in both regions. It has been found in summer at various points on the Alaskan coast (Swarth, 1911, p. 101).

***Wilsonia pusilla pileolata* (Pallas). Pileolated Warbler**

In our experience a rare species in the upper Stikine Valley. A few were seen from May 29 to June 1, between Telegraph Creek and the Junction, but these appeared to be migrants. None seemed to be nesting. Next encountered at Flood Glacier, where, on August 4, a bird was caught in a mouse trap. The fall migration was then setting in, and a few days later, at Great Glacier, pileolated warblers were noted from time to time with other migrating warblers. At Sergief Island, the latter part of August they were seen almost daily, the last on September 1.

Six specimens were collected (nos. 40208–40213), two adult males and one adult female from the vicinity of Telegraph Creek, an immature (sex not determined) from Flood Glacier, and an immature male and immature female from Great Glacier. These specimens, in my opinion, are all referable to the subspecies *pileolata*. The three Telegraph Creek adults are slightly darker and duller colored throughout than coastal birds, and to that extent, presumably, lean toward *pusilla*, but they are not so dark colored as eastern specimens of that subspecies. In measurements they do not differ from coastal *pileolata*. With the material at hand it is not possible to tell whether the immatures collected in August at Flood Glacier and Great Glacier are migrants from the interior or from the coast. They are not appreciably different from immature *pileolata* from Alaskan coastal points.

***Setophaga ruticilla* (Linnaeus). American Redstart**

First encountered near Telegraph Creek on June 11. From the actions of the birds seen on that date and the number that were observed, it seemed as though they might have arrived some time previously, but the same ground had been traversed two days before without any redstarts being seen or heard. From this time on the song of this species was heard by us practically everywhere we went in the poplar woods of the lowlands. Males in the plumage of the female, supposed to be birds of the previous year, sang just as did those in the brilliant black and orange livery. That the dull feathered males were breeding was shown in one instance in the capture of a mated pair, evidently preparing to nest. This was on June 15. The male was just like the female save for a few black feathers scattered through the body plumage. The female was almost ready to lay.

At Doch-da-on Creek, the latter part of July, redstarts were present to the same extent as about Telegraph Creek. They were probably still nesting. During the third week in July certain birds could be found daily at the same places in the woods, and they always evinced concern at the presence of an intruder.

That we saw no redstarts at Flood Glacier was probably just chance. The species may not breed that far down the river, but it undoubtedly occurs as a migrant, at least in the fall. At Great Glacier, August 8 to 16, the birds were frequently seen, and to the last day of our stay. This station is about ten miles from the Alaska-British Columbia boundary, and the redstarts were sufficiently numerous there to make it seem certain that some individuals must occasionally stray the few miles farther that would take them into Alaskan territory. I looked carefully for the species on Sergief Island, at the mouth of the river, but did not see it there.

A set of four eggs was taken near Glenora, July 5 (no. 1823). On July 2 this nest was found containing two eggs. It was placed in an upright crotch in a willow sapling, about eight feet from the ground.

Ten specimens of the American redstart were collected (nos. 40214-40223), three adult males, two males, breeding but in female plumage, one adult female, three immature males, one immature, sex not determined. I cannot see that these birds differ in any particular from specimens of *Setophaga ruticilla* from the eastern United States.

Anthus rubescens (Tunstall). Pipit

Small flocks that were seen at Telegraph Creek, May 23 and 24, were undoubtedly of migrating birds, for the species does not breed in that region at so low an altitude. On May 29 a number of pipits were seen at the Summit, twelve miles north of Telegraph Creek, and at an altitude of about 2700 feet. They should have been breeding thereabout, for the locality is suitable, and birds taken on this date appeared to be in breeding condition, but on a later visit to the same place, June 4, no pipits were seen.

Next encountered July 11 on the mountains above Doch-da-on Creek at 4500 feet altitude and higher, where they were fairly abundant and evidently feeding young. They were extremely shy, and though a good many were seen they were usually drifting about through the air, and keeping well out of gun shot. They were calling continually, uttering a note that I have never heard in the winter. This was a sharp, oft-repeated *wheet, wheet, wheet*, the notes given

singly at intervals of several seconds, and uttered both in flight and from the ground. No nests were found and no young seen. When we reached Sergief Island, August 17, the pipits had not yet arrived. The first was seen on August 25, then they increased in numbers rapidly, and were abundant at the time of our departure, September 7.

Three specimens were collected (nos. 40224-40226), an adult male and female from the Summit, May 29, and an adult female from the mountains above Doch-da-on Creek, July 11.

Nannus hiemalis pacificus (Baird). Western Winter Wren

Found nowhere in the lowlands of the upper Stikine Valley. On July 23 an adult female (no. 40227) was taken in a spruce forest on the slope of a mountain above Doch-da-on Creek, at about 3000 feet altitude. This was the only one seen at that point. The species was next encountered at Flood Glacier, where a juvenal was collected on August 2 (no. 40228). At Great Glacier, several were seen and two juvenals collected (nos. 40229-40230). Whether or not the two latter places, at the level of the river, are breeding stations I cannot say. The bird collected upon the mountain above Doch-da-on Creek was, I believe, upon its nesting ground.

At Sergief Island the western winter wren was found amid most unusual surroundings in tall grass and reeds, far out on the marshes. The birds were seen thus daily, foraging over the water just as do the marsh wrens. Sometimes they were in small gatherings, five or six at a time being flushed from the grass.

Certhia familiaris occidentalis Ridgway. Tawny Creeper

A young male just finishing the molt into first winter plumage was taken at Flood Glacier, August 2. On Sergief Island, August 24, two birds in juvenal plumage were collected. These were all that were seen. Once or twice I thought I heard a creeper's call notes at high altitudes in the mountains but was never able to verify my belief. It seems likely that some form of this species breeds throughout the Stikine region, but if so the birds are certainly present in but small numbers or we would have encountered some.

The three specimens collected (nos. 40231-40233) are apparently best referred to *Certhia f. occidentalis*, though they all exhibit a decided leaning toward *C. f. montana*. They may all have been migrants from some inland point, not far distant, inhabited by the subspecies *montana*.

***Sitta canadensis* Linnaeus. Red-breasted Nuthatch**

Not breeding at any point visited. One was seen at Doch-da-on Creek on July 22, at a time when birds were generally beginning to move about, and several more on July 26. An immature male (no. 40234) was taken at Flood Glacier, August 2. No more were seen.

***Penthestes atricapillus septentrionalis* (Harris). Long-tailed Chickadee**

Seen at every collecting station east of the British Columbia-Alaska boundary line. Near Telegraph Creek, the last week in May and the first week in June, those seen were quiet and unobtrusive, and doubtless there were many more pairs nesting in the general vicinity than appeared to be the case from the few we saw. A nest found near Telegraph Creek contained nine young, about ready to leave on June 14. At Glenora, during the first week in July, full-grown young were collected, from flocks formed by the junction of two, sometimes of three, families. Encountered at Doch-da-on Creek and certainly nesting there, but not so abundant as farther up the river. At Flood Glacier there were a few of the birds about, but it seems unlikely that they had nested there. We were not at that station at the proper season to definitely ascertain this, but the woods are not of the character that is most favored by this chickadee; there are no poplars at all, the forest is, for the most part, of conifers with but a few cottonwoods, and is dense and dark. Where the long-tailed chickadee appears to be most at home is in rather open and sunny poplar woods.

Several small flocks were seen at Great Glacier, August 9 to 16, but again it does not seem likely that the species had been nesting there. The Great Glacier is only about ten miles from the British Columbia-Alaska boundary, so that it is probable that the long-tailed chickadee occurs at times quite to the mouth of the river.

The nest discovered near Telegraph Creek was in a tract of rather open woods, mostly of small poplars. It was in a dead poplar stub about three inches in diameter, a mere shell of dead and decayed wood, hardly strong enough to hold the tightly packed and rapidly growing young, who did actually break through the wall at one place. The entrance hole was five inches from the base, the nest itself, flush with the ground. The lining appeared to be entirely of matted moose hair.

Both parents carried food to the nest assiduously after foraging expeditions that lasted from two to five minutes. In approaching the nest, the old birds came through the trees and bushes until within

about eight or ten feet of their destination; then they dropped to the ground and hopped to the entrance. To the casual observer they disappeared at a point some distance from the nest, and it was not until they had been observed for some time that this subterfuge was detected. The staple food that was being brought to the young was a small green caterpillar infesting the poplars at that time; also a white grub, a green katydid, and many mosquito-like insects.

Thirty specimens were collected (nos. 40235-40264), six adults, eighteen in juvenal plumage, and six in various stages of the molt from juvenal to first winter plumage. Two of the latter category, from Great Glacier, August 12, have nearly finished the change. The birds of this series, in color and size, exhibit the characters ascribed to the subspecies *septentrionalis*, that is, as regards differentiation from the eastern *atricapillus*. Within the rather extensive habitat of *septentrionalis* there appears to be some variation in color, perhaps enough to separate the Stikine River birds as distinguishably darker colored than typical *septentrionalis*. A few specimens at hand from the middle west suggest this possibility, but there is not enough material available to verify the supposition. The buffy coloration on the sides and flanks appears to be an extremely evanescent character, conspicuously present in the fresh fall plumage, but absent in breeding adults (in which this same plumage has been subject to several months of wear). In very young birds (nestlings) it is strongly apparent, but in juvenals that could have been out of the nest no more than a month it has almost entirely vanished.

***Penthestes gambeli abbreviatus* Grinnell.** Short-tailed Mountain Chickadee

The limited opportunities we had for observation of this bird did not suffice to demonstrate its ecological relationships with *P. atricapillus septentrionalis*. That is, as regards choice of local habitats of the two—an interesting point where two such closely related species of one genus occur in the same general region. *Septentrionalis*, as previously remarked, strongly favors the poplar woods, and other subspecies of the species *atricapillus* are known as denizens of deciduous forests elsewhere. The species *gambeli*, on the other hand, is largely an inhabitant of coniferous woods, and it seems likely that in the Stikine region *P. gambeli abbreviatus* makes its summer home amid the spruce and balsam of the higher mountain slopes, where we never encountered *P. atricapillus septentrionalis*. At Doch-da-on

Creek, at the end of the nesting season, small flocks of *P. gambeli abbreviatus* were seen on several occasions; it was observed nowhere else. Five specimens were collected (nos. 40265–40269), four on July 14 in woods at the river's edge, and one on July 23, on a mountain slope at about 3000 feet elevation, close to timber line. The series consists of two adults in extremely worn plumage, and three in juvenal plumage. Oberholser (1919b, p. 424) has reported the occurrence of this subspecies at Thudade Lake, British Columbia. The present point of record is about two hundred miles northwest of Thudade Lake, and, in a direct line, about sixty miles from the coast. It must indicate about the extreme northwestern limit reached by this bird. For the use of the name *Penthestes gambeli abbreviatus* see Grinnell, 1918, p. 510.

***Penthestes rufescens rufescens* (J. K. Townsend).** Chestnut-backed Chickadee

A number of small flocks seen in the dense spruce woods at Flood Glacier. The occurrence of this common coastal species at that point implies its continuous distribution along the river below that station. That we did not meet with it at Great Glacier and Sergief Island was probably fortuitous. Nine specimens were collected at Flood Glacier on dates ranging from July 31 to August 7, all young birds in juvenal plumage (nos. 40270–40278).

***Regulus satrapa olivaceus* Baird.** Western Golden-crowned Kinglet

Very few kinglets were seen anywhere. From May 27 to June 4 several of the present species, apparently migrants, were observed at different times along the trail from Telegraph Creek to the Summit. Our failure to find the species subsequently may, perhaps, have been because the birds were breeding in the spruce timber of the higher mountain slopes, to which we made but few visits. Several times I thought I heard the sibilant call note of the golden-crowned kinglet in some dense timber above Doch-da-on Creek (at about 3000 feet altitude), in July, but I was unable to see the birds. At Flood Glacier, August 7, one was seen in a mixed flock of migrating small birds, and there may have been others passing through at the time. Two specimens were collected during the summer, an adult male at the Junction, May 27 (no. 40279), and an adult female at Flood Glacier (no. 40280).

Regulus calendula calendula (Linnaeus). Ruby-crowned Kinglet

Occurred in about the same manner as the golden-crowned kinglet. A few were seen between Telegraph Creek and the Summit during the last week in May and the first week in June. Then on July 18 an adult female was collected on a mountain slope near Doch-da-on Creek, at about 4000 feet altitude, presumably upon its nesting ground. This bird (no. 40281) is in very worn plumage, but, even so, there is no doubt that it does not belong to the coastal subspecies, *R. calendula grinnelli*. It is of a paler colored race of the interior. Whether or not this is the same as the ashy colored subspecies, *R. c. cineraceus*, of the mountains of California, the material at hand does not suffice to determine.

Regulus calendula grinnelli W. Palmer. Sitka Kinglet

A few migrating ruby-crowned kinglets were seen at Great Glacier on August 10, 11, and 13, and four specimens were collected (nos. 40282-40285). At Sergief Island a single bird was seen on September 1. The four obtained are all young birds molting from juvenal into first winter plumage. They are clearly of the subspecies *grinnelli*.

Myadestes townsendi (Audubon). Townsend Solitaire

Fairly common at low altitudes in the upper Stikine Valley. There were at least three pairs nesting within half a mile of the town of Telegraph Creek, and others were seen down the river as far as Doch-da-on Creek. The solitaires had already reached the region when we arrived, on May 23; in fact, nesting activities must have been well under way by that time. On June 7 a nest was found containing five eggs, just hatching; the next morning it held three young birds. Two of the eggs were apparently not fertile. This nest, close to town and by the side of a road we traversed almost daily, was kept under observation until the family departed. On the morning of June 20 the young were gone, having left since the previous evening.

The nest was placed under the overhanging bank on the upper side of a wood road. The slope was south facing and the nest well exposed to the sun's rays. This exposure, advantageous as far as warmth was concerned, placed the bulky structure conspicuously in view of anyone passing along the road, for there was no concealing vegetation on the bare, dirt bank.

A second nest, in a somewhat similar situation, was discovered, unfinished, on June 8. Both birds were around at that time, but they deserted this home before any eggs were laid.

The solitaires did not sing much but the call note was uttered continually. From our rooms in town at Telegraph Creek, this was one bird note that could be heard hour after hour, monotonously repeated nearly the whole day through. To our ears it sounded so nearly like the distant barking of a California ground squirrel (*Citellus beecheyi*) that the sound would surely have been disregarded as a bird call had we been in a region where the squirrels occur.

Fig. FF. Townsend solitaire (*Myadestes townsendi*) on nest. This nest was placed in a cut bank at the side of a road, a southern exposure that received the full benefit of the sun's rays. Photograph taken near Telegraph Creek, June 9, 1919.

At Glenora, early in July, and at Doch-da-on Creek, toward the end of the same month, solitaires were seen at intervals, single birds, and apparently migrating, though nearly all that were seen were still in the juvenal plumage. While none was observed by us any farther down the river, the capture of one at Wrangell on April 30, 1919, by E. P. Walker (no. 41286) indicates the possible occurrence of the species at any point in the Stikine Valley during the migrations.

Two specimens were collected, a male and a female, both in juvenal plumage, taken at Glenora on July 5 and 7, respectively (nos. 40286, 40287). Compared with Californian birds at the same stage, the Stikine River specimens show some difference in coloration. The ground color

of the upper parts in the northern birds is appreciably more gray, less buffy, and the spots are less yellowish. We obtained no adults, but the Wrangell adult, above mentioned, and others from the Rocky Mountain region farther south are not perceptibly different from the Californian birds. The differences seen in the juvenals may be significant, but our material is not sufficient to demonstrate the fact.

***Hylocichla ustulata ustulata* (Nuttall). Russet-backed Thrush**

There were a very few individuals of this species still lingering in the region when we arrived at the mouth of the Stikine River, about the middle of August. One was seen on Sergief Island, August 18, and another on September 4, both in the alder thickets that surrounded our camp. As neither one was taken, it is, of course, possible that the birds seen were of the subspecies *swainsoni*, rather than *ustulata*. Our experience on the Stikine disclosed the presence of *swainsoni* so far down the river that it would not be surprising if occasional individuals should wander quite to the coast during migration. However, as Sergief Island is within the known range of *ustulata*, while *swainsoni* has never yet been taken on the coast, it is proper to refer the records from that point to the race known to occur there.

***Hylocichla ustulata swainsoni* (Tschudi). Olive-backed Thrush**

One of the commoner species of the upper Stikine Valley. First noted at the Junction on May 28; the next three days saw an influx of considerable numbers. On May 31 the first song was heard, so similar to the, to us, more familiar notes of the russet-backed thrush as to be indistinguishable. On June 5 a female was shot, with eggs beginning to enlarge in the ovary, on June 9 one was taken which had laid part of its set, and on June 12 the first set of eggs was obtained. A young bird, just out of the nest, was taken at Glenora on July 7, and full-grown juvenals were collected at Flood Glacier early in August.

This is a bird of the poplar woods and willow thickets of the lowlands, primarily, but we found it also in small numbers well up the mountain sides. On July 17 Dixon saw several at the upper edge of the spruce timber (about 4000 feet) on the mountains above Doch-da-on Creek.

Nests found were all at the lower levels. The first discovered was in fairly open woods, mostly of small willows, and in a very exposed

situation. The nest was about four feet from the ground, between four upright willow branches, and there was no concealing green growth about it. The material used was mostly dried weed stems, grass, and shreds of bark. The lining differs from the outer structure only in that it consists of finer material of the same sort. Dimensions of this nest are as follows: greatest outside diameter, 170 mm.; inside diameter, 68; outside depth, 100; inside depth, 40. It contained four eggs, partly incubated.

A second nest was collected on June 19, essentially like the first except that it is less bulky. This was in an alder, about four feet from the ground, alongside a seldom used road, and again in a most exposed situation. The set was of four eggs. On June 19 still another nest was found, in a crotch in a dead willow, about eight feet up. In this one there are more and coarser bark strips used, and a good deal of the cottony fiber from the fireweed pods. It contained five eggs. The last occupied nest was found at Doch-da-on Creek, July 21, containing three eggs nearly ready to hatch. This was in an alder, about three feet from the ground. In the case of the nest last described, the parent bird, presumably the female, was in great distress and did not go very far away. With each of the others, the sitting bird slipped unobtrusively away and did not return until some time had elapsed, probably never under twenty minutes.

At Great Glacier, August 11, a young bird was collected, not yet able to fly, that is clearly referable to *swainsoni*. This last record is of considerable interest as it carries the breeding range of *swainsoni* westward in this region to a point about thirty miles from the coast, the habitat of *Hylocichla u. ustulata*. Although the habitats of the two subspecies thus approach so closely, there is no evidence of intergradation of characters between them. In the Stikine River series of *swainsoni* there is not one specimen of an equivocal character. On the contrary, these birds, like those from the Yukon region, show an extreme of grayness, compared with typical *swainsoni* from eastern North America, that carries them farther from *ustulata* in appearance than are specimens from the Atlantic coast. (In this connection see Oberholser, 1898, p. 305.) It may be pointed out also that although *ustulata* and *swainsoni* breed in different parts of northern California, there is no section of that state that is known to be occupied by birds of intermediate character. As in the Stikine region, both occur in typical form quite to the margins of their respective habitats. Thus, if *ustulata* and *swainsoni* are to be regarded as two subspecies of one

species, it must be on the criterion of individual variation rather than on that of gradual blending through the population of contiguous territories. In the Stikine region the two forms occur, in the interior and on the coast, respectively, and within a few miles of each other, as distinct in appearance as any two species. On the other hand, as regards song, nesting habits and eggs, these features all supply evidence to show close relationships between the two. In none of these respects is there any apparent difference.

Twenty-one specimens of the olive-backed thrush were collected (nos. 40288-40308), fifteen adults and six young.

***Hylocichla guttata guttata* (Pallas). Alaska Hermit Thrush**

There were a few pairs nesting along Telegraph Creek to within a mile or two of the Stikine, but mostly the birds were at higher elevations. None was seen in the immediate vicinity of Glenora or of Doch-da-on Creek, but the species was encountered in spruce woods on the mountains above the latter point, at about 3000 feet altitude.

Two nests were taken. The first (no. 1827) was found on May 23, with three eggs, and collected on May 26 with a set of five. It was in the creek bottom, about two miles north of the town of Telegraph Creek, some three feet from the ground, in a spruce sapling. The nest rested against the trunk and upon some small branches. The outer structure is of twigs, weed stems, rootlets and bark strips; the lining is of fine rootlets and grass, with a good many of the long overhairs of a porcupine. It measures as follows: greatest outside diameter about 160 mm.; outside depth, 90; inside diameter, 60; inside depth, 40 mm.

The second nest (no. 1828) was taken June 4, with four slightly incubated eggs. This was found near the Junction, four miles north of Telegraph Creek, amid similar surroundings to the first one. It was placed between two small spruce trees, thirty inches from the ground. In general appearance and in details of structure, it is very similar to the first one found, even to the porcupine hairs in the lining. Both were in situations where there was little concealing vegetation, and were easily seen from some distance.

Five specimens, two males and three females, were collected between Telegraph Creek and the Summit (nos. 40309-40313). The hermit thrush of this general region has been referred to *Hylocichla guttata sequoiensis* by Ridgway (1907, p. 44); specimens from Atlin, two hundred miles north of Telegraph Creek, have been recorded as

sequoiensis (E. M. Anderson, 1915a, p. 17). I cannot agree with this determination, as applied to the Telegraph Creek series. These birds are not the same as the hermit thrush of the Sierra Nevada of California (*sequoiensis*). They are appreciably smaller than the latter and they are not so gray. They come very close, both in color and size, to a series of *guttata*, from Prince William Sound, Alaska, being perhaps a trifle paler colored. They are quite different in appearance from the dark colored *nanus*, of the coast region of southern Alaska.

TABLE XIII

Measurements in millimeters of *Hylocichla guttata guttata* and *Hylocichla guttata sequoiensis*

<i>Hylocichla guttata guttata</i>		Wing	Tail	Culmen	Tarsus
40312	♂ Telegraph Creek, B. C., June 4, 1919	89	69	13	28.5
40313	♂ Telegraph Creek, B. C., June 4, 1919	87	69.5	12	28.5
40310	♀ Telegraph Creek, B. C., June 1, 1919	84	67	12	29
40311	♀ Telegraph Creek, B. C., June 4, 1919	83	66	12	28.5
40309	♀ Telegraph Creek, B. C., May 26, 1919	85	66.5	12	26.5
<i>Hylocichla guttata sequoiensis</i>					
22668	♂ Independence, Inyo Co., Cal., May 9, 1912	94	72	14	30
22669	♂ Kearsarge Pass, Inyo Co., Cal., June 12, 1912	97	72	14	30
22670	♂ Kearsarge Pass, Inyo Co., Cal., June 13, 1912	97	75	13	27.5
22671	♀ Kearsarge Pass, Inyo Co., Cal., June 15, 1912	91	70	14	30

***Hylocichla guttata nanus* (Audubon). Dwarf Hermit Thrush**

The hermit thrush appears to range the whole length of the Stikine Valley; it is one of the few species of which we found specimens at intermediate points the characters of which indicate a likelihood of intergradation in that region between the two unlike subspecies at the two ends of the stream. A specimen taken at Flood Glacier on July 27 (no. 40314), an adult female not yet beginning to molt, is intermediate in color between the gray Telegraph Creek specimens and the dark colored birds of the coast. Despite the lateness of the season and the consequent greater wear upon the plumage, it is still appreciably browner than the Telegraph Creek birds. On the whole, it seems best regarded as *nanus*, though not typical of that form. A young bird (no. 40315) from Great Glacier, August 11, in the juvenal plumage throughout, is referred to *nanus*.

On Sergief Island, hermit thrushes were fairly numerous up to the first week in September. One was taken on August 23, still in the juvenal plumage (no. 40316), and one on August 27, which had finished the molt into the first winter plumage (no. 40317).

Fig. GG

Fig. HH

Fig. GG. The olive-backed thrush (*Hylocichla ustulata swainsoni*) is a bird of the dry woods of poplar, alder, and willow, as contrasted with the hermit thrush, a denizen of coniferous woods. The nest of olive-backed thrush here shown was in a thicket of alder and willow mixed, and in all respects is typical of the species as it occurs in this region. At the time this nest was photographed (on June 19, and near Telegraph Creek) it contained four eggs.

Fig. HH. Alaska hermit thrush (*Hylocichla guttata guttata*) standing over nest. The nest was built upon the interlaced branches of two small spruce trees, about three feet from the ground, and at the bottom of a cool, shady cañon. Photograph taken near Telegraph Creek, June 4, 1919.

***Planesticus migratorius migratorius* (Linnaeus). Eastern Robin**

At the time of our arrival at Telegraph Creek, robins were present in full force. They were abundant along the river and scarce at higher altitudes, but some were seen clear to the Summit. On May 30 one bird was seen carrying building material, but this must have been rather late, for young were out of the nest on June 9. Robins were fairly numerous at Glenora and at Doch-da-on Creek. By the time we reached the latter place, the middle of July, the spotted young comprised a large proportion of the birds seen.

At Flood Glacier, our next stopping place down stream, robins abruptly became very scarce. Call notes were heard on July 29, but the birds were not seen. At Great Glacier, too, there were very few around. Two seen, but not obtained, on August 11, were the only ones noted.

Nine specimens (nos. 40318-40326) were collected on the upper Stikine River, at Telegraph Creek, Glenora, and Doch-da-on Creek. The series comprises two adult males, five adult females, and two juvenals. These birds are referable to the eastern subspecies, *Planesticus migratorius migratorius*. The outer rectrices are conspicuously tipped with white, which is not the case with the coast form, *P. m. caurinus*, a differentiating character that is readily apparent, even in the live birds. The young from Telegraph Creek are of a different color from the coast birds, being less brownish and more gray, especially on the upper parts.

Just how far down the river *P. m. migratorius* extends we did not definitely ascertain, but, as noted above, robins were abundant as far down the river as Doch-da-on Creek, and abruptly became very scarce just below there. A little below Doch-da-on Creek, and from that point down, forest conditions are such that it seems doubtful that there are many robins breeding anywhere along the lower river. While we saw and heard a few at Flood Glacier and Great Glacier, we obtained no specimens, so cannot be certain which subspecies occurs at those points.

Planesticus migratorius caurinus Grinnell. Northwestern Robin

Fairly numerous at Sergief Island, though irregularly so, during the whole of our stay at that place, August 17 to September 7. Most of the birds seen were in the midst of the molt. One specimen was preserved (no. 40327), a young female molting into first winter plumage. *Planesticus migratorius caurinus* Grinnell (1909b, p. 241) has been refused recognition by the A. O. U. Committee (1909, p. 302), but nevertheless it seems to me a sufficiently distinct subspecies. Additional material acquired since the Committee's action is all corroborative of the describer's diagnosis. (Cf. Swarth, 1912, p. 81; Oberholser, 1917a, p. 195.)

***Ixoreus naevius naevius* (Gmelin). Varied Thrush**

Seen on Sergief Island at various times during our stay there (August 17 to September 7). The subspecies is, of course, a summer visitant and reasonably abundant throughout the coast region of southeastern Alaska. One specimen was collected (no. 40332), a young male, just beginning to molt into first winter plumage.

***Ixoreus naevius meruloides* (Swainson). Northern Varied Thrush**

There were no varied thrushes in the immediate vicinity of Telegraph Creek, nowhere in the river valley at least. We were constantly on the lookout for them, and both the birds and the call notes are sufficiently conspicuous to be readily detected by any one familiar with the species. Subsequent experience farther down the river leads me to believe that they probably breed at higher altitudes throughout the region; we ourselves, found them at but one such station.

At Glenora, early in the morning of July 1, the call note of a varied thrush was heard distinctly, several times repeated. The bird was in thick shrubbery at the river's edge, and could not be seen. It was assumed to be a wandering individual, finished with family cares and straying from the breeding ground on the nearby mountains. On July 11 a male varied thrush was seen on the mountain side above Doch-da-on Creek, at about 3000 feet altitude. The bird was perched high on a dead spruce stub, a hundred feet or more above the ground, uttering at frequent intervals the disconnected notes comprising the song of this species. Later on others were seen or heard at about the same elevation.

On July 18 a young bird was seen at the level of the Stikine River, at Doch-da-on Creek, and from then on a few others were observed from time to time. There were a few in the woods at Flood Glacier and at Great Glacier, exceedingly wary and most difficult to see. Three specimens were collected at Flood Glacier (nos. 40328-40330), an adult male and two juvenal females; and one at Great Glacier, an adult female (no. 40331). These birds are all referable to the interior subspecies, *Ixoreus n. meruloides*.

***Sialia currucoides* (Bechstein). Mountain Bluebird**

There were two or three pairs in the town of Telegraph Creek, presumably nesting about some of the buildings. A few others were seen within a radius of ten or twelve miles, usually around small clearings, where there had been some attempt at cultivation of the ground, or in burnt-over areas, where fire had swept away most of the large timber.

Two nests were found. On June 14 a set of four eggs (no. 1829), about half incubated, was taken. The nest was in an old woodpecker hole in a dead birch stub, eight feet from the ground. This was near the shore of Sawmill Lake, on a slope that had been lumbered and burnt over, so that it was nearly cleared of large trees. A second nest was found in another birch stub nearby, a trunk that was occupied by a pair of tree swallows, as well as the bluebirds. This nest on June 17 contained four newly hatched young and one egg about ready to hatch.

Curiously, no bluebirds were seen near Glenora, though the open fields and old houses were features that should have attracted them, and the species undoubtedly does occur thereabout at times. On July 23 a small flock was seen at timber line, about 4000 feet altitude, above Doch-da-on Creek, apparently the beginning of the migratory movement at the close of the nesting season. I have seen specimens of the mountain bluebird taken at the mouth of the Stikine River on April 10, 1919, in migration, by E. P. Walker.

Ten specimens preserved (nos. 40333-40342), three adult males, three adult females, and four newly hatched young preserved in alcohol.

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