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REPORT ON A COLLECTION OF
BIRDS AND MAMMALS FROM
VANCOUVER ISLAND

BY

HARRY S. SWARTH

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

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INTRODUCTION

In 1910 Miss Annie M. Alexander organized and financed an expedition for the purpose of collecting the higher vertebrates on Vancouver Island. This she led in person during a large part of the summer. Miss Alexander, accompanied by Miss Louise Kellogg, left Berkeley on April 18, beginning the work of collecting at Parksville, April 24. Here they secured the services of Mr. E. Despard, an expert hunter and trapper, who remained with the party throughout the summer and who secured nearly all of the larger mammals taken. The writer left Berkeley on June 4, arriving at the expedition's camp at Beaver Creek on June 9. On July 1 Miss Alexander and Miss Kellogg returned

home, while the writer, together with Despard, continued the work at various points until September 28. The accompanying map (pl. 1) shows the country traversed and the various collecting stations.

The material collected consists of 554 mammal skins with skulls, 1142 birds, three sets of birds' eggs and four nests, twenty-three reptiles and two batrachians. In addition to these, two marten skins with skulls were purchased from Despard, and a wolf and a wolverine skin from the storekeeper at Nootka Sound, after the termination of the trip. Owing to the small number of reptiles and batrachians collected, and to the total lack of comparable material from the neighboring mainland, it was not thought advisable to include them in this report, which consequently deals solely with the birds and mammals. The collections of the expedition were all donated by Miss Alexander to the University of California Museum of Vertebrate Zoology, and together with the field notebooks of the various members of the party, form the basis of the present report.

One hundred and eleven species of birds are listed, eighty-nine of which were collected. This is in no sense to be taken as a complete catalogue of the birds of Vancouver Island. Many other species are known to occur, but only those actually encountered by our party are included in the list. Specimens were secured of each of the twenty species of mammals included in the report, but there are additional species known to occur on Vancouver Island, with which we did not meet.

The elk (*Cervus canadensis occidentalis*), formerly abundant over the entire island, is still to be found in many of the wilder parts, but it is strictly protected, and, lacking permission to take specimens, we made no attempt to penetrate its haunts. The English rabbit (*Oryctolagus cuniculus*) was introduced into Vancouver Island years ago (see Brown, 1868, p. 417), and I was told by several people of the occasional occurrence of rabbits as far north as the vicinity of Alberni, but we saw none ourselves. There are also species of bats that should occur here, which we did not secure.

In color descriptions Ridgway's *Nomenclature of Colors*, 1886 edition, has been the basis of comparison. All measure-

ments are in millimeters unless otherwise specified. For manner of taking measurements see Taylor (1911, pp. 206-207).

It is proper here to express our appreciation of the courtesies received from Mr. A. Bryan Williams, J.P., the Provincial Game Warden. He extended permission to our party to collect specimens of protected species of birds and mammals, gave us letters of introduction to local officials on Vancouver Island, and also aided us with information and advice.

ITINERARY AND DESCRIPTIONS OF LOCALITIES

VANCOUVER

On the mainland of British Columbia. While delayed here for several days, Miss Alexander and Miss Kellogg placed lines of traps on the outskirts of the city, April 20 to 22, and secured a few specimens of several species of mammals.

NANAIMO

A seaport on the east coast of Vancouver Island. Miss Alexander and Miss Kellogg were here April 23 and 24, and had a line of traps set out in the vicinity, and the writer had occasion to make several short visits to the town, on June 8, June 15-17, June 28-30, and September 28, 29.

PARKSVILLE

A small settlement on the east coast of the island, some twenty miles north of Nanaimo. Considerable land has been cleared in this region, and a good deal of farming is carried on. Miss Alexander and Miss Kellogg remained here from April 24 to May 7; and it was at this point that Despard joined the party.

LITTLE QUALICUM RIVER

Some eight or nine miles northwest of Parksville. Camp was established here from May 7 to 16.

FRENCH CREEK

A small stream about midway between Little Qualicum River and Parksville. Miss Alexander and Miss Kellogg camped about a mile from the mouth of the stream, remaining here from May 16 to 20.

ERRINGTON

A post-office about four miles west of Parksville. Camp was established on what is known as the Swain Ranch, some three miles west of the post-office. Miss Alexander and Miss Kellogg were here from May 20 to 27, and I returned and made a base camp at this same place at the end of the summer, August 29 to September 28. There are farms scattered at intervals of several miles, where there are small areas of cleared land, grain fields and pastures, the rest of the region (and by far the greater part of it) being covered with forest. The woods are not so dense, however, but that they can be traversed with comparative ease. The bulk of the forest is made up of conifers, of course, but there are thickets of alder and willow in the low spots, and a number of wild cherries in many places. There are also a good many madroñas scattered through the woods, some of them of large size. About Beaver Creek wharf (some six miles from Errington) there are a number of oaks, but I saw none more than a few hundred yards back from the shore. There are also large areas of low-lying marsh land, submerged in winter, but quite dry at the time we were there, covered with patches of willow and spiraea. This whole region, near the coast, is low and quite level and unbroken, but toward the southwest it rises into hills which culminate in high mountains, of which Mount Arrowsmith, some ten miles inland, is the highest and most conspicuous peak.

MOUNT ARROWSMITH

September 6 to 8 were devoted to the ascent and descent of Mount Arrowsmith. We drove from Errington to the east end of Cameron Lake, where the trail leads up the mountain to a long-abandoned mine. From this point, though there is no trail, traveling is fairly easy for the most part. We camped in a thicket just at the edge of the timber, and at the foot of the southernmost rocky peak. The extensive hillsides are covered with heather, intersected by numerous little streams descending from the surrounding snowbanks. Across the ridge from where we were camped was a little lake, with heather-covered slopes on all sides.

ALBERNI

On the west side of the island, at the head of Alberni Canal. We did no collecting in the immediate vicinity of the town, but used it as a base for the greater part of the summer. Our first camp in this region was at Beaver Creek, fifteen miles northwest of Alberni, and not to be confused with the harbor of the same name near Parksville, on the east coast, which we also visited. It is a common name in the northwest. This is a broad, level valley, containing one large stream and innumerable small ones, draining into the head of Alberni Canal. It is heavily timbered, mostly with Douglas fir and cedar, both of which attain a great size, while the creek beds and swamps are thickly grown up with willow and alder, with a dense undergrowth of devil's club, skunk cabbage, and other vegetation, and with many thickets of salmon-berry. A large part of the region has been burned over in years past, and there are innumerable tall, dead stumps standing everywhere, while the ground is strewn with logs and fallen trees.

In the immediate vicinity of Alberni much land has been cleared, and throughout the valley, between the town and our camp, there were cleared tracts, at gradually lengthening intervals, as the town was left behind. Many of these were deserted and the fields choked with rank second growth. Near the camp there were some extensive grassy meadows, intersected by numerous small streams, and on all sides there were many swamps, mostly caused by beaver dams.

About two miles to the east a low range of timbered hills arose somewhat abruptly. Above camp the valley rapidly narrowed, the ground became rocky and broken, with a rather steep ascent, and the road, terminating where we were camped, changed to a poorly defined trail winding through the hills. The forest became uniformly dense and animal life was consequently much less abundant and varied than in the more open country below.

In the town of Alberni, and in the immediate vicinity, birds were numerous, and of many species. The open fields and meadows, the partly cleared woods nearby, and the maples along

the roads, and shrubbery in the gardens, sheltered quantities of the smaller species, while the quiet waters of the harbor, with the streams flowing into it, attract many water birds.

The road between Alberni and the east coast, traversed by stage, lies mostly through forest, and a part of the distance (on the west side of the divide) through stands of prodigiously large trees. Even on a bright sunny day it is dark and gloomy in these woods, and the stillness is impressive. The ground is remarkably free from underbrush, and bird life almost totally lacking.

GOLDEN EAGLE BASIN

In the mountains about twenty miles southeast of Alberni. These mountains center in a tall, rocky peak, Mount Saunders (altitude 5500 feet), streams draining from it in all directions, and the various cañons terminating at the base of the peak in large circular amphitheatres, or "basins" as they are called (see pl. 2). The Golden Eagle Basin and the cañon draining from it (China Creek) were years ago the scenes of mining activities which entailed the building of a road into the mountains. The mines were failures and have long since been abandoned, and the road is now choked with vegetation and otherwise allowed to deteriorate, but it is still passable and our outfit was hauled over it without difficulty. Camp was established in one of the mine buildings through the courtesy of the caretaker in charge of the property, who resides there alone throughout the year.

The road into the mountains, ascending China Creek Cañon most of the way, passes through dense coniferous forests for its entire length, but the character of the landscape changes abruptly in the basin at its head. This is grown up with thickets of willow, elder and alder, interrupted with patches of grass and veratrum, while there are places where all vegetation has been destroyed by rock slides descending from the surrounding slopes and covering everything with gravel and boulders. The mountains rise precipitously on all sides except where the stream finds an outlet. There are tongues of scattered and dwarfed conifers on some of the ridges, but the slopes are clothed mostly with thickets of alder, salmon-berry and devil's club, with

many steep rock slides, or towering faces of sheer, unscalable rock. The higher slopes of the mountains, from about 4000 feet upward, are plentifully covered with heather and blueberries.

Mount Saunders forms the southwestern wall of the basin, while just north of this peak, connected by a comparatively low ridge and directly overlooking the site of our camp, is a lesser mountain, Hansen Height, altitude 4952 feet.

The cañon to the westward, King Solomon's Basin, is practically a replica of the one we were in, but somewhat smaller; the two cañons are separated by the ridge running up to Hansen Height and Mount Saunders, and come together at a point some four miles below our camp.

The summers are short at this altitude (Golden Eagle Basin is from 1900 to 2200 feet elevation). During our stay here (July 1 to 20), snow lay deep on the ground; most of the floor of the basin was covered; the ravines on the slopes held drifts thirty or forty feet deep, and there was snow everywhere on the higher peaks. The veratrum and grass were just pushing up, and when we left, the willows and alders had not yet fully leaved out, while the salmon-berry bushes were still in blossom, though we had eaten berries in the lowlands six weeks before.

MOUNT DOUGLAS

The highest point on the ridge extending from Mount Saunders to the westward of King Solomon's Basin. The summit (4245 feet) is gently rounded, and comparatively easy of access, once the ridge is attained, but the slopes from the cañon bottom to the ridge are steep and brush-covered, presenting a stiff climb. The ridge and slopes above are quite open, covered with moss and heather, and with many groves of stunted conifers. We found here two little lakes, one about an acre in extent, the other, just below, about half as large, both fed by surrounding snow banks. At the upper end of the lakes these drifts were from twenty to thirty feet high, rising sheer from the water like miniature glaciers. From the summit both coasts of the island can be seen.

Though the weather was clear and sunny the air was decidedly chilly at this height, and ice formed on the water in the night. Birds were abundant, much more so than in the

cañons below, but we failed to find any of the smaller species of mammals. A string of mouse traps was set out, but with no results, and I could find no runways or any other indication of the presence of either mice or shrews.

Despard visited the mountain on July 3, and again July 7 to 9, and he and I together were there July 14 to 16.

Nootka Sound

There is hardly a spot in the Pacific Northwest of greater historical interest than this remote and almost forgotten inlet on the west coast of Vancouver Island. The history of British Columbia practically begins with Captain Cook's discovery of the bay in 1778, while for years afterwards it was the objective point of most of the traders and explorers in the region, and was regarded as the strategic key to the whole northwest coast. The naturalist's interest in the spot is due to the fact that some of the early explorers brought back with them specimens of animals and plants which were new to the scientists of the period, and many species in various branches of natural history were described from examples taken there.

With the opening up of more promising regions, and the decline of the fur trade, Nootka Sound ceased to be of political or commercial importance, and today the little Indian village of Friendly Cove is probably in many respects very similar to what it was when Captain Cook anchored nearby in the spring of 1778, or as John Jewitt saw it during his two years' captivity there in 1803-5. Except for the infrequent visits of the coasting steamer that runs from Victoria up the west coast, and an occasional fishing schooner driven in by stress of weather, the harbor is abandoned to the fleet of canoes belonging to the village; the only white man residing there at the time of our visit was the storekeeper, though there is a mission there and a priest during the winter months.

Nootka Sound is enclosed between Vancouver Island and Nootka Island, and the village of Friendly Cove lies on a little spit projecting from the southeastern extremity of the latter. This peninsula is unforested, level and grass-covered, affording a splendid site for the town, while a string of rocky islets extend-

ing to the eastward, at right angles with the line of the beach, gives the shelter that forms the cove. On the sheltered side, where the town is placed, there is a strip of beach several hundred yards long, composed of coarse gravel in which one sinks ankle deep at every step, but a beach of any sort is something to be appreciated on this rocky coast. On the exposed side of the island is another strip of beach some two miles long, also composed mainly of the same coarse gravel, though in one or two places there are stretches of firm sand.

At the north end of the outer beach, about two miles from the village, is a large lagoon, opening into the sea and affected by the tides, but with freshwater streams flowing into it at the upper end, and with grassy flats on all sides. About half a mile behind the village, entirely surrounded by the forest, is a shallow freshwater lake, several acres in extent. This pond is described by Jewitt, in the narrative of his captivity, but though he speaks of it as being at that time surrounded by open woods, with no underbrush, at present the banks are so overhung and hidden by willows and salal that it is only at occasional intervals that the water's edge can be reached. Most of our collecting was done about this lake and along the edge of the timber on the outer beach. The whole island is densely covered with good-sized timber and impenetrable underbrush, the salal, devil's club, and other brush forming impassable thickets higher than a man's head.

There are several large inlets opening from the sound, Muchalat Arm extending due east, Tlupana Arm, northeast, and the Tahsis Canal, due north. We ascended the Tahsis Canal to its head, where we established camp, about twenty-five miles from Friendly Cove. The shores of the canal, as elsewhere about the sound, are rocky and abrupt, except for one or two level spots occupied by Indian shacks, but at the extreme head of the inlet there are some rather extensive grassy flats, and two valleys containing large streams. There is an abandoned marble quarry at this point, and we found a solitary trapper residing here, with whom we made our home.

This proved to be a difficult place to work, for animal life was scarce, and the forests gloomy and all but impassable. The

grassy meadows, though attractive to the eye, were deceptive, for the rank grass was more than waist high, and concealed innumerable logs, stumps and pitfalls, while narrow winding gullies intersected the flats in all directions. There was a cluster of Indian houses here, unoccupied during the summer months, and around a spring nearby were dense thickets of elder, salmon-berry and other brush.

There is said to have been formerly a trail from the head of the Tahsis Canal across the island to Alert Bay, on the east side, but we were unable to find any trace of it, though the trapper with whom we were camping had blazed a trail over a portion of the ground it was supposed to traverse.

The steamer on which we departed having occasion to ascend the Muchalat Arm about twelve miles, gave me an opportunity of seeing this branch of the sound, which, like the Tahsis, has abrupt, rocky sides, with rough, timber-covered hills surrounding.

We arrived at Friendly Cove on the evening of July 23, and on the following day traveled up the Tahsis Canal, where we remained until August 2. August 3 to 11 were spent at Friendly Cove. While here we were the recipients of many courtesies from Mr. H. L. W. Smith, the storekeeper. When we shifted camp from the Tahsis Canal he came in his canoe from Friendly Cove, twenty-five miles, to assist in the moving; he provided us with a cabin in which to stay at the latter point, and gave us all the information and assistance possible. In short, he did everything in his power to render our stay pleasant and profitable, and I gladly take this opportunity of expressing my appreciation of his acts.

GREAT CENTRAL LAKE

A narrow sheet of water, twenty-four miles in length, the lower end of which lies twelve miles northwest of Alberni. The lake is surrounded by hills and mountains, and though there are occasional stretches of rocky beach, the shores are precipitous for the most part, the only level ground being at the two ends. At the upper end, where we camped, several large streams empty, and at their mouths are limited areas of grassy flats, but so grown up with willows and underbrush as to be

impassable. The forest growth is dense, but there is comparatively little underbrush, so the woods are fairly easy to traverse. Scattered along the north shore of the lake I noticed several madroñas at different points, the only place on the west side of the island where we saw this tree; there are none around Alberni, none nearer than the east end of Cameron Lake. We were at Great Central Lake from August 17 to 26.

DELLA LAKE

In the high mountains, some twelve or fifteen miles northwest of the upper end of Great Central Lake. From our camp at the latter point we made a short trip here in search of ptarmigan, the country being so rough that we were unable to transport enough camp equipment to enable us to remain more than a day or two; in fact it is a sufficiently hard trip without any load. Most of the way the trail leads through thick woods, over rolling country, gradually ascending, but with no very steep grades. There are a number of streams to be crossed over very precarious bridges, some of them at dizzy heights above the water. One of these, composed of two fir trees felled across a narrow gorge, with split slabs laid across about three feet apart, spanned a waterfall, dropping below a sheer seventy or eighty feet; and the roar of the water, together with the trembling of the rickety structure formed a combination that would be decidedly unnerving to a person inclined to be dizzy. The hard climb came at the farther end of the trail, which led to the base of a towering rocky cliff, over which a stream tumbled in a series of tremendous falls. A fragment of rotten rope dangling from a ledge at one side showed where the "trail" ascended, and the climb (of about 2000 feet) was a series of scrambles up the face of the cliff, with the occasional aid of ropes or leaning trees, and with short intervals of rocky slides where walking was possible. Our dog was unable to follow, and remained at the foot of the trail. Arrived on top we found ourselves in a rocky, bowl-shaped valley, nearly filled by the lake whose waters cascaded over the cliff we had ascended, while on every other side snow-covered mountains rose precipitously, some scrubby timber on their heather-covered lower slopes, but the summits

snowy and barren of vegetation. The lake itself was more than half filled with masses of snow and ice, and probably remained so throughout the rest of the summer.

A view from a mountain top in this region, even in mid-summer, gives one the impression that the island is mostly snow and glaciers, so wintry is the aspect, while from the warm valleys below, looking toward the mountains, there is but little of this to be seen.

About Della Lake are several mining claims, the occasion of the trail we had followed, none of which have been worked with any profit. Our visit to this point consumed three days, August 19 to 21.

THE BIRDS

CHECK-LIST OF THE BIRDS

1. *Æchmophorus occidentalis* (Lawr.)
2. *Podilymbus podiceps* (Linn.)
3. *Gavia immer* (Brünn.)
4. *Brachyramphus marmoratus* (Gmel.)
5. *Cepphus columba* Pall.
6. *Larus philadelphia* (Ord)
7. *Mergus americanus* Cass.
8. *Lophodytes cucullatus* (Linn.)
9. *Anas platyrhynchos* Linn.
10. *Nettion carolinense* (Gmel.)
11. *Charitonetta albeola* (Linn.)
12. *Histrionicus histrionicus* (Linn.)
13. *Ardea herodias fannini* Chapm.
14. *Grus canadensis* (Linn.)
15. *Rallus virginianus* Linn.
16. *Pisobia minutilla* (Vieill.)
17. *Ereunetes mauri* Cab.
18. *Actitis macularius* (Linn.)
19. *Ægialitis semipalmata* (Bonap.)
20. *Dendragapus obscurus fuliginosus* (Ridgw.)
21. *Bonasa umbellus sabini* (Dougl.)
22. *Lagopus leucurus leucurus* (Swains.)
23. *Phasianus torquatus* Gmel.
24. *Columba fasciata* Say
25. *Zenaidura macroura carolinensis* (Linn.)
26. *Cathartes aura septentrionalis* Wied
27. *Circus hudsonius* (Linn.)
28. *Accipiter velox* (Wils.)
29. *Astur atricapillus striatulus* Ridgw.
30. *Buteo borealis calurus* Cass.
31. *Haliaeetus leucocephalus alascanus* Towns.
32. *Falco columbarius columbarius* Linn.
33. *Falco columbarius suckleyi* Ridgw.
34. *Falco sparverius sparverius* Linn.
35. *Pandion haliaëtus carolinensis* (Gmel.)
36. *Asio flammeus* (Pont.)
37. *Otus asio kennicotti* (Elliot)
38. *Bubo virginianus saturatus* Ridgw.
39. *Glaucidium gnoma californicum* Selater
40. *Ceryle alcyon caurina* Grinn.
41. *Dryobates villosus harrisi* (Aud.)
42. *Dryobates pubescens gairdneri* (Aud.)
43. *Sphyrapicus varius ruber* (Gmel.)

44. *Phloeotomus pileatus abieticola* (Bangs)
45. *Colaptes cafer saturatior* Ridgw.
46. *Chordeiles virginianus virginianus* (Gmel.)
47. *Cypseloides niger borealis* (Kennerly)
48. *Chaetura vauxi* (Townsend.)
49. *Selasphorus rufus* (Gmel.)
50. *Nuttallornis borealis* (Swains.)
51. *Myiochanes richardsoni richardsoni* (Swains.)
52. *Empidonax difficilis difficilis* Baird
53. *Empidonax trailli trailli* (Aud.)
54. *Empidonax hammondi* (Xantus)
55. *Cyanocitta stelleri stelleri* (Gmel.)
56. *Perisoreus obscurus obscurus* Ridgw.
57. *Corvus corax principalis* Ridgw.
58. *Corvus brachyrhynchos caurinus* Ridgw.
59. *Agelaius phoeniceus caurinus* Ridgw.
60. *Sturnella neglecta* Aud.
61. *Euphagus cyanocephalus* (Wagl.)
62. *Pinicola enucleator flammula* Homeyer
63. *Carpodacus purpureus californicus* Baird
64. *Loxia curvirostra minor* (Brehm)
65. *Spinus pinus* (Wils.)
66. *Calcarius lapponicus alascensis* Ridgw.
67. *Passerculus sandwichensis savanna* (Wils.)
68. *Zonotrichia leucophrys gambeli* (Nutt.)
69. *Zonotrichia leucophrys nuttalli* Ridgw.
70. *Zonotrichia coronata* (Pall.)
71. *Spizella passerina arizonae* Coues
72. *Junco oreganus oreganus* (Townsend.)
73. *Melospiza melodia rufina* (Bonap.)
74. *Melospiza lincolni gracilis* (Kittl.)
75. *Passerella iliaca fuliginosa* Ridgw.
76. *Passerella iliaca insularis* Ridgw.
77. *Passerella iliaca townsendi* (Aud.)
78. *Pipilo maculatus oregonus* Bell
79. *Zamelodia melanocephala* (Swains.)
80. *Piranga ludoviciana* (Wils.)
81. *Progne subis hesperia* Brewst.
82. *Hirundo erythrogastra palmeri* Grinn.
83. *Tachycineta thalassina lepida* Mearns
84. *Stelgidopteryx serripennis* (Aud.)
85. *Bombycilla cedrorum* Vieill.
86. *Vireosylva olivacea* (Linn.)
87. *Vireosylva gilva swainsoni* (Baird)
88. *Lanivireo solitarius cassini* (Xantus)
89. *Vermivora celata lutescens* (Ridgw.)
90. *Dendroica aestiva rubiginosa* (Pall.)
91. *Dendroica coronata hooveri* McGregor
92. *Dendroica auduboni auduboni* (Townsend.)

93. *Dendroica townsendi* (Townsend.)
94. *Oporornis tolmiei* (Townsend.)
95. *Geothlypis trichas occidentalis* Brewster.
96. *Wilsonia pusilla pileolata* (Pall.)
97. *Anthus rubescens* (Tunst.)
98. *Cinclus mexicanus unicolor* Bonap.
99. *Thryomanes bewickii calophonus* Oberholser.
100. *Troglodytes aëdon parkmani* Aud.
101. *Nannus hiemalis pacificus* (Baird)
102. *Certhia familiaris occidentalis* Ridgw.
103. *Sitta canadensis* Linn.
104. *Penthestes rufescens rufescens* (Townsend.)
105. *Regulus satrapa olivaceus* Baird
106. *Myadestes townsendi* (Aud.)
107. *Hylocichla ustulata ustulata* (Nutt.)
108. *Hylocichla guttata nanus* (Aud.)
109. *Planesticus migratorius caurinus* Grinn.
110. *Ixoreus naevius naevius* (Gmel.)
111. *Sialia mexicana occidentalis* Townsend.

GENERAL ACCOUNTS OF THE BIRDS

Æchmophorus occidentalis (Lawrence)

Western Grebe

Seen only in the harbor at Beaver Creek wharf (near Parksville) on September 28, where they were abundant.

Podilymbus podiceps (Linnaeus)

Pied-billed Grebe

Only a single bird secured, at the head of Great Central Lake, August 22 (no. 15553). This bird is in first winter plumage, with the throat and sides of the head and neck variously streaked with dusky markings. Its stomach was filled with a mass of what appeared to be its own feathers.

Gavia immer (Brünnich)

Common Loon

Two seen in a little mountain lake on the west slope of Mount Douglas on July 8. Quite common at the head of Tahsis Canal during the last week in July. At Friendly Cove, August 2 to 11, one was seen daily in a little lake in the woods. Every day at precisely the same time it left the lake, circled about once or twice, and then flew out to sea, calling as it went. I watched it

repeatedly, and it invariably took the same line over the trees, nor did it vary its time of departure more than five minutes. At the head of Central Lake, August 18 to 23, loons were seen and heard daily.

Brachyramphus marmoratus (Gmelin)

Marbled Murrelet

A few seen from the steamer on the west coast of the island between Port Alberni and Nootka, July 22 and 23, and August 11 and 12. Common at the head of the Tahsis Canal during the last week in July, and in the vicinity of Friendly Cove, August 3 to 11.

Cepphus columba Pallas

Pigeon Guillemot

A single bird was seen in the harbor at Friendly Cove on August 3.

Larus philadelphia (Ord)

Bonaparte Gull

Several seen August 22 at the head of Central Lake, evidently migrating. They appeared late in the afternoon and remained until dark, circling about and feeding on the surface of the water.

Large gulls were seen from the steamer at various points between Alberni and Nootka Sound, and along the outer beach at Friendly Cove, but they were all birds in various stages of the immature plumage, and seen at too great a distance to permit of their identification.

Mergus americanus Cassin

American Merganser

A female with a brood of downy young was seen in the swift rushing stream by our camp at Beaver Creek, on the evening of June 23. They gathered together on the river bank, evidently preparing to spend the night; in the morning they were gone.

Several broods of half-grown young, attended by the parent birds, were seen in the several streams at the head of the Tahsis Canal, the end of July, and individuals were observed in the lake at Friendly Cove, at various times from August 2 to 10.

Lophodytes cucullatus (Linnaeus)

Hooded Merganser

A single bird, an adult female, taken at Errington, May 23 (no. 15552).

Anas platyrhynchos Linnaeus

Mallard

A nest containing nine eggs was discovered by Miss Alexander at Errington, on May 21. On May 24 the nest was deserted and the eggs gone, though the old bird was still seen in the vicinity. Four were seen swimming together on several occasions at Central Lake, August 18 to 22. At Errington on September 2 and 22 flocks of eight or ten were flushed from a little lake in the woods.

Nettion carolinense (Gmelin)

Green-winged Teal

Small flocks and some single birds seen at Errington during the latter half of September. Two were shot on September 22, and the skeleton of one of them preserved (no. 15549).

Charitonetta albeola (Linnaeus)

Buffle-head

Only two females, seen at Della Lake, August 20.

Histrionicus histrionicus (Linnaeus)

Harlequin Duck

Three seen in the Tahsis Canal, Nootka Sound, on July 24.

Ardea herodias fannini Chapman

Northwestern Blue Heron

Apparently fairly common, as a few individuals were seen at all suitable points visited. Miss Kellogg saw one on the Little Qualicum River, May 10, and secured an adult female at the same place, May 13 (no. 15554). I saw one feeding on the beach between Nanaimo and Parksville on June 8. In the vicinity of our camp at Beaver Creek they were occasionally seen flying overhead or feeding about the ponds and streams, and an adult male

was secured on June 19 (no. 15555). Several were seen from the steamer at different points on Clayoquot Sound, July 23. A number were seen at different times from July 24 to August 11, at points on the Tahsis Canal and in the vicinity of Friendly Cove. Two full-grown juvenals were secured, one at the head of Tahsis Canal, July 30 (no. 15556), and one at Friendly Cove, August 4 (no. 15557).

The four specimens obtained are indistinguishable in color and markings from examples from southeastern Alaska, but the two adults are a trifle larger than any from that region. Their measurements are as follows:

No.	Sex	Wing	Tarsus	Middle toe and claw	Culmen
15555	♂	532	174	138	149
15554	♀	493	146	113	123

***Grus canadensis* (Linnaeus)**

Little Brown Crane

On September 24 and on several occasions during the next few days, flocks of cranes, presumably of this species, were seen flying southward. On September 27 a flock of twenty-five birds lit in a grain field near our camp, and remained there, feeding in the stubble, until late in the afternoon, when they were frightened away.

***Rallus virginianus* Linnaeus**

Virginia Rail

A pair of adults and a downy juvenal secured in a swamp near Errington on May 19 were the only ones of the species seen at this point. At Beaver Creek there was a small swamp near our camp where the rails appeared to be quite abundant. Specimens were secured and others seen or heard calling at various times. Six specimens in all were preserved (nos. 15558-15563).

***Pisobia minutilla* (Vieillot)**

Least Sandpiper

Seen only at Nootka Sound. A small flock was observed on the beach at Friendly Cove, July 24. At the head of Tahsis Canal, July 25 to August 1, single birds appeared on the mud

occasionally; on the outer beach at Friendly Cove, August 3 to 11, small flocks were seen on numerous occasions. One specimen was preserved (no. 15564), immature male, Friendly Cove, August 3.

Ereunetes mauri Cabanis

Western Sandpiper

Met with only at Nootka Sound, a few scattered individuals at the Tahsis Canal, and small flocks on the outer beach at Friendly Cove, July 24 to August 11. Two specimens were preserved (nos. 15566, 15565), an adult male and female, in worn breeding plumage, the latter beginning to molt into the winter garb.

Actitis macularius (Linnaeus)

Spotted Sandpiper

One only, seen at the head of the Tahsis Canal, July 26.

Ægialitis semipalmata (Bonaparte)

Semipalmated Plover

A single bird seen on the Tahsis Canal, July 26. At Friendly Cove, August 3 to 11, small flocks and single individuals were occasionally seen on the outer beach. One specimen was preserved, an immature male, Friendly Cove, August 3 (no. 15567).

Dendragapus obscurus fuliginosus (Ridgway)

Sooty Grouse

Common at most of the points visited. At Parksville and Errington many were seen and specimens secured in April and May. At Beaver Creek, in June, though not common, they were met with on various occasions, and toward the end of the month several broods of downy young were seen. A nest containing six eggs was found by Despard on June 3, placed close by the road, and discovered through the female flying up as he passed. As the nest was apparently deserted the next day, he took the six eggs it contained (no. 1075). In the Golden Eagle and King Solomon basins females with broods of young were seen on various occasions during July.

Nootka Sound was the one point visited where the species was

not found. It probably does occur there but is certainly uncommon, as the storekeeper at Friendly Cove had not seen one during a residence of two years. At Della Lake (altitude about 3000 feet), August 20, feathers and droppings were noted at various points, but no grouse were seen.

The species is locally migratory, descending into the valleys during the breeding season, and retreating into the higher mountains at the end of the summer. The old males go first, beginning to leave about the time the females are bringing their young from the nest. At Beaver Creek a few still lingered through June and could occasionally be heard hooting. In the mountains south of Alberni, in July, no old males were seen at the bottoms of the basins, or in the cañons, where females with young were frequently met with, but on the higher slopes and the summits of the surrounding ridges they were quite abundant. At the top of Mount Douglas (altitude about 4200 feet) several were heard hooting July 14 to 16.

At Errington, early in September, sooty grouse were abundant and gathered in flocks, usually of from six to ten individuals, though as many as fifteen were seen in one gathering. At this time there were no males in the lowlands, these flocks being in all probability composed usually each of a female with her brood; but a trip to the summit of Mount Arrowsmith, September 6 to 8, disclosed the presence of the cock birds in numbers everywhere on the higher slopes of the mountains. About the second week in September the others began to follow, and they soon became quite scarce in the lowlands. By the end of the month but very few remained.

This seasonal movement is extraordinary. For a bird to descend into the lowlands during the summer, and then to retreat to the bleak, exposed ridges at the advent of cold weather seems contrary to all expectation and is the opposite of the usual migratory movement of the birds of the high mountains. Neither does it seem to be analogous to the autumnal dispersal of birds, in which many lowland species ascend to high altitudes. Although under primitive conditions this would seem to be anything but an advantageous move on the part of the bird, at the present time it undoubtedly does save the lives of many grouse

which would otherwise be killed by sportsmen; for though they are abundant about the farms and on the outskirts of the towns during the breeding season, at the beginning of the shooting season most of them have withdrawn to the wilder and more inaccessible regions.

The male birds collected are indistinguishable from comparable specimens from southeastern Alaska, but the females from the two regions show conspicuous differences of coloration. The Alaska birds are of a decided reddish tone as compared with the gray and brown of Vancouver Island specimens. This is especially noticeable on the dorsal surface of the body, on the head and neck, and on the tarsi. It appears to be a constant difference between females from the two regions, the only Alaska specimens showing an approach toward the other type of coloration being individuals in very worn plumage, which condition is probably largely accountable for the departure from the usual character. No Vancouver Island specimens are of the reddish color of the Alaska birds.

Eighteen specimens were preserved (nos. 15547, 15568-15584): seven adult males, seven adult females, one immature male (molting from juvenal into first winter plumage), two in natal down, and one adult female saved as a skeleton.

***Bonasa umbellus sabini* (Douglas)**

Oregon Ruffed Grouse

Common at many of the points visited, but apparently confined to low altitudes. About Parksville and Errington on the east coast, and about Alberni, near the center of the island, it was abundant in the woods. At Nootka it was uncommon, all that were seen being two old males, one at Friendly Cove and one at Tahsis Canal, and a female with a brood of young at the latter place. There were none in the Golden Eagle and King Solomon basins, nor on the surrounding mountains. A number were seen between Alberni and Central Lake, but at the head of the lake and in the mountains beyond no ruffed grouse were encountered. Thus on Vancouver Island it appears to be a bird of the lowlands. At Errington, in September, they were abundant in the woods, in small flocks, probably family groups,

and frequenting dense thickets of willows or crab-apples. They lay close and were hard to flush without a dog, when startled usually flying up to some low limb, where they remained in utter disregard of approaching men or dogs.

The male birds were heard drumming about Parksville and Errington in April and May, and at Beaver Creek in June; but not thereafter. A female shot near Parksville on April 27 had an egg in the oviduct. At Beaver Creek broods of downy young began to appear during the second week in June, and were seen daily thereafter, for the species was numerous at this point. The old birds were fearless in defense of their broods, and often the first intimation of the proximity of a grouse family was the sudden onslaught of the perturbed mother, who did not hesitate to hurl herself at any intruder, while her brood effaced themselves in the underbrush. Very young birds usually lay perfectly still when alarmed, and, if visible, suffered themselves to be picked up, but as soon as their wings could support them they flew to some distance when startled.

September birds were all molting, and it was not until near the end of the month that any were secured with the rectrices grown out to their full length. Most of the immature birds taken during this month were stubby-tailed and with the head and neck still mostly in juvenal plumage. A young one shot on September 4 was still almost entirely in the juvenal plumage.

The dichromatism of the species is very apparent in the series collected, the gray and the red-colored birds being conspicuously different. Those in the gray phase are quite uniform in color and markings, but the reddish birds show considerable variation. The former all have black ruffs, and gray tails with a black subterminal band. Of the reddish birds some have red ruffs, some black, and others are variously intermediate. Some have a gray tail with a red band, some a red tail with a dark band, and one a red tail with a darker red band. These different styles of coloration are not indicative of age, sex, or season, for both phases are represented among adults and immatures of both sexes.

The stomachs and crops of birds collected in September contained some berries, but were filled for the most part with fern leaves and clover. A young bird shot in a tidal meadow on the

Tahsis Canal had its crop filled with small snails swallowed whole.

Twenty-two specimens were secured (nos. 15585-15606): six adult males, three adult females, two immature males, three immature females, two females in juvenal plumage, and six birds in the natal down.

Lagopus leucurus leucurus (Swainson)

White-tailed Ptarmigan

Ptarmigan probably occur on all the higher mountains, where favorable conditions prevail, but they do not appear to be numerous. We searched for them at various points, with but moderate success. The regions they inhabit are so extremely wild, rugged and difficult of access that we were never able to conduct as thorough a hunt as I should have liked. In each case it meant a trip of several days from our base camp, over mountains so steep and rough that we were able to carry but a very limited amount of supplies, even the bedding being left behind, while twice our hunts were brought to an abrupt end by sudden storms that forced us to descend hurriedly to the lowlands.

The caretaker at the Golden Eagle Mine told us that he had occasionally seen ptarmigan on the high surrounding ridges, but we failed to secure any at this point. On July 11 Despard saw one on a high ridge south of Mount Saunders. This appeared to be a female, and from its actions it undoubtedly had a brood of young near by. Numerous feathers and droppings were noted in the vicinity, but a later visit to the place was unproductive of results, no ptarmigan being seen.

The next place where we had an opportunity of hunting them was in the high mountains northwest of the head of Great Central Lake. Here, on the afternoon of August 20, a small flock was encountered on a steep mountain side overlooking Della Lake, at an estimated altitude of about 4000 feet, and three birds secured. The next morning the remainder of the flock was found again at the same spot, and three more were shot. This covey was composed of nine individuals, probably a pair of adults with their brood. They were found at the lower edge of deep snow banks which cover all these high ridges, where numerous small, terrace-like breaks in the steep, rocky hillside held sufficient soil

to support a scanty growth of grass and heather. The melting snow kept all these places saturated, the water trickling over the rocks. The numerous, deep gulches seaming the mountain side at frequent intervals were filled with snow, the depth of which we had no means of ascertaining, but in places faces of snow banks were exposed, forty feet high or more.

The birds were wild and difficult to approach, scattering to some distance when flushed, and alighting on projecting rocks where approaching danger could be watched. There they stood observant, with outstretched necks and nervously twitching tails, uttering an occasional cackle.

This was the only flock seen here, and before we could hunt farther the weather suddenly turned cloudy, and threatening fog banks settled over the peaks, making traveling dangerous over the slippery, dripping ledges; so, while we could still distinguish directions and landmarks, we hastily descended the mountain.

Our last effort to secure ptarmigan was made on Mount Arrow-smith, September 6-8. They are known to occur on this mountain, and I talked with people who had seen them there, but we failed to find any. The greater part of a day was spent hunting in wind, rain and storm, but with no results, and as, after a wretched night, the storm showed no signs of abating, we gave it up and descended the mountain empty-handed. We tramped over large areas of open, heather-covered slopes well adapted to the species, and with a little more time and under somewhat more favorable circumstances there is no doubt but that they could be found there.

The six specimens secured on August 20 and 21 (nos. 15607-15612) are all young birds, four males and two females, no adults being obtained, unfortunately. They are largely in the intermediate plumage between the juvenal and the pure white winter plumage, that designated by Dwight (1900, p. 149) as "first winter plumage, preliminary." This has replaced the soft juvenal plumage on the head, neck, upper breast, and to some extent on the back. The white winter plumage is beginning to appear on the wings, some partly grown lesser wing coverts and the two outer primaries being white. Head, neck, and upper

breast are coarsely mottled, black and white, the feathers being barred with these colors in about equal amounts, and with a little ochraceous intermixed. Abdomen, white, suffused with dusky. Flanks barred with pale ochraceous and black. The general appearance is of a gray colored bird, with a suffusion of buffy on the back. The six specimens are almost precisely alike, having advanced to the same stage in the molt almost feather for feather.

The lack of comparable specimens prevents the comparison of these with mainland examples of *leucurus*. The conditions surrounding the Vancouver Island white-tailed ptarmigan are very similar to those under which *Lagopus rupestris dixonii* of southeastern Alaska has developed dissimilarities from true *L. r. rupestris* of the interior, and it seemed natural to suppose that there might be a humid coast race of *leucurus* perceptibly different from the mainland form. The determination of this, however, will have to await the obtaining of additional material. Through the kindness of Mr. Frank M. Chapman, Curator of Ornithology, American Museum of Natural History, I have been enabled to compare my birds with some young of *Lagopus l. peninsularis* from the Kenai Mountains, Alaska. These are not so far advanced in the change into the transition plumage, but in the comparable parts there is surprisingly little difference between the two series. On the head and neck, however, where the juvenal plumage has been discarded, the Vancouver Island birds seem to be more purely gray, that is, more decidedly black-and-white-barred, and with less admixture of ochraceous, than is the case with any other white-tailed ptarmigan at hand, either adult or young.

***Phasianus torquatus* Gmelin**

Ring-necked Pheasant

Introduced in the southern part of Vancouver Island, where it appears to be increasing in numbers and extending its range. Miss Kellogg saw one at French Creek, May 18, and a number were observed about Errington in September. We were told that there were a few in the vicinity of Alberni, but none was encountered there by any member of our party. At Errington they were usually seen in the grain fields, but took refuge in the timber when flushed. Unlike the native grouse they were

exceedingly wary and difficult to approach. When startled they flew long distances, lit in dense cover, and probably ran, for I was never able to flush one a second time. Several broods were seen, never composed of more than four or five young. One specimen was secured (no. 15613), a juvenal male, about half grown, shot on September 1.

***Columba fasciata* Say**

Band-tailed Pigeon

Common in the vicinity of Parksville and Errington in April and May, when several specimens were taken. On May 24 Miss Alexander saw near Errington a flock numbering about a hundred birds. Common at Beaver Creek but no longer gathered in flocks, and probably breeding in the vicinity, though the females secured did not appear to be breeding birds. They frequented certain patches of swampy lowlands, feeding on salmon-berries and gooseberries, and were vigilant and hard to approach. At the first alarm they took refuge in the tops of the numerous tall dead fir trees standing everywhere in the valley, where they were quite safe from molestation.

In the Golden Eagle basin two birds seen on July 12 were the only ones noted, but the caretaker at the mine told us that later in the summer, when the berries were ripe at this altitude and about exhausted in the lowlands, the pigeons became quite numerous for a few weeks.

At Nootka Sound but a single bird was seen, at the head of the Tahsis Canal on July 27. At Errington in September only occasional small flocks or single birds were seen, and I was told that they departed altogether during the winter months. A single bird was seen near the summit of Mount Arrowsmith on September 7.

Seven specimens were secured (nos. 15614–15620), two males and five females, all adult.

***Zenaidura macroura carolinensis* (Linnaeus)**

Mourning Dove

I saw a single bird in the town of Alberni on the evening of June 14, feeding in the road near the hotel. The species was not met with elsewhere during the summer.

Cathartes aura septentrionalis Wied

Turkey Vulture

Common during the summer months in the southern part of Vancouver Island. I saw it in the vicinity of Alberni on numerous occasions in June and July, usually soaring about over the neighboring tide flats. At our camp on Beaver Creek, fifteen miles to the northward, it was seldom observed, probably not more than five or six being noted during the month we remained there. It apparently remains in the warmer lowlands, for none was seen in any of the mountain regions we visited. Neither were any observed at Nootka Sound.

Miss Alexander observed it at Errington in May, as many as ten being seen at once on May 25, and at the same place, in September, I saw some almost daily.

Circus hudsonius (Linnaeus)

Marsh Hawk

Seen only at Errington, where, during September, several were observed evidently migrating.

Accipiter velox (Wilson)

Sharp-shinned Hawk

Apparently of rather rare occurrence in summer, as we met with it on very few occasions until the fall migration had begun. Miss Alexander saw one at Errington on May 26. Several were noted in the Golden Eagle and King Solomon basins during our stay there, and two secured on July 17, one an immature female, the other an adult male. The adult was one of a pair that suddenly appeared, circling over our heads as we were walking along a trail, screaming and scolding at us most vociferously. Although their actions intimated the proximity of a brood of young ones, we were unable to find them.

Several were seen at the head of the Talsis Canal, the end of July, and one at Friendly Cove the first week in August. At Errington, during September, they were seen on various occasions, but were never abundant. At the last-mentioned point one was observed in pursuit of a flock of ruffed grouse, and

another was seen to catch a Savannah sparrow late one evening, when it was almost dark.

Three specimens were secured (nos. 15621–15623), an adult male and two immature females.

***Astur atricapillus striatulus* Ridgway**

Western Goshawk

Seen only at Errington, in September. First noted on September 13, and subsequently observed on several occasions, though they never became at all numerous. Two secured on September 15 (nos. 15624, 15625), both immature males, and both in pursuit of poultry when they were shot. The species has an evil name as a chicken hawk among the ranchers of the region.

***Buteo borealis calurus* Cassin**

Western Red-tailed Hawk

Seen on but two occasions during the summer, one at Beaver Creek, June 19, and another at Errington, September 20. Both were adults, as the red tail was distinctly visible as they flew, though neither ventured within shotgun range.

***Haliaeetus leucocephalus alascanus* Townsend**

Northern Bald Eagle

Fairly common on or near the coast; much less abundant inland. Seen in the vicinity of Parksville and Errington in May, and again in September. A few observed in Alberni valley in June. A number were seen from the steamer at various points on the west coast between Port Alberni and Nootka. On the Tahsis Canal and at Friendly Cove, July 24 to August 11, one or two were observed almost daily. A single bird was seen circling about over the summit of Mount Arrowsmith, September 7.

***Falco columbarius columbarius* Linnaeus**

Pigeon Hawk

One specimen, a male, apparently immature, secured at Errington, September 16 (no. 15626), is typical *columbarius*. Pigeon hawks were quite abundant in this vicinity during September, but the difficulty of distinguishing between *columbarius*

and *suckleyi* in life made it impossible to determine the proportional abundance of the two subspecies.

***Falco columbarius suckleyi* Ridgway**

Black Pigeon Hawk

Seen only after the autumnal migration had begun. The first was noted at Central Lake, on August 22, in pursuit of a swallow. Another was observed near Cameron Lake on August 28, and thereafter, during the remainder of my stay on the island, they were seen daily in the vicinity of Errington and Parksville.

In habits and actions they were exactly like pigeon hawks as observed elsewhere. The cleared fields seemed to attract them and they were fond of sitting in elevated, exposed positions while at rest, and of sweeping along the edge of the brush, close to the ground, while hunting. They were frequently observed pursuing flocks of Steller jays, but were never seen actually to seize one, while the moment a hawk lit he was sure to be surrounded by the jays and pestered until he moved away.

Five specimens were secured (nos. 15627–15631), all taken at Errington during September. Two are males and three females, and apparently none are in fully adult plumage. They are all very uniform in appearance, sooty above, and very heavily marked below, as compared with true *columbarius*. In all, the transverse bars on the tail feathers are reduced to disconnected spots; in one (no. 15627) the middle rectrices and the outer webs of the others are unmarked.

***Falco sparverius sparverius* Linnaeus**

Sparrow Hawk

Fairly common at several of the points visited. One was seen by Miss Kellogg at French Creek, April 28, and one by Miss Alexander at the Little Qualicum River, May 9, while a number were observed at Beaver Creek during June. At Errington they were common early in September, but had nearly all disappeared before the end of the month. Not met with at Nootka Sound, nor elsewhere in the higher mountains.

Sparrow hawks were usually seen about patches of cleared land, never in the thick woods; and the dense and uninterrupted

nature of the forest on the west coast of the island probably accounts for the absence of the species from that region.

Five specimens were preserved (nos. 15548, 15632-15635), four as skins and one as a skeleton.

Pandion haliaëtus carolinensis (Gmelin)

Osprey

At Friendly Cove there was at least one pair of ospreys, the birds being seen daily circling overhead. Others were observed from the steamer at points on the west coast between Friendly Cove and Port Alberni. One passed over the boat in Clayoquot Sound, July 23, close enough for me to see that it was carrying a branch in its claws, as if nest building, though the season is certainly unusual.

The only others noted were two single birds seen, one near Parksville, June 8, and the other at Central Lake, August 22.

Asio flammeus (Pontoppidan)

Short-eared Owl

A female only, secured at Errington on September 17 (no. 15636). It was shot late in the evening, as it was following the course of a thicket-bordered ditch stretching across a grain field, a shelter for numerous small birds as well as for rats and mice.

Otus asio kennicotti (Elliot)

Kennicott Screech Owl

At Errington, during September, unmistakable screech owl notes were heard on many occasions, but I was never able to catch sight of one of the birds. They were not heard at any other point visited during the summer.

Bubo virginianus saturatus Ridgway

Dusky Horned Owl

At Beaver Creek, June 9, Despard brought in a horned owl that a neighboring rancher had shot and hung on a fence a week or ten days before. It was a conspicuously dark-colored bird, with heavily marked feet and toes, and was of very large size.

At Errington, during September, they were frequently heard hooting at night, but I never saw one and failed to secure a specimen.

***Glaucidium gnoma californicum* Selater**

California Pigmy Owl

Observed only in the vicinity of Errington, in September, except as noted beyond. At this point it was heard calling daily, and it is rather remarkable that the call notes were not heard elsewhere. The species is in all probability quite generally distributed over Vancouver Island, and the fact that it was not heard calling until September would seem to indicate that the call note is not given very frequently during the summer months. The notes were heard most often about dusk, but also quite frequently during the day.

Three specimens were secured, two males and a female (nos. 15637-15639). The first, secured on September 11, about 10 A.M., was perched on a pole by some abandoned ranch houses. Its stomach contained a few feathers. The second was taken on September 22. I was clambering over a mass of windfall by the edge of a lake in the woods when the agitation of some chickadees at the other end of the tangle attracted my attention. At first there was nothing to be seen, but finally a pigmy owl flew out and lit on a nearby limb, where it was secured. This was the middle of the day and the bird's stomach contained a large dragon fly, evidently just swallowed, sufficient evidence of diurnal hunting. The third bird was shot after dark, September 23. The collection contains a fourth specimen (no. 15640), killed by Despard near Parksville in September, 1909, and presented by him to the Museum. One was heard calling near Cameron Lake on August 28, and a dried-up wing of a pigmy owl was picked up on the trail at the head of Central Lake.

The four specimens at hand have just finished the annual molt, are consequently in perfectly fresh, unfaded plumage, and present an extremely dark appearance. The general ground color of the dorsal surface is between sepia and bistre, while the streakings of the under parts are still darker, clove brown in two, and more nearly the color of the back in the others. The

only two other adult specimens of *Glaucidium gnoma californicum* at hand, one from Seattle, Washington, the other from Marin County, California, present a decidedly more reddish appearance than these Vancouver Island birds.

***Ceryle alcyon caurina* Grinnell**

Northwestern Belted Kingfisher

A common species on or near the seashore but not so frequently seen farther inland. Some were observed or secured by Miss Alexander and Miss Kellogg at the mouth of French Creek, at Englishman's River, and at Little Qualicum River, in May; and several were seen at Beaver Creek in June. While we were at Nootka Sound they were evidently beginning to migrate south, and kingfishers were of daily occurrence, some along the beach, but more often by the little pond in the woods behind the village.

Ten specimens were preserved, six males and four females (nos. 15641-15650). Through the courtesy of the U. S. National Museum I have been able to compare these with a series of birds from various points in the eastern United States and the West Indies. The seven specimens at hand from Alaskan points (Prince William Sound and the Sitkan district), including the type of *C. a. caurina*, have also been carefully examined in this connection. Following are the measurements of kingfishers from the eastern United States and from the northwest coast region.

	Wing	Tail	Culmen	Bill from nostril	Depth of bill	Bend of carpus to longest secondary in closed wing
Average of six males from Vancouver Id.,	159.3	90.5	58.5	45.6	14.5	132.9
	(157-162.5)	(87-93)	(54-61)	(40.5-48.5)	(13-15)	(132-134)
Average of eight males from eastern U. S. and West Indies,	154.4	84.4	56.8	44.0	12.8	118.8
	(150-159)	(78-89)	(53-59)	(39-47)	(12-13)	(112-127)
Average of five females from Vancouver Id. and Alaska,	161.4	92.8	58.0	44.6	13.6	132.2
	(159-166)	(89-97)	(56-62)	(41.5-48)	(13-14)	(128.5-138)
Average of fifteen fe- males from eastern U. S. and West Indies,	155.4	85.1	56.8	44.5	13.2	116.5
	(152-162)	(78-88)	(51-60)	(40-48)	(12-14)	(105-129)

From these measurements it is apparent that while the birds from northwestern America are a trifle larger than eastern specimens, the differences are very slight. One character of the western birds is quite apparent, however,—the greater length of the secondaries as compared with eastern birds, shown in the closed wing by the diminished space between the tip of the longest secondary and the tip of the longest primary. As shown in the accompanying table, there is almost no overlapping of measurements in this regard in the specimens examined by me. This difference was figured and described by Grinnell (1910, p. 388) in his description of *caurina*, and is constantly present in all the specimens examined by me. It seems to be, however, the only character that can be relied upon in separating the two races, for occasional eastern birds are as large as the largest western ones, and there are no differences in color or pattern.

***Dryobates villosus harrisi* (Audubon)**

Harris Woodpecker

Of fairly common occurrence at every point visited, except at high altitudes. Many were seen at Beaver Creek in June, including full-grown juvenals, which began to appear by the middle of the month. In the higher mountains, the Golden Eagle and King Solomon basins, in July, a few were noted, but they were not common. Seen almost daily at Nootka Sound, both on the Tahsis Canal and at Friendly Cove; and quite abundant in the woods at the head of Central Lake. At Errington, during September, they were common everywhere in the woods.

Compared with a series of hairy woodpeckers from southeastern Alaska the Vancouver Island birds are slightly smaller, and decidedly darker and more smoky on the ventral surface. None of the series shows the light-colored underparts distinguishing the former. In two specimens, no. 15664, Great Central Lake, August 23, and no. 15667, Errington, September 14, both adult males, the white dorsal stripe is very restricted, and streaked with black; in another, no. 15658, Errington, May 24, an adult female, it is distinctly barred. All three, as well as some others in the series, have flank markings, usually black

streaks, but occasionally ill-defined bars. This is an apparent approach toward the characters of *D. v. picoideus* of the Queen Charlotte Islands to the northward.

Wear and fading produces a great change in the color of the under parts, the extent of the difference being well shown in some molting birds. An adult male shot at Central Lake on August 24 (no. 15664) has nearly finished the annual molt, but has a patch of old feathers still remaining in the center of the breast. The color of this patch is about ecru drab; that of the rest of the under parts about no. 4 slate color.

Eighteen specimens were collected (nos. 15651–15668), from various points on the east and west coasts, and from the center of the island.

***Dryobates pubescens gairdneri* (Audubon)**

Gairdner Woodpecker

Apparently of rare occurrence in the region traversed. Two specimens were collected, an adult male secured by Miss Alexander at Parksville, April 26 (no. 15669), and an adult female taken by Miss Kellogg at the same place April 25 (no. 15670).

Noted subsequently on but one occasion, on May 28, when Miss Alexander saw a pair in the woods by the roadside between Parksville and Alberni.

Of the two birds collected the female shows but a few white spots on the wing coverts; the male has numerous spots on the coverts, and all of the remiges are conspicuously spotted on both webs. Both birds have the under parts smoke gray, of about the same tint as the Harris woodpeckers.

***Sphyrapicus varius ruber* (Gmelin)**

Red-breasted Sapsucker

Though looked for carefully at every point visited, this bird was noted on but two occasions, so the species would seem to be of rare occurrence on the island, at least during the summer months. Miss Kellogg found a nest at Beaver Creek, in a huge dead stump in the more open woods. This nest, on June 26, contained two young birds nearly ready to leave, and the carcass of a third, which had been dead several days. Both young and

the female parent were secured (nos. 15671-15673); the male was not seen at any time. The only other occasion on which the species was seen was at Errington, September 26, when one was shot in a cherry tree near our tent. This bird (no. 15674) is an immature female in first winter plumage, with a few juvenal feathers still lingering on the breast.

I searched carefully for the species at Nootka Sound, but failed to find it, though there were old sapsucker workings on trees in the woods. None of this work was at all fresh, and as the perforations are visible for years after they are made, they are of little assistance in determining the abundance of the bird. Old workings were seen at other points on the island also, at Great Central Lake, Golden Eagle Basin, and at Errington.

The Vancouver Island birds, as represented by the four specimens at hand, belong to the northern race of the red-breasted sapsucker, though they are not quite as deeply colored as are Alaskan birds. The color characters of the race are as strongly marked in the two young birds as in the adults. Compared with juvenals of *daggetti* from California the two young ones from Beaver Creek are much darker toned throughout, being decidedly sooty in appearance. One has the back almost uniformly black, there being only one or two tiny flecks of white, nearly hidden in the black feathers.

According to prevailing usage the name *ruber* is applied to the southern race of this sapsucker, but I think that the facts fully warrant its restriction to the northern subspecies. *Picus ruber* of Gmelin (1788, p. 429) was based on Latham's (1782, pp. 562, 563) description of the Red-breasted Woodpecker. I am indebted to Dr. C. W. Richmond for a manuscript copy of this description. It reads as follows:

"Somewhat less than the last. The bill is an inch long, and of a brownish horn-color: the head, neck, and breast, crimson: from each nostril is a line of buff, passing under the eye, where it finishes: the back part of the neck mixed with dusky: back and wings black: several of the lesser wing coverts, near the outside of the wing, are tipped with white, and others of the greater coverts have the outer webs white, making a streak of this color parallel to and near the edge of the wing: most of the scapulars marked with an obscure yellowish spot at the tip: the first quill feather black, marked on the inner web half way from the base

with round spots of white; the others spotted on both webs with white; the secondaries spotted on the inner web only: under wing coverts black and white mixed: the middle of the belly dusky yellowish white: the sides of this last color, mixed with dusky: the tail and legs were wanting.

“This specimen came from *Cayenne*, and is in the collection of *Capt. Davies*. ”

That this bird came from Cayenne was, of course, a mistake, but what grounds are there for arbitrarily assuming, as has been done, that it was procured from some point on the coast of California? None that I know of—at least I have seen no published information bearing on the subject—while there is much to be said on the other side.

First, to examine the evidence contained in the description itself, which is remarkably clear as to details. It is not often that descriptions of that date are so lucid as to be capable of application to any one of closely related forms of a species, but it seems to be so in this case. “The bill is an inch long.” Of sixty California examples of the red-breasted sapsucker at hand not one has a bill of that size. The average length in the males is about seven-eighths of an inch, or a little less; in the females it is smaller. Alaskan specimens have the bill almost precisely an inch long.

“Most of the scapulars marked with an obscure yellowish spot at the tip.” *Daggetti* has the back conspicuously variegated with *white*, sometimes overcast with yellowish, but frequently quite as extensively and clearly white as in *S. varius*. Birds from the northwest coast of California are darker, and those from Oregon and Washington still darker, but it is not until Vancouver Island is reached, and from there northward, that they are found with only obscure yellowish spots on the back. This describes the northern bird exactly.

“The first quill feather black, marked on the inner web half way from the base with round spots of white; the others spotted on both webs with white.” On most of the southern birds the first (outermost) primary is definitely white-spotted on the outer web. Sometimes there are only one or two spots near the base of the feather and sometimes it is clearly spotted to the very tip, but in only one or two instances in the extensive series at hand is there a total absence of white spots on the outer web.

The thirteen adult specimens at hand from Alaska and Vancouver Island all have the outer web of the first primary unspotted.

Thus in this description every detail which may be definitely referred to one race or the other points toward the northern form.

Latham's supplementary description (1787, p. 106) includes the tail, and it is on this that Suckow's *Picus ruber notkensis* is based.

All of the early accounts of the species that can be traced at all lead back to Captain Cook's statement of its occurrence at Nootka Sound. In view of Latham's description of the specimen from "Cayenne" being of a tail-less and legless bird, the following excerpts from Cook's (1784, 2, pp. 292, 293) narrative are of interest:

"As the season of the year was unfavorable to our gaining much knowledge of the vegetable productions of this country, so our own situation while there, put it out of our power to learn much about its animals. For as the want of water made it necessary that we should enter the Sound at first, the unforeseen accidents which happened afterwards, though they lengthened our stay, were rather unfavorable to our obtaining any knowledge of this kind. . . . The account, therefore, that we can give of the quadrupeds is taken from the skins which the natives brought to sell; and these were often so mutilated with respect to the distinguishing parts, such as the paws, tails, and heads, that it was impossible even to guess at the animals to whom they belonged; though others were so perfect, or, at least, so well known, that they left no room for doubt about them."

And again (1784, p. 296):

"Birds, in general, are not only rare as to the different species, but very scarce as to numbers; and these few are so shy, that, in all probability, they are continually harassed by the natives; perhaps to eat them as food, certainly to get possession of their feathers, which they use as ornaments. . . . Amongst some other birds, of which the natives either brought fragments, or dried skins, we could distinguish" etc.

All things considered, it seems to me that the name *ruber* should be applied to the northern race. If the evidence, as given above, is not considered conclusive, then the name should be discarded entirely, for there is absolutely nothing to connect it with the California bird. In any event, *Sphyrapicus varius*

daggetti Grinnell (1901, p. 12) should be the accepted designation of the breeding bird of California.

As to the specific distinction of *S. ruber* and *S. varius*, specimens showing various degrees of intergradation between *ruber* and *S. v. nuchalis* are of common occurrence. Coues (1903, p. 591) accorded *ruber* specific rank on the grounds that, although the males of the two species intergraded, the sexes were alike in *ruber* and different in *varius*, hence there was no intergradation in the females; but occasional females of *S. v. nuchalis* are very slightly, or not at all, distinguished from the males, which would seem to overcome that objection.

***Phloeotomus pileatus abieticola* (Bangs)**

Northern Pileated Woodpecker

Seen at Parksville, Errington, French Creek, Little Qualicum River, Alberni, and Central Lake. At most of these points not more than two or three birds were observed, and the species did not appear to be common at any point visited. None was seen at Nootka, nor anywhere in the higher mountains. Possibly six or seven were encountered in the vicinity of Errington at various times during September. They were usually wary and hard to approach, and as they remained much in the tops of the tallest trees, it was difficult to obtain specimens.

Wherever the birds were seen, sign of their work was also in evidence, particularly on rotten or charred trees, which often had large areas closely covered with punctures made by the woodpecker.

The pileated woodpecker of the northwest coast region has been separated by Bangs (1910, p. 79) as *Phloeotomus pileatus picinus*, type from Sumas, British Columbia, distinguished from *P. p. abieticola* by darker color, and restriction of white markings, especially on the throat. Most of our Vancouver skins are darker than specimens at hand from California, Minnesota, and Illinois, but they vary somewhat among themselves. A male and a female shot at Errington in September, in fresh winter plumage, are appreciably darker and more sooty than those taken in April and May. Some of the Vancouver birds have the throat purely and extensively white; in two it is mixed with a good

deal of dusky. We secured six specimens, four males and two females (nos. 15675-15680). There is not available sufficient material representative of typical *abieticola* to afford a basis for comparison.

***Colaptes cafer saturation* Ridgway**

Northwestern Flicker.

A common species at nearly every point visited. Miss Alexander reported them as abundant in the vicinity of Parksville in April. At Beaver Creek, in June, they were numerous, and by this time the young birds were out of the nests and scattered through the woods. Very few were observed in the Golden Eagle Basin, but on the summit of Mount Douglas, July 14-16, a number were observed. A few were seen at Nootka Sound, both on the Tahsis Canal and at Friendly Cove. At Errington, in September, the species was abundant, much more so than at any other point.

Thirteen specimens were collected (nos. 15681-15693). All show the dark coloration of *saturation* to a marked degree, but six of the thirteen exhibit markings similar to those encountered in *C. auratus*. No. 15683 has two yellow rectrices; nos. 15686, 15687 and 15689, all adult males, have more or less distinctly marked red nuchal crescents. No. 15691, juvenal female, has a well-defined nuchal crescent, and no. 15692, juvenal male, besides having such a mark, has a great deal of red on the anterior portion of the crown also. It is interesting that characters of *auratus* should appear so often in specimens of *cafer* secured in a region far distant from the point of junction of the two species.

***Chordeiles virginianus virginianus* (Gmelin)**

Nighthawk

Seen in the vicinity of Alberni at different times from June 14 to August 27, and at Errington in September, but nowhere else. Though the birds were observed every time I visited the town of Alberni, they were not seen at all at our camp on Beaver Creek, fifteen miles north of town. On one occasion one was heard calling at a point some three miles south of camp. None was seen in the mountains south of Alberni, nor at the head of

Central Lake, some thirty-five miles from the town, though the surface of the lake might be supposed to form an attractive feeding ground. Not met with at Nootka.

Although not common at Errington, some were observed nearly every evening during the first half of September. They appeared about dusk, hawking over the grain fields, and in diminishing numbers until September 15, when the last was seen. Though generally observed sailing about in the usual manner of the species, several were seen to alight on the ground, and from there to make occasional flights after passing insects, much in the manner of the poor-will. One of them when secured proved to be an immature bird, so it may be that the young nighthawks feed in this manner until their wings become strong enough to support them in more prolonged flights.

Four specimens were secured (nos. 15694–15697), two males and two females, an adult and an immature of each. The two adults, taken at Errington, August 29 and 30, are in worn breeding plumage, the male just beginning to molt, as shown by a few pin feathers on the forehead. The immature male differs from the adult principally in lacking the subterminal white tail band, and in having the white throat patch much obscured by black or brownish markings. The immature female differs from the other three birds in being much more ochraceous on all parts.

The adults are markedly different from any nighthawks available from more southern localities in the west. *C. v. hesperis* as illustrated by specimens from California, Oregon, and Nevada, is more grayish, while *C. v. henryi* from southern Arizona is decidedly more brown in general tone of coloration. The Vancouver birds are very dark colored, and are not to be distinguished from examples of *C. virginianus virginianus* at hand from Illinois and Wisconsin.

In defining the ranges of the western varieties of the nighthawk, our latest authority, the A. O. U. *Check List of North American Birds*, 1910 edition, states that *C. v. hesperis* occurs in southwestern, and *C. v. henryi* in southeastern British Columbia. If that is the case, *C. v. virginianus* has an interrupted range disappearing on the mainland of southwestern Canada to reappear on Vancouver Island. As it is stated to occur in southern

Yukon, it may, however, range from that point southward through British Columbia, nearly to the southern boundary of the province, where it is replaced by the other two forms, as stated. In all probability the migration route of the Vancouver Island nighthawk lies to the eastward of the coast ranges, as is the case with other species of somewhat similar distribution.

Cypseloides niger borealis (Kennerly)

Black Swift

Observed at most of the points visited. A single bird seen at Alberni on June 9, and a large flock at Beaver Creek on June 10. At Alberni, August 12 to 16, they appeared in numbers every evening together with the nighthawks. Large flocks were observed at Nanaimo, on June 17 and 30, circling about over some fields at the outskirts of the town. A few seen at Nootka Sound, on the Tahsis Canal, July 28, and at Friendly Cove, August 6. At Errington, in September, they were common, appearing at dusk with the nighthawks and circling about until after dark. They diminished in numbers before the middle of the month, and the last was seen September 20.

The presence of these birds, feeding in flocks in the lowlands of the region throughout the summer, would lead to the inference that they were breeding at higher altitudes nearby, but none was observed anywhere in the mountains. They were not seen otherwise than in flocks, nor did their actions at any time suggest the probability of their breeding in the immediate vicinity of the place where they were encountered. Usually they were circling about overhead, far beyond gunshot. One specimen was secured, an adult female (no. 15698), taken at Errington, August 30.

Chaetura vauxi (Townsend)

Vaux Swift

Fairly common at Beaver Creek in June, flocks being frequently observed feeding over marshy meadows in the vicinity. Not met with again until we reached Errington, in September. At this point small flocks were seen on various occasions early in the month, but all had disappeared before September 15.

***Selasphorus rufus* (Gmelin)**

Rufous Hummingbird

An abundant summer resident on Vancouver Island. Numerous in the vicinity of Parksville and Little Qualicum River in April and May, as reported by Miss Alexander and Miss Kellogg. At this time they were noted as frequenting thickets of gooseberry bushes. At Beaver Creek, in June, they were abundant everywhere. Many were seen in the Golden Eagle Basin. July 1 to 19, but mostly immature birds, only one or two adult males being observed.

This was one of the species of birds of which we were anxious to obtain a good series of specimens from Nootka Sound, but at the time of our visit there the adult males had already departed, and the females and immatures were becoming decidedly scarce. Mr. Smith told us that earlier in the summer they were quite abundant, and frequently to be seen hovering over the flowers in his garden.

The last hummingbird observed during the summer was one seen at the head of Great Central Lake on August 22. Thirty specimens were collected (nos. 15699–15728), nineteen adult males, five adult females, and six immatures. Seven specimens were taken at Nootka Sound.

***Nuttallornis borealis* (Swainson)**

Olive-sided Flycatcher

Seen and heard daily in the vicinity of our camp at Beaver Creek in June. They were not really abundant, but were scattered throughout the valley, individuals frequenting the same localities, frequently the same favorite perch, day after day, and though no nests were found they were undoubtedly breeding in the vicinity. The only other place where the species was observed was at the head of the Tahsis Canal, a single bird, apparently migrating, being seen on July 26.

Our failure to find the species at the other points visited on the island is rather strange, environmental conditions at these places being so very similar, and the bird being sufficiently conspicuous as not to be readily overlooked if present.

Three specimens were collected (nos. 15729–15731), a male and two females, all adults.

***Myiochanes richardsoni richardsoni* (Swainson)**

Western Wood Pewee.

Though fairly common at Beaver Creek and in the vicinity of Alberni during the time we spent at these points, it was seen nowhere else. Usually observed at the edge of clearings and meadows, and in more open places in the woods. The two specimens preserved (nos. 15732, 15733), adult male and female, are in no wise to be distinguished from others taken at more southern points.

***Empidonax difficilis difficilis* Baird**

Western Flycatcher

The range of the western flycatcher on Vancouver Island, as observed by us, presents certain points of interest, compared with its manner of occurrence farther south. In California *difficilis* is found in summer in high Upper Sonoran Zone and the lower part of Transition, a lower faunal area than that occupied by the *wrighti-griseus-hammondi* group of flycatchers. On Vancouver Island these conditions appear to be reversed. In midsummer *difficilis* was absent from the lowlands, where *hammondi* was breeding in some numbers, while we found it in the only high mountain locality we visited during the nesting season—a place where *hammondi* was not observed.

Specimens of *E. difficilis*, evidently migrants, were taken at the Little Qualicum River and at French Creek, at various times from May 8 to 18. At Beaver Creek, in June, I looked for it carefully, but without success, and the call-note of the bird is sufficiently loud and distinct to render it probable that it would have been noticed. At the Golden Eagle Basin, altitude 2200 feet, and on the surrounding mountains, it was quite common in July. It was a hard matter to get sight of the birds in the dense woods in that locality, but they could be heard calling incessantly.

A few seen at the head of the Tahsis Canal during the last week in July were probably individuals that had already begun to move from their breeding grounds, as were several others secured along the beach at Friendly Cove, the first week in August.

None was seen at any point visited subsequent to our departure from Nootka Sound on August 11.

Ten specimens were secured (nos. 15734–15743), taken at the Little Qualicum River, French Creek, and Friendly Cove.

***Empidonax trailli trailli* (Audubon)**

Traill Flycatcher

Breeding in numbers in the bottom lands at Beaver Creek. The numerous willow thickets in this locality constitute a suitable summer home for the species, and the call note was frequently heard, though the dense vegetation rendered it difficult to catch sight of the birds. About the town of Alberni, also, Traill flycatchers were noted on many occasions.

At the head of the Tahsis Canal, July 24 to August 1, several were met with, easily recognizable as they were calling continuously, but here again I was prevented from securing specimens on account of the impenetrable nature of the vegetation they frequented. These appeared to be migrants, and as none was observed at any point subsequently visited, they probably depart from the region rather early in the fall.

Five specimens were collected (nos. 15744–15748), four males and one female, all taken at Beaver Creek on dates ranging from May 31 to June 25. They are indistinguishable from comparable specimens from California.

***Empidonax hammondi* (Xantus)**

Hammond Flycatcher

An abundant species at many of the points visited. Many migrating birds taken in the vicinity of Parksville and French Creek in April and May, the earliest arrival noted being on April 29.

At Beaver Creek they were breeding in some numbers, at a slightly higher altitude than our camp. At this point the valley becomes more narrow, steep, and broken, rising up into higher hills beyond, and this change in the character of the country is accompanied by certain changes in the bird population. Our camp was about at the dividing line between the ranges of *E. hammondi* and *E. trailli*, and the abruptness with which one

species was replaced by the other was strikingly apparent in a walk along the trail.

The Hammond flycatchers remained almost altogether high up in the fir trees, where they could be heard calling continuously, but they were very difficult to see. In all respects their actions, habits, and manner of occurrence were exactly like those of *E. griseus* as observed in the mountains of southern California, and many of the call-notes also seemed to me to be exactly the same. They appeared to be quite regularly distributed throughout the region where they were observed, and, in a walk along the trail, pairs of the birds would be encountered at intervals of about three hundred yards. A female secured on June 20 (no. 15759) was evidently sitting on a full complement of eggs, judging from her denuded abdomen, but I failed to find the nest.

There were a few in the woods at the head of the Tahsis Canal, Nootka Sound, and an adult and two juvenals secured are sufficient indication of their breeding at this point. As an old bird was observed feeding the young ones secured, they were probably not long out of the nest. A few were observed at the head of Central Lake, but none secured.

I saw none at Errington when we arrived there, August 29, but they appeared a few days later; one was shot on September 3, and shortly after they became fairly common. The last was taken on September 20.

The three species of *Empidonax* encountered on Vancouver Island appear to occupy distinct areas during the breeding season. *Trailli* occurs in the lowlands of the southern part of the island, *difficilis* at high elevations—possibly of general distribution in the north—while *hammondi* occupies an intermediate zone. Our observations were not sufficient to demonstrate conclusively that this is the case, but the evidence certainly points in that direction. The sharply defined ranges of *hammondi* and *trailli* as observed at Beaver Creek, the replacement of both these species by *difficilis* at the higher elevations visited, and the occurrence of *hammondi* apparently as a migrant only in the lowlands around Errington, are all corroborative of such a view.

Twenty-nine specimens of Hammond flycatchers were secured (nos. 15749–15777): eighteen adults from Parksville, French

Creek, Errington, Beaver Creek, and Nootka; four juvenals, two from Nootka Sound, and two from Errington, September 3, 4 (these latter apparently migrating); six immatures, in fresh fall plumage, taken at Errington in September, and one adult female in fresh fall plumage, shot at Errington, September 4.

***Cyanocitta stelleri stelleri* (Gmelin)**

Steller Jay

A common species at most of the points visited. Found in greatest abundance about Parksville and Errington, and also at Alberni and Beaver Creek, being probably the commonest species of bird at the latter point. Very few were seen in the high mountains. At our camp in the Golden Eagle Basin a family of Steller jays hung about the camp daily, entering the cabins and stealing odds and ends of food, but only one or two were seen elsewhere in the vicinity.

We were particularly anxious to obtain a good series of jays from Nootka Sound, the type locality of the species, but found them unexpectedly rare, as I was told was the case along the whole west coast of the island. At our camp at the head of the Tahsis Canal in one week's time I secured one bird, and heard another calling in the distance. At Friendly Cove I was rather more successful, collecting eight specimens, but this was only through a special effort, following up every bird heard calling, and letting pass no opportunity of getting one. Not more than two or three were seen or heard in addition to the eight secured.

At Errington, in September, the jays were exceedingly abundant, particularly about the edges of the pastures and grain fields. Harvesting operations were in progress at this time, and a wheat field near our camp had just been cut and the grain piled in shocks. On those nearest the edges of the field, close to the shelter of the woods, the jays were feeding by scores; when startled most of the birds departed, carrying one or more long straws with them, to be thrashed out at their leisure in the nearby woods. Certain favorite stumps and logs were well covered with straws from which the grain had been eaten.

It seems probable that the partial settlement and cultivation of the country is favorable to the increase of the species, not so

much by diminishing the number of predaceous birds and mammals, for I doubt if these affect the jay population appreciably, but through the supplying of an abundance of food and more congenial surroundings. They certainly prefer partly cleared or fairly open woodland to the dark, uninterrupted forest, and this is, I believe, the main reason for their much greater abundance about the outskirts of civilization on Vancouver Island than on the densely forested west coast. At the latter point they were present in about the same numbers as on the coast of southeastern Alaska, where conditions are very similar.

Forty-nine specimens of Steller jays were collected during the summer (nos. 15778–15826), twenty-three summer adults, eighteen juvenals, and five adults and three immatures in fresh fall plumage. Most of the young were taken at Beaver Creek during June; none at any of the earlier camps. The Nootka series (nos. 15813–15821) consists of three adults and six young. The young birds (taken from July 28 to August 10) are all well advanced in the post-juvenal molt. The three adults (two shot on August 8, and one on August 10) are in fresh winter plumage. This seems to me to be a very early date at which to have completed the post-nuptial molt, but only one of the three has any pin feathers remaining, and this one but a few. The large flocks seen at Errington in September were all in perfect winter plumage.

I have compared the large series of Steller jays we collected on Vancouver Island with the Alaskan material in the Museum with much interest, especially so with the birds from the more southern Alaskan islands (Prince of Wales, Dall, etc.). I still (see Swarth, 1911, p. 78) do not see that we are justified in considering the Prince of Wales birds the same as *carlottae*. They are slightly larger than the average of typical *stelleri* (though well within the range of variation of the subspecies), and some individuals are, perhaps, a slightly deeper blue, but the differences are too slight and impalpable to warrant our considering these individuals as *carlottae* (see Osgood, 1905, p. 70) and thus extending the range of this subspecies over *part* of an island (widely separated from the rest of its habitat), when there is nothing to hinder its occurrence over the rest of this and on adjacent islands.

Winter-plumaged examples of *stelleri* from Vancouver Island, especially the three adults from Nootka Sound, are quite as dark colored as the darkest of the birds from the southern Alaskan islands.

MEASUREMENTS OF SERIES OF *Cyanocitta stelleri* FROM VARIOUS POINTS ON
THE NORTHWEST COAST

	No.	Wing	Tail	Culmen	Tarsus
Three adult males from Nootka	15818	150.0	141	30	42
Sound,	15819	150.5	137	30	41
	15820	148.0	138	31	45
Average of seven males from various points on Vancouver Island,		148.6	140.1	30.5	42.6
Average of four males of <i>C. s. carlottae</i> from Queen Charlotte Islands (Ridgway, 1904, p. 354),		156.2	.....	30.4	48.0
Average of four males from Prince of Wales and Dall islands, Alaska,		152.9	142.2	31.1	46.5
Average of six males from Baranof and Admiralty islands, Alaska,		148.7	137.5	30.7	43.5
Average of five males from Prince William Sound, Alaska,		148.2	136.2	30.3	41.1

Perisoreus obscurus obscurus Ridgway

Oregon Jay

In the summer, at least, a resident at high altitudes only, and of rather uncommon occurrence. We first met with the species in the mountains south of Alberni. On July 3 Despard saw several on the trail below King Solomon's Basin, and again, July 9, on Mount Douglas. On July 15 we were together on Mount Douglas, when he killed a bear. While we were engaged in skinning the animal, entirely hidden by the surrounding trees and underbrush, a flock of Oregon jays suddenly appeared, to feed on the refuse. There were five in all, a pair of adults and three young ones, evidently a family gathering. The species was not again met with until August 18, when several were seen flitting through the shrubbery at the edge of Great Central Lake. A few days later, August 21, three were secured on the mountain slope above Della Lake, at an altitude of about 4000 feet. On September 8 a flock of four or five individuals was seen in a dark cañon on the north side of Mount Arrowsmith.

On the few occasions we had to observe them, the Oregon jays

showed the absolute indifference to human presence that is so characteristic of the genus. They were not seen until almost within arm's reach, dropping silently about us from the trees like huge, feathery snowflakes. They had, however, a disconcerting way of keeping on about their own business and were not to be distracted by appeals to their curiosity, such as are so successful with *Cyanocitta* and *Aphelocoma*. Thus the flocks observed at Great Central Lake and below Mount Arrowsmith were evidently traveling somewhere, and though they suddenly appeared within a few yards of where we were sitting, they disappeared, fading away, before we realized it, and were not to be recalled by any amount of "squeaking," such as would bring the Steller jay back, headlong, to investigate.

Eight specimens were preserved (nos. 15827-15834), two adults and three juvenals from Mount Douglas, July 15, and two adults and one juvenal from Della Lake, August 21. The adults were all undergoing molt, showing patches of old and new plumage. The three young birds from Mount Douglas are in the juvenal plumage purely; the one from Della Lake is in the midst of the post-juvenal molt.

Compared with a large series from Humboldt Bay, California, the Vancouver Island birds are decidedly larger, with especially larger bills, being nearly the size of *P. o. griseus*, of the interior. The type locality of *P. o. obscurus* is Shoalwater Bay, Washington, almost exactly midway between the points where these two series of jays were collected. The measurements of typical *obscurus*, as given by Ridgway (1904, p. 372) are intermediate between those of the two series at hand, and it is probable that the Vancouver Island birds and the Humboldt Bay birds, taken at the extreme north and south points of the known range of the species, represent the extremes in size. I cannot detect any color differences between the specimens from the two regions.

MEASUREMENTS OF THE VANCOUVER ISLAND ADULTS

No.	Sex	Wing	Tail	Culmen	Tarsus
15830	♂	140	132	22	34
15832	♂	140	131	21	35
15831	♀	138	136	20	33
15833	♀	142	135	....	34

AVERAGE OF FOUR ADULT MALES FROM HUMBOLDT BAY, CALIFORNIA

Wing	Tail	Culmen	Tarsus
133.75	123.37	18.25	30.87

AVERAGE OF FOUR ADULT FEMALES FROM HUMBOLDT BAY, CALIFORNIA

132.25	124.0	18.25	31.12
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***Corvus corax principalis* Ridgway**

Northern Raven

Nootka Sound was the only place where ravens were seen in any numbers. Here, both at Friendly Cove and on the Tahsis Canal, they were very abundant, feeding in flocks on the mud flats and along the beaches. Two specimens were secured on August 1, juvenals, molting into the first winter plumage (nos. 15835, 15836).

At Beaver Creek a few were seen at different times during June, probably not more than five or six altogether. They were not observed elsewhere.

***Corvus brachyrhynchos caurinus* Baird**

Northwestern Crow

Common everywhere near salt water but not observed at any point very far inland. Miss Alexander saw them at Parksville, April 25, and I met with them in numbers at Nanaimo, on June 8. At Nootka Sound there were numerous good-sized flocks feeding on the mud flats at low tide, frequently in company with the ravens.

The only inland point where crows were met with was at our camp near Errington, about five miles from the coast. Early in the morning of September 26 large flocks, numbering probably several hundred individuals, suddenly appeared and settled on the trees in the vicinity. After a stay of several hours they departed, but as they flew directly northward this can hardly be considered as indicative of any regular migratory movement.

***Agelaius phoeniceus caurinus* Ridgway**

Northwestern Redwing

Miss Kellogg shot five red-winged blackbirds, three males and two females (nos. 15837–15841) on the Little Qualicum River,

May 9 and 10. They were evidently breeding, the ovaries of the females containing well-developed eggs, but the five birds secured apparently formed the entire colony as they were all that were seen. The species was not encountered at any other point.

The specimens secured have the extremely slender, sharp-pointed bill characteristic of the race *caurinus*, and appear to be typical examples of that form.

***Sturnella neglecta* Audubon**

Western Meadowlark

A fairly common species in the more settled portions of the southeastern part of the island, and to a lesser degree as far west as Alberni. Seen in the fields about Parksville on numerous occasions in May and June.

In the Beaver Creek Valley, extending some fifteen miles north of Alberni, there are scattered tracts of cleared land, some under cultivation, others formerly cultivated but now abandoned. Meadowlarks occur in small numbers to the limit of these open places. Most of these tracts were cleared but a few years ago, and I was told that the birds appeared after the land was deforested. In all probability this is what has happened over the entire range of the meadowlark on Vancouver Island. Before the settlement of the region by white men, there could have been but very small areas sufficiently free from forests to support the species, whereas the clearing of the land for farming purposes has undoubtedly enabled it to establish itself on the island, and to extend its range yearly.

At Errington, in September, a flock of thirty or forty frequented some grain fields in the vicinity of our camp, where they were seen daily. They were exceedingly wary and unapproachable and I had difficulty in obtaining specimens.

In all, eleven meadowlarks were secured (nos. 15842-15852), five in April and May, and six in September in fresh fall plumage. They are quite indistinguishable from comparable specimens from various parts of California, environmental differences apparently having been so far unable to produce any appreciable modifications of color or markings. These birds, in a region whose climate is supposedly productive of the dark

style of coloration seen in many of the forms occurring therein, are not to be distinguished from others of the species residing in the most arid parts of North America. The transplanting of this species to altered surroundings has not been immediately followed by the appearance of those adaptations supposedly most advantageous to the inhabitants of the region. In other words, the coloration of this bird appears to be an inherent, deep-seated character, and one that surrounding conditions have not directly affected.

***Euphagus cyanocephalus* (Wagler)**

Brewer Blackbird

A common species on the east side of Vancouver Island, especially in the vicinity of settlements and clearings. A very few were seen near Alberni, but on the west coast they appeared to be entirely absent, for none was observed. A breeding colony was discovered in a swamp near Errington on May 20; the several nests examined at this date all contained young. One nest was placed in a bunch of grass at the edge of a ditch, and others were up in the bushes.

I revisited this place in September, and saw flocks of blackbirds almost daily. They were then feeding in nearby grain fields which had just been harvested.

At Beaver Creek, in June, there were a few scattered pairs breeding in pasture land in the vicinity, but no colonies. From the solicitude shown by the old birds when we appeared in their vicinity it was evident that they had young somewhere near, but we did not discover any nest.

Fifteen specimens of Brewer blackbirds were collected (nos. 15853–15867), four adult males, six adult females, four juvenals, and one immature female in first winter plumage.

***Pinicola enucleator flammula* Homeyer**

Kadiak Pine Grosbeak

Seen at only one point, on the ridge leading up to Mount Douglas, at an altitude of about 4200 feet. Early in the morning of July 15 I heard one singing in a tree top near camp, but he ceased before his exact whereabouts could be ascertained. Later in the day a single bird was seen sitting on the top of a scrubby

little fir tree, such as are scattered all along the ridge, and, with a little trouble, was secured. An hour or two later another was observed in a similar location, but was too wary to be approached. They did not appear to be feeding, but sat quietly on the tree tops, giving utterance to an occasional low whistle. These three were all that were observed.

The specimen secured (no. 15868) is a male in juvenal plumage, just beginning to molt into first winter plumage. It is rather a dark colored bird, compared with the juvenals of *P. e. californica* at hand, but the distinguishing feature of the specimen is the large, swollen bill. In this, as well as in other respects, it is indistinguishable from comparable examples of *P. e. flammula* from the coast of Alaska, to which race it is apparently to be referred.

While the capture of this young bird does not in itself constitute a breeding record, it makes it seem highly probable that the species does breed in some parts of the island. This is far south of the breeding range of *flammula* as defined heretofore, but a pine grosbeak breeding on Vancouver Island would, reasoning from analogy, be more apt to be related to the bird of the Sitkan district of Alaska, directly to the northward, than to the one residing in the interior of British Columbia.

***Carpodacus purpureus californicus* Baird**

California Purple Finch

A fairly common species on the east side of Vancouver Island, but not seen on the west coast. The second week in May, on the Little Qualicum River, male birds were observed, singly, sitting in the tree tops singing. Two females collected at this time by Miss Alexander contained eggs in their oviducts. At Errington, in September, small flocks and single birds were seen from time to time throughout the month, usually feeding in clumps of willows.

Fifteen specimens were collected (nos. 15869–15883). Eight are adult males, two are breeding males, but in the brown, streaked plumage, four adult females, and one an immature female in first winter plumage. In both sexes the colors are appreciably darker than in most California examples of the

species; the red in the adult males more intense, the ground color of the females more olivaceous. Occasional California specimens, however, are not to be distinguished from the Vancouver birds.

***Loxia curvirostra minor* (Brehm)**

Crossbill

Common at many of the points visited. Miss Alexander and Miss Kellogg collected a number of specimens at Parksville and Errington, in April and May, when they were gathered in large flocks. A few were seen at Beaver Creek from time to time in June, but they were not abundant. At the Golden Eagle Basin, in July, they were quite numerous, gathered in flocks of old and young together, but usually feeding in the tree tops, where they received the benefit of the sunshine, and seldom descending to the ground below where the sun's rays rarely penetrated. None was seen either at Nootka Sound or at Great Central Lake, but this was probably fortuitous, as the species is in all probability of general distribution over the island. A few were noted at Errington, during September, but not in any numbers.

Although at the Golden Eagle Basin they were feeding almost exclusively in the tree tops, at other points they frequented the ground. Near Parksville they were frequently observed on the beach, sometimes in the sand or gravel, or in the beach grass, and sometimes feeding in the drifted kelp. At Errington some were shot with their mouths filled with mud and sand, and at Beaver Creek a small pile of gravel under the shelter of a barn on an abandoned ranch, was an attraction that was visited daily by crossbills.

If *Loxia curvirostra sitkensis* Grinnell (1909, p. 223) turns out to be a recognizable form it will probably prove to be restricted to southern Alaska, for I do not see how the Vancouver Island crossbill can with certainty be distinguished from birds from eastern North America.

The expedition collected ninety-two specimens (nos. 15884-15975), of which fifty-seven are adult males, twenty-two adult females, and thirteen juvenals. Of the old males about one-half are rather brilliantly red, quite as much so as those from eastern points. The others are variously greenish-yellow, orange, or

parti-colored, some of them quite similar to some of the Alaskan birds on which the description of *silkensis* was based. Possibly further collecting will produce Alaskan crossbills in the bright red plumage, but however that may be, no color difference can be maintained to exist between Vancouver Island and eastern birds, nor do I find that there are any notable differences in the measurements of specimens from the various regions.

The duller colored, presumably younger, males, show considerable variation. Some are quite uniformly dull red or orange, while others have the body plumage of about the greenish yellow color of the female, but interspersed with patches of quite brilliant red. It accordingly seems possible that the brightest plumage may be acquired through a single change, rather than after a series of molts into successively brighter red plumages.

One bird with many red feathers in the greenish yellow body plumage, still retains on the abdomen the streaked feathers of the juvenal plumage. Two adult females also have similar tracts of juvenal feathers still lingering. Several males shot during April and May, and early in June, are undergoing a slight molt about the head and neck. One bird with comparatively few yellow feathers in the red plumage, is nevertheless acquiring additional yellow ones by this change.

Streaked young were taken in April, May, June and July. One shot at Parksville, May 4, is already changing into first winter plumage.

MEASUREMENTS OF *Loxia curvirostra minor* FROM VANCOUVER ISLAND

	Wing	Tail	Culmen	Depth of bill	Tarsus
Average of ten	86.36	49.38	15.75	9.05	15.39
adult males,	(83.8-90.0)	(46.0-51.8)	(15.0-17.0)	(8.5-9.8)	(14.0-16.0)
Average of ten	82.49	46.65	14.77	8.5	15.53
adult females,	(79.0-85.2)	(44.5-50.5)	(14.0-16.8)	(8.0-9.0)	(14.2-16.8)

***Spinus pinus* (Wilson)**

Pine Siskin

Fairly common, and observed at nearly every collecting station except at Nootka Sound. Specimens were collected at several points on the east coast—Parksville, Errington, and Little

Qualicum River. Two stubby-tailed juvenals collected at Errington on May 25 were evidently not long out of the nest, and had undoubtedly been hatched in the immediate vicinity. Toward the west side of the island they became less common, but in the Golden Eagle Basin (altitude 2200 feet) it was one of the few species of birds that were fairly abundant.

A solitary siskin seen feeding on a snowbank (probably on seeds blown from adjacent shrubbery), on the mountain side above Della Lake (about 4000 feet), August 20, was noteworthy as being one of just three species of birds seen during a half day's hunt, the other two being the white-tailed ptarmigan and buffle-head duck.

Nine specimens were preserved (nos. 15976-15984), five adults and four juvenals.

***Calcarius lapponicus alascensis* Ridgway**

Alaska Longspur

Seen only at Errington. First observed on September 15, and thereafter, in small companies of six or eight, on various occasions up to the end of the month. They frequented the stubble fields in the vicinity, and were rather shy and difficult to approach, so much so that I failed to secure any specimens.

***Passerculus sandwichensis savanna* (Wilson)**

Savannah Sparrow

Abundant as a migrant, but observed nowhere under circumstances that led us to believe they were breeding. Numerous in the spring in the fields about Parksville, Little Qualicum River, and French Creek, evidently migrating; and specimens were taken at various times up to May 19. None seen in midsummer at any point.

There were none at Errington upon our arrival there August 28, but on September 6-8, when we ascended Mount Arrowsmith, we found them in numbers on the heather-covered slopes near the summit. There was a heavy storm at this time, September 7-9, and immediately thereafter the Savannah sparrows began to appear in the fields about Errington. By the end of the month

they were exceedingly abundant. Thirty specimens were preserved (nos. 15985-16014), twenty-two being spring adults, and six immatures and two adults in fresh winter plumage. They are precisely like birds from the coast of southeastern Alaska; in all probability most of them are migrants from that region. As already pointed out by Grinnell (1909, p. 227) and myself (1911a, p. 85), the Savannah sparrow of the northwest coast is practically indistinguishable from *P. s. savanna* of eastern North America, and I continue to use this name for the form. The additional material obtained does not furnish obvious means of distinguishing the races, and I am unable to do so; from *P. s. alaudinus* these coast birds are widely different, and should not be lumped under the same name.

***Zonotrichia leucophrys gambeli* (Nuttall)**

Intermediate Sparrow

Seen at Errington in September, evidently migrating. The first was taken on September 17, and for a short time thereafter a few could usually be found in thickets and brush piles about the edges of the cleared fields. Nearly all had disappeared before the end of the month. Two specimens were preserved (nos. 16015, 16016), an adult female and an immature male.

***Zonotrichia leucophrys nuttalli* Ridgway**

Nuttall Sparrow

A common species on the east coast of Vancouver Island, but observed nowhere on the west side. In driving between Nanaimo and Alberni, as I had occasion to do several times during the summer, the Nuttall sparrows were conspicuous along the roadside to a point a little beyond Parksville, some thirty miles north of Nanaimo, but soon after the road turned to the westward they ceased to be seen.

Though no nests were found the species was undoubtedly breeding in this region. A female collected by Miss Alexander at French Creek, on May 13 (no. 16024), is entered in her notebook as containing eggs in its oviduct. None were seen during June, July and August, spent on the west side of the island, and

when we returned to the east coast, in September, they apparently had migrated, an immature male, shot at Errington, September 9 (no. 16027) being the only one noted. A day or two later a few white-crowned sparrows began to appear in the thickets but all that were shot proved to be *gambeli*, evidently just arriving from the north. This would indicate that *nutalli* was a summer resident only, in the region.

Eleven specimens were preserved (nos. 16017–16027), ten in summer plumage and one immature male in first winter plumage.

***Zonotrichia coronata* (Pallas)**

Golden-crowned Sparrow

Evidently a common migrant on Vancouver Island. Seen in the vicinity of Parksville in April and May, and at Errington in September. Six specimens taken by Miss Alexander and Miss Kellogg at Parksville and the Little Qualicum River (nos. 16028–16033), the last on May 10, were all females, possibly an indication that the males had already passed through.

Common at Errington the latter part of September. First seen on September 13 and thereafter observed daily in the thickets and brush piles. Two immature females in first winter plumage secured (nos. 16034, 16035). They were still abundant when I left, at the end of September, though the white-crowned sparrows had nearly all gone.

***Spizella passerina arizonae* Coues**

Western Chipping Sparrow

Four adults taken at Parksville in April and May (nos. 16036–16039), where the species was probably breeding. It was not seen anywhere on the west side of the island, though there was no obvious reason why it should not occur about Alberni, environmental conditions being very much as they were on the east coast, and apparently quite as favorable.

Subsequently met with only at Errington, where, on September 18, a number suddenly appeared, apparently migrating, and one in juvenal plumage was secured (no. 16040). They disappeared as quickly as they came, and were not seen again.

The five specimens secured, both adult and juvenal, are not

to be distinguished, either by coloration or size, from comparable specimens from California.

***Junco oreganus oreganus* (Townsend)**

Oregon Junco

Juncos were found in abundance at every point visited, except Nootka Sound, where none was seen. That they occur here, too, however, is evident from the description given by Captain Cook (1784, p. 297) of a finch seen at this point in April, 1778. Full-grown juvenals were taken at Errington the last week in May; and at Beaver Creek in June, they were in evidence everywhere. Juncos were fairly common in the Golden Eagle Basin in July, frequenting the willow thickets and underbrush in the comparatively open "Basin," though but seldom seen in the dense woods of the cañons below. A number were seen on Mount Douglas (4200 feet), July 14, and a nest was found containing four eggs. It was just off the ground, in a mass of heather, and completely hidden in the vegetation.

Juncos were abundant at Errington throughout September, gathered in large flocks, composed principally of young birds, which by this time had assumed the first winter plumage.

The breeding junco of Vancouver Island has been referred to *J. o. shufeldti* (see Ridgway, 1901, p. 285), but I cannot with certainty distinguish our series (sixty-one specimens—nos. 16041–16101) from breeding birds of *J. oreganus oreganus* taken in southern Alaska. Selected Alaskan specimens have the brown and vinaceous areas somewhat more richly colored than any of the Vancouver Island birds, and certain of the latter have those areas less rufescent than any of the Alaska birds, but many specimens in the two series are quite indistinguishable. Furthermore, September birds from Alaska and from Vancouver Island, in fresh fall plumage, unworn and unfaded, are precisely alike. It may be argued that birds taken on Vancouver Island in September might have migrated from points farther north, but there is an adult male in the series (no. 16091, Great Central Lake, August 24, 1910), in the midst of the molt, and obviously not a migrant, which is acquiring a plumage as dark as fall examples of *oreganus* from Alaska.

Winter specimens of *shufeldti* from southern Arizona, aside from the color differences distinguishing them from the series under discussion, are appreciably larger, or at least have considerably longer wings. There is no size difference between the Alaska and Vancouver Island birds.

It seems more reasonable to regard as *shufeldti* (a pale colored bird with a long wing) the form inhabiting the more arid interior of British Columbia, forced by the severe winter climate to migrate far southward; and as *oreganus* the breeding bird of the humid coast region, south to include Vancouver Island.

This is the course adopted by Mr. Frank M. Chapman in his treatment of the juncos contained in the collection of British Columbia birds reported upon by him (1890, pp. 145-146); and it is certainly to be expected that the junco of this coast region should be more nearly like the southern Alaska race, climatic and environmental conditions being so nearly similar, than that it should resemble the bird from the widely different interior of British Columbia.

Melospiza melodia rufina (Bonaparte)

Rusty Song Sparrow

Abundant everywhere except in the high mountains. The numerous water courses, lakes and swamps, with the profusion of sheltering underbrush, both characteristic of Vancouver Island, provide ideal surroundings for song sparrows, and we found them in numbers at almost every point visited. At Parksville, the last week in April and early in May, females were taken which contained eggs nearly ready to be laid, and at the Little Qualicum River, a nest built in a rose-bush was found on May 11, with three small young. Another nest with young, possibly a second brood, was found at Beaver Creek a month later, June 12. Young birds taken at Nootka Sound during the last week in July are just beginning the post-juvenal molt; those taken at Errington, in September, are, with the exception of one or two shot early in the month and still showing traces of the juvenal plumage, in complete first winter plumage.

Adults taken at Nootka between July 24 and August 11 are mostly in the midst of the annual molt. One or two, in exceed-

ingly worn plumage, have hardly begun to change, and one, shot on July 28, is nearly through.

At every point visited on the east coast, song sparrows were found in numbers in suitable places. At Beaver Creek and around Alberni they were also very abundant. In the Golden Eagle and King Solomon basins, in July, I saw quite a number, mostly full-grown young, but I am inclined to believe that these birds were wanderers from the lowlands, and that they were not hatched at that altitude.

At Nootka Sound, both on the Tahsis Canal and at Friendly Cove, they were very abundant, one of the few species that was really common at these points. None was seen at the head of Central Lake, nor in the high mountains beyond. At Errington, in September, they were present throughout the month.

Song sparrows were collected in some numbers at every point where they were encountered, the resultant series amounting to 148 specimens (nos. 16102-16245, 16683-16686). Of these, ninety-seven are summer adults, thirty-eight juvenals (four in alcohol), and nine immatures and adults in fresh winter plumage. The post-nuptial and post-juvenal molts are fully illustrated. After careful comparison of these birds with a series of forty specimens of the breeding form of song sparrow of southeastern Alaska, I am quite unable to perceive the differences supposedly distinguishing *morphna* from *rufina* (see Ridgway, 1901, p. 373), and have consequently referred the Vancouver Island birds to the latter form.

Certain individuals in the Alaskan series show a decided tendency toward the characters of *caurina*, and are thus quite different from any of the Vancouver Island specimens, but taking the majority of the skins from the two regions, and comparing birds of the same stage of plumage, so far as I can see there are no discernible differences in color or markings. This is true of the juvenal plumage as well as the adult.

The measurements of the two series are as follows:

	Wing	Tail	Culmen	Tarsus
Average of eight males from southeastern Alaska,	68.37 (66.0-71.2)	63.75 (60.5-68.0)	12.34 (11.5-13.0)	23.0 (22.0-23.5)
Average of eight males from Vancouver Is- land,	66.04 (64.0-68.8)	64.9 (62.0-67.0)	11.85 (11.0-12.8)	21.87 (21.0-22.5)

Melospiza lincolni gracilis (Kittlitz)

Forbush Sparrow

Surprisingly rare. This species should occur as a common migrant throughout the region, but it was encountered by us on only two occasions. Miss Kellogg secured an adult male at Parksville on April 26 (no. 16246), and I shot an immature male in first winter plumage, at Errington, on September 11 (no. 16247). These are indistinguishable from comparable Alaskan specimens.

Passerella iliaca fuliginosa Ridgway

Sooty Fox Sparrow

Encountered at just two of our collecting stations and in very limited numbers. Evidently breeding in the mountains south of Alberni. They were seen and heard singing on the brush-covered slopes surrounding the Golden Eagle and King Solomon basins, and a few were noted in the willow thickets along the creek bottom, but they never ventured into the dense forests below. On Mount Douglas, July 14-16, several were heard singing in the brush just below the ridge. They were very shy, and clung to the thickets of dense underbrush, so that it was difficult to get sight of one. Singing birds were usually perched on a projecting branch, about the center of an impenetrable thicket of salmon-berry or alder, into which they plunged at the first intimation of danger.

At Nootka Sound, the only other place where they were observed, a few were seen at the head of the Tahsis Canal, and also at Friendly Cove. Although at every opportunity special efforts were made to obtain specimens, I succeeded in killing only four birds, two males in juvenal plumage, at the Golden Eagle Basin, July 13 (nos. 16251, 16252), and two females at Friendly Cove, one (no. 16254, August 10) in juvenal plumage, the other (no. 16253, August 4) in first winter plumage. It is rather singular that none was seen on the east side of the island, where it might be expected to occur, at least as a common migrant.

There is some variation in the three juvenals, one of them being appreciably darker than the other two, but all three are

much darker colored and more heavily marked than any juvenal example of *townsendi* at hand. The one in winter plumage is of intensely deep coloration, about clove brown on the head, and very slightly more castaneous on the lower back. The lateral under surface of the body and the spots on the breast are also dull and sooty, with hardly an indication of reddish. It is markedly different from examples of *townsendi* in corresponding plumage.

***Passerella iliaca insularis* Ridgway**

Kadiak Fox Sparrow

A single specimen, an adult female, taken by Miss Alexander at Parksville, April 26 (no. 16255). It was caught in a mouse trap, and was the only one of the species secured.

***Passerella iliaca townsendi* (Audubon)**

Townsend Fox Sparrow

Two specimens taken by Miss Alexander at Parksville, April 26 and 28, were evidently migrants. The species was not again encountered until September 24, at Errington, when two fox sparrows were seen. The one secured proved to be of this subspecies. These two were the only ones noted in September, though they might be supposed to migrate commonly through the region. Possibly they pass through at a somewhat later date.

The three birds from Vancouver Island (nos. 16248-16250) are typical examples of *townsendi*, as compared with specimens from southeastern Alaska.

***Pipilo maculatus oregonus* Bell**

Oregon Towhee

An abundant species on the east coast of Vancouver Island. Many were seen and specimens collected at all the various points visited from Nanaimo to Alberni—Parksville, Errington, French Creek, and Little Qualicum River. At Nootka the towhees were absent, together with many other common east coast birds.

In the vicinity of Beaver Creek and Alberni, in June, they were fairly numerous in the shrubbery, and at this time many young ones began to appear. At Errington, in September, they were also quite common.

This is a species that must have increased in numbers and greatly extended its range on the island with the settlement of the region. It was observed almost exclusively in the neighborhood of civilization, in the brushy second growth on abandoned clearings, in pastures, along the edges of fields, and in bushes by the roadside. None was seen anywhere in the more dense forests, or very far from human habitations.

Thirty-five specimens were collected (nos. 16256–16290), of which twenty are breeding adults, four in juvenal plumage, and eight immatures and two adults in fresh fall plumage. An adult female taken on September 5 is still in the old, abraded summer plumage, having hardly begun to molt, though others shot at the same time are in the fresh, winter plumage throughout.

In the darkest colored males the white markings of the upper parts are so reduced in size and number as to be hardly noticeable; the wing bars reduced to a row of small, disconnected spots, and the scapular markings nearly hidden under the feathers.

Zamelodia melanocephala (Swainson)

Black-headed Grosbeak

Observed with certainty only in Albern Valley, though it may be supposed to occur throughout the southern and eastern portion of the island. In the vicinity of our Beaver Creek camp, during June, several were seen or heard singing at various times, probably not more than eight or ten individuals being noted altogether. They frequented the willow thickets along the stream, where they were undoubtedly breeding. Three specimens were secured at this point, two males and a female, all breeding adults. They exhibit the same characters as California examples of the species, rather than those of the Rocky Mountain birds, having the relatively small bill and, in the males, the post-ocular stripe commonly found in the former.

Piranga ludoviciana (Wilson)

Western Tanager

Met with at Albern Valley and in the adjacent Beaver Creek Valley during June. They were not abundant, but were only occasionally observed or heard singing in the tree tops. That the species

breeds in the region is shown by the fact that the ovary of a female bird collected June 4 contained partly developed eggs. Two were seen at Errington, one on August 31, the other on September 13. Three specimens were collected, an adult male and female (nos. 16294, 16295) and an immature male in first winter plumage (no. 16296).

***Progne subis hesperia* Brewster**

Western Martin

At Nanaimo, on several occasions during June, western martins were seen in considerable numbers circling over the city, or sitting on telegraph poles or on the roofs of the buildings, where they were probably breeding. Not observed at any other point.

***Hirundo erythrogastra palmeri* Grinnell**

Western Barn Swallow

Evidently a common summer visitant. Seen in numbers about Parksville and Errington, and also at Alberni, almost invariably in the vicinity of human habitations. A barn near the Little Qualicum River, and one at Errington, held many nests; at Alberni the bridge across the river south of town sheltered numerous pairs. No barn swallows were noted at Nootka, nor in any of the wilder regions visited.

The seven specimens collected (nos. 16297–16303), four males and three females, all breeding adults, are precisely like birds from southern Alaska, and together with these exhibit the intensely deep rufous coloration below, and the broad, deeply colored band on the forehead, characteristic of the western barn swallow as compared with true *H. e. erythrogastra* of eastern North America. The differences between these two forms are at least as well marked as those in several others given general recognition.

***Tachycineta thalassina lepida* Mearns**

Northern Violet-green Swallow

A common species at most of the points visited during the summer. Many were seen and specimens collected at Parksville and Errington in April and May, and at Alberni and Beaver

Creek in June. At the latter point the numerous dead stubs standing everywhere in the woods, results of a forest fire of a previous year, afforded an abundance of nesting sites, and the swallows were frequently seen entering holes therein. A number were seen flying about in the streets of Nanaimo, in June. They were entirely absent from the higher mountains visited at the head of China Creek, and above Great Central Lake.

A few were observed at the head of the Tahsis Canal the end of July, the last that were seen. The species probably leaves for the south before the end of August, for none was observed at Errington in September when other migrants were passing through in numbers. Eleven specimens were preserved (nos. 16304-16314), all adults in breeding plumage.

***Stelgidopteryx serripennis* (Audubon)**

Rough-winged Swallow

Several were seen on June 8 flying about a cut on the road between Nanaimo and Parksville. In the vicinity of Alberni they were fairly common, particularly along the nearby river. At this point, on July 21, many young birds were seen perched upon the telegraph wires stretched across the stream, where they were being fed by their parents.

One specimen was preserved (no. 16315), an adult male taken by Miss Alexander at French Creek on May 13.

***Bombycilla cedrorum* Vieillot**

Cedar Waxwing

Seen in some numbers in the town of Alberni, but not met with elsewhere in the vicinity. I visited the town on numerous occasions in June, July and August, and never missed seeing cedar waxwings in the shade trees along the streets, or in the shrubbery in the gardens, but we never met with them in the wilder surrounding country. Seen at various points on Nootka Sound. On the Tahsis Canal several small flocks were seen during the last week in July. At Friendly Cove single birds and small flocks were noted almost daily. Most of these were in the trees and bushes in the more open spots about the houses, but one or two flocks were seen in the tops of cedar trees in the

dense woods. One shot in such a place was found to have its stomach filled with small beetles.

Two specimens of the cedar waxwing were preserved (nos. 16316, 16317), both adult males taken at Friendly Cove. They did not appear to be breeding birds.

***Vireosylva olivacea* (Linnaeus)**

Red-eyed Vireo

An adult male (no. 16318) secured by Miss Kellogg at Beaver Creek on June 24. This was the only one of the species definitely identified, but at Alberni on June 9, and again on July 21, I heard notes that I believe were uttered by this vireo. The one secured had every appearance of being a breeding bird.

***Vireosylva gilva swainsoni* (Baird)**

Western Warbling Vireo

One specimen taken at Parksville, May 3. At Beaver Creek it was fairly common, usually observed in the willows and alders along the banks of the streams. The only other point where it was met with was at Errington, where one was secured on September 13. Four specimens in all were taken (nos. 16319–16322), three adult males in breeding plumage, and an immature female in first winter plumage.

***Lanivireo solitarius cassini* (Xantus)**

Cassin Vireo

Not observed on the west side of the island. One was taken at French Creek, May 19 (no. 16324), two at Errington, May 23 and 26 (nos. 16323, 16325), and another, an adult male in fresh autumnal plumage (no. 16326) at Errington on September 3. Another was seen at the latter point on September 22, evidently migrating.

***Vermivora celata lutescens* (Ridgway)**

Lutescent Warbler

A common species, generally distributed, and met with in some numbers at every point where collecting was done. Thirty-two specimens were preserved (nos. 16327–16359), taken at

Parksville, Little Qualicum River, Errington, Alberni, French Creek, Golden Eagle Basin, and Nootka Sound. Two females taken by Miss Kellogg at the Little Qualicum River, May 7, and at Errington, May 24, are each marked as containing eggs in the oviduct. A juvenal, out of the nest, was collected at Errington on May 27; at Beaver Creek, during June, the young birds were quite abundant. In the Golden Eagle Basin, in July, old and young together were fairly numerous in the willow thickets, but I believe from their actions that they were at this time just moving up into the mountains from the valley below. At Nootka Sound, both at the Tahsis Canal and at Friendly Cove, lutescent warblers were seen daily during our stay, July 24 to August 11, and were evidently moving southward. At Errington, during September, they were observed throughout the month though not particularly numerous.

A male in first winter plumage, a migrant, taken at Errington September 11 (no. 16356), shows an evident approach to *V. celata celata* in the decidedly grayish coloration of the head and throat, but the general color elsewhere is of a brighter greenish-yellow than is seen in that race.

***Dendroica aestiva rubiginosa* (Pallas)**

Alaska Yellow Warbler

At Beaver Creek, in the willow and alder thickets of the numerous swamps, yellow warblers were fairly numerous, the only place where we found them so. An immature male taken at Friendly Cove on August 7 (no. 16369) was the only one seen at this point, and was also the last individual of the species seen during the summer. The ten specimens collected (nos. 16360-16369) are indistinguishable from Alaskan examples of *rubiginosa* at hand.

***Dendroica coronata hooveri* McGregor**

Alaska Myrtle Warbler

An adult male was taken by Miss Alexander at Parksville on May 2 (no. 16370). The species was not met with again until the middle of September, at the beginning of the southward migration, when it became very abundant. The first were seen

on September 13, a few scattered individuals in flocks of *D. auduboni*, but their numbers increased greatly during the next few days, and as the Audubon warblers were rapidly leaving at this time, conditions were reversed before the end of the month, when only an occasional *auduboni* could be found in the flocks of *hooveri*. The two species are so nearly alike in the winter plumage as to render it difficult to distinguish between them in life, especially in the case of the immature birds, but the call notes are sufficiently different to be distinguished without any difficulty.

D. coronata has been reported as occurring in the northern part of Vancouver Island in June (Brown, 1868, 420), but this was probably a mistake, as it is doubtful if the species breeds anywhere in the northwest coast region.

Five specimens were taken at Errington in September (nos. 16371-16375), all immatures in first winter plumage.

***Dendroica auduboni auduboni* (Townsend)**

Audubon Warbler

A common species at the various points visited on the east side of the island in April and May. In the Beaver Creek Valley and about Alberni in June and July it was exceedingly abundant. Young out of the nest were observed at Errington, May 25; about Alberni, in June and July, they were numerous. An area along the water front in this vicinity, cleared of timber for a new town site seemed particularly attractive to these warblers, and scores of them were seen flitting about the piles of brush and timber. Nine-tenths of the birds were in the juvenal plumage.

No Audubon warblers were seen in the higher mountains, nor at Nootka Sound. They were abundant at Errington early in September, usually feeding in the willow thickets bordering the swamps, but after the middle of the month their numbers diminished rapidly, and though some were seen up to the last day of my stay (September 28), it was evident that they would soon all be gone.

Twenty-eight specimens were preserved (nos. 16376-16403), eighteen adults in breeding plumage, nine in juvenal plumage,

and one immature female (Errington, September 3) which has not quite completed the change from the juvenal into the first winter plumage.

Dendroica townsendi (Townsend)

Townsend Warbler

Seen on but a few occasions, and in very small numbers. Two collected, and one or two others seen by Miss Alexander at Errington, May 22 and 24, during the migration period, may have been transients, but as several were seen in Beaver Creek Valley during June the species probably breeds on the island. At Nootka Sound several small flocks were encountered near Friendly Cove, flitting through the shrubbery along the outer beach. Subsequently observed only at Errington, September 19, when an immature male was secured, evidently a migrant. Five specimens in all were preserved (nos. 16404–16408), two of these being adults.

A young bird, sex indeterminable (no. 16407), taken at Friendly Cove on August 7, is still largely in the juvenal plumage. Above it is dark olive-green, below soiled yellowish, with indistinct stripes on the sides. There is a dirty grayish superciliary stripe. The throat, breast, and superciliary stripe are invaded by numerous bright yellow feathers of the first winter plumage, just beginning to be acquired. The white-tipped greater and middle wing coverts are just beginning to appear. Another specimen (no. 16406, an immature female, Friendly Cove, August 6) has completed the change into the first winter plumage.

Oporornis tolmiei (Townsend)

Tolmie Warbler

A common migrant, numerous specimens being taken during April and May about Parksville, Little Qualicum River, and Errington. They were undoubtedly breeding in the Beaver Creek Valley, and about Alberni, for, though not at all numerous, occasional individuals were seen at various times during June. A single bird was seen in King Solomon's Basin (altitude 2000 feet), on July 5, and several were observed at the head of the

Tahsis Canal between July 24 and August 1. During the fall migration it was met with on but two occasions, single birds being seen at Errington on September 2 and 10, respectively.

Sixteen specimens were preserved (nos. 16409–16424), all adults in breeding plumage.

***Geothlypis trichas occidentalis* Brewster**

Western Yellowthroat

Common in the swampy meadows at Errington and at Beaver Creek. Not met with elsewhere, though at Nootka Sound at least, there was plenty of ground suited to the species. Young out of the nest were taken at Beaver Creek on May 30, and subsequently during June. On June 14 Miss Kellogg found a nest with four eggs (no. 1076). It was in a clump of grass at the edge of a small stream flowing through an open meadow, and was built of grass blades, lined with finer stalks of grass and one or two horse hairs.

Yellowthroats were abundant at Errington early in September, evidently migrating; by the end of the month they had nearly all disappeared.

Thirty-seven specimens were collected (nos. 16425–16461), twenty-one summer adults, seven juvenals, and seven immatures and two adults in fresh winter plumage.

This series of yellowthroats does not coincide with the accepted descriptions of *Geothlypis t. arizela*, the form supposed to inhabit the region. In fact, none of the series of western yellowthroats in this Museum (except *G. t. sinuosa*) lend themselves to the divisions of the species as generally accepted.

The latest authority (A. O. U. *Check-List*, 1910, pp. 322, 323) gives the breeding range of *G. t. occidentalis* as follows: "Breeds . . . from central Alberta, southern Saskatchewan, and South Dakota to southeastern California, northeastern Lower California, Chihuahua, and western Texas"; of *G. t. arizela*: "Breeds . . . from southern British Columbia to southern California and east to Fort Klamath, Oregon."

The differences between *occidentalis* and *arizela*, according to the original describer of the latter (Oberholser, 1899, p. 256), and according to Ridgway (1902, p. 670), are briefly as follows:

Occidentalis—larger; coloration brighter; with yellow of underparts usually more orange; whitish posterior margin of black facial mask, broader. *Arizela*—smaller, with much smaller bill; coloration duller, with yellow of underparts less orange; whitish margin posterior to black mask, narrower.

Occidentalis was described from Truckee River, Nevada (Brewster, 1883, p. 159). There are no exact topotypes available, but I have considered a series of eleven breeding birds from Humboldt County, Nevada, as typical of the race. Comparing these with the Vancouver Island adults I can appreciate absolutely no differences of color or pattern, while the differences in size are too slight to merit recognition by name. Chapman, in commenting upon some yellowthroats from British Columbia (1890, p. 151) also expresses his inability to distinguish between birds from the coast and from the interior.

There appear to be, however, two races of yellowthroats on the Pacific Coast with differences such as are supposed to distinguish *occidentalis* and *arizela*. The breeding bird of southern California and southern Arizona is of very bright colors, sometimes with the yellow of the ventral surface extending over almost the entire abdomen and flanks. This bird was designated *Geothlypis t. scirpicola* by Grinnell (1901b, p. 65; type from El Monte, Los Angeles County, California), a name now relegated to the synonymy of *G. t. arizela* (see Ridgway, 1902, p. 672)—which is described as a small, dull-colored form!

The material at hand points toward the following disposal of these two western races of yellowthroats, as being probably the correct solution of the question:

Occidentalis—small billed, and duller colored, with the yellow of the throat and breast not extending posteriorly over the flanks and abdomen; whitish posterior margin of black facial mask narrow and rather sharply defined. Range (approximately) from central Nevada and California north through British Columbia (including Vancouver Island) to southeastern Alaska (Swarth, 1911a, p. 101). *Arizela* thus becomes a pure synonym of *occidentalis*.

Scirpicola—with larger bill and brighter colors; yellow of throat and breast brighter, extending over the entire abdomen,

and sometimes tinging the flanks. Broad whitish margin posterior to the black facial mask, not sharply defined but frequently extending backwards over the entire crown, and to the nape. Ranges through southern California and southern Arizona. It is possible that the bird found in southern Arizona is recognizably distinct from *scirpicola*, but the material I have at hand (four adult males, breeding birds, San Pedro River, Cochise County, Arizona) is not sufficient to determine this. It shows the extreme accentuation of the color characters of *scirpicola*, thus approaching the Mexican form *G. t. melanops*, and is noticeably different from typical *occidentalis*, which occurs commonly in the same region as a migrant (see Swarth, 1904, p. 56).

Following are measurements of breeding males of *G. t. occidentalis* and *G. t. scirpicola*, from various localities:

Geothlypis t. occidentalis

	Wing	Tail	Culmen	Tarsus
Eight males from Vancouver Island,	54.1	51.1	10.07	18.4
Seven males from Humboldt Co., Nevada,	55.8	53.0	10.8	20.4
Five males from southeastern Alaska,	55.1	51.3	10.8	19.7

Geothlypis t. scirpicola

Five males from Los Angeles Co., California,	54.6	51.1	11.2	19.5
Four males from Cochise Co., Arizona,	55.6	51.5	11.4	18.9

***Wilsonia pusilla pileolata* (Pallas)**

Pileolated Warbler

Seen at various points, but always in limited numbers. Specimens taken at Errington and the Little Qualicum River in May were probably migrants, but a few were seen about Alberni, and in the Beaver Creek Valley in June, when they were undoubtedly breeding. The few that were seen in the willow thickets in the Golden Eagle Basin in July had, in their manner of occurrence, the appearance of being casual visitants to the region, probably migrants from the valleys below.

At Friendly Cove, early in August, the species was more abundant than at any other point visited, and a few were seen daily in the willows and shrubbery surrounding the lake back of the village. It was not seen at any point after we left Nootka Sound.

Thirteen specimens were collected (nos. 16462-16474), nine adults and four immatures. An adult male shot at Friendly Cove, August 6, is in fresh winter plumage throughout, but an adult female taken the same day has not yet begun to molt from the old breeding plumage.

Anthus rubescens (Tunstall)

Pipit

Met with only while migrating southward, in September. The first was observed at Errington on September 3, and from then on their numbers increased rapidly; toward the end of the month vast flocks frequented the open fields and swampy pastures of the vicinity. On September 7 and 8, a few were seen near the summit of Mount Arrowsmith, on the heather-covered slopes above the timber, at an altitude of about 5000 feet.

One bird observed at this point flew to the top of a stunted hemlock tree some fifty feet high, where it remained for some time sitting on the topmost branch. This was an action I had never before seen performed by a pipit, and I was uncertain what the bird was until he finally flew down to earth again close enough to me to be easily recognized.

One specimen of the species was preserved (no. 16475), an immature male in first winter plumage.

Cinclus mexicanus unicolor Bonaparte

Dipper

Fairly common in suitable localities. A nest containing five young was found on the Little Qualicum River on May 15. It was built of moss, and was located among the roots of a tree, on a bank overhanging the river. At this time the young were about ready to leave the nest. Dippers were seen quite frequently at the head of China Creek in July, possibly, however, all belonging to a single family. Four or five were usually seen at once, wandering up and down the stream for long distances, and seldom staying long in one place. Many were observed along the various streams emptying into the head of Tahsis Canal, probably three or four broods within a radius of a mile or two. A single bird

was seen on the shore of Great Central Lake, August 18, the only individual seen anywhere except along swiftly rushing streams.

Vancouver Island, with its innumerable streams, large and small, affords peculiarly congenial surroundings to the dipper, and it is abundant and of general distribution.

Ten specimens were collected (nos. 16476-16485), three adults and seven in juvenal plumage.

Thryomanes bewicki calophonus Oberholser

Seattle Wren

Apparently restricted to the east side of the island. Although occurring in numbers at the various points visited in the vicinity of Parksville and Errington, it was entirely absent in Alberni Valley, some thirty miles to the westward, a region not obviously different in its characteristics.

Young, out of the nest, were taken at French Creek May 19, and later. Probably in some cases two broods are raised in a summer, as young birds at about the same stage of development were collected in the last week of May and early in September. The birds were quite common at Errington during the first two weeks in September, but by the end of the month nearly all had disappeared.

Eighteen specimens were collected (nos. 16486-16503), eight breeding adults, seven in juvenal plumage, and two immatures and one adult in fresh winter plumage.

Troglodytes aëdon parkmani Audubon

Western House Wren

Fairly abundant at Parksville and neighboring points the last week in April and during May. Seen in Alberni at various times in June, and also in the Beaver Creek Valley. Just below our camp at the latter point a nest was found in a huge, dead stub by the roadside. On June 9 it contained young birds, as was evident from the sounds, but the entrance was too small and the hole too deep to admit of further investigation. The species was not seen at Nootka Sound, nor in the higher mountains we visited. They must leave for the south at a rather early date in

the fall, for the last seen was a single bird taken at Errington on September 1.

Ten specimens were taken (nos. 16504-16513), eight adults, one in juvenal plumage, and a young male molting into first winter plumage. They are quite indistinguishable from comparable specimens from various points in California and Arizona.

***Nannus hiemalis pacificus* (Baird)**

Western Winter Wren

A few specimens taken at Parksville and the Little Qualicum River in April and early in May were very probably migrants through this region, since none was collected here toward the end of May. Elsewhere during the summer, they were found at a somewhat higher altitude. At Beaver Creek I saw a few, at elevations where the Hammond flycatcher, Canada nuthatch, and creeper replaced the Traill flycatcher, yellow warbler, song sparrow, and house wren.

At the head of China Creek (1900 feet) winter wrens were quite abundant, being one of the very few species that were at all numerous in the dark, gloomy forests of that region. They frequented the creek bottoms and tangles of windfall and drift, and were entirely absent from the more open and sunny areas found in the basins and on the ridges.

At Nootka Sound, both at Friendly Cove and the Tahsis Canal, they were decidedly scarce, not more than four or five being seen at either place. A single bird was seen at the head of Great Central Lake, August 22. At Errington, in September, it was not seen until the 22nd; during the last week of the month about six or eight were observed, apparently migrating.

Eight specimens of the winter wren were preserved (nos. 16514-16521), six summer adults and two in juvenal plumage.

***Certhia familiaris occidentalis* Ridgway**

Tawny Creeper

Seen in small numbers at Beaver Creek in June and at the head of China Creek in July, at both points in flocks composed each of a single family, the young attended by their parents. At Friendly Cove, early in August, there were a few seen from

time to time at the edge of the woods along the beach. At Errington in September, they were evidently migrating, and in increasing numbers toward the end of the month. Usually seen in mixed flocks of chickadees, nuthatches and kinglets, the whole assemblage keeping together and moving rather rapidly through the forest.

Thirteen specimens were taken (nos. 16522-16534), four summer adults, five juvenals, and four immatures in freshly acquired winter plumage.

***Sitta canadensis* Linnaeus**

Red-breasted Nuthatch

A fairly common summer resident of the western side of the island at least; possibly of general distribution, but from its habits as observed by us, very difficult to secure, or even to see. At Beaver Creek during June, the familiar nasal note was frequently heard, but always from the tops of the tallest fir trees, far out of gun range, and it was long before I had so much as a glimpse of one flitting from tree to tree. They were not observed in the dense woods at the head of China Creek, but on July 14-16, on the summit of the neighboring Mount Douglas, several were met with in the open woods along the ridge.

At Friendly Cove they were again heard calling in the tree tops, but only one or two were seen and none secured. They were fairly abundant at Errington in September, but under the same disadvantageous circumstances as elsewhere, and though seen or heard nearly every day I was able to secure only three specimens. These are two males and a female, all adults in fresh winter plumage (nos. 16535-16537).

***Penthestes rufescens rufescens* (Townsend)**

Chestnut-backed Chickadee

About the most abundant and most generally distributed species of bird encountered. Met with at every point visited, sometimes in considerable numbers. A female taken at Parksville, April 28, contained eggs nearly ready to be laid. The first young out of the nest was taken at Beaver Creek, May 31, and thereafter the broods of young were seen everywhere in the

woods. The species was occasionally met with in the woods at the head of China Creek, but was not common there. At Nootka Sound it was not common at the head of the Tahsis Canal, though quite abundant at Friendly Cove. A few were seen at the head of Great Central Lake.

By September the flocks encountered were of larger size, being probably composed each of several families. Such flocks were frequently met with in the woods at Errington.

An adult female taken at Friendly Cove on August 9 is just beginning the post-nuptial molt; adults shot at Errington on September 19 and 24 have completed the change, except for a few scattered pin feathers. The young birds molt from the juvenal into the first winter plumage before the end of August; those taken during the first week in September are in the first winter plumage throughout, and externally are indistinguishable from adults.

Forty specimens of this chickadee were collected (nos. 16538-16577), twenty summer adults, fifteen juvenals, and two adults and three immatures in fresh, winter plumage. In coloration these Vancouver Island birds are indistinguishable from the series at hand from southern Alaska (the Sitkan district), but they have decidedly longer bills. In this respect they show an interesting approach toward *Penthestes r. vivax* of Prince William Sound (Grinnell, 1910, p. 414), though the character is not quite so accentuated as in that race. The birds of the Sitkan district, occupying an intermediate region, have thus much smaller bills than the birds to the northward or to the southward. In other external measurements and proportions the Vancouver birds and the Sitkan district birds are indistinguishable.

***Regulus satrapa olivaceus* Baird**

Western Golden-crowned Kinglet

A fairly common species, and quite generally distributed. Adults were seen and taken at points near Parksville; at Beaver Creek adults and juvenals in flocks together were frequently encountered. A young female collected August 7 at Friendly Cove has nearly accomplished the molt into the first winter

plumage. At the head of China Creek, in July, the species was met with in some numbers, but always on the high slopes and ridges leading up to Mount Saunders and Mount Douglas, and never in the darker and more densely wooded cañons. It was fairly common in the woods at Nootka Sound.

Six specimens were collected (nos. 16578–16583), four summer adults, one juvenal, and one in first winter plumage.

It is rather singular that the Sitka kinglet (*Regulus calendula grinnelli*) was not met with at any time during the summer, though it certainly should occur in this region, at least as a migrant.

***Myadestes townsendi* (Audubon)**

Townsend Solitaire

Observed on but three occasions, each time a single bird. One was seen on the Beaver Creek road, about five miles north of Alberni, on June 9; another along the road near Errington on June 30; while a third was secured at Errington on September 23 (no. 16584). The last mentioned was feeding in a wild cherry tree, and had its stomach filled and its intestines discolored with the fruit. It is an immature bird in first winter plumage, a few spotted feathers of the juvenal plumage still lingering on the lower surface of the body.

The fact that the species was present in June would seem to imply that it was breeding in the region, but our observations would indicate that it occurs in very small numbers.

***Hylocichla ustulata ustulata* (Nuttall)**

Russet-backed Thrush

One of the most abundant species of birds encountered. Specimens were taken on the east coast in May (the first at Errington, May 19), while in the vicinity of Alberni and Beaver Creek in June the ringing song could be heard issuing from every clump of underbrush. In the Golden Eagle Basin (2000 feet) during July it was seen daily, but was not nearly so abundant as at lower altitudes. A few were seen on the Tahsis Canal, and at Friendly Cove it was quite numerous, particularly in the thickets surrounding the little lake near the village.

A nest was found at the head of Tahsis Canal, July 31. It was placed in a bush at the edge of the woods, about five and one-half feet from the ground. The nest was quite unconcealed by any vegetation, but bore such a strong resemblance to a bunch of moss, such as could be seen on every tree and bush, that it was only the sudden departure of the parent bird that disclosed it. A few small fir twigs enter into the composition of the structure, but it is mainly composed of green moss, with a very slight lining of small rootlets and dried leaves. It contained three young birds, not yet able to fly, and one rotten egg.

The russet-backed thrush must leave the region rather early in the fall, for none was seen after leaving Nootka, August 11, though it was so abundant at that point. The ensuing two weeks were spent at Great Central Lake, a region poorly adapted to the species and where I did not expect to see it. When we reached Errington, at the end of August, I thought it would surely be present as it had been early in the summer, but none was seen or heard anywhere.

Thirty-four specimens were preserved (nos. 16585-16618), nineteen adults and fifteen in juvenal plumage. An adult male shot at Friendly Cove on August 10 is far advanced in the post-nuptial molt, with most of the flight feathers gone and with stubby tail, less than an inch long, but none of the other seven adults taken here have even begun to molt. Young birds taken at the same place during the first two weeks in August are some of them in juvenal plumage purely, while the others have nearly accomplished the change into the first winter plumage.

***Hylocichla guttata nanus* (Audubon)**

Dwarf Hermit Thrush

Of unexpectedly rare occurrence in the region. A single bird taken by Miss Kellogg at Parksville, April 26 (no. 16619) was the only hermit thrush observed anywhere until I reached Nootka Sound in August. They were not common at this point; I saw none on the Tahsis Canal but secured six (nos. 16620-16625) in the vicinity of Friendly Cove between August 4 and 10, and saw and heard several others. Those secured are all young birds, in the juvenal plumage or molting into the first winter plumage,

so the species may be said to breed at some points at least on the west coast of the island. Three were collected at Errington, an immature male (no. 16626) on September 15, and an adult male (no. 16627) and immature female (no. 16628), on September 22, all that were seen here.

These Vancouver Island hermit thrushes present an extreme of dark coloration. Compared with birds from the Sitkan district, Alaska, they are appreciably darker throughout, this in all stages but most noticeably so when birds from the two series in fresh winter plumage are compared. A juvenal female from Nootka, which has almost completed the autumnal molt has the upper parts dark, olivaceous brown, between sepia and bistre; the upper tail coverts and rectrices, mummy brown.

There is as much difference in coloration between these birds and specimens of *H. g. nanus* from the Sitkan district, as between the latter and examples of *H. g. guttata* from the Prince William Sound region.

***Planesticus migratorius caurinus* Grinnell**

Northwestern Robin

Robins were abundant at nearly every point visited, and apparently breed throughout the region. At Parksville, during the last week in April, they were, as observed by Miss Alexander and Miss Kellogg, the most abundant species of bird, frequenting the vicinity of the farm houses, and also the woodland. They were breeding at the time, as some were seen carrying food to the young. Common about Alberni and in the Beaver Creek Valley. In the Golden Eagle Basin they were seen daily, but in small numbers, but I found them quite numerous on the comparatively open ridges on the south side of Mount Douglas (about 4000 feet).

In the village of Friendly Cove, at Nootka Sound, robins were exceedingly abundant about the houses. They were probably the most abundant species of bird at this point, certainly the most conspicuous.

There were a few in the pastures about Errington early in September, but after the middle of the month they increased greatly in numbers. There were many wild cherry trees in the

vicinity of our camp, loaded with fruit at this time, and during the last two weeks in September they were filled from morning to night with garrulous, quarreling flocks or robins.

Twenty-six specimens were collected (nos. 16629–16654), eighteen summer adults, seven in juvenal plumage, and one young male molting into first winter plumage. The series of robins now at hand from the northwest coast region emphatically justifies the recognition of the race *caurinus* (see Grinnell, 1909, p. 241). There are fifty specimens in the Museum collection, both in adult and juvenal plumage, and in neither stage is it to be confused with *P. m. propinquus*, to the synonymy of which the name *caurinus* is at present relegated (see Fifteenth Supplement A. O. U. *Check-List*, 1909, p. 302). The dark coloration of the coast race distinguishes it at once, and this is quite as apparent in the juvenals as in the adults. There are at hand comparable series of young birds from Vancouver Island and from the Warner Mountains, California, and the difference in the general tone of coloration, both above and below, is quite noticeable. The latter series is assumed to be representative of *propinquus*; the type locality of the subspecies is Laramie Peak, Wyoming.

***Ixoreus naevius naevius* (Gmelin)**

Varied Thrush

Not observed on the east coast during April and May. First met with at the upper end of the Beaver Creek Valley, about the center of the island, where they were fairly common and breeding. Full-grown young were flying about early in June, and became more numerous toward the end of the month. At the head of China Creek, in July, we found the varied thrush one of the very few species of birds that seemed at home in the dense forests of this region. They were by no means common, but were conspicuous through the absence of nearly all other species. Pairs of birds were encountered at intervals, extremely solicitous for the young, which at this altitude were hardly able to fly at a time when broods hatched in the lower valleys were caring for themselves. Full-grown juvenals were observed in the willow thickets of the open basins, and it seemed to me that these had

probably moved up into the mountains from the lower valleys. They were seen together with other species that appeared to be migrating in a similar manner—song sparrows, lutescent and pileolated warblers, and robins. On the higher slopes and on the summit of Mount Douglas (July 14–16), varied thrushes were observed in greater numbers than was ever the case in the dark cañons below.

At Nootka Sound they were decidedly scarce during our stay, and the few that were seen were extremely wild. Although a special effort was made to obtain a good series from this point, because of its being the type locality of Gmelin's *Turdus naevius*. I was able to secure only five specimens, one adult male and four young birds, three of the latter being well advanced in the post-juvenal molt.

On August 28 we moved to Errington, on the east coast. There were absolutely no varied thrushes in the lowlands in the vicinity at this time, but on September 6–8, which we spent on Mount Arrowsmith, we observed them in considerable numbers on the higher slopes of the mountains. They first appeared in the lowlands on September 11, when several were seen; from then on they were seen in small numbers daily until September 20, when they suddenly became abundant.

Sixteen specimens were preserved during the summer (nos. 16655–16670), of which three are adult males, one an adult female, and the remainder young birds, some in the juvenal plumage and others variously advanced in the post-juvenal molt.

***Sialia mexicana occidentalis* Townsend**

Western Bluebird

Fairly common on the east side of the island, where it was met with in some numbers in the vicinity of Nanaimo and Parksville. The western and northern limit of the species is reached about at Alberni. I saw several near this town on June 9, and Miss Kellogg saw a single bird at Beaver Creek, some fifteen miles to the northward, on June 23, the only place on the west coast where it was met with. Next observed at Errington in September. They were not at all numerous then, but an occasional small flock would appear from time to time during the

month. The wild cherries were an attraction to them, as to several other species of birds, and they were generally seen in the vicinity of these trees.

Eleven specimens were collected (nos. 16671-16681), five males and three females in summer plumage, and two adult females and one young one molting into winter plumage. Of the five males three have no chesnut on the back, one has a little on each shoulder, and one a little on the middle of the back.

THE MAMMALS

CHECK-LIST OF THE MAMMALS

1. *Odocoileus columbianus columbianus* (Rich.)
2. *Sciurus hudsonius vancouverensis* Allen
3. *Marmota vancouverensis* Swarth
4. *Castor canadensis leucodontus* Gray
5. *Epimys norvegicus* (Linn.)
6. *Peromyscus maniculatus austerus* (Baird)
7. *Evotomys caurinus* Bailey
8. *Microtus tetramerus* (Rhoads)
9. *Felis oregonensis* Raf.
10. *Canis occidentalis* Rich.
11. *Lutra canadensis periclyzomae* Elliot
12. *Gulo luscus* Linn.
13. *Lutreola vison energumenos* (Bangs)
14. *Putorius streator* C. H. Merriam
15. *Mustela caurina* C. H. Merriam
16. *Ursus americanus americanus* Pall.
17. *Procyon psora pacifica* C. H. Merriam
18. *Sorex vancouverensis* C. H. Merriam
19. *Myotis lucifugus alascensis* Miller(?)
20. *Eptesieus fuscus* (Beauv.)

GENERAL ACCOUNTS OF THE MAMMALS

Odocoileus columbianus columbianus (Richardson)

Columbian Black-tailed Deer

Abundant nearly everywhere, though from accounts I heard of conditions as they existed twenty or twenty-five years ago, deer were far more numerous at that time. At Beaver Creek, during June, many were seen, mostly does, sometimes accompanied by their fawns. A buck shot at this point on May 30 was shedding the winter coat, and had acquired a little of the red summer hair. The horns were grown out about six inches.

At the Golden Eagle Basin, in July, we saw numbers of deer daily. Despard counted twenty in about four hours one morning, and it was a common occurrence to see them crossing open spots on the hillside opposite camp while we were at breakfast. At this time the big bucks were mostly on the high, snow-covered ridges, in comparatively open country, presumably to protect their tender antlers from injury which they would be apt to

receive in the forests below. The does were usually lower down, and I came across several spotted fawns, some apparently but a few days old, in thickets along the streams. But one adult was killed at this point, on July 1, and this one, together with many others seen at close enough range to distinguish details of their condition, was shedding the winter coat so as to be nearly naked in spots, while but little of the summer coat had as yet grown in. The deer in the lower valleys were already in the red summer pelage.

At Nootka Sound deer were remarkably scarce. I saw fresh tracks of a single animal at the edge of the lagoon near Friendly Cove, and Despard saw a little fresh sign at the Tahsis Canal, but no deer were encountered at any time. Toward the end of our stay the Indians brought in one that they had killed on an island in the sound.

Deer were also extremely scarce at the head of Central Lake, but at the other end, between the lake and Alberni, I saw an abundance of fresh sign.

During September, in the vicinity of Errington, we saw some almost daily. They came into the grain fields in the neighborhood of our camp every night, and I frequently saw tracks about the barns and outhouses. Seven specimens were collected here, between August 30 and September 16. These were just beginning to lose the summer coat, patches of gray hair appearing on various parts of the body; the bucks still had strips of dried "velvet" adhering to their horns.

The effect of the weather on the habits of the deer was quite noticeable here. On bright, sunny days there were none to be seen, though from the numerous fresh tracks it was evident that there were many in the vicinity, but if there was even a light shower one was sure to encounter deer in the woods before going very far. All the bucks that were seen here were small, or of medium size, but on Mount Arrowsmith, September 6 to 8, several large bucks were observed, and from the tracks seen it was apparent that there was a much greater proportion of large-sized animals at this altitude than in the lowlands.

It was noticeable throughout the summer that deer were most abundant in the regions that had been partially settled and

farmed. In such places, on the outskirts of civilization, the wolves and panthers are hunted and driven back, and the deer prosper accordingly, while in the wilder regions these predaceous animals are abundant enough to be a serious menace to them.

Eleven specimens were preserved (nos. 12052–12061, 12603), two adult males, two adult females, three immature males (shot in September, one of them still retaining some ill-defined spots), two spotted fawns, one skull of an adult male, and a fragment of a skull with a deformed antler.

***Sciurus hudsonius vancouverensis* Allen**

Vancouver Island Squirrel

Generally distributed and, in places, quite abundant. Miss Alexander and Miss Kellogg found them common on the east coast in April and May, and secured specimens at Parksville, French Creek, and Little Qualicum River. In the Beaver Creek Valley they were not so abundant. This country had been burned over in years past, and it may be that the altered conditions were not as favorable to the species as in places where there was not so much dead and burned timber. Here, after the middle of June, young squirrels began to appear, the first that were seen. In the Golden Eagle Basin there were a few, usually observed near the edge of the woods, in the vicinity of the more open ground. This was the highest altitude (about 2000 feet) at which I saw them. At Nootka Sound they were seen daily, both at the Tahsis Canal and at Friendly Cove, but never in any numbers. When we returned to Errington in September red squirrels were more abundant than I had seen them at any other point. They were seen everywhere in the woods and at the edges of the clearings, the bulk of them evidently young and not yet full grown, and almost always exceedingly tame.

We collected twenty-eight specimens during the summer (nos. 12062–12089), all but two being adults. Those taken on the east coast in April and May are all in the winter pelage. Of eight collected in Beaver Creek Valley from May 31 to June 25, one (no. 12074, May 31) is in complete summer pelage, two (nos. 12078, 12079, June 23) are in winter pelage, and the others variously advanced in the change, and showing molt lines and irregular patches of old and new hair over parts of the body. Of

the two specimens taken in the Golden Eagle Basin, one collected on July 3 is in summer pelage, the other, July 4, in complete winter pelage, rather worn in appearance, and just beginning to change to the summer coat. One taken at the Tahsis Canal July 31 is still entirely in the winter coat. All the others taken at this point are in summer pelage.

A comparison of these Vancouver Island squirrels with a series in corresponding pelage from southeastern Alaska, previously referred by me to *vancouverensis* (1911a, p. 120) reveals certain appreciable dissimilarities. The squirrels from the two regions are hardly distinguishable in summer pelage, but in the winter coat the following differences are apparent: typical *vancouverensis* is darker above, nearly uniform dull chestnut, with the reddish stripe ill-defined; the tip of the tail is much more extensively black; the center of the tail, on the ventral surface, is decidedly grayish. Alaskan specimens are brighter colored, with a fairly well defined, bright hazel dorsal stripe; center of tail, below, reddish, nearly as bright as the upper surface. In all pelages the Alaska squirrels have the tip of the tail much less extensively black, and have the black lateral stripe on the body much more prominent.

Thus in color they are intermediate between typical *vancouverensis* and *petulans*, and a comparison of the skulls shows the same to be true of the cranial characters. *Petulans* has a sharp indentation on the orbital arch (see Osgood, 1900, p. 27, pl. 5) which is nearly or quite obsolete on the Vancouver specimens at hand. On nearly all the skulls from southeastern Alaska it is quite as apparent as in typical *petulans*. As the red squirrel ranges uninterruptedly along the northwest coast it is, of course, to be expected that intergradation between the races should appear in the intermediate localities.

EXTERNAL MEASUREMENTS OF *Sciurus h. vancouverensis*

	Length	Tail	Hind foot
Eight males from Vancouver Island,	293.5 (280-310)	111.5 (92-124)	48.12 (45-50)
Eight males from southeastern Alaska,	312.37 (308-317)	125.37 (123-128)	50.75 (49-53)
Eight females from Vancouver Island,	302.37 (285-313)	117.0 (110-124)	48.87 (45-51)
Eight females from southeastern Alaska,	308.25 (292-321)	123.0 (114-132)	51.25 (46-55)

Marmota vancouverensis Swarth

Vancouver Island Marmot

We found marmots in the high mountains south of Alberni, and nowhere else. In the more open portions of the King Solomon and Golden Eagle basins, and on the surrounding peaks and ridges they were fairly abundant, but we met with them at no other point, nor could we learn of their presence in other parts of Vancouver Island. Of course the greater part of the interior of at least the northern two-thirds of the island is a wilderness of forest and glacier-covered mountains, of which very little is known, and the species may possibly be found elsewhere, but the summer's investigations proved at least that it does not occur in all apparently suitable localities. Mount Arrowsmith, in the same range of mountains, and in an air line not more than fifteen miles distant from the peaks where we found the marmots, was ascended later in the summer and no trace of the animals found, though conditions were apparently favorable. The same was true of the high mountains we visited northwest of Great Central Lake.

On the west coast of the island I talked with several timber cruisers, men who had been exploring the wilder parts of the island for years, and could find none who had ever seen a marmot.

We found them in the mountains at the head of China Creek, some twenty miles south of Alberni, in the Golden Eagle Basin, and King Solomon Basin, and on the surrounding slopes and ridges. They were most abundant on Mount Douglas, the peak to the west of King Solomon's Basin. Wherever the ground was bare of timber, or but sparsely covered, as is the case over extensive areas at this point, the marmots had established themselves, burrowing under the rocks, and apparently never wandering very far from home.

They were vigilant and unapproachable; all secured were shot by Despard with his 30-30 rifle, as we were never able to approach within shot-gun range, and it was impracticable to use traps. They were also very tenacious of life, and it was necessary to use soft-nosed bullets on them, as those shot with the hard points struggled down their burrows in every instance. These are large

enough and descend steeply enough to permit the animals to tumble in and out of sight and reach with very little effort, and the ground is far too rocky to permit of their being dug out. Their extreme wariness is correlated with conspicuousness, for the dark brown pelage shows in marked contrast against either gray rocks or green grass. The only condition under which they could be regarded as colored protectively was when one lay still, sprawled on a boulder in the sunshine; one or two seen thus might easily have been passed by unnoticed as bunches of brown moss on the rocks. They whistled but seldom, only one or two being heard during the three weeks we spent in their territory.

At the time we were in the region, the first three weeks in July, no young ones had yet emerged from the burrows, but several of the females secured were nursing. They are thus somewhat later in their breeding than *M. caligata*, as observed in southern Alaska, where young were seen running about the middle of June. The period of hibernation must be long in these mountains, for the snowfall is heavy, covering the ground to a great depth. Even at the end of July there were snow banks twenty or thirty feet deep lingering in many places.

Eleven specimens were collected (nos. 12090–12100), five males and six females, all adults. Two complete skeletons were preserved. Two of the marmots are in fresh pelage, the others variously advanced in the change from the old coat to the new. The color of the fresh pelage is very dark brown, above and below, the tip of the nose and chin and an irregular streak along the center of the breast and abdomen, white; a few white hairs scattered over the back. The old, faded pelage is much paler, nearer a cinnamon or wood brown. For a detailed description and measurements of the species see Swarth, 1911b, p. 201.

***Castor canadensis leucodontus* Gray**

Pacific Beaver

As a result of a number of years of protection beavers have multiplied on Vancouver Island so as to be really abundant in many places. We found them at several points in greater or less numbers, and at other places saw remnants of dams and houses as evidence of the former occurrence of the species. There was

a small colony at a point near Errington, but we found them in far greater numbers at Beaver Creek, near Alberni, and here secured a series of specimens. There was old beaver work along the streams throughout this valley, and from the size of some of the old dams they must have existed here in immense numbers at one time, but at present, though there are a good many left still, they are more scattered, apparently not more than one or two families at any one point, and such groups separated by intervals, sometimes of several miles.

Nearly all the smaller streams were obstructed by their dams, and most of the adjoining low lying land flooded as a consequence. Most of our specimens were taken from two houses, which I, together with Despard, examined and photographed on June 22. They were surrounded by shrubbery to such an extent as to be difficult of access, the water in which they were standing being grown up with weeds and grasses, and the dryer ground adjoining with willows and alders and a few scattered fir trees, and with tall ferns everywhere underfoot. The first house (see pl. 3), about fifty yards up-stream from the dam, was built over a huge, moss-covered log lying in the water. Its greatest height was about five and a half feet, that is, from the surface of the water; from the top of the log it was built up about three feet. The greatest outside diameter was about ten feet. The material used, such as could be seen, was sticks cut into lengths of from three to ten feet, the largest about three inches in diameter. No mud was visible anywhere on the outside.

The second house examined was on an abandoned farm, the ground now covered with second growth timber to such an extent that neither farm house nor barn was visible at a greater distance than a few yards. The beaver house was in what had been a grain field several acres in extent, now flooded by the beavers to a depth of several feet, and thickly grown up with small willows. This house was somewhat larger than the first, about six or seven feet high, but built in deeper water; the same sort of materials went into its construction, but it was rather more symmetrically shaped.

Both houses were occupied at the time by several beavers, at least, and we could plainly hear them grunting and snuffling

within. We did not examine into the internal arrangements of the structures, as we were desirous of obtaining more specimens, but made our observations and took our photographs with the least noise possible.

At another part of the valley there was a pond formed by a prodigiously large beaver dam, evidently once occupied by a large number of animals, but at the time of our visit apparently by one solitary old beaver, who was far too wary to venture into a trap.

It was no easy task to obtain an adequate series of specimens of this animal, but one calling for an immense amount of labor and no small degree of skill in trapping; and we were fortunate in having in the party a man possessing the requisite ability and energy. It took days of tramping before any occupied houses were found, while the intervals at which they were scattered and their distance from our camp made it an all-day tramp to make the round of the traps. Then, too, it was disagreeable work, wading for hours in the cold streams, or struggling through dense and frequently dripping vegetation.

When they were finally located several discouraging days passed before any were trapped. Finally Despard obtained some oil of rhodium (largely used among trappers to attract the smaller carnivores, but something of an experiment as regards beaver) and secured one the first night he used it. After that they came more easily, for the castor obtained from the first was a most efficient lure to draw others into the traps.

Steel traps were used, placed in shallow water or on the dams, and set in such a way that the captured animal could flounder into deep water, where he would speedily drown, hampered as he was by the weighted trap. Otherwise an adult beaver will invariably cut off the pinioned foot and make his escape. One of the younger animals secured had the front leg and breast cut to ribbons, as Despard supposed, by an older one endeavoring to effect its release.

Ten specimens were collected at Beaver Creek during June (nos. 12101-12110), three adult males, three adult females, and four juvenals. Besides these, two young ones were caught, too small to drag the traps into deep water; and as they were un-

injured they were brought to camp alive and kept for several days. One of these, as we approached it in the trap, slapped the water sharply with its tail and endeavored to dive. That failing, he put up a most spirited resistance, and it was only after a sharp struggle that he was projected head first into a tied-up coat sleeve and in that fashion carried home. The two were put into a box, and given various green stuff, some of which they ate, but the second night they escaped. I heard them moving about in the night, mewling much like kittens, and gnawing the sides of the box, but they made their escape by forcing up the lid; and, as the river was but a few yards distant, they doubtless swam down the stream.

The beavers secured apparently represent at least three generations: the six very young ones, apparently but a few weeks old, three males and two females, fully adult, but probably not as large as they would eventually become, for the remaining specimen, an old female (no. 12107) is very much larger than any of the others. The accompanying table of measurements shows the differences, both in size and weight. This very large one, two of the medium sized animals, and two juvenals were all taken from the same house, and very possibly represent three generations of the same family.

The young ones, all about the same age, are about the size of musk rats. One caught on June 20 (no. 12105) measures: length 503, tail vertebrae 162, hind foot 93, ear 24; weight four pounds. They are covered with soft, thick fur, paler colored than the adults, about hazel above, and more grayish brown below.

We saw no beavers at Nootka Sound, but were told that there were many at Vernon Lake, some eight or ten miles inland from the head of the Tahsis Canal. The next place we encountered them was at the head of Central Lake, where there were a few, possibly only a single family, at the river mouth near our camp. No houses were seen, but one or two beavers were swimming about nearly every evening, and Despard finally captured one, an old male, on August 25 (no. 12111).

The Vancouver Island beavers differ from those from southeastern Alaska (*C. c. phaeus*, Heller, 1909, p. 250), principally in slightly paler coloration. The Alaska skins, though collected

at the same season of the year, are nevertheless in better pelage, with longer hair and thicker underfur. For the application of the name *leucodontus* to the Vancouver Island beaver see Osgood, 1907, p. 47.

EXTERNAL MEASUREMENTS OF *Castor c. leucodontus* FROM VANCOUVER ISLAND

No.	Sex	Length	Tail	Hind foot	Ear	Weight in pounds
12101	♂	1000	340	175	31	38
12102	♂	932	350	173	31	28
12104	♂	900	280	165	22	22
12111	♂	990	395	175	30	....
12103	♀	925	350	170	25	28
12107	♀	1157	450	200	33	49½
12108	♀	967	400	170	38	25

CRANIAL MEASUREMENTS OF *Castor c. leucodontus*

No.	Sex	Basilar length of Hensel	Zygomatic width	Mastoid width	Inter- orbital width	Length of nasals	Width of nasals
12101	♂	112.0	95.0	.....	23.0	45.5	23.0
12102	♂	106.0	87.5	66.5	22.2	41.0	21.0
12104	♂	98.0	82.0	62.5	22.0	39.0	20.0
12111	♂	111.5	92.0	75.0	24.0	43.5	23.0
12103	♀	103.0	83.8	65.0	22.5	38.8	20.5
12107	♀	123.5	101.5	.....	25.0	55.5	24.5
12108	♀	101.0	88.0	67.5	25.0	38.0	21.0

***Epimys norvegicus* (Erxleben)**

Norway Rat

Probably occurs at all the seaports, as we encountered it far inland at several points. I was rather surprised to find Norway rats in considerable numbers in the vicinity of our camp at the head of the Tahsis Canal, where they had probably been carried from Friendly Cove. The distance is not great, about twenty-five miles, but all the travel up the canal is in small boats, and it is difficult to conceive how the rats escaped observation in transit. The several Indian houses at this point sheltered innumerable rats, but as the buildings are occupied but a brief portion of the year the animals must obtain other sustenance than the garbage and scraps they are most fond of. They were living in the woods in the immediate vicinity of the cabin in

which we were camped, and a number were caught in traps, many of them early in the evening, long before dark.

At Errington they were abundant in the grain fields, and I saw many of their burrows in the walls of the drainage ditches, but I was told that in the winter much of this land was flooded, or so saturated with water that the rats were all driven to higher ground.

Two specimens were preserved (nos. 12447, 12448), an adult male and female, collected at the Tahsis Canal, July 27.

***Peromyscus maniculatus austerus* (Baird)**

Puget Sound White-footed Mouse

Very abundant almost everywhere; in fact, the majority of specimens secured were trapped in self-defense in and about our various camps. During the month spent at Beaver Creek three or four mice were caught every night in the tent where the provisions were kept. Most of those taken at Nootka Sound were trapped in the cabin, and at Central Lake twenty-three were caught in two nights in the cabin we occupied.

Two hundred and three specimens were preserved (nos. 12112-12309, 12597-12601), 198 as skins, and five in alcohol, from Vancouver, Nanaimo, Parksville, Little Qualicum River, French Creek, Errington, Alberni, Golden Eagle Basin, Tahsis Canal, and Friendly Cove.

The Nootka Sound specimens are appreciably larger than those from the east side of the island. Comparative measurements are as follows: average of nine adults from Tahsis Canal and Friendly Cove, length 191.8, tail 103.3, hind foot 22.6; average of nine adults from the vicinity of Parksville: length 167.4, tail 84.1, hind foot 20.6.

***Evotomys caurinus* Bailey**

Northwestern Red-backed Mouse

An adult female of this species was trapped by Miss Alexander on the outskirts of the city of Vancouver, on the mainland of British Columbia, on April 22 (no. 12310). It measures as follows: length 136, tail 34, hind foot 18.

Microtus tetramerus (Rhoads)

Vancouver Island Meadow Mouse

A large series was collected at Beaver Creek, and a few at other points. None was secured, nor did we see runways or other signs of their presence at any of the points visited on the east side of the island. Some extensive grassy meadows at Beaver Creek harbored large numbers of the animals, but the runways were few and rather ill-defined, considering the extent to which they were used. A large proportion of the specimens collected here during June were young of various ages. Many of the females were pregnant, containing five, six or seven embryos. In the Golden Eagle Basin (altitude 2000 feet) the ground in many places showed traces of the old burrows which had been used under the snow during the previous winter, plugs of dirt and dry grass enabling one to trace their courses easily. There were many of these around the mine buildings, where the piles of lumber, wood and rubbish had evidently been used as shelters, but at the time of our visit the mice had all left this place, and none was caught about the houses. I found them in patches of grass and veratrum in the open basin, but there were almost no runways, and they did not appear to be abundant. A line of traps was set out for two nights near the summit of Mount Douglas, but no mice were secured, nor did I see any sign of their presence.

One specimen was taken at Friendly Cove, but they may be more abundant here than this would indicate, for we did comparatively little trapping at this point.

One hundred and forty-two specimens were preserved (nos. 12311–12446, 12591–12596), 136 skins and six in alcohol. Adults measure somewhat larger than the dimensions given by Bailey (1900, p. 47) of specimens from the vicinity of Victoria. Ten adults from Beaver Creek, five males and five females, average as follows: length 198.2 (185–205), tail 62.7 (59–64), hind foot 24.4 (24–25).

Felis oregonensis Rafinesque

Northwestern Puma

An abundant species, for an animal of this type, throughout

the wilder parts of Vancouver Island, and frequently seen near many of the smaller towns also. Everywhere we went we heard accounts of panthers seen nearby, but none was encountered by any member of our party. They are shy and secretive, of course, and in the dense growths of ferns and other underbrush that obscure everything during the summer months, are easily able to avoid observation.

A good specimen, skin and skull, of an adult male (no. 12449) shot in the vicinity of Parksville on April 24, was purchased from the man who killed it. In the Beaver Creek Valley, near Alberni, they are evidently abundant, as one farmer residing a few miles from where we camped had killed thirteen during the previous winter. He shot two more during the month we were there, but we were unable to obtain either of them from him. He had two good dogs, by which the panthers were all treed, and held at bay until the hunter arrived. The dogs were apparently very small for such work, one of them about the size of a fox terrier, and the other somewhat larger, and it seems curious that an animal the size of a panther should run from such small assailants, the more so as they have the reputation of preferring dog meat to almost anything else as a diet, and are said to carry dogs away from the ranches frequently. The panthers probably fear the man, who they realize is apt to be near at hand, more than they do the dogs, but it may be that the fearless and noisy onslaught of the latter is also not without its demoralizing effect on animals that prefer to hunt in the dark and in absolute quiet.

At Beaver Creek a panther got into a beaver trap one night, but broke the chain by which it was fastened and went off with the trap. Fresh sign was seen several times in the vicinity of the Golden Eagle Basin and on the China Creek road, between that point and Alberni. I saw several skins in the store at Friendly Cove and was told that many were killed about Nootka Sound during the winter months. I obtained four skulls here (nos. 12450-12453), two at Friendly Cove and two at the Tahsis Canal.

The specimen secured at Parksville was in good condition, and, according to the man who shot it, with a thick covering of

fat over the entire body. It measures as follows: total length, 6 feet 7 inches; tail 30 inches, hind foot 11 inches. Its appearance is as follows: General body color cinnamon rufous, becoming darker on the middle of the back (chestnut), and on the top of the head (hazel); chin, throat, median line of abdomen, and inner surface of thighs, rather abruptly pure white, interrupted on the breast, which is like the sides but somewhat duller; inner surface of fore legs more grayish. Face about the color of sides; black patches at the base of whiskers sharply defined and conspicuous; upper lips, between this marking and nostrils, pure white. A whitish area above the eye, and another below, the latter merging into the white of the throat; upper surface of ears very dark, almost black. Tail, the color of the back on the dorsal surface, duller below; abruptly black tipped, this mark extending about 90 mm. from the tip above, about 50 mm. below.

One of the skulls obtained at Friendly Cove (no. 12450), has the top of the head very much malformed, apparently as the result of an injury received years before. There is a deep groove extending diagonally from just behind the left post-orbital process to just above the right one, and this whole part of the skull is distorted and with portions of the bones missing. The three left upper incisors with the portion of the premaxillary in which they grew, are gone, and the edges of the bone smooth and rounded. It is difficult to see how the animal could have survived such injuries.

Another skull (no. 12452) was taken from the carcass of an animal killed by strychnine, and the whole frontal region is torn to shreds, the injuries having been done by the animal's own claws, in the agonies induced by the poison. The nasals are torn through nearly to the palate, and even the thick heavy bones above and surrounding the eyes are torn away or pierced through in a score of places.

There is not at hand material to indicate the relationship of the Vancouver Island puma to the animal occurring on the mainland farther south. A skull of a male from Mount Shasta, however, is not to be distinguished from those in the former series, and some female skulls from points still farther south in California are very similar to the single female from Nootka Sound.

Two skins from central California, one from Tulare, the other from El Dorado County, are decidedly different in color from the single Vancouver Island skin, being very much duller and without the reddish appearance of the latter.

CRANIAL MEASUREMENTS OF *Felis oregonensis* FROM VANCOUVER ISLAND

Number	Sex	Greatest length	Basilar length of Hensel	Zygomatic width	Interorbital constriction	Nasals	Width between tips of post-orbital processes	Occipito-nasal length	Height of skull; frontals above palatines	Occipito-sphenoidal length	Transverse diameter of bullae	Under jaw; anterior symphysis to posterior condyle	Greatest length of left upper carnassial	Greatest diameter of left upper carnassial
12449	♂	213.0	171.5	138.0	39.2	45.0	69	188.0	81.0	64.0	20.0	140	23.0	12.2
12450		224.0	.....	154.0	46.0	46.5	91	196.5	86.5	.....	.....	146	23.5	12.0
12452	♂	210.0	172.0	146.5	.....	.....	....	187.0	79.0	64.5	21.0	143	23.5	12.0
12453		221.0	.....	158.0	49.2	46.0	86	199.0	87.0	.....	22.0	150	24.0	13.0
12451	♀	172.5	145.5	119.5	36.0	39.0	63	156.0	72.0	54.2	19.2	117	20.5	11.0

***Canis occidentalis* Richardson**

Gray Wolf

Wolves are quite abundant in the wilder parts of at least the northern two-thirds of Vancouver Island, sufficiently so to be a serious menace to the deer in many places. While at Parksville Miss Alexander was presented with the skull of a wolf killed near by, on Englishman's River, some time before. At Beaver Creek one was heard howling one night, and I was told that they were occasionally seen in the valley during the winter, but very seldom in summer. At Nootka they were said to be abundant. On the Tahsis Canal we stayed at the camp of a trapper who made it his principal occupation during the winter to hunt wolves and panthers, and who evidently secured enough to make it pay. The Provincial government pays a bounty of fifteen dollars a head on these two species, and this added to the value of the fur makes it, if not a very lucrative pursuit, at least sufficiently so to induce some men to devote considerable of their time to it. This man used poison exclusively, and seemed to have no trouble in killing the animals. In several years hunting he had seen but two or three alive, for they are extremely cunning in keeping out of sight.

I secured three skulls from him, of animals killed during the

previous winter, picking these up in the woods at the points where he had killed and skinned them. Of two he was able to tell me the sex. I also purchased from Mr. Smith, at Friendly Cove, the skin of a wolf brought in by the Indians during the previous winter, and killed somewhere in the immediate vicinity. At this point wolves had been so abundant for some years past that the deer had been almost completely driven out. During the two weeks of our stay here we saw fresh deer tracks on only one or two occasions. No live deer were seen by either of us, but the Indians killed one on an island nearby, where another was seen.

At Great Central Lake, on the night of August 23, a wolf was heard howling nearly all night.

The skin secured at Nootka (no. 13005) was evidently of a large specimen; the tanned skin measures 1850 mm. in length. The general appearance is of a gray animal, lighter on the sides and legs, and darker on the head, back and tail. Head, muzzle, and ears dark "pepper-and-salt." Hairs on neck, back and upper surface of the tail, yellowish-white basally, and black tipped for about the terminal third of their length. A small proportion of the hairs on the back, and a great many of those on the sides of the neck, are entirely white; those at the tip of the tail, black almost their entire length, so that the tail appears decidedly black-tipped. Sides, belly and legs abruptly paler, yellowish white. Inner surface of legs almost pure white. There is a narrow, dusky streak on the front of each fore leg. The hind legs are immaculate. Hair between the toes chestnut. The body is everywhere covered with thick gray under fur. The long hairs of the neck and back are from three to four inches in length.

CRANIAL MEASUREMENTS OF *Canis occidentalis* FROM VANCOUVER ISLAND

Number	Sex	Total length	Basilar length of Hensel	Zygomatic width	Width across post-orbital processes	Median length of nasals	Palatal length	Length of upper tooth row	Length of canine	Length of lower jaw	Height at coronoid process
12454	...	249	216	134.0	...	91.8	118.0	102.0	30.0	187.0	70.0
12455	♂	248	211	128.0	62	88.2	121.5	104.5	31.0	182.0	63.2
12456	♂	259	221	142.0	71	88.2	125.0	105.8	32.2	192.5	70.5
12457		257	220	143.5	72	87.8	122.0	106.0	29.0	190.0	68.0

***Lutra canadensis periclyzomae* Elliot**

Island Otter

One was trapped by Despard near Parksville the last week in April (no. 12475). This specimen, an adult female, measures as follows: length, 1219; tail, 495; hind foot, 127; weight, twenty-four pounds. The skull is not to be distinguished from specimens from southeastern Alaska, but in color the skin is appreciably darker than any of our specimens from the latter locality. The general color of the upper surface is very dark brown, between seal brown and clove brown; below it is about Prout brown.

The species is probably of general distribution over the island, though we did not meet with it elsewhere. I saw a skin at Friendly Cove that had been procured somewhere in the vicinity.

***Gulo luscus* (Linnaeus)**

Wolverine

There are a few wolverines on the higher mountains of Vancouver Island, but they are rare, and but very seldom trapped. Despard saw the tracks of what appeared to be this species near the summit of Mount Saunders, on July 2, and I was told of one or two that had been killed in the mountains near Alberni in years past. Mr. Smith, the storekeeper at Friendly Cove, told me that the Indians usually brought in one or two every year, and promised to save me the next one he received. In accordance with this promise he later shipped to the Museum the skin of a wolverine caught by an Indian somewhere in the immediate vicinity of Nootka Sound, during the winter of 1910-11 (no. 13006). Unfortunately he was unable to get the skull for us.

This animal is extremely dark colored as compared with two skins at hand from the Alaska Peninsula. These latter (the only additional ones available) are summer specimens, however. The Nootka wolverine is colored as follows: Forehead and muzzle very dark brown, almost black. Top of head, from between the eyes, abruptly paler, more grayish. Dorsal stripe from neck to rump glossy black. Lateral stripes, meeting on rump, grayish over the shoulders, and becoming more yellowish posteriorly at

the base of the tail. Terminal half of tail black. Legs and feet glossy black. Under surface of body dull black; throat, breast, and sides of neck extensively but irregularly blotched and streaked with white, the neck blotches strongly suffused with ochraceous buff.

The fur is very much finer and softer than that of the two Alaskan skins mentioned above, to an extent that does not seem entirely due to the different seasons at which they were collected.

***Lutreola vison energumenos* (Bangs)**

Pacific Mink

Six specimens (nos. 12476–12481), all males, collected during May and June, two at French Creek, three on the Little Qualicum River, and one at Beaver Creek. Besides these I picked up a skull on the beach at Nootka Sound (no. 12605).

These skins, compared with mink from southeastern Alaska (*L. nesolestes*) taken at the same season of the year, are appreciably paler and more reddish. The general body color is vandyke brown, darker on top of the head, the median line of the back, and the tip of the tail. The under fur is paler, about wood brown. On each specimen there are disconnected and somewhat variable patches of white on the chin, throat, breast and abdomen.

The specimens collected measure as follows:

EXTERNAL MEASUREMENTS OF *Lutreola v. energumenos*

No.	Sex	Length	Tail	Hind foot	Weight
12476	♂	630	213	77	4 lbs. 1 oz.
12477	♂	559	166	64	2 lbs. 1 oz.
12478	♂	557	183	70	.....
12479	♂	596	190	80	.....
12480	♂	640	200	82	.....
12481	♂	563	161	70	.....

***Putorius streator* Merriam**

Puget Sound Weasel

The dessicated carcass of a small weasel was picked up at French Creek, May 1 (no. 12482). It is in summer pelage, brown above and white below, but too weather-beaten to afford an exact

criterion of the color characters of the species. I saw a weasel at Friendly Cove, but was unable to secure it. As I was skinning birds in our cabin in the late afternoon of August 8 he suddenly appeared on the doorstep and stood there for a few moments, but at my first movement he disappeared and was not seen again. Frequently at night I heard the mice scurrying about over the floor, as though something was after them, so in all probability he used the house regularly as a hunting ground.

Mustela caurina C. H. Merriam

Pacific Marten

Apparently fairly common in the higher mountains, but in summer at least not found in the valleys and lowlands. Four specimens, all males, were secured by Despard (nos. 12471–12474), one near Errington, May 25, and three in the Golden Eagle and King Solomon basins, taken on July 6, 16, and 20, respectively. At least one other marten pulled loose from the trap and escaped at the latter locality, and one was seen in the woods by Despard on July 3. He remarked that in his many years of trapping it was only the second or third he had ever seen at large in the woods.

Two females were subsequently trapped by him in the hills near Errington on January 10 and 21, 1911, and acquired by the Museum (nos. 13002, 13003).

The six specimens thus obtained are referable to the species *caurina*, judging from the published description (Merriam, 1890, pp. 27–29). The four males are in summer pelage, and consequently short-haired and with scanty under fur. In general appearance they are uniform dull brown (about Prout brown), darkening somewhat on rump, feet, and tail, where the long, dark-colored hairs more effectually hide the yellowish-brown under fur. The tip of the tail, of conspicuously longer hairs, is black. The inner surface of the ear is very slightly grayish. On the throat there is an irregular patch of pale orange-rufous, disconnected spots of the same interspersed with a few white hairs, extending onto the breast.

The two winter skins are much more richly colored. They,

too, are uniform brown, with no trace of gray on the head, but the pelage is darker and much more glossy than the summer specimens. Long outer hairs dark brown, about mummy brown; under fur paler, about raw umber; tail black. There are numerous white hairs scattered over the entire skin. The throat patch is of about the same color as in the summer skins.

There are at hand, of interest in this connection, two specimens of *Mustela* from southeastern Alaska, recently donated to the Museum by Mr. Allen E. Hasselborg, of Juneau, Alaska. These are an adult female, skin and skull, taken on Admiralty Island, Alaska, December 12, 1910 (no. 12674), and an adult male, skull only, also from Admiralty Island, December 15, 1910 (no. 12675). These, together with a skull from Kuiu Island, Alaska (no. 8814), I have provisionally referred to *M. nesophila* (see Swarth, 1911a, p. 139).

These three skulls are much like those from Vancouver Island, but somewhat larger, with smaller and less inflated audital bullae, and with appreciably larger last upper molar, thus closely resembling the description and figure of *M. nesophila* (Osgood, 1901, p. 33, pl. 5). The one skin from Admiralty Island is quite different from any of the Vancouver Island specimens. It is of about the same shade of brown, but the whole body, except along the median line of the back, is strongly suffused with orange-red (somewhat darker than Chinese orange), giving a very rich effect—a character, however, that, according to Merriam (1890, p. 27), is sometimes present in *caurina*. Feet, legs, and tail, are lustrous black. The head is abruptly grayish, drab on the chin and lower jaw, broccoli brown, mixed with white hairs, above; tip of muzzle darker; inner surface of ears white. A large spot of orange-rufous on the throat and breast.

Nesophila was based on cranial characters only, no skins having been seen by the describer, but, taking this Alaska specimen as a representative of the species, it may be readily distinguished from the more southern form (*caurina*) by its gray head, and from the more northern one (*americana*) by its intensely dark coloration otherwise.

EXTERNAL MEASUREMENTS OF *Mustela caurina* FROM VANCOUVER ISLAND

No.	Sex	Length	Tail	Hind foot	Ear
12471	♂	602	190	90	....
12472	♂	638	195	90	38
12473	♂	610	200	100	40
12474	♂	590	200	90	40
13002	♀	590	190	100	30
13003	♀	585	180	100	30

EXTERNAL MEASUREMENTS OF *Mustela nesophila* FROM ADMIRALTY
ISLAND, ALASKA

12674	♀	565	185	90	
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CRANIAL MEASUREMENTS OF *Mustela caurina* FROM VANCOUVER ISLAND

No.	Sex	Basilar length of Hensel	Palatal length	Post- palatal length	Zygomatic width	Width across post- orbital processes	Least post- orbital breadth
12471	♂	72.5	38.8	33.7	51.0	25.5	16.0
12472	♂	75.5	41.0	34.5	53.0	26.0	15.5
12474	♂	69.5	38.0	31.5	50.0	24.0	17.0
13002	♀	65.0	34.2	30.8	44.2	22.5	16.0
13003	♀	66.2	34.2	32.0	43.5	24.0	15.0

CRANIAL MEASUREMENTS OF *Mustela nesophila* FROM SOUTHEASTERN ALASKA

8814	....	75.0	42.0	33.0	51.5	26.0	17.2
12674	♀	68.5	36.0	32.5	47.0	23.0	16.2
12675	♂	76.0	41.2	34.8	50.0	24.8	18.0

Ursus americanus americanus Pallas

Black Bear

We found bears in some numbers in the mountains south of Alberni, and saw abundant sign of their recent presence at nearly every other place visited. Eight specimens were preserved (nos. 12458-12464), as follows: an adult male, Errington, June 20, 1909, shot by Despard and presented to the Museum, skin of the head, with skull; male, Englishman's River, May 9, skin and skull; female, King Solomon's Basin, July 12, skin only; female, Mount Douglas, July 14, skin and complete skeleton; male, King Solomon's Basin, July 15, skin and complete skeleton; and two skulls, one from Mount Douglas, July 15, and the other from Nootka Sound, July 25.

In the vicinity of the Golden Eagle Basin, during the three weeks spent at this point, we saw between us probably eleven or twelve bears. They were met with at all times of the day, several being encountered about noon, when the sun was beating down with intense heat. July 14 to 17 we spent on Douglas Mountain, and several were seen each day. On the 14th, while crossing King Solomon's Basin, about nine in the morning, a bear was seen leisurely picking his way up a rocky gulch across the cañon, but it was too far to risk a shot and he disappeared in the brush without becoming aware of our presence. Later in the day, on the summit, a bear swam across a corner of the little lake by which we were encamped, and waded out on the mossy bank, where he stood not more than twenty-five yards distant. It made a beautiful picture, the black animal, with the drops of water sparkling in the sunshine on his shaggy coat, standing on the green moss, partly out of the water, with a background of snow banks on the farther margin of the lake. He quite evidently had not scented us at all, though we had a fire burning, but almost at once he caught sight of our black dog who sat quietly regarding him with placid curiosity. The two stared at each other, while we sat unseen in the shadow of the trees, but Despard reached for his rifle and fired without awaiting any further developments. The bear disappeared in the brush with a crash, but went only a few yards before it dropped dead. The same evening another was seen from the ridge leading up to Mount Douglas, feeding in the bottom of the cañon far below.

On July 17, on our return trip, one was secured in King Solomon's Basin. We were picking our way, heavily laden, along the edge of a snow slide, when the tall grass on the side was violently agitated by some animal coming toward us, only about thirty yards distant, but entirely hidden by the vegetation. We stood still and waited, and almost at once a black head was poked up, sniffing suspiciously in all directions. Despard fired and the head disappeared, but although everything was quiet, it was some time before we ventured into the grass to investigate. Then we sent the dog on ahead to reconnoiter, and as nothing happened to him, followed, with caution. However, the bear was quite dead, with a broken neck, and had not moved out of his tracks. This

was at noon, in the hot sunshine, and it was the third we had seen in three days feeding in the middle of the day.

The three secured here all had their stomachs filled with grass. The vegetation was just coming up at this altitude, where the spring growth was much later than in the lowlands, and there were quantities of rank, green grass everywhere.

These bears are in remarkably fine pelage, considering the season, being almost like winter skins. The outer hair is from four to five inches long, over the entire animal, and there is fairly thick under fur. Despard informed me that the lowland animals were at this season thin-haired and of shabby appearance, and that their skins had no commercial value. The differences in environment seem to be the cause of the variation, for though the weather was exceedingly hot in the lowlands at this season, at the altitude where these bears were collected the snow still lay deep on the ground, and much of it would probably remain throughout the year.

On August 17 I saw one on the shore of Great Central Lake; on the following day another was observed near the head of the lake.

The skins obtained, and others seen, were all black, and I was told that the brown phase was unknown on the island.

Although I have provisionally referred these bears to *Ursus americanus americanus*, which they seem to resemble more nearly than they do the various western subspecies, judging from published descriptions, it is possible that comparison with material from eastern North America would show that they are a distinct form; especially so as an apparently well-marked race occurs in the intervening area on the adjacent mainland. The Vancouver Island bear is not at all like *U. a. altifrontalis* (Elliot, 1903, p. 234) from Washington, which it might be expected to resemble. The skulls at hand have not the tall, rounded forehead of that form, but in their superior outline closely resemble specimens from the Alaskan mainland (Yakutat Bay and Kenai Peninsula). They differ from these constantly in greater proportional width (zygomatic width) and in larger size of the teeth. In the latter characters they approach the southeastern Alaska island form *pugnax*, differing from that again in the same degree as they resemble the Yakutat Bay and Kenai Peninsula specimens.

The combination of characters presented by the Vancouver Island bear appears to be: invariably black coloration, somewhat rounded skull, with proportionally wide spreading zygomata, and very large teeth.

The specimens secured measure as follows:

EXTERNAL MEASUREMENTS OF *Ursus americanus americanus*

No.	Sex	Length	Hind foot	Ear
12461	♂	1540	252	107
12464	♂	1880	254	110
12459	♀	1250	220	104
12460	♀	1380	232	137

CRANIAL MEASUREMENTS OF *Ursus americanus americanus*

Number	Sex	Basilar length of Hensel	Palatal length	Post-palatal length	Zygomatic breadth	Width across post-orbital processes	Length of nasals	Posterior edge of alveolus of canine to posterior edge of alveolus of last upper molar	Crown of last upper molar	Ratio % of zymo- matic breadth to basilar length
12458	♂		141	.....	185.0	101.0	67.5	80.0	26.5	.....
12461	♂	248	139	109	182.5	102.0	68.0	80.2	26.5	73.5
12463	♂	260	144	116	193.0	109.2	68.5	81.2	28.2	74.2
12464	♂	247	135	112	.....	92.0	70.0	78.0	27.8	.....
12460	♀	220	121	99	141.0	81.5	64.0	73.0	24.8	64.1
12462		225	124	101	146.0	78.2	60.5	72.0	27.0	64.9

Procyon psora pacifica C. H. Merriam

Pacific Raccoon

Probably of fairly common occurrence in suitable places over the entire island. We secured six specimens (nos. 12465–12470), at Parksville, Little Qualicum River, French Creek, Errington, and Beaver Creek. At Friendly Cove I saw three young ones in the possession of Mr. Smith, the storekeeper, who had just got them from the Indians and intended to keep them as pets.

One was killed at Errington on September 12 while making a raid on the poultry yard at the ranch where we were staying. The intervention of the dog drove the raccoon up a tree, where it was easily secured.

These raccoons are very dark colored, though not appreciably more so than specimens from the northwest coast of California.

The dark tail rings are very broad and black, and the tail is extensively black-tipped.

***Sorex vancouverensis* C. H. Merriam**

Vancouver Island Shrew

Found in abundance at nearly every point visited. We collected in all 105 specimens on Vancouver Island (nos. 12485–12587, 12602–12604), from Parksville, Little Qualicum River, French Creek, Errington, Beaver Creek, and the Golden Eagle Basin. The only places where trapping was carried on, and where we failed to find shrews, was on Douglas Mountain and at Nootka Sound. At the former locality we secured nothing in the traps, and at Nootka the small mammal trapping was somewhat neglected in favor of bird collecting.

Two species of shrews are supposed to occur on Vancouver Island, *Sorex vancouverensis* and *S. obscurus* (Merriam, 1895, pp. 70, 72), but I am unable to distinguish more than one form in the material we collected. Two specimens were trapped on the mainland, in Stanley Park, Vancouver (nos. 12483, 12484) which, for geographical reasons, should belong to the subspecies *S. obscurus longicauda* (see Merriam, *l.c.*, p. 74), but although they are larger than any of the individuals composing the island series, they do not differ from them in color or proportions. They measure respectively: length, 120, 117; tail, 52, 52; hind foot, 13, 14. The average and extreme measurements of ten males from Vancouver Island are as follows: length, 106.9 (104–112); tail, 46 (41–52); hind foot, 13 (12–15).

***Myotis lucifugus alascensis* Miller**

Alaska Brown Bat

A brown bat taken at Errington, August 31 (no. 12588), I have provisionally referred to this form. The specimen is so imperfect as not to admit of exact identification.

Small bats (apparently some species of *Myotis*) were fairly common at several points. At Beaver Creek I saw but few, and the days being very long then, it was not dark enough for bats to appear until nearly ten o'clock, so there was little chance to

secure them. One was seen at Friendly Cove, the evening of July 23.

At the head of Great Central Lake, August 17 to 25, bats were irregularly abundant, sometimes six to eight suddenly appearing at once, skimming over the surface of the water, to disappear again as quickly as they came. They were quite numerous at Errington, throughout September, but seldom came out until late in the evening, and remained in the woods where it was almost impossible to shoot them. The one secured was shot at such close range as to be badly mutilated.

Eptesicus fuscus (Beauvois)

Brown Bat

Two specimens taken at Errington (nos. 12589, 12590) on August 30 and September 25, respectively. The species was fairly common here, but was not positively identified at any other point.

The two collected are darker colored than most examples from southern California, but are exactly like specimens at hand from Humboldt County. The dorsal surface is Vandyke brown, the under surface wood brown.

GENERAL REMARKS ON DISTRIBUTION

Though the one season's work is not sufficient to supply data for the accurate definition of the life-zones of Vancouver Island, it is in general confirmatory of the division indicated on the zone map in the 1910 edition of the A. O. U. *Check-List*. That is, that the extreme southern tip of the island, and a narrow strip on the east coast, south of the center, is Transition Zone; the remainder, by far the greater part of the island, Canadian, with the exception of the limited area of Hudsonian and Alpine-Arctic on the mountain tops. The following generalizations, and the accompanying lists are tentative, to the last degree, and will probably require extensive revision with additional work in the region. They represent conditions as noted during brief visits at various points during a single season, and as such may serve for comparison with further observations.

The following species of birds were found by us on the east coast only, in the vicinity of Parksville and Nanaimo. They are characteristic of the Transition and Upper Sonoran zones, elsewhere, and find here their northern limit on the Pacific Coast.

<i>Dryobates p. gairdneri</i>	<i>Spizella p. arizonae</i>
<i>Agelaius ph. caurinus</i>	<i>Progne s. hesperia</i>
<i>Carpodacus p. californicus</i>	<i>Lanivireo s. cassini</i>
<i>Zonotrichia l. nuttalli</i>	<i>Thryomanes b. calophonus</i>

Vireo huttoni obscurus also occurs at the southern extremity of the island, but was not encountered by our party.

A number of other Transition and Sonoran Zone species found on the east coast, extend across the divide of the island and find their northern and western limit in Alberni Valley. Some of the more conspicuous of these are:

<i>Rallus virginianus</i>	<i>Stelgidopteryx serripennis</i>
<i>Cathartes a. septentrionalis</i>	<i>Vireosylva g. swainsoni</i>
<i>Sturnella neglecta</i>	<i>Dendroica a. auduboni</i>
<i>Euphagus cyanocephalus</i>	<i>Troglodytes a. parkmani</i>
<i>Pipilo m. oregonus</i>	<i>Sialia m. occidentalis</i>
<i>Zamelodia melanocephala</i>	

The species which we found breeding on the west coast only (Canadian Zone) are as follows:

<i>Sphyrapicus v. ruber</i>	<i>Dendroica townsendi</i>
<i>Empidonax difficilis</i>	<i>Nannus h. pacificus</i>
<i>Empidonax hammondi</i>	<i>Hylocichla g. naus</i>
<i>Passerella i. fuliginosa</i>	<i>Ixoreus n. naevius</i>

There were two species encountered in a manner possibly indicative of a distinguishable belt of Hudsonian Zone:

<i>Perisoreus o. obscurus</i>	<i>Pinicola e. flammula</i>
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One Alpine-Arctic species of bird was met with:

Lagopus l. leucurus

The long list of birds of general distribution over Vancouver Island during the breeding season includes the following species, of particular abundance:

<i>Bonasa u. sabini</i>	<i>Colaptes c. saturator</i>
<i>Dendragapus o. fuliginosus</i>	<i>Cypseloides n. borealis</i>
<i>Columba fasciata</i>	<i>Selasphorus rufus</i>
<i>Ceryle a. caurina</i>	<i>Nuttallornis borealis</i>
<i>Dryobates v. harrisi</i>	<i>Empidonax t. trailli</i>

<i>Cyanocitta s. stelleri</i>	<i>Dendroica ae. rubiginosa</i>
<i>Corvus b. caurinus</i>	<i>Oporornis tolmiei</i>
<i>Loxia c. minor</i>	<i>Wilsonia p. pileolata</i>
<i>Spinus pinus</i>	<i>Cinclus m. unicolor</i>
<i>Junco o. oregonus</i>	<i>Penthestes r. rufescens</i>
<i>Melospiza m. rufina</i>	<i>Hylocichla u. ustulata</i>
<i>Bombycilla cedrorum</i>	<i>Planesticus m. caurinus</i>
<i>Vermivora c. lutescens</i>	

These are all wide ranging species, many of them occurring from southern California to Alaska, and most of them are not distinctive of any one zone.

Of the mammals, the following appear to be distributed over the length of the island, both in the Canadian and Transition zones, but usually at low altitudes, in the valleys and along streams.

<i>Sciurus h. vancouverensis</i>	<i>Putorius streator</i>
<i>Castor c. leucodontus</i>	<i>Procyon ps. pacifica</i>
<i>Peromyscus m. austerus</i>	<i>Sorex vancouverensis</i>
<i>Microtus tetramerus</i>	<i>Myotis</i> (three species)
<i>Lutra c. periclyzomae</i>	<i>Eptesicus fuscus</i>
<i>Lutreola v. energumenos</i>	

The following four species are of general distribution, in all zones and at all altitudes; they are all great wanderers:

<i>Odocoileus columbianus</i>	<i>Ursus americanus</i>
<i>Felis oregonensis</i>	<i>Canis occidentalis</i>

Three species are apparently restricted to high altitudes:

<i>Marmota vancouverensis</i>	<i>Mustela caurina</i>
<i>Gulo luscus</i>	

Two conspicuous trees, very noticeable on the southeastern coast, are lost sight of on the west side of the island—the Garry oak (*Quercus garryana*) and the madroña (*Arbutus menziesii*). The former occurs in abundance about Victoria, and I saw trees as far north as Beaver Creek (near Parksville). The madroña is common along the stage road between Nanaimo and Parksville, and for some distance north of the latter point, but stops rather abruptly near the east end of Cameron Lake. I saw none in Beaver Creek Valley, nor in the immediate vicinity of Alberni, and was consequently rather surprised at encountering a few trees scattered along the north shore of Great Central Lake.

To sum up: There seems to be a well-defined area of Transition Zone at the southern extremity of Vancouver Island, extending up the east coast at least to a point ten miles north of Parksville, probably some distance farther. The great bulk of the island elsewhere is Canadian, except that in Alberni Valley, on the west coast, there is a decided infusion of Transition species. The presence of the wolverine, marmot, marten, pine grosbeak, and Oregon jay, at the altitudes where we found them, is perhaps indicative of a recognizable, though restricted, timberline belt of Hudsonian Zone. The ptarmigan is apparently the only species restricted to the Alpine-Arctic mountain tops, though the pipit also may be found to breed there.

Vancouver Island is but slightly separated from the mainland and has but few species peculiar to it. There are no birds of this class, but the following mammals are not known to occur elsewhere: *Microtus tetramerus*, *Marmota vancouverensis*, and *Sorex vancouverensis*. The marmot, singularly isolated in the center of the island, is a strongly marked species. The shrew and meadow mouse are not so widely different from allied mainland species. *Peromyscus maniculatus austerus* ranges unchanged on the island and on the adjacent mainland, though singularly enough there are two distinct subspecies known from Saturna and San Juan islands in the separating channel (see Osgood, 1909, pp. 61, 62). In view of the presence of such genera as *Marmota*, *Gulo*, *Mustela*, and *Felis*, the non-occurrence of *Erethizon*, *Lynx*, and *Evotomys*, as well as several others from the nearby mainland, seems rather remarkable. The presence of the elk on Vancouver is also of interest.

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EXPLANATION OF PLATES

PLATE 1

Map of the portion of Vancouver Island traversed by the expedition.
Dotted line shows the route followed; crosses indicate collecting stations.

PLATE 2

Mount Saunders, altitude 5500 feet; July 5, 1910. Showing Hudsonian and Alpine-Arctic zones; the habitat of *Marmota vancouverensis*, *Mustela caurina*, *Lagopus leucurus*, and *Passerella i. fuliginosa*.

PLATE 3

Beaver house. Beaver Creek Valley; June 22, 1910. Built over a log, in shallow water. Though beavers were numerous in the valley they were not congregated in numbers in any one place. Single houses were scattered at wide intervals along the smaller streams, so hidden by the surrounding vegetation as to be difficult to see.

PLATE 4

Indian deadfall trap. The type generally used by the coast Indians of British Columbia and southern Alaska, for the capture of the smaller fur bearers, such as marten, mink, and weasels. Head of Tahsis Canal, Nootka Sound; July 31, 1910.

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