ALASKAN BIRD-LIFE

AS

Depicted by Many Writers

Edited by
ERNEST INGERSOLL

Published by the
National Association of Audubon Societies
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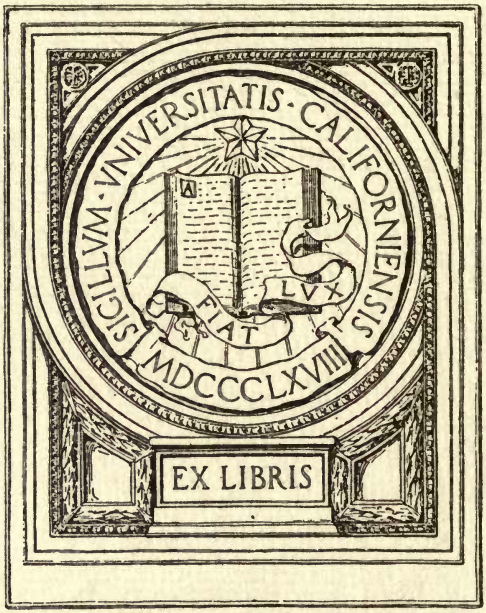

THE RED CROSSBILL

ALASKAN BIRD-LIFE

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Seven Plates in Colors and Other Illustrations.

Published by the

NATIONAL ASSOCIATION OF AUDUBON SOCIETIES

NEW YORK, 1914

NATIONAL ASSOCIATION OF AUDUBON SOCIETIES

(FOUNDED 1901. INCORPORATED 1905)

For the Protection of Wild Birds and Animals

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INTRODUCTION

THIS volume on Alaskan Bird-Life has been prepared for free distribution among the people of Alaska. This has been done in pursuance of the established policy of this Association to seek, by all available measures, to cultivate on the part of the general American public a better appreciation of the value to mankind of our wild birds and animals.

In offering this account of bird-life in Alaska, we have attempted to furnish a general sketch of the subject, rather than a scientific treatise. The greatest care has been taken as to accuracy. All of the writers whose contributions are here combined, and given a certain uniformity, are men of recognized authority in their subject. The purpose primarily in view, however, is educational; to give those who have an interest in the animal life of their country additional knowledge, and to attract to the subject the attention of those who, largely from lack of information, have neglected what others have found to be a most delightful study.

The mere enjoyment derived from knowing the birds, recognizing them by name, and observing the varying characteristics and habits of the different local groups and species, offers a satisfactory inducement for study, and is an adequate reward, increasing as knowledge progresses. This alone might well be a sufficient reason for publishing and distributing a book of this kind. The Association and the Government have had, however, an additional, and perhaps an even higher purpose in view, namely, to teach the people of Alaska, and especially the boys and girls there, to understand and appreciate the very important place which the birds of this country—or of any country—occupy in the list of national assets.

To impress this truth on the minds of the American people, to teach those who are ignorant and encourage those who are wise, and to form and enforce legislation

tending to the conservation of this valuable part of the nation's wealth, is the mission of the Audubon Societies. It is with that purpose in view that this and other publications of the National Association are issued, and that its extensive work in the schools of the country is carried on.

It is greatly to be hoped, therefore, that all of the teachers in Alaska into whose hands this volume may fall will give serious attention to it, and make use of its contents in their school-work. Examination will show that careful attention has been paid by the editor to the diction, foreseeing that the book was likely to be used in reading-classes, as a source of material for exercises in English composition, and in other ways; therefore a good literary style was desirable.

Accompanying the colored plates, which have been made by capable artists with critical care for accuracy, are outlines of the figures, which a child may color with his paint-brush or crayons, either from a living bird, or from the portrait-plate. No better way has been devised of fixing the colors of a bird in the mind than this; and in many schools the coloring of these outlines takes the place of the ordinary exercise in drawing.

In gathering material for the book it was found expedient to conduct some original field-work, and therefore the Association, coöperating with the Government, maintained a naturalist, Mr. George Willett, at the St. Lazaria Bird Reservation during the summer of 1912, to study and report upon the wild-bird life of that vicinity.

In 1913 a similar work was carried on at the Forrester Island Government Bird Reservation by Dr. Harold Heath.

The expense of this field-work, as well as the cost of publishing this book, was borne by a member of this Association, whose generosity has made it possible to accomplish many useful undertakings along similar lines.

T. GILBERT PEARSON,

Secretary.

APPROVAL BY THE UNITED STATES BUREAU OF EDUCATION

In area Alaska is equal to New England, New York, New Jersey, Pennsylvania, Ohio, Indiana, Illinois, Michigan, Wisconsin, and the two Dakotas. A map of Alaska, imposed upon a map of the United States drawn to the same scale, would extend from Charleston, South Carolina, to San Francisco. The coast-line of Alaska is longer by many thousands of miles than the distance around the world at the equator. The climate of Alaska varies from the soft, even climate of southeastern Alaska and the Aleutian Islands, similar to that of the coast of Oregon and Washington, to the uneven climate of the interior and of the Northwest, with its annual swing of more than 160 degrees.

We have heard much of Alaska within the last two decades—of its mountains, rivers, and plains; its seas, and islands, and glaciers; its forests and tundras; its fishing-waters and hunting-grounds; its gold and copper—but we know little about its abundant and varied bird-life; and the people of Alaska, particularly the white people, seem to know not much more. How varied this life is we might guess from the size, location, physical features, and climatic conditions of the country. A brief visit at the proper season of the year gives some idea as to its abundance.

For the natives who have learned to read English, for the white settlers, for the numerous visitors, and for thousands interested in Alaska and all parts of the world, there has been need of such a brief, accurate, and readable account of the important forms of bird-life in the various parts of this great peninsula as that presented in this book, prepared under the direction of the National Association of Audubon Societies. That the people of Alaska may have an opportunity to inform themselves on this subject, and to deal with it intelligently, this Association has placed in the hands of the Commissioner of Education of the United States eight thousand copies of this book for distribution in Alaska. Every copy should bring some one a fuller appreciation of the beauty, the wealth, and the greatness of this country.

P. P. Claxton

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ALASKAN BIRD-LIFE

General Characteristics

The bird-population of Alaska is large, varied, and interesting, despite the remote and northern situation of the country. This is possible because it has a warm and moist summer, although a short one, favoring the rapid and copious growth of vegetation, including extensive forests; and because the adjoining seas abound in food naturally attractive to many kinds of birds.

Any map of Alaska showing average weather conditions makes plain the fact that the lines (isotherms) which connect places in North America having the same average summer warmth swing up in the west far toward the north, proving—what is plain to all who live there—that a climate as mild in midsummer as that of the Great Lakes region prevails much farther toward the north on the Pacific than on the Atlantic slope of the continent.

The amount and character of the bird-population in any region depend greatly on its having a climate favorable to birds at the season when they are hatching and rearing their nestlings, not only because most birds are creatures of mild rather than rough conditions, but because a warm and moist climate furnishes far more food, both animal and vegetable, than does a cold or an arid one. The fact that a temperate summer climate extends as far northwest as central Alaska therefore allows the land-birds to spread their area of summer residence much farther in that direction than they are able to do on the bleak northeastern side of the continent. For this reason Alaska has many kinds of birds well known in the United States.

Another reason why Alaska has a large bird-population is found in the fact that the Pacific Coast and the long trough between the Rocky Mountains and the Sierras and northern coast ranges form natural and unobstructed pathways for the migratory birds of the west as they annually travel northward in spring and back again in autumn. Another convenient and natural approach for migratory birds is from western Canada down the upper Yukon Valley; and probably most of the small birds of the interior go and come by this river-valley route. When to this mingled company is added the group of birds—principally sea-fowl—that reside in the Territory all the year round it is manifest that the bird-population of Alaska is not only extensive, but is more representative of the whole of North America than that of any other part of the continent.

Faunal Districts in Alaska

If Alaska were a great plain it would have a substantially uniform climate, gradually colder from south to north. However, the country is embroidered with ranges of lofty mountains, which divide it into several regions, each distinct in climate, and consequently distinct in plant and animal. Four of these districts may be marked off as below: and it is important to keep them in mind if one wishes to form a clear idea of Alaskan ornithology, for each has its own characteristic bird-life.

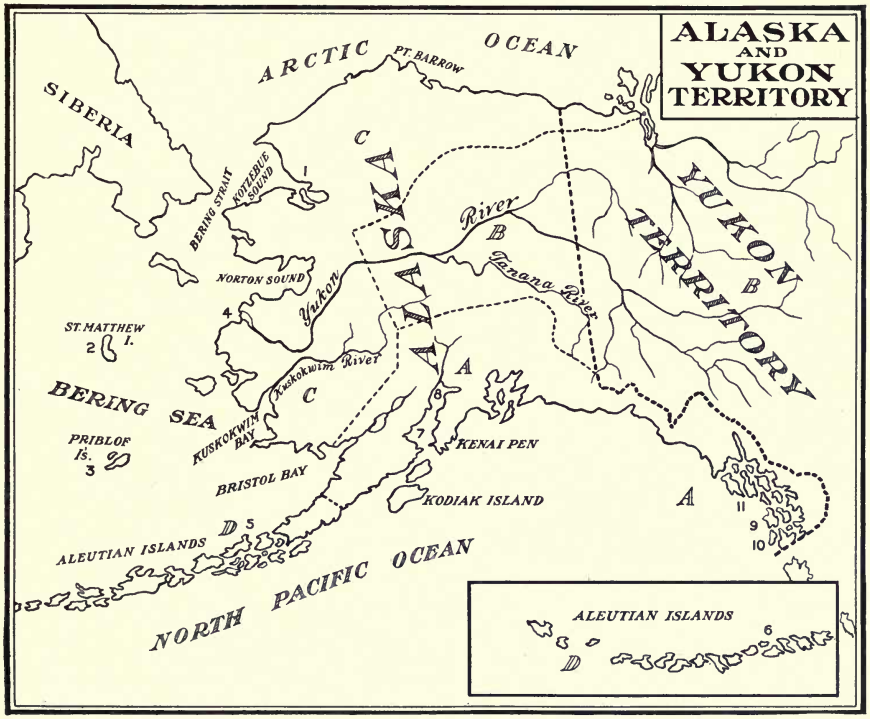
A. The South-Coast District.
B. The Wooded-Interior District.
C. The Arctic-Coast District.
D. The Aleutian District.

These districts might be reviewed in any order; but that of the islands and shore of the southern coast has been placed first because it is the best known, the most easily accessible, and the most populous part of Alaska.

A BREEDING COLONY OF CALIFORNIA MURRES
From a Photograph by A. C. Bent

SOUTH-COAST DISTRICT (A)

The southern border of Alaska consists of a ragged strip of coast indented by deep, fiord-like bays and by narrow channels that so intersect as to cut off hundreds of islands. At varying distances, but never far from the ocean, stand lofty mountains capped with snow-fields and glaciers, protecting the coastal valleys and islands from the cold north and northeast winds. The Coast Range continues northward from British Columbia as far as Icy Strait and Lynn Canal, beyond which the massive uplift of the St. Elias Alps presents



Sketch-Map of Alaska, Showing Areas of Faunal Districts (see page 8), and the Situations of Federal Bird Reservations (see page 72)

hardly more than ice-cliffs to the sea until the mouth of Copper River is reached. Thence westward a marginal coast of considerable width, cut by many rivers and inlets, fringed with peninsulas and islands, and walled by mountains, extends to the base of the Alaska Peninsula.

This long coastal belt receives from the prevailing westerly winds the warmth and moisture of the Pacific Ocean, shed upon it copiously by the chilling effect of the mountains, against which the clouds incessantly drift. Hence all this district, except the glacial

headlands of the St. Elias Range, is covered with forests, valley-swamps and mountain-meadows, which reach far higher on the seaward front than on the interior slopes of the ranges. The woods are mainly of evergreen trees, and toward the south they grow to an astonishing height; but in the more open places are to be found many kinds of deciduous trees, berry-bearing shrubs, and a rich flora of flowering plants and mosses. The country is frequented by mammals in large variety, from bears to mice, and the rivers and inlets abound in fish. Considering this warm and humid climate, often really hot in summer, and the plenitude of food, it is not surprising to learn that birds are numerous here, embracing, in fact, if migrants are included, nearly the whole avifauna of Alaska.

The warmly moist climate of this coast has the effect of intensifying and making darker the colors of the fur of mammals and the plumage of the birds and butterflies that spend their summers there. "Pale browns," Nelson observes, "become rich rufous, or rusty red, and grays become dark brown, with corresponding changes in other colors." Hence a large number of the birds of this district are distinguished by varietal names.

South-Coast Water-Birds

Beginning, as is customary, at the foot of the scale of organization, the first birds to be mentioned are the grebes, of which two species may be met with in this district—the red-necked and the horned. Grebes, or divers, are water-birds with the general appearance of ducks, but their bills are small and narrow, and their feet, instead of being fully webbed, have the toes flattened and broadened into paddles. The legs are set so far back that it is difficult for grebes to walk upon land, but they are among the most expert of swimmers and divers, and often, when trying to avoid observation, will quietly submerge the whole body, leaving only the inconspicuous head out of water. They feed chiefly on fish and small aquatic creatures, but also nibble at succulent plants. Their nests are mere rafts of reed-stalks, usually afloat among the rushes of some inland pond, and the few greenish-white eggs lie in a sodden bed.

Loons are near relatives of the grebes, but are larger, and more strongly marked in dark colors checkered with white; they feed on fish and lay two eggs in a slight hollow on the bank of a river or lake. Three species come here: the common great northern diver, the red-throated diver, and the Pacific loon.

The cliffs and ragged islands of this southern coast of Alaska harbor many members of those quaint tribes of small sea-birds, the puffins, murres, and others of the auk family, which, however, are better represented on the northern coasts, and are described hereafter by Mr. Nelson and Mr. Bent. Among those breeding in crowded colonies south of the Aleutian islands are the tufted puffin (see page 49), the rhinoceros, Cassin's, and the crested auklets, the marbled, ancient, and Kittlitz's murrelets, and the Californian and the black guillemots. The pigeon, paroquet, and least auklets appear only as migrants in winter.

George Willett notes that the burrows of the rhinoceros auklets, birds found by him to be common about Sitka Sound, and nesting in a numerous colony on St. Lazaria Island in company with many tufted puffins, are entirely different in situation and construction from those of any other of the birds dwelling there. Their burrows are much larger than those of the petrels, and longer than those of the puffins, from which they differ also in situation. St. Lazaria Island is a Federal bird-reservation, and the auklet colony "is well up toward the top of the island among the timber, and the burrows frequently run under logs and among the roots of trees."

Gulls are numerous, as might be expected along such a coast, but no tern is known east of Kadiak Island, and even there the arctic tern alone represents this fine group of diminutive gulls. Those powerful sea-hawks, the jægers—both the parasitic and the long-tailed—visit this coast in winter, but keep well out at sea, harassing every bird that fishes. Winter gulls, whose summer home is in the north, are the rare ivory gull, the glaucous gull or burgomaster, and Sabine's or the fork-tailed gull. Resident here in summer, nesting on both sandy islets and rock-ledges, are the glaucous-winged gull, the big, world-wandering herring gull, with its snowy head and black wing-tips, the short-billed, and the familiar black-headed, white-tailed, Bonaparte's gull.

Gulls' nests are very simple structures—sometimes nothing at all—and large colonies often breed together both on the sea shore and on the beaches of inland lakes. Their eggs are blotched and marbled with various tints, from lavender to deep red-brown.

Other oceanic birds, seen by voyagers, but rarely near shore, are the shooty shearwater, Fisher's, the fork-tailed, and Leach's pe-

trels—adventurous northern representatives of several great tropical families. The last two reside in extensive breeding-companies on the heights of St. Lazaria, where their young are hatched beneath the grass-roots in midsummer.

With a mention of the white-breasted and the violet-green cormorants, that breed in large numbers on the westernmost islands, we come to the end of the list of sea-birds, and turn to that of the fresh-water species. Many sea-birds, which used to nest numerously near Sitka, now are rare there, owing mainly, it is believed, to the destruction of their eggs or young by crows and ravens.

Ducks are not so numerous in this district as in the interior or on the tundras. Of the mergansers, the only one regularly seen is the red-breasted, the other being scarce. Mallards, green-winged teals, Barrow's golden-eyes (whistlewings), the scaups, harlequins, buffleheads (butter-balls), and the scoters, appear to be the only ducks nesting at all frequently near the coast; and few except the pintail, scaup, old-squaw, scoters, and eiders, occur in winter. The white-winged scoter is the most abundant of the surf-ducks, and is numerous on salt water all through the year.

The same may be said of the geese, the white-fronted and the white-cheeked alone nesting on the southern coast, while the snow-goose, Hutchins's, and the cackling goose, the brant and some others, are occasionally seen in migrations or during the winter. The climate and other conditions are too unfavorable to induce or permit such wading-birds as herons, bitterns, rails, and gallinules, to dwell in any part of Alaska, except that the Pacific-coast variety of the great blue heron visits the southern part of the Territory.

The situation is a little better for the shore-birds, which can pick up food along the margins of sheltered bays, especially west of the Copper River; but such of these as are seen in the course of a year are principally autumnal migrants. Only Wilson's snipe, the Aleutian, Pribilof, and least sandpipers, the greater yellowlegs, and the wandering tattler, halt to rear their young south of the Yukon Valley. Nests of the black oyster-catchers, however, have been discovered near Prince William Sound. The northern phalarope is common on salt water at all seasons.

The Larger Land-Birds.

The only game-bird of the region is the white-tailed ptarmigan, and its dwelling-place is far up the slopes of the mountains. Neither partridge nor pigeon has been noted, except one record of a mourning dove.

Birds of prey, however, find plentiful means of living, and abound throughout the coastal district. The almost cosmopolitan marsh hawk shows itself occasionally, and probably rears its young among the reeds margining one or another of the many lakelets. The sharp-shinned hawk is there, and will be likely to increase as civilization extends its conquest to the wilderness. The western goshawk and the roughleg are to be found, both nesting in tall trees. The western redtail is seen occasionally in the south, usually hunting for mice about timber-line on the mountains. The bald eagle, according to Willett, is the most common raptorial bird of the coast south of St. Elias; it is also conspicuously present elsewhere in Alaska. Mr. Willett offers the following interesting note upon it at Sitka:

> The nest is always placed near salt water, all those noted being in tall coniferous trees. The birds seen in the high mountains during the summer were nearly all immature. The young leave the nest late in August. According to James Brightman, the eggs are deposited in late April and early May. During the early summer these birds apparently subsist to a considerable extent on fawns. Several dead eagles examined at this season were gorged with fawn-meat, and the claws were covered with hair. The hunters of the region claim that the eagle is the worst enemy the deer have, and kill them at every opportunity. In the early fall, when the salmon are running up the streams to spawn, these birds feed largely on fish, and they may be seen in numbers around every salmon-stream. A nest examined in St. Lazaria Island in August, 1912, contained the remains of a great number of tufted puffins and young glaucous-winged gulls.

The golden eagle also frequents the sea-fronting cliffs, but is more familiar westward; also both forms of the duck hawk. The pigeon hawk (of the "black" variety) and the fish hawk complete the summer list, but both are rare.

Of the owls, the short-eared finds excellent nesting-places in the thick woods, where also Kennicott's screech-owl is heard, but neither is common. Of the large owls, two are resident—the dusky variety of the great horned owl and the gray owl. Both the snowy and the hawk owls are to be found in winter among the mountains.

The kingfisher flourishes in a region where streams and fishes are so plentiful; and of woodpeckers local varieties of the downy, the hairy, and the three-toed, a sapsucker, and the northwestern flicker, are to be noted. There is also a hummingbird (see page 20), and Vaux's swift; but the latter is rare.

Next comes the great order of Perching Birds. Three flycatchers have been listed, but the western pewee alone is numerous. The magpie is seen irregularly, and seems to be less common than formerly. Steller's jay is a numerous resident, his gaudy plumage flashing before the eyes of the travelers along all the shores, and in clearings and villages. Crows are common, near the coast and on the islands, robbing the nests of the sea-birds as long as any eggs or young are to be obtained; and at other seasons, as Willett tells us, "they gather in large flocks along the beaches at low tide, feeding on shell-fish and crustaceans, and when the tide is in scratching among the drift-kelp along the shore." The fish crow has similar habits, and may be seen in throngs, sometimes, about the fishing-stages and canneries, feeding upon offal. Still more conspicuous and generally distributed is the raven, of which Mr. Willett gives us a graphic picture:

> . . . plentiful in the streets of Sitka, and on the near-by beaches, feeding on refuse and carrion. They were also noted on the tops of the mountain ranges, where they were frequently seen playing on the snow-banks and glaciers. They would dig holes in the snow, and, lying down in them, would scratch the snow over their backs with bill and wings, the coolness secured in this way evidently affording them great enjoyment. They frequently follow the eagles when the latter are hunting, probably in hopes of securing a share of the prey. On one occasion I had killed a deer and left it for a couple of hours. On my return the eyes and a part of the intestines had been picked out by the ravens. . . . The raven is very fond of clams, abalones, sea-urchins, and other shell-fish, which are secured from the rocks at low tide. The shells are frequently found high up on the hillsides, where they have been carried by the ravens. On one occasion Merrill watched a number of birds standing around a hog that was digging clams from the mud. As fast as the clams were brought to the surface they were appropriated by the ravens.

The handsomely marked form of the nutcracker may well reward the keen-eyed observer, but thus far it has been seen, or at least has been recorded, only once inside the bounds of Alaska. The only blackbird is the wide-ranging rusty grackle, and that is uncommon. No other grackles, orioles, meadowlarks, or bobolinks make music in that region of dense forests and rainy skies.

The finch tribe is well fitted to such surroundings, and is largely represented in southern Alaska. The pine grosbeak is plentiful, especially in autumn, the Kadiak race of this species breeding along the coast from the base of the Alaska Peninsula eastward as far, at least, as Glacier Bay, making its nest in spruce trees. Crossbills are seen irregularly, but no doubt breed. Rosy finches make their home on the higher mountain-slopes, and redpolls rear their young in the higher woods.

Along the coast, in open, grassy places, are to be seen and heard in summer the western savanna sparrow, Gambel's whitethroat, its cousin, the golden-crowned, and the western tree-sparrow. Of the snow-birds (*Junco*), both the typical and the Oregon forms are to be found, nesting on brushy hillsides at the roots of bushes; while several subspecies of the highly variable song sparrow are present, but much scattered in distribution. The rusty song sparrow occurs only at the extreme southern extremity of the Territory; the sooty variety is numerous only as far north as Glacier Bay; the Yakutat song sparrow belongs to the chilly front of the Mt. Fairweather range, the Kenai to the Kenai Peninsula; the Kadiak to the island of that name and the neighboring mainland, and the Aleutian variety to the Alaska Peninsula and certain of the Aleutian Islands.

Forbush's sparrow, a variety of Lincoln's, and two races of fox sparrows, are scattered in favorable brushy or grassy places all along the coast to the Alaska Peninsula. One of the fox sparrows (Townsend's) is a brilliant singer.

The barn swallow (a few of which still place their nests on the cliffs of the outlying islands) gladdens the villagers along the coast for a few weeks in midsummer; and tree swallows nest in old woodpecker-holes in the dead stubs in the woods, coming down to the shore after their young are able to fly, and soon drifting southward.

Few warblers, of course, appear upon the list of this part of the country. The lutescent variety of the orange-crown, the Alaska yellow warbler, Townsend's warbler, and the pileolated variety of the blackcap, are all so far noted. The dipper is to be found on almost every stream.

The large family of wrens and thrashers is represented only by the winter wren in its western variety; but a separate race inhabits Kadiak Island. Brown creepers are fairly common along streams, and there are two chickadees—the long-tailed and the chestnut-

backed—and two kinglets. As to the kinglets Grinnell makes some interesting observations; he found the golden-crowned common everywhere about Sitka, especially in the dense fir thickets along the streams. He says:

> On June 22, as I was carefully picking my way through a clump of firs, I chanced upon six of these mites of birds sitting in a row close together on a twig; but when one of the parents appeared and discovered me, her single sharp note scattered them in all directions with a chorus of squeaks, and then in a moment all was quiet and not one to be seen, although all were probably watching me intently within a radius of ten feet.

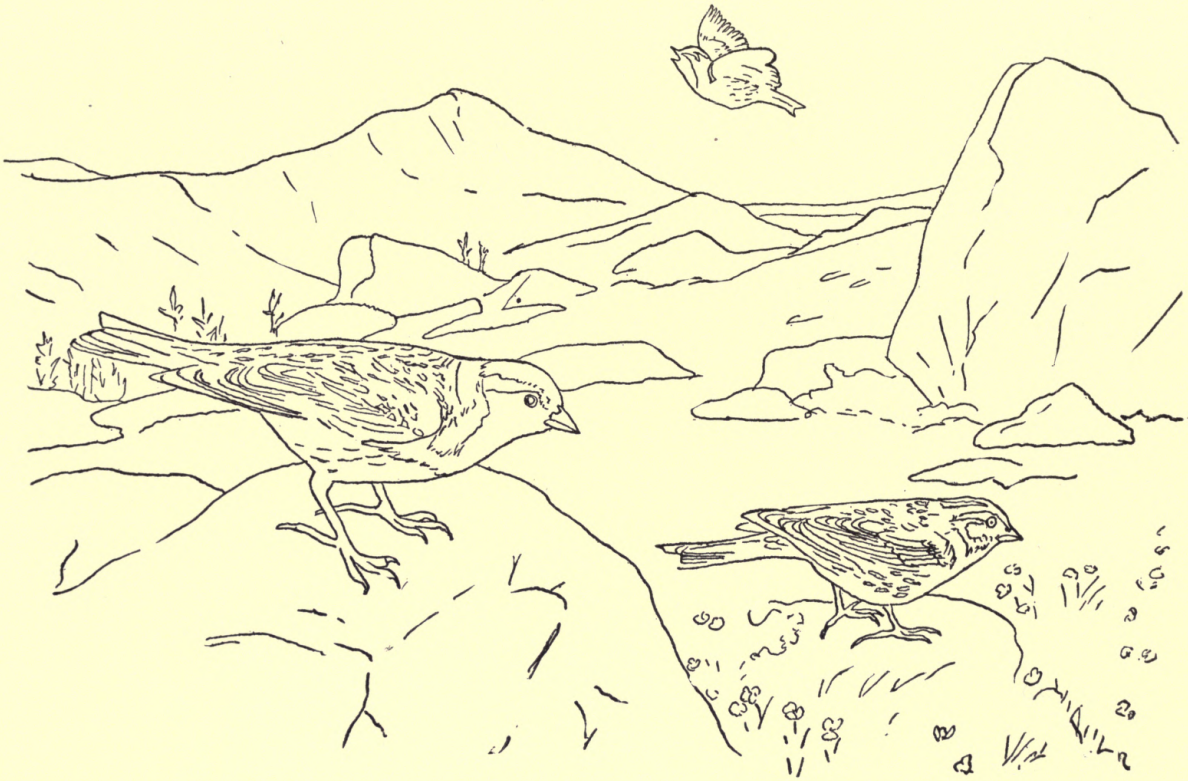
Of the thrush family this coastal region has the russet-backed and the Alaska hermit. The western variety of the robin is present in large numbers, and with the familiar disposition he shows in the East; also the Oregon, or varied, robin—the last of the list of those birds known or believed to rear their young on the seaward side of the mountains.

WOODED-INTERIOR DISTRICT (B)

The principal sources of information upon the birds of the interior of Alaska are the Report by Edward W. Nelson, hitherto quoted, and the account by Dr. Louis B. Bishop, in North American Fauna, No. 19, of a "biological reconnoissance of Alaska" made in the summer of 1889. Dr. Bishop states that about a third of the birds noted by him had their center of distribution in the east, and migrated to Alaska along the Yukon Valley.

The account of the birds of this district, which embraces the forested part of the Territory north of the Alaskan Mountains, begins, as usual, at the lower end of the scale in classification, so that—as seabirds are absent—the first to be mentioned are the fresh-water ducks. The American and red-breasted mergansers, the mallard, shoveler, baldpate, pintail, scaup, American goldeneye or whistlewing, buffle-head, old-squaw, harlequin, both of the teals, and the surf-scoter, all occur, breeding in suitable places; but the green-winged teal and the pintail are by far the most widely distributed and most often encountered. The breeding-habits of several of them, typical of all, have been described by Mr. Nelson (pages 40, 41) as he learned them on the coastal tundras.

Of the geese, while all species are seen during their migrations, the brown, or Hutchins's goose, is most numerous in summer in the interior, where they are said to resort to the hilltops for nesting-sites. Dall reports the white-fronted goose, however, breeding gregariously all along the Yukon, depositing their eggs in hollows



ALASKAN LONGSPUR

Order—PASSERES
Family—FRINGILLIDÆ
Genus—CALCARIUS
Sub-Species—LAPPONICUS ALASCENSIS

National Association of Audubon Societies

scooped out of the sand. The Canada goose is there, too, but is rare. The cackling goose also abounds along the larger rivers and lakes. The whistling swan nests all over the interior, where the trumpeter also is occasionally met.

Shore-birds and Game-birds

The climate and character of the country are unfavorable for the large waders, and the only representative of the group in this district is the little brown or sandhill crane, which seems to be more common in the valley of the Porcupine River than anywhere else.

Of the small waders, however, many species are to be enumerated. The red phalarope nests in the marshes of the interior, as on the coast, and Wilson's, miscalled the English snipe, and the long-billed dowitcher (more common and widely distributed) along the Yukon near the international boundary; but other small waders are rare there except the familiar spotted sandpiper, or tip-up. "Hardly a day passed," Bishop notes, "without our seeing many along the shore [of the Yukon], or skimming over the river. The least, and the semipalmated, and the western sandpipers are present in the breeding-season, but are usually rare. Whether the Hudsonian godwit and the pectoral sandpiper breed inland seems doubtful. The solitary sandpiper, lesser yellowlegs, wandering tattler and upland plover are also recorded as breeders, but probably nowhere in abundance.

Plovers are more fitted to the inland conditions, and most of the northern species make their home along the Yukon—among them the golden, the black-bellied and the semipalmated, but the last is the one most commonly obtained by sportsmen. The surf-bird also is credited with a place in this district.

Turning to the grouse, both varieties of the Canada or spruce grouse, or fool-hen, resort in summer to breeding-places all over the interior of the Territory, and are resident, as a rule, wherever found. "At Anvik on the lower Yukon," according to Nelson, "it is rather common, and inhabits the mixed forests of spruce and deciduous trees, whence it has the habit of coming out on the gravelly river-bank, early in the morning, during pleasant weather in spring and summer." Closely associated with it in extent and station is the gray variety of the ruffed grouse.

The willow ptarmigan is also widely distributed as a resident throughout the year, but most commonly toward the northern part of the forested region. "In autumn," to quote Nelson again, "they unite in great flocks and migrate south to the sheltered banks of the Kus-

kokwim and Yukon rivers, and their numerous tributaries. . . . Early in June . . . the first eggs are laid: by June 20 and 25 the downy young are usually out, and when approached the female crouches close to the ground among her brood. When she sees it is impossible to escape notice she rolls and tumbles away as if mortally injured, and thus tries to lead one from her chicks. At the same time the young try to escape by running away in different directions."

The rock ptarmigan, in its typical form, is also a common summer bird on mountain ranges all over the Territory, as is the sharp-tailed grouse; the latter, however, does not extend its range westward beyond the Ramparts of the Yukon, and it frequents only the more open parts of the country.

Falcons, Eagles, and Owls

Birds of prey find a congenial home in these northern forests, which abound in small mammals and birds upon which they may feed throughout the year; for when the winter's snows bury the mice, lemmings, and ground-squirrels in their underground homes, the hardy rabbits, and the ever-present ptarmigans and snow-birds on the ground, and grosbeaks, jays, finches, and other winged quarry in the trees suffice to feed the few owls and falcons that remain, since most of the hawks, at least, migrate southward in autumn.

The marsh hawk is common wherever open, swampy places attract it. The sharp-shin is present also, and nests in spruces along the rivers. The goshawk was seen by Bishop; and Nelson says it is a characteristic bird of the northern interior, breeding nearly to the Arctic Circle. The skins of these, and of some other small hawks, used to be highly prized among the redmen of the region for ornamental purposes. The western redtails and the roughleg are commonly seen, but Swainson's hawk is rare. Bishop and Osgood consider the redtail the more abundant.

Both kinds of eagles inhabit all the wooded parts of Alaska; and occasionally the bald eagle remains here throughout the winter, when most of its race migrate to warmer regions, where streams are free from ice. The gray gyrfalcon is not numerous, but is resident; and the duck hawk is found as far north as the limit of trees, and nests numerously along the Yukon and other rivers, laying its eggs so promptly that the young are able to fly early in June. Bishop notes that in the neighborhood of the eastern boundary these hawks may be seen almost daily, and that their eyries are numerous on the ledges of the rocky cliffs; but where no such cliffs occur they nest in tall

spruces. Specimens shot by his party had been feeding on marsh hawks, jays, crossbills, sparrows and other birds. The pigeon hawk and sparrow hawk visit the same region—the latter rarely. The osprey fishes along all the larger rivers and lakes, wandering far to the northward.

Several owls are to be found in the interior of Alaska. The far-ranging short-eared owl is common, but is migratory. The great gray species is perhaps the best known owl of the wooded interior, to which it is almost exclusively confined. It is a sleepy, stupid sort of bird, at any rate in the daytime, when it may sometimes be caught in the hand without seeking to avoid this misadventure. It is a hunter of small birds. Dr. Dall wrote that in his day old men and old women among the Indians ate it, but added: "The natives have a superstition that if young persons eat it they will become old very soon and die."

Another common species is the handsome little Richardson's owl, and this, also, is frequently taken from its perch by hand, and is the subject of legends and bed-time stories among both Eskimos and Indians, who sometimes keep it as a pet for the children. It usually nests in a hole in a tree, but now and then takes possession of the abandoned nest of a jay or thrush.

The western, or subarctic, variety of the great horned owl is to be discovered in both summer and winter in all parts of Alaska, although restricted to the wooded district during its breeding-season which begins early, sometimes early in April. The nest is a large structure, made of twigs and branches and placed in a spruce tree in the depths of the woods. Mr. Nelson, in his Report, gives a vivid picture of the feelings inspired in the winter traveler by the hooting of these great owls, as he listens to them in the darkness and toil of a sledge-journey across the snowy and otherwise utterly silent wastes. "When the winter draws on," he tells us, "and during the famine period just before the spring opens, it is common for them [the owls] to get a foot into a fox-trap while they are foraging for food. Again, in early June, as the fur-traders come down the Yukon with their furs they not infrequently bring the half-grown young of these birds as pets."

The snowy owl, on the contrary, is rare in the wooded district, but the American hawk owl is familiar throughout the year. "This," Nelson remarks, "is perhaps the most abundant bird of prey throughout the entire wooded part of northern Alaska. It is rather closely limited to the region of spruce and pine forests of the interior, and

occurs along the open coasts of the Arctic and Bering seas merely as a straggler." Joseph Grinnell, in his essay on the Birds of Kotzebue Sound, gives an interesting note of his experience with this owl, from which I quote:

> In the spring of 1899 their arrival was noted on April 10th in the Yukon district of Alaska. At this date they were already paired, and a female secured contained large ova. On April 26th I located a pair of hawk owls which by their restlessness indicated a nesting site near by. The nest was finally found, but there were as yet no eggs. It was in the hollow end of a leaning dead spruce stub about 10 feet above the ground. The dry rotten chips in the bottom were modelled into a neatly rounded depression. The male bird was quite noisy often repeating a far-reaching rolling trill. Both birds frequently uttered a low whine, alternately answering one another. On May 8th, while snow-shoeing across the country toward the base of the Jade mountains, my attention was attracted by the distant trill of a hawk owl. . . . I had given up hope of finding a nest and had started on, when, by mere chance, I happened to catch sight of a hole in a dead spruce fully 200 yards away. A close approach showed a sitting bird which afterwards proved to be the male. Its tail was protruding at least two inches from the hole, while the bird's head was turned so that it was facing out over its back. When I tapped on the tree the bird left the nest, flew off about thirty yards, turned and made for my head like a shot. It planted itself with its full weight on to my skull, drawing blood from three claw-marks in my scalp. My hat was torn off and thrown twelve feet. All this the owl did with scarcely a stop in its headlong swoop. When as far on the other side the courageous bird made another dash and then another, before I had collected enough wits to get in a shot. The female which was evidently the bird I had first discovered on look-out duty then made her appearance, but was less vociferous. The nest contained three newly hatched young and six eggs in various advanced stages of incubation. The downy young, although their eyes were still tightly closed and they were very feeble, uttered a continuous wheedling cry, especially if the tree were tapped or they were in any way jarred. This could be heard twenty feet away from the base of the tree. The nest cavity was evidently an enlarged woodpecker's hole.

Woodland Species

The kingfishers, arriving early from the south in large numbers, frequent all the streams of the interior, digging nest-tunnels in their banks, and remaining until the freezing of the rivers compels them to betake themselves to less severe latitudes.

Both hairy and downy woodpeckers abound, making their nest-holes by preference in the stubs and trunks of deciduous trees, yet occupying spruces whenever birches and poplars are not at hand. Two species of three-toed woodpeckers also breed in these forests, as also does the northern variety of the eastern flicker. Bishop says that these flickers are the most common of all woodpeckers about Fort Yukon.

Whether the hummingbird of the coast (*Selasphorus rufus*) ever crosses the mountains into the interior is not certainly known; no doubt it does so now and then, as it appears to be a regular visitor to the head-valleys of the Yukon River.

Passing to the tribe of insectivorous perching-birds—the songsters of wood and meadow—we find the list in this district a short one; yet representatives of many kinds familiar in the south resort to these far northern valleys and hills to rear their young during the brief season of warmth allotted to them for that purpose. Among these are several flycatchers, the first on the list being the phœbe. It is especially welcome because it settles at once in the villages and about the miners' cabins, and dares, with engaging confidence, to place its nest of mud and moss upon the projecting end of some house-log, or beneath the porch or eaves. Where rocky cliffs border the Yukon the phœbes build their nests on the ledges, as seems to have been their primitive custom everywhere. Their highway of migration is along the course of the great river.

The olive-sided flycatcher, which one would expect to find here, does not seem to go much north of British Columbia. The plaintive call of Richardson's, or the Alaska, wood pewee, is to be heard in summer even beyond the Arctic Circle, and its eggs may be looked for in July. The alder and Hammond's flycatchers are numerous in this district wherever thickets of alders and willows grow in warm valleys.

Steller's jay occasionally follows the Yukon north to its great bend near the international boundary. The jay of Alaska, however, is the "smoky" form (*fumifrons*) of the Canada jay, known to everyone by such names as whisky jack, camp-robber, moose-bird, and the like. It is as bold in its nest-making as in other things, and often lays eggs which must hatch in a temperature below zero. Joseph Grinnell gives a graphic account of its nesting, supplementing the amusing story told in Mr. Nelson's Report of the superstitious fear the natives formerly felt toward disturbing the nests of these birds, which, they believed would revenge themselves by prolonging the winter. Mr. Grinnell writes:

> Toward spring the jays became remarkably reclusive, and their visits around camp were less and less frequent. I suspected that by the middle of March they would nest, and I consequently spent much time in fruitless search. . . . Finally I saw a jay with a large bunch of white down in its bill, flying back along the timber. . . . Not until May 13th, however, did I finally find an occupied jay's nest, and its discovery then was by mere accident. It was twelve feet up in a small spruce amongst a clump of larger ones on a low ridge. There were no "tell-tale sticks and twigs on the snow beneath," as Nelson notes, and in fact nothing to indicate its location. The nest rested on several horizontal or slightly drooping branches against the south side of the main trunk. . . . The walls and bottom consisted of a closely felted mass of black hair-like lichen, many short bits of spruce twigs, feathers of ptarmigan and hawk owl, strips of a fibrous bark, and a few grasses. The interior was lined with the softest and finest grained material. The whole fabric is of such a quality as to accomplish the greatest conservation of warmth, which certainly must be necessary where incubation is carried on in below zero weather.

The raven wanders over the entire Territory, but is much less conspicuous and familiar in the interior than on the coast. It is resident; and Nelson gives a fine picture of the part it plays in the terrible landscape and experiences of midwinter life amid the wastes of the lower Yukon Valley. No crows reach this country, but the rusty blackbird is a regular, although infrequent, visitor, extending its breeding-range to the northern limit of tree-growth.

Finches and Other Small Songsters

The finch family, as would be expected, is numerously represented, some of those which haunt trees, as the grosbeaks, being among the most abundant of Alaskan birds. The Alaskan pine grosbeak is everywhere abundant and fearless all the year round. Grinnell furnishes the best account extant of this very interesting bird:

> In September and October pine grosbeaks were quite numerous, being often met with in companies of six to a dozen, immatures and adults together. They were usually among the scattering birch and spruce which line the low ridges. There, until the snow covered the ground, they fed on blueberries, rose-apples and cranberries. During the winter their food was much the same as that of the redpolls—seeds and buds of birch, alder and willow, and sometimes tender spruce needles. In the severest winter weather they were not often in the spruce, but had then retired into the willow beds. The usual note is a clear whistle of three syllables. The native name, ki-u-tak, represents it. Then there was a low, mellow, one-syllabled note uttered among members of a flock when alarmed. Twice I noted solitary males, when flying across the woods, singing a loud, rollicking warble, much like a purple finch. One morning, the 18th of February, found me across the river skirting the willows in search of ptarmigan. Although it was 50 degrees below zero, a pine grosbeak, from the depths of a nearby thicket, suddenly burst forth in a rich melodious strain, something like our southern black-headed grosbeak. He continued, though in a more subdued fashion, for several minutes. Such surroundings and conditions for a bird-song like this! Again one day in March, during a heavy snow-storm, a bright red male sang similarly at intervals for nearly an hour, from an alder thicket near the cabin, and as summer approached their song was heard more and more frequently.
>
> Not until May 25th did I discover a nest. This was barely commenced, but on June 3rd, when I visited the locality again, the nest was completed and contained four fresh eggs. The female was incubating, and remained on the nest until nearly touched. The nest was eight feet above the ground on the lower horizontal branches of a small spruce growing on the side of a wooded ridge. The nest was a shallow affair, very much like a tanager's. . . . The eggs were pale Niie blue with a possible greenish tinge, dotted and spotted with pale lavender, drab and sepia.

The red, or American, crossbill is extremely rare, and perhaps does not occur at all north of the Alaskan Mountains; but the white-winged crossbill is to be seen everywhere that forests grow. It is more familiar, Nelson tells us, than the pine grosbeak, frequently coming low down among the smaller growth; and it is a common sight to see parties of them swinging about in every conceivable position in the tops of the cotton-woods or birch trees, where the

birds are busily engaged in feeding upon the buds. "They pay no heed to a passing party of sleds except, perhaps, that an individual will fly down to some convenient bush, whence he curiously examines the strange procession, and then, his curiosity satisfied or confidence restored, back he goes to his companions and continues his feeding. When fired at they utter chirps of alarm, and call to each other with a long, sweet note, something similar to that of the goldfinch."

Equally abundant all the year round are the two redpolls—both the hoary redpoll and the common "linnet." They are alike in range and habits, and in July come trooping about, young and old, in large parties, with great confidence and a peculiar pertness, taking possession of the premises and using the roofs and fences for convenient perches. "On warm sunshiny days during April they come familiarly up to the very windows and doors, and peer about with an odd mixture of confidence and curiosity, examining everything, and scarcely deigning to move aside as the people pass back and forth. By the 8th of June their young are frequently hatched, and by the 1st of July are fully fledged."

The snowflake resorts in summer to the northernmost parts of the interior to rear its young; but as the cold weather comes on nearly all go south to the warmer or less snowy parts of Canada, and the same may be said of the Lapland longspur.

The western savanna sparrow is not uncommon, Osgood finding many young about Circle City in August; and Gambell's, or the intermediate, white-crowned sparrow is one of the most numerous and familiar of summer birds all over the Territory, beginning to nest about May 20. Its nest ordinarily is placed on the ground, rarely in low bushes, and is lined with deer's hair and feathers, or sometimes with club-moss. The four eggs "have a clayey-white ground-color, thickly covered with small reddish spots," and measure about .87 by .64 of an inch.

The golden-crowned sparrow is much less often seen in the interior than near the coast. The western tree sparrow is very numerous, but the chipping sparrow much less so. In regard to the tree sparrow Nelson gives many particulars:

> Upon its first arrival it comes about the trading-posts and native villages, frequenting the weed-patches. After a short visit here, and when the snow has melted from portions of their bushy retreats, they leave the vicinity of man and betake themselves to the hill-sides, where . . . the young are hatched and become fully fledged early in July. Toward the last of this month—sometimes by the middle—the young and old come trooping back to the vicinity of the houses, ready to feast with numbers of their fellows in a motley crowd among the weed-patches and in the garden-plot. During

the last half of July and the entire month of August, with various others of their kind they may be found flitting about the buildings, or even coming within the yard and up to the very doorsteps, their bright black eyes carefully searching every inch of ground for morsels of food. In spring these birds attain their breeding plumage by the wearing away of the grayish tips. . . . In the north, before taking leave for their winter home, they gather in flocks on the bushy borders of the woods, and their low, sweet chorus is heard rising and falling as they tune their gentle pipes for the songs they are to utter later in the season. This bird's power of song, however, is not great, and its music is, perhaps, most pleasing when thus heard in chorus.

The snow-bird (*Junco*) also breeds abundantly all along the Yukon and its tributary valleys. "The slate-colored junco and the western chipping sparrow," remarks Dr. Bishop, speaking of the region about Fort Yukon, "were most common about the brush-heaps left by the lumbermen, weed-grown clearings resulting from forest-fires, and about cabins or the towns. Every nest found was sunk in the ground to the rim in an open place under a weed or a tussock of grass."

None of the varieties of the song sparrow goes so far north; but its place is taken by Lincoln's sparrow, whose habits are similar, and whose delightful singing is heard all over the wooded interior. The fox sparrow, too, regales the ear in summer wherever trees or bushes grow.

Both the cliff and the barn swallows cheer the hearts of the people in towns, as well as the residents in lonely miners' and prospectors' cabins scattered through the mountains, placing their nests confidingly under roofs as soon as these are provided for them; yet many colonies of both species inhabit the wild cliffs. The tree swallows, nesting in abandoned woodpecker-holes, and in hollow stubs, are regular summer visitors, along with the violet-green and the bank swallows; the violet-green species customarily nests in the cliffs, but Dr. Bishop records that several times he saw it entering tunnels resembling those of bank swallows, great numbers of whose burrows pitted the earthen banks along the Yukon.

The Bohemian waxwing is a resident of northern Alaska, where the first nest and eggs on record were obtained at Fort Yukon in 1861 by Robert Kennicott. This nest was placed in a spruce growing at the edge of a swamp, and both it and the eggs much resembled those of the familiar cedar-bird. Bishop furnished an interesting note on this bird:

Two males that we noticed while descending Thirty-Mile River were perched on the topmost sprays of tall spruces, uttering a lisping whistle at frequent intervals. One of them flew after a passing insect in the manner of a flycatcher. Flocks were easily approached, and when one bird was shot the rest would scatter, and each would alight on the top branch of some spruce and utter a characteristic call-note. This note, which we often hear

from passing flocks, was similar to the whistle just mentioned. The birds that we collected had been feeding on the purple berries of some unidentified plant.

The northern butcher-bird is also common all over the interior of Alaska; and Nelson gives a pleasantly full account of its singing, and of other features of its summer life, making it appear to much better advantage than does the ordinary biography, which dwells too much on the bird's predatory habits, most noticeable in winter.

A surprising number of those delicate migrants, the wood-warblers, travel annually to this far-northern region—a fact surprising less on account of the cold of the climate than of the distance from their winter home, and of the high mountains which must be passed over in the flight from the Canadian plains to the valley of the Yukon. Yet the wooded interior of Alaska harbors in summer great numbers of yellow warblers, orange-crowned warblers, myrtle-birds, blackpolls, oven-birds, blackcaps and water-thrushes; and Mr. Nelson devotes many pages to his observations upon their pretty ways, which do not differ essentially from those observable in more southern latitudes.

The pipit lark, the dipper, the red-breasted nuthatch, the chickadee (in three varieties), and the ruby-crowned kinglet of Alaska, are the same attractive little creatures so well known elsewhere.

This brings the list for this district up to the thrushes, a group that is well represented, happily for the Alaskan people. The gray-cheeked, or Alice's, thrush is to be met with abundantly all over Alaska in summer; and equally numerous at that season throughout the wooded parts of the Territory is the local buff-cheeked variety of Swainson's, or the olive-backed thrush; but it differs very slightly from the type in appearance, and not at all in habits. The music of even these charming choristers, however, is surpassed by that of the solitaire:

> On the hot noon of June 26, while seated on the summit of a hill some 1,500 feet above Caribou Crossing, I heard the most beautiful bird song that has ever delighted my ear. It seemed to combine the strength of the robin, the joyousness and soaring quality of the bobolink, and the sweetness and purity of the wood thrush. Starting low and apparently far away, it gained in intensity and volume until it filled the air, and I looked for the singer just above my head. I finally traced the song to a Townsend solitaire that was seated on a dead tree about 150 yards away, pouring forth this volume of melody without leaving its perch. The singer came close enough later to make identification certain.—*Bishop.*

The robin also occurs numerously wherever woods grow to give it food and shelter; and it is seen in the spring migrations on the coast of Bering Sea, but few, if any, breed there. Its relatives, the Oregon robin and the mountain bluebird, occasionally appear near the Canadian boundary.

ARCTIC COASTAL DISTRICT

BY E. W. NELSON

Alaska is widely famed for its gold-placers, fur-seals, salmon-fisheries, majestic glaciers and awe-inspiring mountains. To these and other favors, bestowed by the generous hand of nature, is added a bird-life wonderfully rich and varied in comparison with that of the same latitudes on the eastern side of North America. This is due to more favorable climatic conditions, to the varied physical character of the land-area, and to the abundance of small animal-life in the ocean, which affords an inexhaustible supply of food to sea-fowl.

Along the extreme southeast coast of the Territory lies a series of heavily forested islands; far to the west are strung the rock-bound, treeless islands of the Aleutian chain; to the northward bordering the coasts of Bering Sea and the Arctic Ocean lies a broad belt of arctic tundra, separating the sparsely wooded interior from the sea. These coastal plains are cut by the great Yukon, Kuskokwim, and Kowak rivers, flowing down from the interior, where they rise on the slopes of far-distant mountains. This great region offers a superb background for the swarming bird-life that visits it in summer.

Alaska is situated so far north that its year is divided into only two seasons, a short summer and a long, cold winter. From the middle of May until the middle of July there is much calm and sunny weather, with a delightful temperature. This pleasant period is especially favorable to the successful nesting of myriads of birds of both land and sea, and enables them to bring their downy young through the first few precarious weeks of their lives. It is amazing to note the rapidity with which flowers spring up and bloom as soon as the snow melts from the tundra; and in sheltered places grasses and flowering plants grow rankly, sometimes waist high, even directly under the Arctic Circle, as I saw on the shore of Kotzebue Sound.

Along the coast of Bering Sea the sun sinks only a short distance below the horizon during a few hours of the twenty-four, so that in June the light at midnight is sufficient to enable one easily to read fine print. The birds at this season observe the nightly hours of rest, however, with the same regularity shown where night and day are definitely marked. At eight or nine o'clock at night all except the nocturnal species retire to secluded spots to rest until three or four o'clock in the morning. The noise of their many voices dies suddenly

away as the birds go to sleep, and quietness reigns unbroken, except for the melodious songs of the old-squaws, or the occasional wild, laughing cry of a loon. During the long twilight of these early summer nights I often wandered for hours over the silent tundra southeast of St. Michael, watching the sleeping birds on the numberless ponds as well as on the open land. From 9 o'clock in the evening until about 3 o'clock in the morning the sight of birds on the wing was rare, except when occasionally straggling parties of Sabine's gulls appeared. These exquisitely beautiful birds trailed silently by, one by one, at all hours, their black heads and wing-borders contrasting with their snow-white bodies. Now and then an arctic tern would pass, and more rarely still a wandering loon.

The day's activity is usually begun in the morning by the clanging cries of geese, quickly echoed by a medley of other bird-notes from all directions. The bird-world becomes at once awake. Flocks of ducks and geese move away to feeding-grounds, gulls and terns circle and hover over ponds, cranes stalk solemnly about, and small waders are busy everywhere.

Asiatic Visitors to Alaska

Alaska is separated from the nearest point of Asia at Bering Strait by a distance of only about forty-eight miles. This nearness makes it certain that various East-Asian birds will appear from time to time within our borders, and, in fact, more than twenty species of Old World birds have already been found in western Alaska; two of these, the Pacific golden plover and the bristle-thighed curlew, winter on the southeastern coast of Asia or in the Polynesian Islands, but breed in northeastern Siberia and on the Bering-Sea coast of Alaska. The typical form of golden plover, familiar as a migrant in the eastern United States, occupies only that part of Alaska from Kotzebue Sound north, and the more richly golden form of the Pacific replaces it to the southward of Bering Strait. The European teal breeds throughout the Aleutian Islands, where it replaces the green-winged teal of the mainland. The sharp-tailed sandpiper, a beautiful species somewhat similar to the pectoral but much more richly colored, swarms across from northeastern Siberia after the breeding-season, and is very numerous along the Alaskan coast of Bering Sea. The yellow wagtails, also, breed on this Alaskan coast as well as in eastern Siberia, but in autumn all of the Alaskan ones return to Asia for their southward migration. The beautiful little spoon-billed sandpiper, the dotterel, the Mongolian plover, Cassin's bullfinch, the Siberian red-spotted, blue-throated warbler,

the willow warbler, and the red-throated pipit, occur as wanderers from Siberia at the end of July or in August, but return to Asia for the southward migration.

The Pribilof, or Fur-Seal, Islands are the most notable part of Alaska for the number of Old World strays which have been taken there. Among these are the tufted duck, the European pochard, the long-toed stint, the ruff, Tegmalm's owl, the Kamchatkan cuckoo, and the Japanese hawfinch. The information on this subject already obtained on these islands, despite so small an amount of work done, indicates that numerous other Old World birds are likely to be added to our fauna there. Wandering species appear to drop in at these islands much as they do on the island of Helgoland in the German Sea, which has become famed in bird-annals for the extraordinary number of its strange visitants.

Braving an Arctic Winter

In spite of its northern situation and the arctic conditions that prevail in winter over the greater part of the Territory, Alaska possesses a long list of birds that remain within its borders the year round, some even in the extreme north—hardy spirits that hold their own through all the severities of a boreal winter.

Conspicuous among these is the Alaskan jay, the northern representative of the well known Canada jay, from which it differs only a little in coloration. Like the Canada jay, it is called "camp-robber" and "whisky-jack," and is a common and familiar visitor to camps and villages, especially in winter, when these jays are amusingly, and often exasperatingly, audacious in their raids on any unguarded food. If encouraged they become extremely tame, and will enter cabins to enjoy the hospitality of the occupant, or will even fly to meet a friend when he goes abroad, alighting on his head or shoulder, and otherwise making themselves interesting companions to the lonely dweller in an isolated winter camp. A typical instance of the impish humor of these birds was given by an encounter I had with one early in June on the coast of Bering Sea. I was crossing from the mouth of the Yukon to St. Michael in a large kyak, with two Eskimo companions. About midway we camped and slept for a few hours on the low point of Cape Romanoff. When the sun arose, very early in the morning, we made a fire of driftwood and had our breakfast close to a scraggy little patch of leafless alders near the beach, which were the only shrubs in sight and appeared too small and scattered to conceal any bird. Finally we launched our kyak and started

to paddle away. At the first stroke a shrill, exultant note caused us to look back, and there, balanced on the tip of the largest alder stood a whisky jack, his attitude and cries expressing contemptuous derision at our failure to see him while camped within ten feet. The Eskimos were as much amused as myself by this impudent performance, and we paddled away laughing, while the bird proceeded to search our camping-place for scraps of food.

The water-ouzel, or dipper, is another of the notable land-birds that lives throughout the year in the North. It is smaller than the robin, has a much shorter tail, and is of nearly uniform dark leaden gray. The ouzel dwells along small swift streams, and feeds on insects and other minute animals that it finds along the margins or seeks by diving into the water and walking along the bottom. In winter its distribution is limited strictly to the vicinity of openings in the ice, where the current is so swift that it does not freeze over. Through these openings the ouzels reach the bottom of the streams and gather their food. It appears almost incredible that these small birds can exist by haunting the icy margins of such openings in the vicinity of the northern limit of trees, and in temperatures often ranging from 50° to 70° F. below zero; but they have dense and closely set feathers that turn water like the plumage of a duck.

That some water-fowl are equally hardy, is shown by the observations of Charles Sheldon during the winter of 1907-8, which he spent on the north base of Mt. McKinley. On January 3, 1908, he visited a point on the Toklat River about forty miles above its mouth where a swift rapid about three miles long prevents the water from freezing throughout the winter. Here a flock of about three hundred mallard ducks were wintering, and were feeding solely upon the dead salmon and unhatched salmon eggs lodged in the bottom of the stream. Sheldon reports that mallards had been noted wintering at this place during the preceding seven years, and mentions several other places in interior Alaska where mallards are known to winter. These observations show that birds are indifferent to the lowest winter temperatures, as long as sufficient food is available.

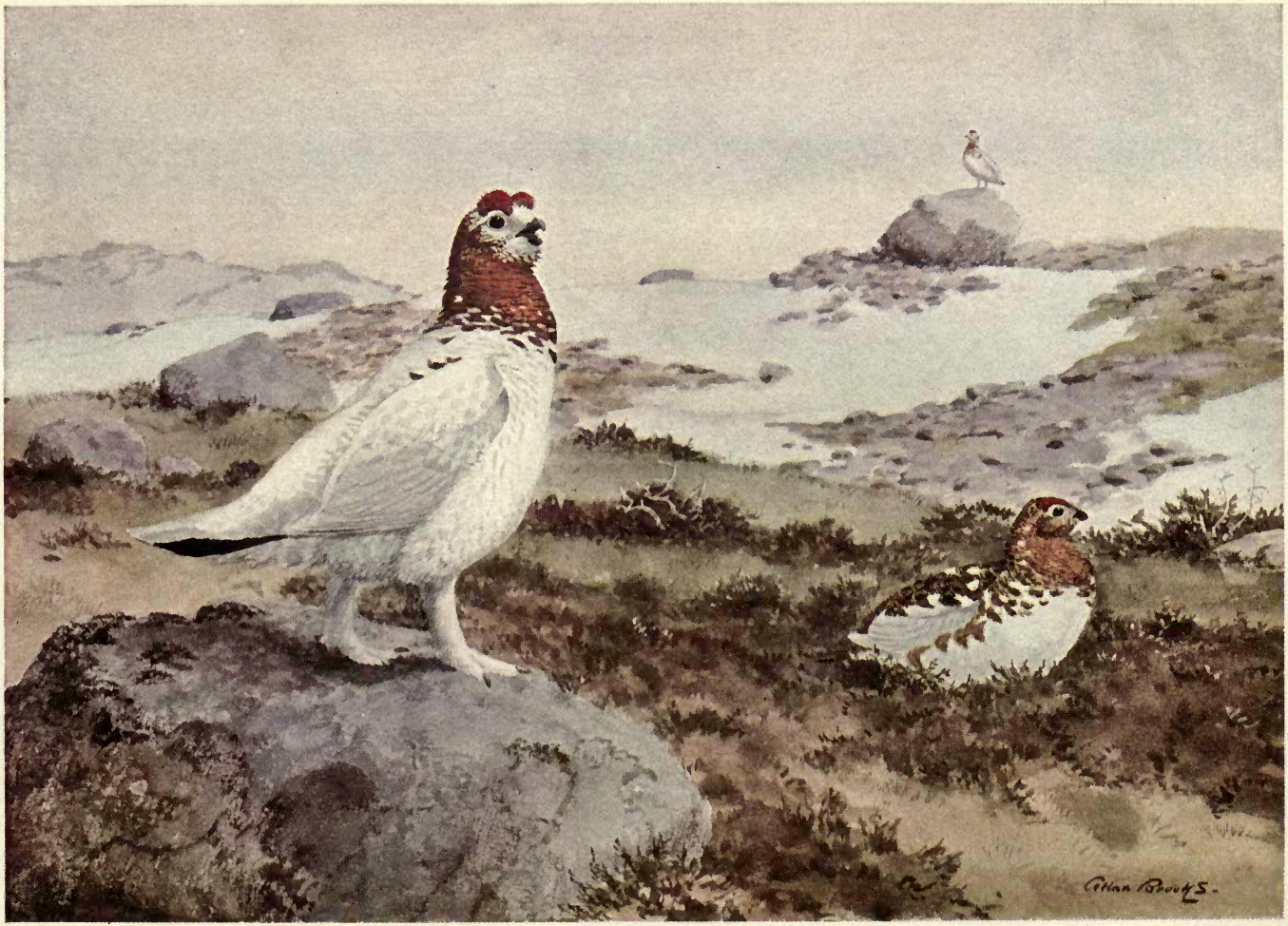
One winter during my residence in the North Jack McQuesten brought me a fine specimen of the fork-tailed petrel, that he had captured toward the end of November at an opening in the ice about seventy-five miles above the mouth of the Tanana River. This bird was evidently a stray individual that had become lost over the snow-covered land, and had wandered many hundreds of miles from its proper wintering-range in the North Pacific. It was extremely emaci-

ated, and evidently was about to perish from exhaustion. Such tragedies are common in bird-life.

Although so far north, Alaska has within its borders several species of grouse. The sharp-tailed grouse ranges westward from the Yukon Territory, in Canada, to the vicinity of Fairbanks on the Tanana River. The gray ruffed grouse and the spruce partridge occupy the forested parts of the interior, and the Oregon ruffed grouse and Franklin's grouse inhabit the forests of the southern parts of the Territory. In addition to these handsome birds Alaska is the home of several species of ptarmigan, living on the bare mountains, or on open tundras, wherever arctic conditions prevail.

All of the ptarmigan of Alaska have a mottled buff-and-brown summer plumage, changing at the approach of winter to an almost entirely snowy white one, which is worn until the ground begins to become free of snow in spring. Of these grouse the white-tailed ptarmigan, which lives above timberline on the bare mountain-tops south of the Yukon, is least numerous and not often seen. It may be distinguished from the others by its pure white tail, the others having black tails hidden under the long overlying white feathers of the rump. The rock ptarmigan is a little larger, and is more generally distributed than the white-tailed species. The only remaining species, the willow grouse, or willow ptarmigan, is generally distributed over all the tundras and open barrens of the Alaskan mainland. It is the largest and by far the most abundant of all the ptarmigan, and soon becomes a familiar bird to everyone who travels across country in that region.

In winter these birds gather in enormous flocks, numbering hundreds, along willow-grown bottoms south of the Yukon River. When one comes on such a congregation, and the pure white birds suddenly take wing, it looks like an explosion of the snowy surface of the ground. Small coveys, probably families of the previous summer, occur here and there wherever food is to be found. Being ground-roosting birds, they are in constant danger of being stalked at night by foxes, and sometimes by lynxes. In order to avoid making a trail likely to lead an enemy to them, these small coveys, when going to roost, often fly to the middle of a patch of scrubby alders, or other small bushes, and drop into the snow in their midst. Here they remain imbedded to the level of their backs in the snow until morning, when they take flight by springing straight up, leaving clean-cut moulds of their forms, and fan-shaped marks on each side in the snow showing where the tips of their wings cut the surface at the first

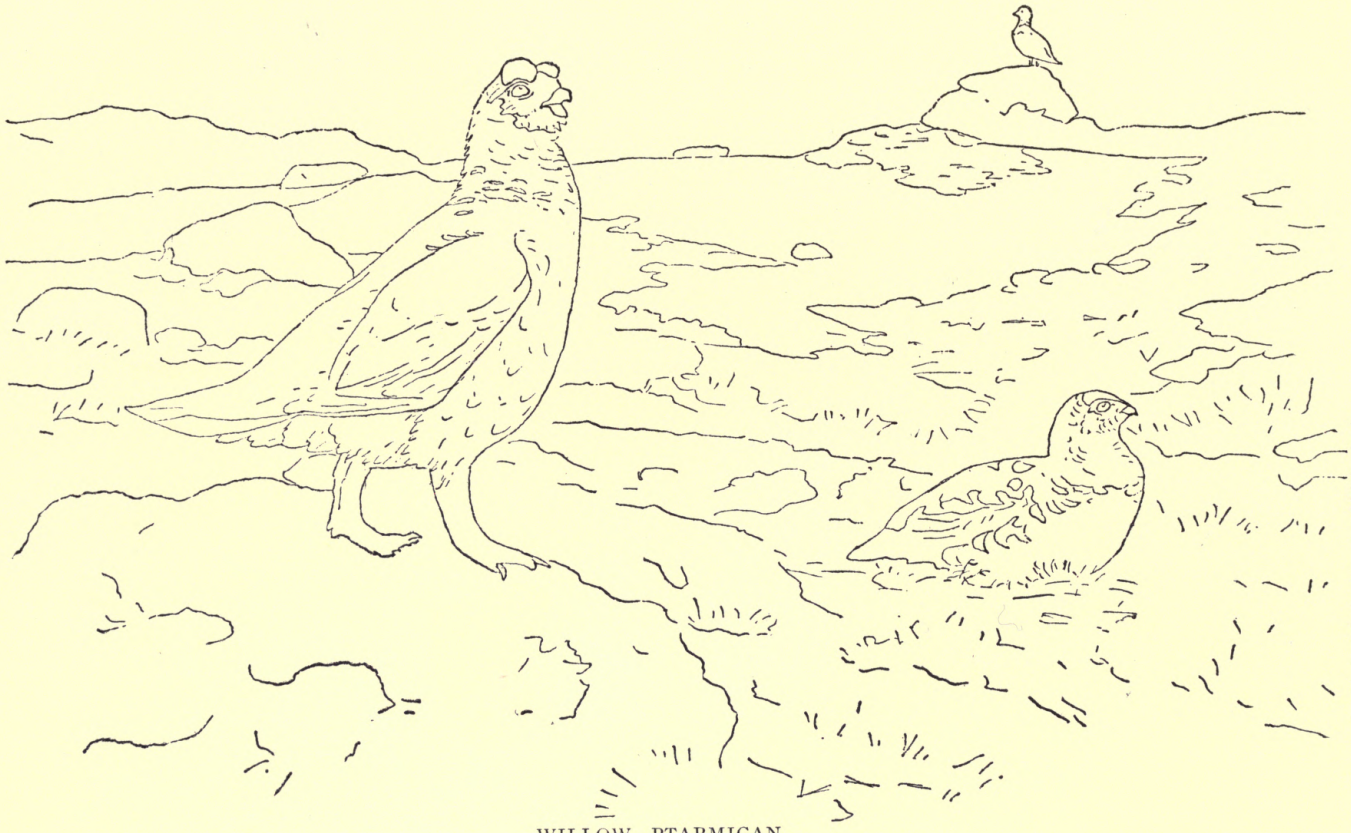


WILLOW PTARMIGAN

Order—GALLINÆ
Genus—LAGOPUS

Family—TETRAONIDÆ
Species—LAGOPUS

National Association of Audubon Societies



WILLOW PTARMIGAN

Order—GALLINÆ
Genus—LAGOPUS

Family—TETRAONIDÆ
Species—LAGOPUS

stroke. The snowy plumage of these birds in winter renders them as difficult to see at that season as their brown coat does in summer. Ptarmigan and other grouse suffer heavily throughout the year from the birds of prey that haunt their territory and pursue them relentlessly—eagles, goshawks, gyrfalcons, owls, ravens, etc.

Golden eagles occur throughout most of Alaska, ranging to the Arctic Coast and well out on the Aleutian chain. The Alaskan bald eagle also is numerous, and in certain places extraordinarily numerous. The multitude of these handsome birds upon the islands and along parts of the southern coast of Alaska is almost incredible to one who knows the bald eagle only elsewhere. Sometimes scores of them may be seen congregated about the shores of a single small bay in southeastern Alaska and they are to be seen along the entire length of the Aleutian chain. These eagles are reported to be a serious pest in places where fox-farming has been attempted, as they destroy the foxes, especially the young. The great gray sea-eagle also crosses sometimes from the coast of Kamtschatka to the Aleutian Islands.

Horned owls are numerous in the wooded districts, and become very plentiful during years when rabbits or lemmings are especially abundant, providing an unusual food-supply. The traveler along the frozen surface of the Yukon on winter nights frequently hears the hollow notes of these birds from the forests which loom like black walls on each side of the river. Late in the autumn they wander from their usual haunts, and sometimes appear at St. Michael or elsewhere on the barren tundra.

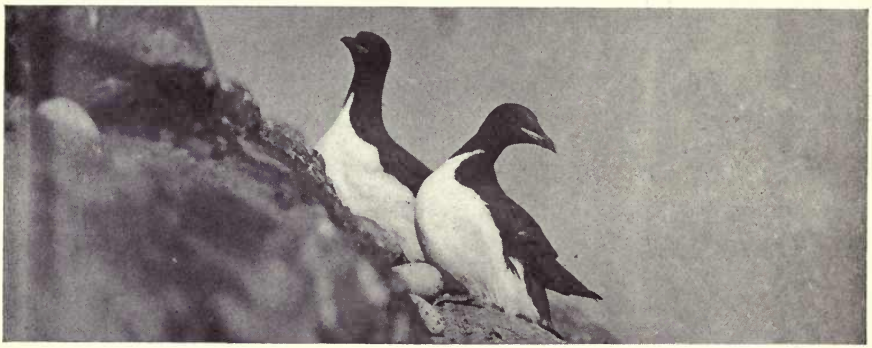
The snowy owl, the arctic member of this family, makes its home on the open tundra. It is more diurnal than most other owls, and in winter may be seen gliding over the snow close to the surface, when it is difficult to follow with the eye on account of its lack of color. During a sledge-trip south of the Yukon, one December, I saw a freshly killed snowy owl whose immaculate plumage was suffused throughout with a rich and beautiful shade of lemon-yellow, exactly as a salmon-color or a rosy red suffuses the plumage of certain gulls and terns in spring. The following morning this lovely tinge had almost completely vanished, only a trace of it remaining under the wings and near the bases of the feathers.

Ravens occur throughout Alaska, and are abundant along the southern coast and on the Aleutian Islands, where they come familiarly about the settlements, and have attracted the interested comment of visitors since the early days of the Russian occupation. At Unalaska

the ravens live in large numbers about the village, perching on the roofs of the houses, and hopping about among domestic fowls as familiarly as the chickens themselves. These ravens spend much of their time on the wing, circling high over the town and bay, and performing a series of extraordinary evolutions. They sometimes drop a long distance in a series of heels-over-head revolutions like an acrobat, ending in a long glide on outspread wings or in some other eccentric performance, always accompanied by explosive cork-drawing sounds and a variety of other cries and croakings. They appear to enjoy especially making these playful flights during hard gales, when the entire raven-colony will take part. They soar, turn, and twist, on facile wing, and fill the air with a medley of strange cries, as if taking impish joy in the fierce wind roaring across the rugged mountain-sides and beating the surface of the bay into a froth of flying spray. Although seeming so jocular in mood, these black-garbed birds are remorseless pirates, robbing other birds of their eggs and young whenever opportunity offers.

Bird-Life of the Sea Islands

My first approach to Alaskan shores was about the middle of May, when we neared Akutan Pass on our way to Unalaska Harbor.



PALLAS'S MURRES ON BOGOSLOF ISLAND IN BERING SEA
From a Photograph by A. C. Bent

The morning was clear and absolutely calm, the only breaks in the glassy surface of the swelling sea those made by the wake of the steamer, and the ripples circling from the breasts of thousands of water-fowl—murres, auklets, gulls, and fulmars—and a few fur-seals.

The swarming abundance of bird-life about the rocky shores of the Aleutian chain, and of the islands of Bering Sea, adds wonderfully to the interest of these frowning coasts. The cliff-walled shores of the Fur-Seal group, and of the islets in Bering Strait, which stand like

stepping-stones between America and Asia, are occupied in spring and summer by uncounted millions of murres, murrelets, auklets, cormorants, and gulls, nesting in crevices and on ledges along the ragged fronts and slopes of the rocky cliffs, which often rise a thousand feet or more sheer from the stormy sea at their base. When startled from their perches on the Diomede and King islands in Bering Strait the murres and auklets fill the air with whirring forms, so that the islets appear like huge bee-hives in swarming time. Fortunately the vast nurseries of the Aleutian Islands are now set aside as National bird-refuges, where, through all the coming years, the birds may rear their young in comparative safety.

The Aleutian Islands are swept by so many gales and fierce local storms, or "woollys," that if birds are to exist there they must continue their affairs despite them and they have become able to do so. As a consequence, even in the fiercest gales, when a man has hard work to face the wind, he may hear the ptarmigan crowing on the hills and song sparrows and wrens singing in the little valleys and coves near the shore.

The number of land-birds on these islands is extremely limited nevertheless. Most notable are the ptarmigan. These are close relatives of the rock ptarmigan of the mainland, and are found throughout the Aleutian chain. Owing to climatic influences and isolation the ptarmigan on each of the larger islands or groups of islands have become a little different from the others and naturalists have recognized seven kinds among them.

On Akutan Island I once saw an Aleutian wren, a little brown bird, clinging to a twig of dwarf willow a foot or so high on the crest of a cliff, and pouring forth its soul in melodious song, while a heavy gale swept over the island and whipped the bird on its perch back and forth until it seemed as if the songster must be torn loose and blown away to sea. Another conspicuous habitué is a gigantic song sparrow, so strongly built that he can well withstand his harsh surroundings. A large brown finch with rosy sides also makes its home there; and three species of snowflakes dwell on the barren coasts and islands of Bering Sea, their contrasting black-and-white plumage making them conspicuous on the dull brown tundra. The presence of eagles and certain other birds of prey is elsewhere alluded to.

On the heavily wooded islands of southeastern Alaska the bird-life is closely related to that of the adjoining humid and forested area of British Columbia and the coast of Washington. Among the most

interesting of the birds here is the rufous hummingbird—a dainty little species, the male of which is bright rusty rufous with a flaming coppery-red gorget. These pygmy birds rear their young along the coast northward to the 61st parallel of latitude in Prince William Sound, where they endure a raw and extremely inclement summer climate in a region of gigantic glaciers and of mountain-sides clothed in snow.

The Bird-Year at St. Michael

During the years I lived on St. Michael Island, the coming and going of birds about the small group of log-houses which formed the trading-post were constant features of interest; and the arrival of the birds in spring was always heralded with especial joy. During the last days of April or first of May everyone is on the alert to note the first goose of the season. The ground at this time is still covered with snow, and the sea overlaid with the heavy pack-ice to the far horizon, and zero-temperatures are common. In the interior, however, the season is farther advanced, and from there come solitary geese spying out the land along the coast from one to two weeks in advance of the main body, which appear to be waiting behind the horizon until the sun has bared most of the broad tundras, flooded the ponds, and set icy streams running everywhere over the country. These first arrivals come singly from the direction of the lower Yukon, flying high over head, and uttering loud, clanging notes as they go speeding in a wide circle over the wintry landscape. The passage of the first of these harbingers of returning life and plenty is welcomed with exultation by the fur-traders as well as by the Indians and Eskimos. At the loud cry "Goose! Goose!" shouted joyously by the first to see the newcomer, everyone, young and old, hurries out of doors, shouting and dancing in a state of excitement difficult to appreciate by one who has not gone through those long, slow, winter months in the far North.

The yearly calendar of the birds about the houses usually began some cheerless morning in May, on the border-line between winter and spring, when we were greeted by the sharp *tsip tsip* of a tree sparrow that had arrived over night and taken possession of adjacent weed-patches. As the weather became milder the sparrows increased and, in company with plump, rosy-breasted little redpolls, they were seen everywhere, from the top of the wind-vane to the sun-dial outside the kitchen-window, whence they peeped in curiously. As the snow decreased, both the tree sparrows and redpolls drifted away to prepare their summer homes among the alders on some warm hill-

slope. Meanwhile the savanna sparrows had arrived and were enlivening the muddy places, running in and out among the dead grasses in playful pursuit of one another. At the first alarm they would dive into the nearest cover of grass and weeds, only to reappear quickly on the far side. As the season advanced the males mounted a wood-pile or other conspicuous elevation, and uttered their weak, unmusical songs.

By the 15th or 20th of May the white-crowned sparrow made its appearance, and, capturing the top of the wood-pile from its smaller relative, favored us with its sweetly modulated song. About the same time the common barn swallows were seen circling about, bubbling over with happy chuckling notes, as if rejoicing to be back again after a winter in a far southern clime. By the middle of May the fox sparrows were back, their first arrival being usually announced some fine evening by their clear thrush-like whistle, usually from the top of the cross on the old Russian church.

As June arrived we caught glimpses of an occasional blackcap, or a yellow warbler, as one or both species paid brief visits to a little garden by the kitchen. The barn swallows were now hard at work building nests about the eaves, struggling with unwieldy feathers or trying to carry off straws. This work was commonly varied by fierce battles between the pugnacious males, which often rolled about on the ground and pummeled one another with surprising tenacity and vigor. All obstacles were finally overcome, and in various snug nooks under the eaves the birds guarded their treasure-filled nests. At the same time a pair of savanna sparrows kept ward over their egg-laden nest behind the ice-house,

Spring passed into summer, and from the middle of July until well into August small birds made the vicinity of the houses a general resort. The redpolls came in family parties all clad in dull colors, for the rosy flush of youth had been worn from the parental breast by the cares of family life. These little plebeians stuff themselves with the good things they find in the garden and weed-patches, chirping and frolicking merrily. They infested the place, flitting about, one moment see-sawing on a tall weed and the next hopping carelessly along the walk before one, or peering down from the eaves with liliputian gravity. In return for this friendliness they were prime favorites with all. The redpolls do not come alone, for in the yard, and outside it, the bare ground is now the gathering place for young Lapland longspurs, nearly as heedless of our presence as the redpolls. They are, however, more sedate and business-like, and appear intent on the search for food, running from place to place, their bills pointing

down and eyes intently scanning the ground, heedless of their sur roundings, until a step close by frightens them away a short distance, where the search for food begins again. They lack the pretty confiding ways of the redpoll, and awaken but little interest.

The young yellow wagtails were also numerous at this time, and searched damp spots in and about the yard for insects, their long slender tails balancing up and down with a jaunty air. When the tide went down they gathered along high-water mark to feast on the fare there provided. Flitting from rock to rock, or picking their way daintily from place to place, they offered a pleasing picture until, their hunger satisfied, they arose and passed one by one to the bare hillsides, where they remained until hunger called them back again.

In the latter part of July the garden was the center of attraction for several species of warblers, which reveled among the insects of the lettuce and turnip beds. The black-capped flycatcher was the most numerous, although at times the black-poll warbler was about equally common. Now and then a yellow warbler enlivened the place like a ray of sunshine. Numerous young golden-crowned warblers, and an occasional willow warbler, appeared at this time, and searched the crevices of the fences, and even the eaves of the houses, for insects. Along wet paths leading away from the houses, and sometimes from the yard itself, stray water-wagtails and titlarks were sometimes started.

Golden-crowned and white-crowned sparrows claimed their share of attention at this time, as they levied their tax upon the garden, or flitted from fence to fence, ready to dive into a weed-patch at the first alarm. The fox sparrow returned for a short and timid farewell before seeking winter quarters, and was followed by the tree sparrow.

Stray robins showed themselves once or twice during the summer, but a single brief visit to the garden was enough for them. A few gray-cheeked thrushes usually appeared silently for a day or two. More rarely still a wheatear appeared, skulking about the ends of the houses, then hastening to take shelter in crevices among the stones on the beach. A few white-bellied swallows fraternized a few days with the barn swallows before going south; and the latter were busy during August preparing their young for the long journey to warmer lands.

Sometimes black-breasted turnstones visited wet places about the houses, while the semipalmated sandpiper was always numerous, adventurous individuals even passing under the fence and investigat-

ing the yard after a rain. Once I caught a glimpse of a golden plover making free of the area inside the fence, but it hastily departed.

As the end of August approached the sprightly forms which had enlivened the surroundings one by one departed, so imperceptibly that scarcely was one missed before we found that of all the goodly company only a few stragglers remained. At this time we usually had a visit from one or two downy woodpeckers, which clung pensively to the rough logs in the sides of the buildings, apparently dazed to find the tree-trunks all extending horizontally. After a short stay they would leave us, headed straight back for the interior, where the trees were in their proper position.

During September we were visited by various birds of prey. Every autumn brought one or two hawk owls to perch on the wind-vane or the flagstaff; while young goshawks and gyrfalcons circled about, frequently alighting for a short time upon the fence or any convenient post. More rarely a pigeon hawk appeared for a moment and then vanished. Several times during the evening at this season I surprised a short-eared owl perched on the fence or hovering over the yard, probably attracted by the tundra-mice which gathered about the buildings at this time. One October a great horned owl used our wood-pile as a lookout station for several successive evenings.

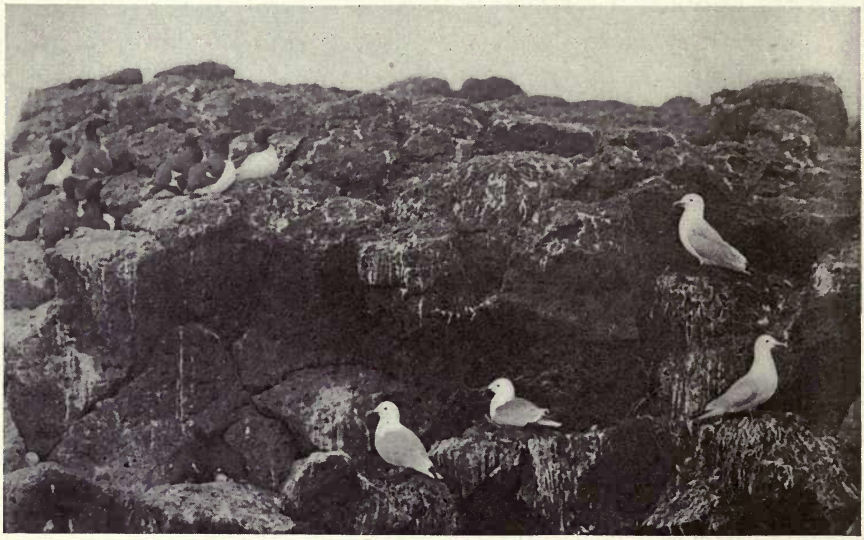
As winter set in occasional parties of black-capped titmice appeared for a day or two, and less often a few Hudsonian titmice. Both spent their time busily climbing about the walls of the old log-houses, or examining the weed-patches nearby, all the time cheerily uttering their familiar *dee-dee-dee;* but at last hurrying away as if without a moment to spare. Then followed long blanks broken only by a stray party of redpolls from the interior, or, as happened a few times, by the visit of a ptarmigan, which would perch on the roof of the warehouse, look with startled surprise at the men and dogs below, and then precipitately depart.

Thus the bird-year went round at this barren place by the shore of Bering Sea, and gave evidence that in the remotest spots some of these companionable and interesting habitants are always to be found, ready to enliven the solitude for whomsoever has eyes to see and sympathy to appreciate them.

Spring and Summer on the Tundras

When the snow leaves the marshy tundras—those extensive frozen barrens fringing the Alaskan coast of Bering Sea—they become alive with a winged host wonderful in its numbers and variety.

The last days of May and the first week of June are notable for their clear and pleasant days, during which the busy life of the feathered residents goes rapidly on toward its culmination in nest-building. Occasional short storms occur at this season; and I was much interested to note that the assembled water-fowl had to some extent the power of recognizing the approaching storms as sensitively as the barometer. The evening before the onset of one of these spring storms was commonly heralded on the tundra, even in the clearest weather, by wonderful outbursts of cries from the larger water-fowl, and these would continue for half an hour before the birds settled down for the night. Thousands of birds took part in



PACIFIC KITTIWAKES, NESTING ON WALRUS ISLAND IN BERING SEA.

From a Photograph by A. C. Bent

producing the tremendous chorus. It was made up of the notes of numberless loons in small ponds, joined with the rolling cries of cranes, the bugling of flocks of swans on the large ponds, the clanging of innumerable geese, the hoarse calls of various ducks, and the screams of gulls and terns, all in a state of great excitement, apparently trying to outdo one another in strength of voice. The result was a volume of wildly harmonious music, so impressive that these concerts still remain among my most vivid memories of the North.

It was a complete surprise to me, during my first spring in the North, to learn that a large number of waders, and some of the ducks, utter series of consecutive musical notes during the mating period

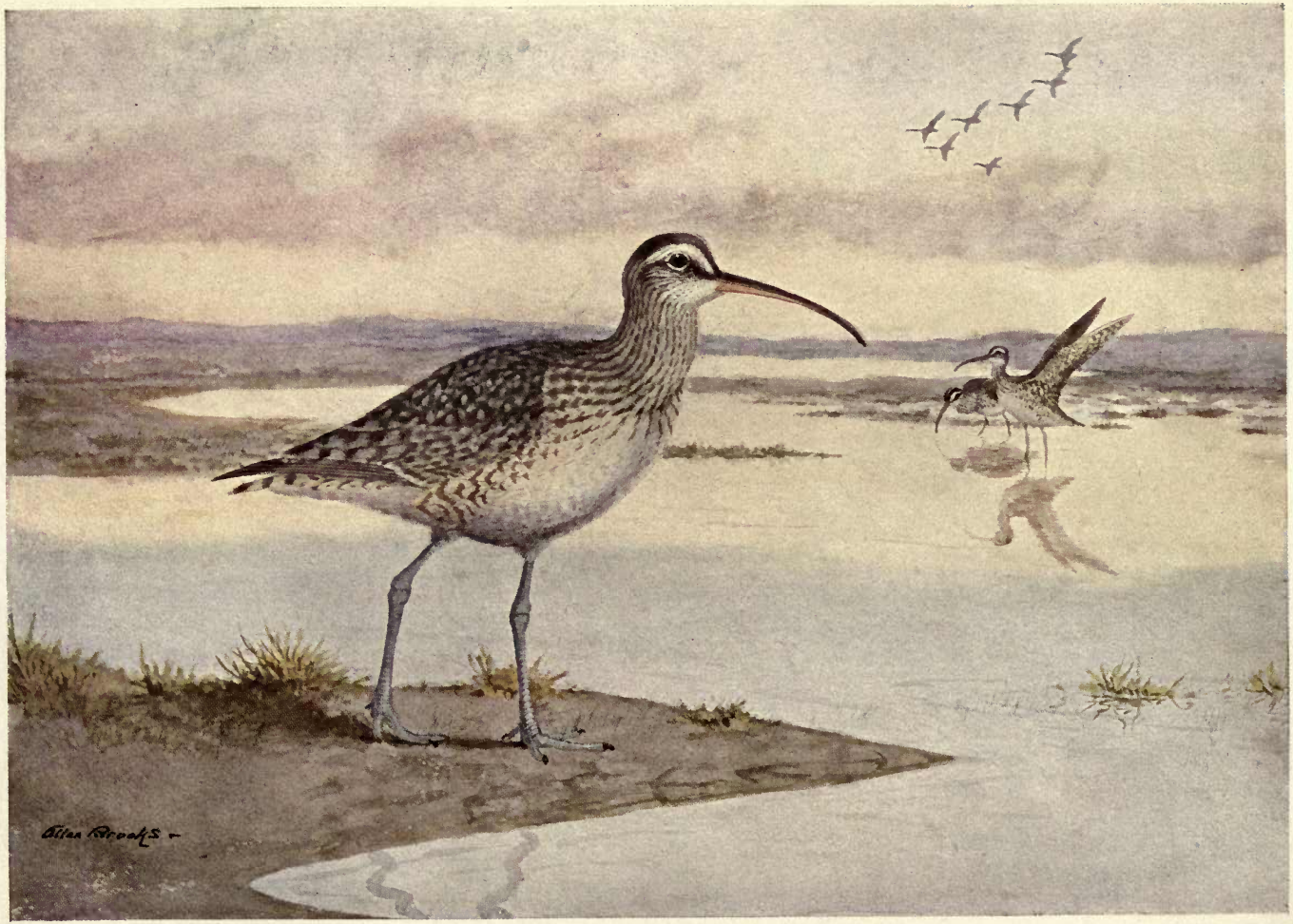
that are as clearly songs as the notes of a robin. Some of the songs of these birds are harsh, and others grotesque, but there are no mutes in this great congregation. The golden plovers, admirable in their handsome breeding-dress, utter an extraordinarily plaintive and musical series of notes. They stand like beautiful statuettes on the tundra as they give their song, sometimes several times in succession from the same spot before moving on.

One of the most interesting songsters among the waders is the western semipalmated sandpiper, which is present along this coast in great abundance. As the snow disappears from the low ground about the 10th or 15th of May, and every pond, still covered with ice, is bordered by a ring of water, these gentle birds arrive on the tundras of the Yukon Delta and Norton Sound. By the end of the month they are extremely numerous, and their gentleness and trusting behavior render them very attractive. Among the many pretty bird-romances going on at this time none is more charming than the courtships of these delicate sandpipers. They forsake the borders of icy pools and scatter in twos and threes over the tundra, choosing dry knolls and tussock-covered areas. Here they trip daintily over the moss, in and out among tufts of grass, never showing the pugnacity so common among some species at this time. The female modestly avoids the male as he pays his homage by running to and fro before her to show his tiny form to best advantage. At times his heart beats high with pride and he trails his wings, elevates and partly spreads his tail, and struts before his charmer with all the pompous vanity of a pygmy turkey-cock. Again, filled with rapture, the sanguine lover springs from the earth, rises ten or fifteen yards on vibrating wings, and poising in mid-air hovers for nearly a minute in the same spot, while he pours forth a series of musical trills that vary in intensity and produce pleasant cadences. During this song the performer's wings vibrate so rapidly they appear to keep time with the trilling notes, which may be likened to the running down of a small spring, producing a fine, high-pitched, buzzing or whirring note. As the song ends the bird raises its wings high over its back in a V-shaped form, and floats slowly to the ground, at the same time uttering a deeper and richer, or more throaty, trill, ending as the ground is reached. These sandpipers have also a variety of low, happy, twittering notes, addressed by the male to the female, and also heard when he is feeding. The females are usually devoted mothers, and are often astonishingly fearless in staying by their eggs or young when danger threatens, at the same time uttering low plaintive notes of alarm.

Another of the tundra-loving waders, the pectoral sandpiper, inflates the loose skin of its throat and breast into a balloon-shaped bag, and runs to and fro in front of the female while he utters a low, musical, booming note; or he will fly up twenty or thirty yards into the air and then float down on up-raised wings, sounding the same note.

The little pools scattered abundantly over the tundra are frequented in spring and summer by northern phalaropes, pretty, graceful members of a family of small waders remarkable for reversing, during the mating-season, all ordinary avian habits and customs. The female is larger and much more handsomely colored than the male, and pays court to him in order to secure a mate, just as does the male among other birds. As the season comes on when the flames of bird-love mount high, the dully colored male of the northern phalarope swims about the pools, apparently heedless of the attending fair ones. Such stoical indifference is too much for some of them to bear. A female in all her finery of nuptial plumage glides close to him and bows her head in pretty submissiveness, but he turns away, pecks at a bit of food and moves off; she follows, and he quickens his speed, but in vain; he is her choice, and she proudly arches her neck and in mazy circles passes and repasses before the harassed bachelor. He turns his breast first to one side and then to the other, as if to escape, but there before him is his gentle wooer, ever pressing her ardent suit. Frequently he takes flight to another part of the pool, all to no purpose. If, with affected indifference, he searches for food, she swims by his side, almost touching him, and at intervals rises a foot or two above his back and makes half a dozen quick wing-strokes, producing a rapid series of sharp whistling notes. Time and importunity at length have their effect. The male accepts a partner, and the female no longer needs to use her seductive blandishments to draw his attention to her. About the first of June the dry side of a knoll near some small pond sees four dark, handsomely marked eggs laid in a little hollow, sometimes without lining, or with a few carelessly added grass-blades. Here the captive male is introduced to new duties, and spends much of his time brooding the eggs, while the female idles about the pool near by. The newly hatched young are beautiful little balls of buff and brown.

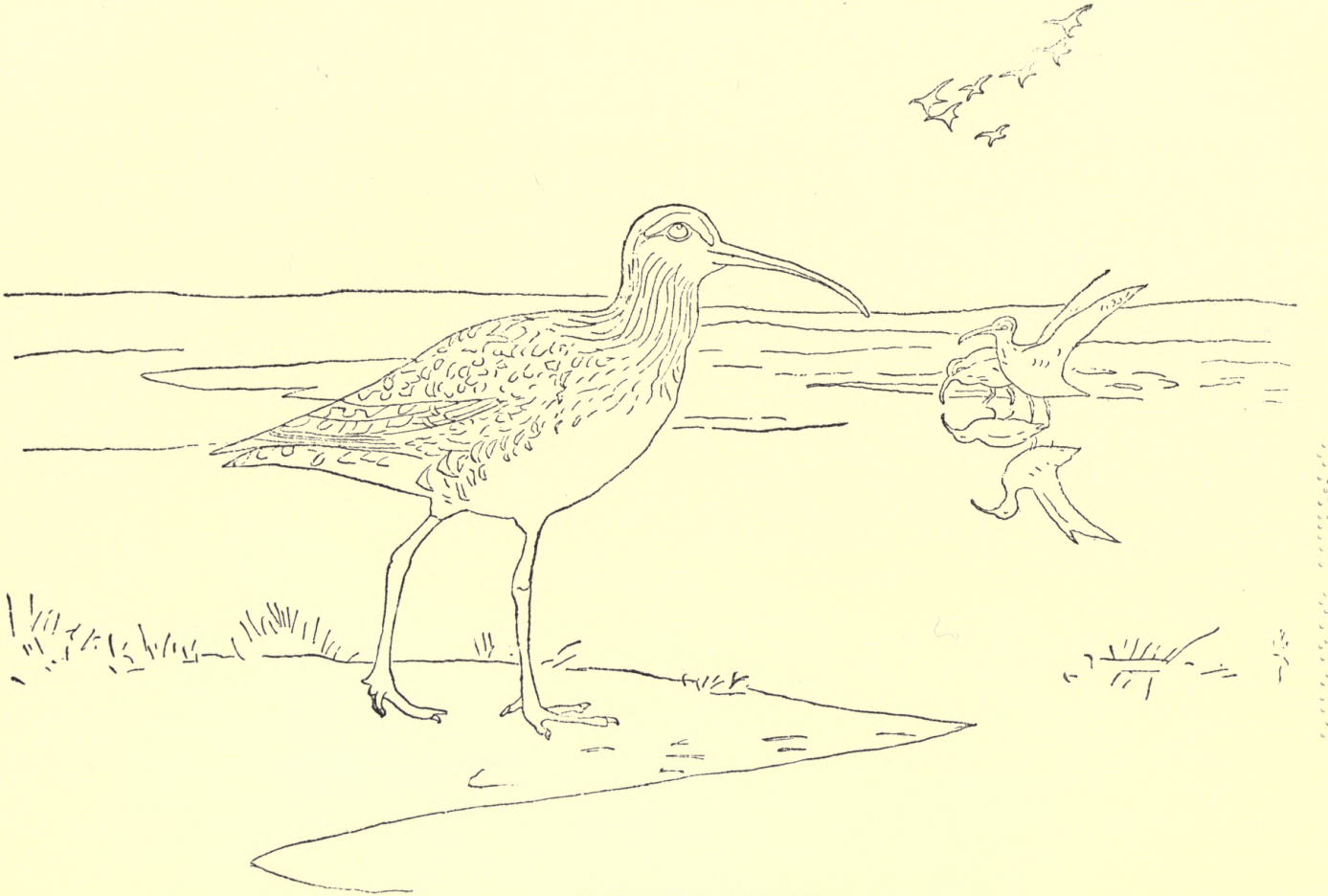
The most musical notes among the ducks are those of the old-squaw, a species common from the upper Yukon to the sea-coast. During the mating-season the drake gives a series of deep, reed-like notes, so melodious that Jack McQuesten and other fur-traders of



HUDSONIAN CURLEW

Order—LIMICOLÆ
Genus—NUMENIUS
Family—SCOLOPACIDÆ
Species—HUDSONICUS

National Association of Audubon Societies



HUDSONIAN CURLEW

Order—Limicolæ
Genus—Numenius

Family—Scolopacidæ
Species—Hudsonicus

the upper Yukon region aptly named it the organ duck. These notes sound remarkably musical in the quiet twilight hours of the arctic spring night. During his courtship the male old-squaw often swims back and forth before the female, his long tail-feathers pointing up at a steep angle and vibrating rapidly from side to side while he utters his mellow notes at short intervals. If he becomes too pressing in his suit the female dives, and is instantly followed by the male; a moment later they appear on the surface, take wing, and a chase ensues, the two plunging below the smooth surface of the water at full speed, then reappearing in full flight some distance away, only to repeat the performance again and again. Two or three males sometimes join in this playful pursuit of a female until she finally makes a choice and retires to some secluded pool with her mate. During these courtship-flights the males often continue uttering their love-notes, and make a very pretty chorus.

The mating loons, ducks, geese, swans, cranes, waders, gulls, and other birds, now present a bewildering variety of attractions to the lover of wild life. Several species of geese are the most clamorous of all in their wild outcries. The harsh, rolling notes of the cranes, and the raucous notes of the many red-throated, and of the Pacific black-throated loons, add greatly to the general sense of wildness on the tundras, especially when the cries of the loons break the general stillness that covers the tundra during the twilight hours of the northern summer night.

By the last of August, or during September, the birds have regained their wing-feathers, the tundras are alive with them, and the air resounds with the clatter of many geese calling. Ducks, geese, curlews, and other birds, seek the dry, sunny slopes where ripe heathberries (*Empetrum nigrum*) abound at this time, and feed upon them until they become extremely fat.

Back from the barrens that border the coast of Bering Sea and the Arctic Ocean, much of the interior is overgrown with forests of birches, spruces, and other subarctic trees. Small birds of many sorts come to this wooded area each summer to rear their young; and several of them, such as the intermediate white-crowned sparrow, the western tree sparrow, and the fox sparrow, range down to the coast of Bering Sea wherever little patches of stunted alders and willows occur. This area, north to the limit of tree-growth, is enlivened through the summer by the songs of the gray-cheeked thrush, the robin, and the varied thrush. The white-bellied tree swallow, and the bank swallow, share the interior with the barn swallow; the last-

named, however, comes to the coast, and appears as much at home in a variety of northern conditions as it is under milder skies. Here, as in the South, they take advantage of buildings for nesting sites, gathering in abundance at the village of Unalaska, and at St. Michael, where their neat forms and cheerful notes seem curiously strange in so bleak surroundings. On the tundra, several miles southeast of St. Michael, I found one spring an ancient Eskimo winter hut, half underground, covered with a mound of earth that was falling in from long disuse. As I approached it a barn swallow suddenly flew out, and I found her nest with newly hatched young on one of the small timbers supporting the roof. On the north shore of Kotzebue Sound, opposite Chamisso Island, directly under the Arctic Circle, I found another nest, built on a small ledge in a narrow vertical cleft in the rock into which the waves of the Arctic Ocean swept freely back and forth, only a few feet below.

Conspicuous among the land-birds of the interior also seen on the coastal barrens is the willow ptarmigan. In spring the white feathers on the head and neck of the male are replaced by brown, and a thin fleshy comb, bright red in color and with a thin fringe on its upper border, develops over each eye. These combs fold down and are overlaid by the feathers on the side of the crown except when the bird is excited, when they are raised and become conspicuous additions to its nuptial adornment. After the mating-season these fleshy crests fade, shrink, and become invisible until the approach of another summer.

With the appearance of the brown feathers on the head and neck in spring these birds become extremely active, noisy and pugnacious. They are then the dominant form of life on the tundras until the water-fowl have arrived in full force. The cock-ptarmigan seeks the tops of slight elevations, and now and then springs on rapid wings a few yards into the air, uttering a loud, harsh, cackling or crowing note of challenge. Here and there on all sides other knolls are occupied by hot-blooded rivals, one of which soon comes in swift flight, with ruffled neck-feathers, to drive away the competitor for the favors of the duller-colored females scattered inconspicuously about the vicinity. The challenger sees the enemy coming like an animated white ball, and flies a short distance to meet him in mid-air. They often strike in full head-on collision, and feathers fly as the combatants drop to the ground. The fight is then continued, sometimes on the ground and sometimes in the air, in true "rough-and-tumble" fashion until one has had enough. Then the vanquished one dashes

away in full flight, pursued for a time by the victor. He quickly returns, however, and springing into the air from the original knoll again sends out his cry of defiance to all comers. During the last half of May along the coast of Bering Sea these ptarmigan are noticeable everywhere, and the air is filled with their loud insistent notes. A little later, when the mating is over and the females are hidden away on nests, the males completely lose their boisterous pugnacity, and are almost as quiet and inconspicuous as their mates.

Additional Notes by the Editor

A few explanatory notes, largely derived from Mr. Nelson's valuable and interesting Report, may be added to the foregoing lively account of the bird-life of the Alaskan tundras.

The loons of this district are of five different species, namely, the widely distributed "common loon," or great northern diver; the yellow-billed; the black-throated; the Pacific; and the red-throated loon. They are distinguished chiefly by their varying colors about the head and neck. In the common loon the black head and neck are in summer deep black, crossed on the throat by a bar or by transverse streaks of white; in the Pacific species the top of the head and the hind neck are pale, smoky gray, the throat and fore neck glossed with bronzy green or purple; in the black-throated loon the head and neck are deep leaden gray above, and are glossed beneath with velvety purple; and in the red-throated the fore neck in summer is rich chestnut in color. This last is the smallest of the lot. The largest of the loons is the yellow-billed, whose head and neck are glossed with violet-blue. The habits, nests, and eggs of all are similar. The eggs number two, and are of an elongated oval form, deep brown or olive in tint, and sparsely speckled.

The black guillemot mentioned is a circumpolar species belonging to the Arctic sea-front and islands, and rarely seen south of Kotzebue Sound.

The jægers, or skuas, as they are more often termed in the North-Atlantic region, are wide-wandering oceanic gulls of predatory habits, that get their living mainly by robbing their smaller brethren. They are large, and exceedingly swift and powerful on the wing. The Eskimos attribute to the parasitic jæger remarkable prowess, and call it "the cannibal" because, as they say, it formerly captured and ate men. This jæger is far more agile and bold than the pomarine, which it will drive from its neighborhood; but it is not so graceful in flight as the long-tailed one. They harry the gulls and terns to make them disgorge fish just caught, and then swoop down beneath the falling

morsel and snatch it with open mouth. The pomarine is confined in summer to the most northern coasts, but the other two abound all over the tundras and nearer Aleutian Islands, laying two, dark-green, profusely spotted eggs on the bare ground. In summer they fly far inland, catching field-mice and lemmings, robbing the nests of ducks and other birds, searching the beaches and river-banks for dead fish, and even eating berries.

The biggest of the Alaskan gulls is the glaucous, or "burgomaster"—the first birds every year to reach the coasts that girt the polar seas. "Their hoarse cries," Nelson tells us, "are welcome sounds to the seal-hunter as he wanders over the ice-fields far out to sea in early spring. They become more and more numerous until they are very common. They wander restlessly along the coast until the ponds open on the marshes near the sea, and then, about the last half of May, they are found straying singly or in pairs about the marshy ponds, where they seek their summer homes. Here they are among the noisiest of the wildfowl."

Not all, however, go to the remote North, for the burgomasters spread all over the coast-regions from the Aleutians northward, and in June construct their nests on some islet in a marsh or pond, forming a conspicuous hillock, two or more feet high, made of tufts of grass and moss torn up near by, and heaped into a pile with a basin-like hollow in the top where the eggs are deposited.

Its relative, the glaucous-winged gull, on the contrary, breeds on "the faces of rugged cliffs, at whose bases the waves are continually breaking." Nelson's and the Bonaparte gull are rare in this district, but the beautiful short-billed gull is to be seen in abundance in summer, haunting the marshes far in the interior as well as near the coast, as also is Sabine's gull, which forms nesting-colonies on islets in the ponds scattered over the tundra.

Of the eiders three species are seen along the northern coasts of Alaska—the spectacled, the Pacific, and the king eider. The first-named has a very limited breeding-range, close to the coast, from the Kuskokwim northward, and nests in colonies, its homes hidden among tussocks of marsh-grass. These eiders are very quiet and retiring in their domestic life, but their flesh and skins are of so much value to the Eskimos that they are killed in great numbers, and every effort should be made to save them. The Pacific eider, which the whalers at Point Barrow call canvasback, has a far broader breeding-range. Nelson describes its nesting-place as "usually a dry spot close to a small pond or tide-creek, and not often in close proximity

to the sea-shore;" and he remarks upon the contrast in habits between it and the spectacled eider, this species nesting in solitary pairs, the other gregariously. The king eider resembles the Pacific in nesting habits, and is said by Murdoch to be the most abundant spring bird on the Arctic seaboard. Murdoch devotes much space in his Report of the Expedition to Point Barrow to an account of the manners of these ducks, and to their service to the people.

The red-backed sandpipers come to the tundras about the middle of May, when the notes of the males "fall upon the ear like the mellow tinkle of large water-drops falling rapidly into a partly filled vessel."

One may also see on the tundra the active buff-breasted sandpiper, greenish black on the upper parts and yellowish buff below, whose eggs are paler and much more distinctly spotted and streaked. Murdoch writes of their pretty manners as follows:

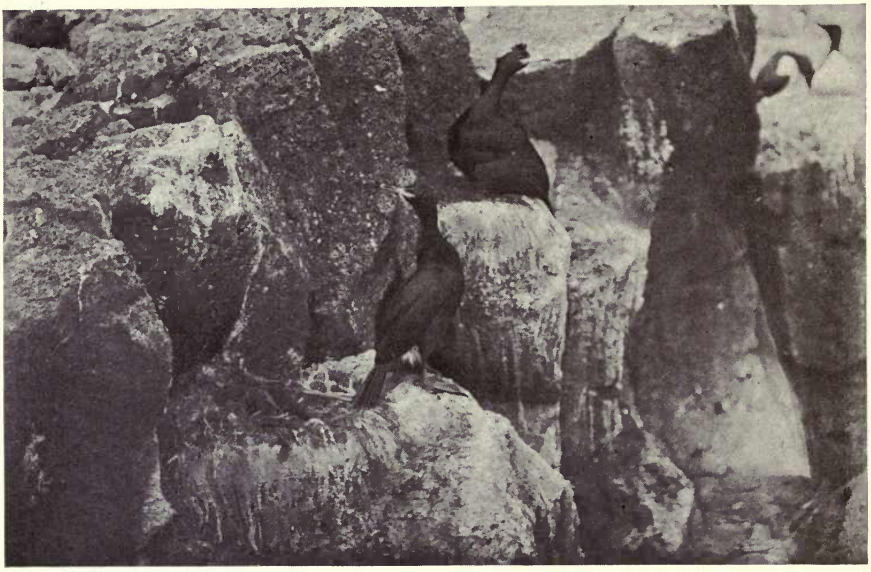
> A favorite trick is to walk along with one wing stretched to its fullest extent and held high in the air. I have frequently seen solitary birds doing this for their own amusement, when they had no spectators of their own kind. Two will occasionally meet and spar like fighting-cocks for a few minutes, and then rise together like "towering" birds, with legs hanging loose. . . . A single bird will sometimes stretch himself up to his full length, spread his wings forward, and puff out his throat, making a sort of clucking noise, while one or two others stand by, and apparently admire him.

Of the beautifully costumed turnstones two species are observable, the common one and the black; the latter is by far the more numerous of the two along the shore of Bering Sea, but seems never to visit the Arctic coast, where the common turnstone is rare. Both search for insects, etc., among the pebbles of the beaches, pushing aside or turning over the stones to get at the little crustaceans and other edible creatures hiding beneath them.

ALEUTIAN DISTRICT (D)

Mr. Nelson's account in this book of the birds of the northern coasts, supplemented by Mr. Bent's biography of the Tufted Puffin, leaves little that needs to be said in respect to the Aleutian District—that chain of lonely, volcanic, storm-swept islands which are the half-submerged summits of the mighty Alaskan Mountains extended westward nearly to the Asiatic coast. Those quaint sea-fowl, the puffins, auks, and guillemots, are the characteristic birds of the coasts, wherever they are high and precipitous, and a picture of their general characteristics is presented in Mr. Bent's paper on the sea-parrot (page 49). The breeding-habits of all much resemble those of the sea-parrot, yet vary with circumstances. On islands where foxes abound, for example, their nests are placed on the highest

ledges, but elsewhere close to the water at the base of a cliff. Even so the eggs of most species (especially of those, such as the paroquet auklet, that scatter in lonely pairs, not associating in colonies) are difficult to obtain, because secreted far under the tumbled rocks, out of reach of foxes, crows, and other enemies.



RED-FACED CORMORANTS ON WALRUS ISLAND IN BERING SEA
From a Photograph by A. C. Bent

Among gulls, the pomarines, and the parasitic jægers are numerous in summer; and both of the kittiwakes, the burgomaster, and the short-billed gull, are present all along the chain, breeding in thousands on certain islands. Turner notes that the short-billed gull is very fond of sea-urchins, for which it hunts at low tide; having found one it carries it some distance into the air, then drops it on the rocks to break it, so that it can get at the soft interior parts. Both the arctic and the Aleutian terns occur in the western part of the islands, but neither is plentiful.

Those oceanic wanderers the albatrosses, fulmars, and fork-tailed petrels are rarely seen, but various cormorants breed on all the principal islands. "The nest," says Turner, "is usually placed on a ledge of some bold-faced rock, and in most instances about forty feet above the sea." The eggs are laid early in June, and are pale blue in color. Some of the crags are fairly covered with these birds, and they look like black bottles standing in rows. They are caught or otherwise killed in vast numbers by the Aleuts, for the sake of both

their flesh and their skins—or used to be, for now the natives have less need of these natural provisions than formerly.

Land-birds of the Aleutian Chain

Fresh-water ducks are not numerous in summer along the Aleutian chain, the green-winged teals being by far those most at home there; and on certain islands they are surprisingly abundant. Turner remarks of Amchitka Island in 1881:

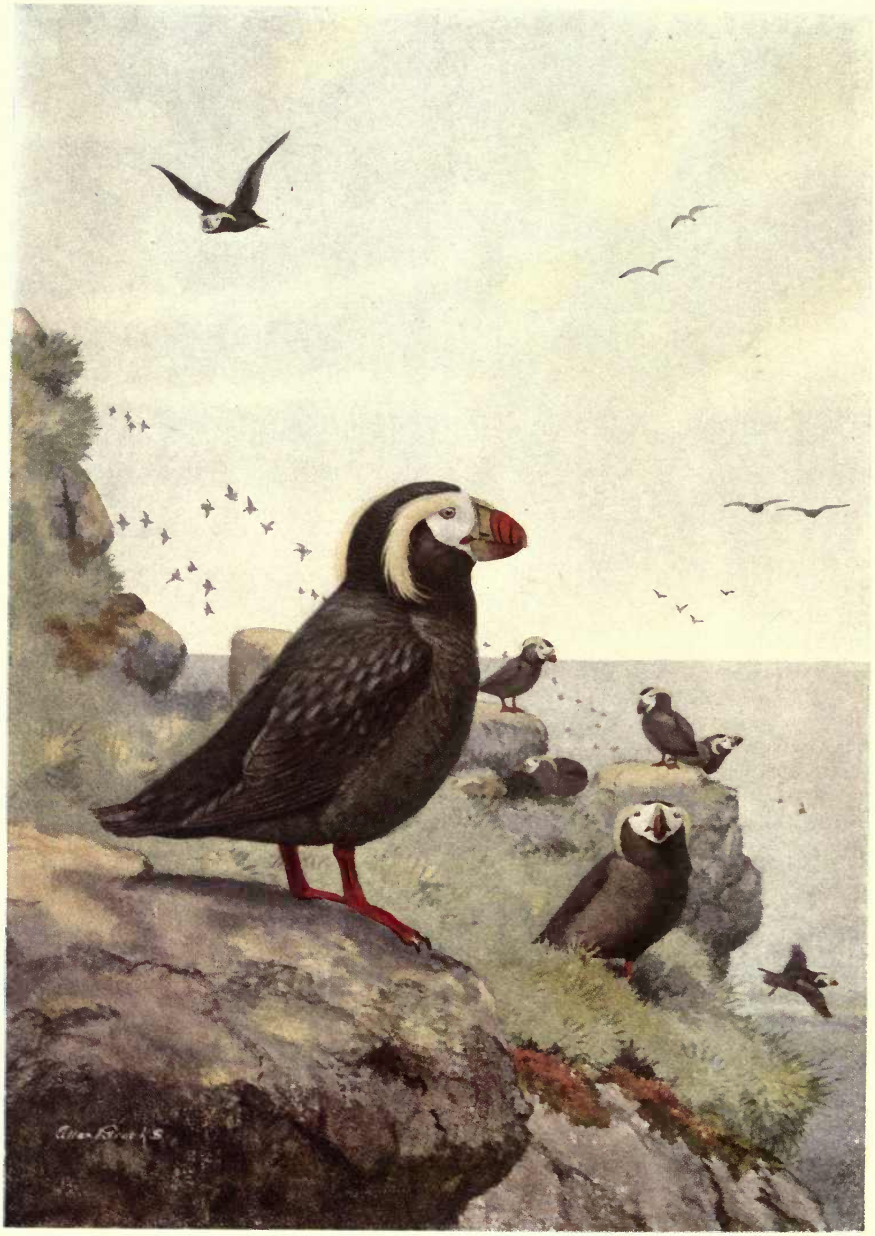
> All along the little streams that were cutting deep into the earth, and so narrow that the tall grass completely hid them for many yards of their length, the teals were found walking along under such places, searching for tender roots and insects. These streams are not long, as they are usually the outlets of inland lakes, and their sides are prevented from widening by the dense mass of grass-roots, so that their streams are deep and narrow. As soon as the current has excavated beneath the roots of grass the stream widens, and the banks thus form an overhanging shelf on each side. Under these places the teals resort, so that it is difficult to find them.

Of the sea-ducks only the old-squaw, the Pacific eider, and the surf scoter, breed numerously. Mr. Turner has given an interesting sketch of the habits of the Aleutian eiders (*S. v-nigra*). He says that they are constant residents among the islands, and especially numerous in winter. They frequent the steep slopes heavily clothed with rank grasses, such as wild rye, which grows in huge tussocks, among which these birds hide their nests. "A slight depression is scratched out; the eggs are placed on the ground, the down being used only as a cover for the eggs when the parent is absent from the nest. The eggs are never placed on the down. The down is plucked from the breast for that purpose only, and increases in amount as the increased complement of eggs demands a greater amount of covering. . . . The female eider becomes very fat in the breeding-season. This may in a measure compensate for the lack of down on her breast. . . . The male eiders are at this season very poor and lean." Eiders subsist on animal food only, and this they obtain by diving to the bottoms of bays and coves. They are able to dive deeply and to swim astonishing distances under water.

Of the shore-birds the red phalarope breeds on the extreme western end of the chain; the Aleutian sandpiper occurs sparingly in summer but abundantly in winter; the western sandpiper is always numerous on most of the islands; the wandering tatler occasionally seen; the golden plover is rare; the turnstone appears here and there, singly and shyly; the black turnstone inhabits only the most distant western islands; and the black oyster-catcher breeds abundantly as far as the chain extends toward Asia.

The rock ptarmigan, in several local races, alone represents the grouse family in this district, and is distributed as follows: Nelson's subspecies on Unalaska, Akutan and Unimak islands; Turner's on Atka and neighboring islands; Townsend's on Kiska Island; the Adak on Adak Island; and Evermann's on Attu Island. These races have become differentiated from each other, and from the type, by their isolation, each being subject to conditions of climate and food not felt by the others.

Both the bald and golden eagles are commonly seen throughout the long archipelago, and Peale's falcon, a variety of the duck hawk, breeds commonly throughout the archipelago, building its nest like the eagles on the sea-cliffs, almost always close to a colony of eiders, whose young it seizes as dainties for its own. The commonest bird of prey on these islands, as elsewhere in Alaska, is the short-eared owl, from whose liver the Aleuts make a love-philter; the snowy owl also breeds there but is rare. Ravens are numerous and busy everywhere, and are the scavengers of the villages, and Turner and other historians relate many curious incidents of their intelligence and impudent tameness.



TUFTED PUFFIN

Order—Pygopodes
Genus—Lunda

Family—Alcidæ
Species—cirrhata

National Association of Audubon Societies.

TUFTED PUFFIN

Order—Pygopodes
Genus—Lunda
Family—Alcidæ
Species—Cirrhata

National Association of Audubon Societies

THE TUFTED PUFFIN

BY WILLIAM LEON DAWSON

To those who have been fortunate enough to visit some romantic isle off the North Pacific shore these quaint fowls make an irresistible appeal of interest. Sea-parrots and Jew ducks, the sailors call them; and we should all be inclined to poke fun at them for their outlandish head-gear if their behavior were not so dignified. For my own part, I confess a positive affection for these droll Quakers.

It is difficult to exaggerate the gravity of these tranquil birds, always absolutely silent, save that, when caught and harassed, they may emit a low, hoarse groan. They spend much time standing demurely at the entrances of their burrows, their little plumes, nodding like tassels on so many caps.

Puffins, like other species of the auk family, spend the winter upon the ocean, and are seen near land only when the buffeting of some storm of unusual severity strews the sand with bodies of dead and wounded. As spring advances, and the new summer coat of plumage grows out, these birds acquire an extraordinary array of ornaments and appendages. Males and females alike receive, in place of dull black feathers, a white facial mask; and this is prolonged behind from each side into long, waving feather-horns of a rich, deep straw-color. The eyelid becomes a brilliant red; and the great red beak, always stout and strongly compressed, is further enlarged at the base by a new set of horny plates of a dull oil-green or delicate horn-color, which exactly matches the eyes in tint. The feet also become bright vermilion, instead of a pale salmon.

A puffin's bill is so remarkable a creation that a glance at its structure may not be out of place; yet as to the necessity of this powerful crushing organ we are ignorant. The bird is not a shallow-water feeder, and so has no need to break bivalved shells to pieces. Moreover, in the breeding-season it seems to subsist upon small fish, which are as easily taken by the slender-billed murre. We do know that the puffin's queer bill is wonderfully composed of eighteen plates (with underlying membranes), and that of these sixteen, including "rosettes, lamellæ and selvedges," but chiefly the olive-green basal plates, fall away at the end of the breeding-season. Their place is taken partly by underlying feathered tracts, and partly by an underlying horny plate colored deep brown; and the breadth of the bill is much reduced. At the same time the white facial mask

and its plumes disappear and the entire head becomes uniform blackish; the vermilion eyelids fade to a sickly salmon-color; and the irides, if we may trust scanty observations, become pale bluish.

Nuptially costumed, the tufted puffins repair in June to the grassy, sloping hillsides of the rocky islets where they make their summer homes, and proceed to renovate the old nesting-burrows, or else to dig new ones. They work intermittently at this. Dr. Leonard Stejneger noted that on the Commander Islands in the early days of the season the puffins spent only one day ashore in alternation with two days at sea. It is probable that the birds seek and find their mates during these "sea-days," for I have never seen anything like courtship on shore.

A steep slope of soil fronting upon the ocean is the favorite nesting-site of the tufted puffin. Here tunnels are driven at random to a depth of three or four feet, and so close together that once, on Erin, one of the Olympiades, by placing a foot in the entrance of a burrow and turning on my heel I was able to touch with my hands the entrances of twenty-five others, all apparently occupied. This may have been an unusually populous section, but if we reckoned at half that rate an acre of ground would carry 2,700 burrows. Hard or rocky soil is not shunned in prosperous colonies, but many efforts to dig here are baffled. The top soil on precipitous clinging ledges may be utilized also, and even crannies, crevices, and rock-hewn chambers. Upon the Farallone Islands, off the coast of central California, these birds have little opportunity for digging in the earth, and little necessity for providing fresh burrows, for crevices and cubby-holes abound —places that have served the purpose no doubt for many centuries. Many eggs, and sitting birds as well, are visible there from the outside; while some of the sites are nothing more than the innermost recesses of niches and caves occupied by murres. On the Farallones there is fierce competition between these silent birds and the rabbits which swarm over the rocks. I have seen impulsive bunnies that, fleeing from fancied danger, and taking refuge in the first burrow at hand, emerged more hastily than they went in. The tufted puffin is a dangerous, as well as a determined foe, and a bite from that rugged beak will cut to the bone.

Although equipped with so formidable a weapon, the birds, in digging their burrows, appear to depend upon their feet. These are provided with nails as sharp as tacks, and the "finish" of the nesting-chamber usually exhibits a criss-cross pattern of fine lines made by their scratching toes.

Long grass and dense thickets, as of salal, salmon-berry bushes, or dwarf spruce, occasionally afford refuge to birds hard-pressed for room. Here the puffin, starting from some exposed edge, drives a tunnel through the matted vegetation and deposits its egg upon the surface of the ground, in shade almost as intense as that afforded by a roof of earth.

If a hillside colony is approached suddenly from shore, the standing population, presumably males, pitches downward to sea by a common impulse; while the nest-occupants come out by twos and threes and dozens as one walks across the earth honeycombed with their burrows. Once a-wing, the puffin returns again and again to satisfy his curiosity by flying in great circles out and back, or perhaps around the nesting-islet, if it be a small one. There is something very weird and funereal about the whole performance!

Later the puffins settle upon the surface of the water until the sea is black with them. Each bird dives, if only for a moment, upon the instant of alighting; and it may be that they find it difficult not to do so. Rising also requires an effort, desperate if the sea is smooth, but easier in proportion to the increasing strength of the wind. As soon as the invader has left the nesting-colony or secreted himself the puffins return rapidly to reclaim the cooling egg, or to take up the sober vigil at the burrow's mouth. Each alights with uplifted wings held well back; the wings are also lifted from time to time as if to rest them, and they are spread as balancers whenever the bird attempts to walk. Be the going ever so easy, the puffin shifts about as gingerly as a slack-wire performer.

Only one egg is laid, dull white, with faint irregular lines of brown and purplish. Because the nest-lining is usually of the scantiest, only a few salal leaves or bits of grass, the egg is often so soiled by contact with the earth as to pass for dingy brown.

The baby puffin is your true *Puffin,* and it is undoubtedly he who gave this trivial name to the group. He is, indeed, a mere puff-ball, for he is densely covered at birth with down at least an inch long, and you could blow him away (Pouf!) if he were not so fat, and anchored in a hole. The down is of a uniform dull slaty black, and the only touch of color about this infant pin-cushion is a showing of dull red near the middle of the otherwise black bill.

The tufted puffin enjoys the widest breeding-range of any bird in the North Pacific, except the pigeon guillemot; and, although not so thoroughly distributed as that species, it is undoubtedly far more

abundant. On the American side, it breeds as far south as the Santa Barbara Islands, California, and as far north as Cape Lisburne, in northwestern Alaska. It is, however, of comparatively rare occurrence in Arctic waters. On the Asiatic side, its breeding-range extends as far south as Japan; while its center of abundance is generally conceded to be the Aleutian Islands. Deposition of eggs occurs as early as May 1 in southern California, and as late as August 1 in northern latitudes; but fresh eggs may also be found somewhere from June 1 to June 20 at any given point in its breeding-range. Thus, on certain islets off the coast of Washington, I have found the puffins punctual to a day, and deposition occurring with practical uniformity; whereas, on the Farallones, in 1911, there was a steady increase in numbers from the 1st to the 28th of May, with a few still to be heard from on June 3. The winter range of this species comprises the open ocean, and the birds are occasionally driven shoreward along the Aleutian chain and the adjacent coasts.

From time immemorable, the natives of the North Pacific islands have placed large dependence upon the puffins, both tufted and horned, to supply both food and clothing. Advantage is taken of the bird's inability to alter quickly its course of flight—your puffin is no dodger—and large numbers are caught annually by means of small nets mounted on poles—a sort of glorified butterfly-hunt. The puffin-meat is not distasteful, as sea-birds go, although white men do not care for it. More important to the native Aleutian is the uniformly tough skin which goes into the making of *parkas,* the famed feather-coats of the North. These garments, each requiring the use of from forty-five to fifty puffin skins, are made up feather-side in, and are nearly impervious to cold.

With the natives we shall, of course, have to be very patient until such times as they may be able to get other food, such as we ourselves eat, instead of the flesh of "torporki" (The name for the puffin in the Commander Islands) and garments made of good wool, instead of the flimsy bird-skins. With the foreign born fishermen we shall have to be very firm, reminding them that Uncle Sam is very unwilling to see his guests assault the ancient rights of his feathered wards.

For ourselves, we need no excuse for our interest in these quaint old-men-of-the-sea, the tufted puffins. Remote, unobtrusive though they be, they belong to us to study, to protect, and to enjoy. A visit paid to one of their breeding haunts is like a trip to fairyland, a real and tangible bit of romance. Such a privilege, properly exercised, is the inherent right of every American citizen, and should be safeguarded to our children for all time.

THE CRESTED AUKLET

BY CHARLES HASKINS TOWNSEND

This is a sea-bird of the far North, frequenting the coasts and islands of Bering Sea and the North Pacific Ocean. We first got acquainted with the crested auklets at the Pribilof Islands, where they abound, and afterward saw them in Bering Strait, and above the Arctic Circle at Kotzebue Sound. Later, in the fishery surveys by the steamship *Albatross,* we saw them from Kadiak Island and the Alaska Peninsula through the whole Aleutian Archipelago, and beyond it to the Commander Islands, off Kamchatka.

The bird is also found along the Kuril Islands, down as far as Japan on the western side of the Pacific. Rich as our experiences with the auklets were in many of these places, they did not prepare us for what we were to see in the Shumagin Islands, south of the Alaska Peninsula.

On the evening of August 1, the *Albatross* came to anchor in Yukon Harbor, at Big Koniuji Islands, of the Shumagin group. While the ship was working her way into this wild and uninhabited bay everyone noticed the increasing numbers of crested auklets. The farther in we went the more numerous they became, until the captain called me to the bridge to tell him what I could about them.

The birds were nearly all of the crested species, and were present in myriads. The surface of the water was covered with them, and the air was filled with them. Large, compact flocks launched themselves into the air from the lofty cliffs, and careened toward the vessel with great speed and whirring of wings. The crested auklets were here more numerous than were the choochkies (least auklets) at St. George, in the Pribilofs, celebrated as the center of abundance for that species.

Twilight did not come until after nine o'clock, and during the long evening the birds were amazingly active. Flocks of them continued to come in rapid succession from the cliffs, many passing close to the ship at high speed and swinging about the harbor. After the anchor was dropped near the cliffs, a loud blast of the whistle made the auklets still more abundant. The bird-legions came from the cliffs until the misty air and water about the ship was alive with them.

These birds appeared to be nesting chiefly in crevices in the cliffs, although they could be heard under the boulders near the beaches. We did not stay long at Yukon Harbor, and I have always wanted to re-

visit the place, and get better acquainted with the metropolis of the auklets. At the Pribilofs we found the birds apparently more abundant under boulders near the beaches than in the high cliffs. In seeking the nests of the crested auklets, and in fact the nests of any of the auklets, one needs a tool not often used by the bird student—a *crowbar*.

To discover the nesting-localities is easy. One has but to walk along the great ridges of volcanic stones thrown up by the sea. The stones are rounded and sea-worn like pebbles, but they are gigantic pebbles and cannot readily be moved. The auklets go far down among them, perhaps three or four feet, and can be heard chattering there during any part of the nesting-season.

A FAVORITE NESTING-PLACE OF AUKLETS ON THE PRIBILOF ISLANDS

From a Photograph by Dr. Charles H. Townsend

The natives attempted to show us the nests. They lifted or rolled the heavy rounded stones for half an hour, until there was a circle of them around us waist high and fifteen feet in diameter. They worked in the central depression, carrying or rolling stones until the task became hopeless, and still the auklets were chattering underneath the stones all about. Edward W. Nelson writes that on the northern islands of Bering Sea, St. Matthew, St. Lawrence, and the Diomedes, the eggs are sometimes deposited in exposed places, with little attempt at concealment. One egg only is laid. It is white, in some cases marked with a few dark blotches, and measures on the average 2.10 by 1.40 inches.

We found that a considerable part of the food of this and other kinds of auklets, consisted of amphipod crustaceans, or beach-fleas, as they are called, when found under bits of seaweed along the shore.

CRESTED AUKLET

Order—Pygopodes
Genus—Aethia
Family—Alcidæ
Species—Cristatella

National Association of Audubon Societies

CRESTED AUKLET

Order—Pygopodes
Genus—Aethia

Family—Alcidæ
Species—Cristatella

These small crustaceans, less than a quarter of an inch in length, are amazingly abundant in Alaskan waters, and, as a never-failing food-supply, account for the surprising abundance of auklets of all kinds.

The native Aleuts eat auklets, just as they do most other kinds of sea-birds, and capture them with nets that are like a large dip-net with a long handle. The native hunter conceals himself at some point near the beach or bluffs over which the birds are accustomed to fly close. When a flock approaches the net is swung upward, and a skillful native has little difficulty in catching two or three birds out of each flock that passes. The Aleut people are true children of nature, and the greater part of their food consists of the fishes, seals, and sea-birds found along their shores. The misty and often stormy shores would be desolate indeed without the lively presence of auklets; and we cannot help wishing that they abounded in more southern latitudes, where their charming ways could be better known. Some of nature's finest exhibitions of bird-life, however, are arranged without reference to civilized spectators.

The crested auklets arrive at the Pribilofs in May, and remain until the winter ice begins to invest the islands, when they go farther south. They are noisy in the breeding-season about their nests, but are rather silent at other times.

While they take alarm and leave the cliffs when closely approached, they have more confidence when on the water, and do not readily dive or take flight except to make way for the boat. About islands where they are not specially abundant they may yet be as thick as bees about some particular cliff, long rows of them standing lined up on the rock-ledges, while others are coming and going. Sometimes we saw them far off shore in flocks hundreds of yards in extent. They are a plump, well-fed race, and appear to have plenty of time for play, both in the air and on the water.

The crested auklet is a very distinct species, distinguished by its much larger size from its nearest relatives, the whiskered and the least auklets; and by the differently shaped bill, and the presence of a recurved crest, from the paroquet auklet. Moreover, the under-parts are entirely dark in the crested auklet, but largely white in the other three species.

Males and females are alike in plumage, which is sooty black above, and brownish beneath; but this obscure coloring is relieved by the lively crest, the bright red of the beak, and the white, plume-like feathers which extend downward and backward from the eye.

The white iris also contributes to the alert appearance of the bird's head. The feet are bluish, with dark webs. That portion of the red beak around the corner of the mouth is soft and flexible.

In length individual birds vary from eight and one-half to nine inches.

The plumage in winter is the same as in the summer, but the bill is markedly different. The crested auklet not only molts its feathers like other birds, but sheds the red, horny plates about the base of its beak after the breeding season.

The forward-curved crest of the auklet, resembling that of the California quail, suggests the name sea-quail by which it is known to English-speaking persons. The native name *"kanooska"* is of Russian origin, and means "little captain."

The very young bird, whose appearance has not long been known, is a ball of smoky down, in no way resembling its parents. In the immature bird the frontal crest and white feathers beneath the eye are wanting or but slightly developed, while the bill is much smaller and dusky brown.

At the Pribilofs, it is no uncomon sight to see fur seals, sea-lions, and many kind of sea-birds, including crested auklets, in great abundance within a radius of fifty yards.

We need not concern ourselves, I think, about the preservation of the auklets. They dwell among the high cliffs and boulder-strewn beaches of a thousand uninhabited islands, and know how to stow away their eggs so safely that neither natives nor blue foxes can get them easily.

THE EMPEROR GOOSE

BY EDWARD W. NELSON

Among all the wild geese that make their summer home in the far North—both in the Old and the New World—the emperor goose is one of the least known and the most beautiful. Its snowy white head, dusky throat, satiny gray body, on which each feather is marked by a black crescent and white margin, and the brilliant orange feet, make a strikingly handsome combination of colors. When the males first arrive on their breeding-grounds in spring, the beauty of their plumage is remarkable, but much of its satiny luster vanishes as the season advances.

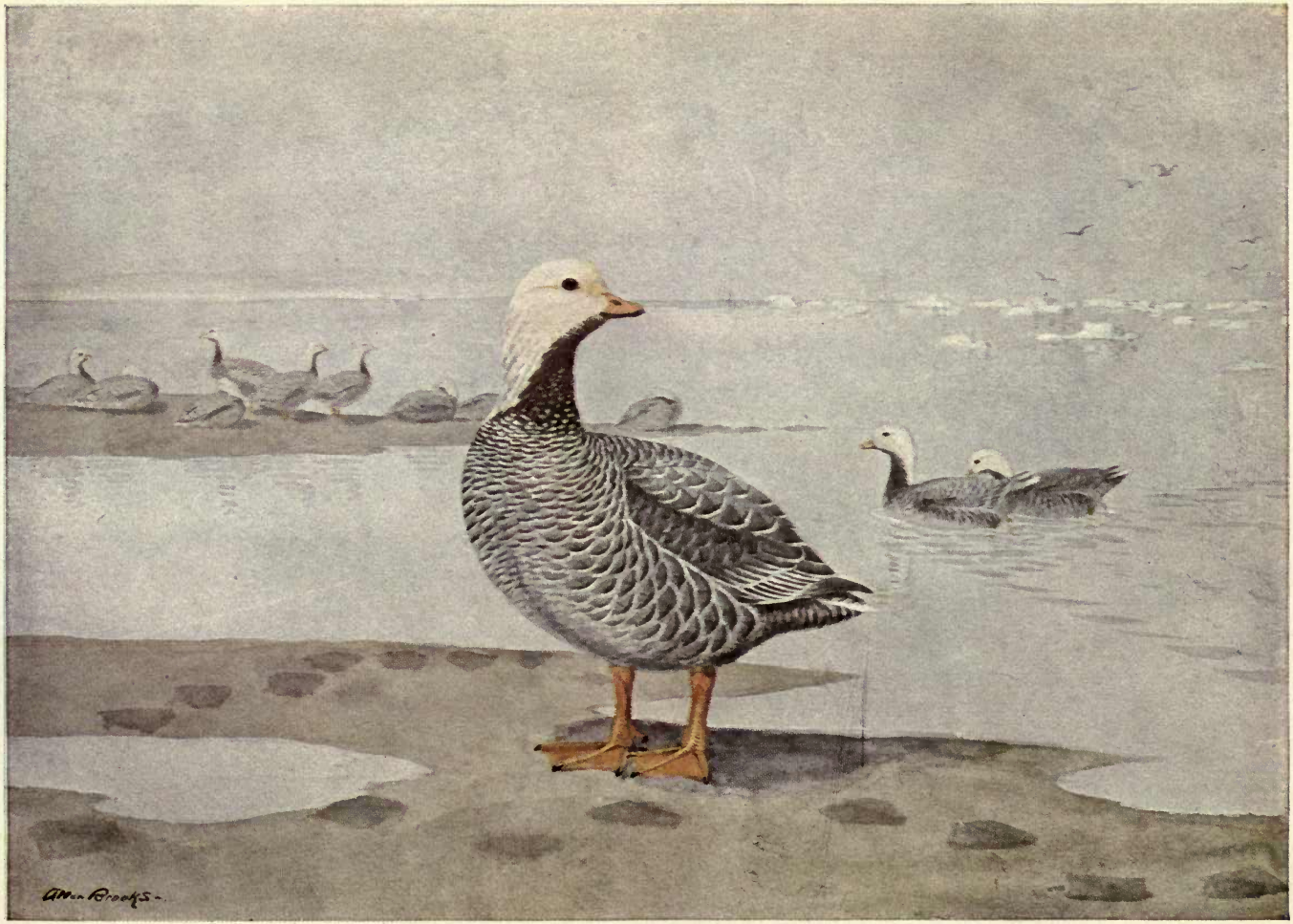
After careful examination I found the adult males and females to be absolutely indistinguishable. A fine adult female, taken at the Yukon Mouth on May 22, had its iris hazel; lower mandible dark horn-color, with a white spot on each side of the rami; membrane about the nares livid-blue, upper surface of bill pale purplish or fleshy white; edge of nail dark horn-color; rest of the nail white; inside of mouth mottled black and white; feet and legs a bright, rich, orange-yellow.

Although the breeding-range of the emperor goose covers parts of two continents, yet it is perhaps more restricted in its territory than any other northern species of goose. Its summer home lies along the coasts on both sides of Bering Strait, but, as we know, the vast majority of the race breed in Alaska, mainly on the islands of the lower part of the Yukon Delta, and thence southward on the low marshy tundras to Cape Vancouver and nearly to the mouth of the Kuskokwim River. A few stragglers nest north of the mouth of the Yukon. Considerable numbers also breed on St. Lawrence Island, where I have seen many flocks in June. They also rear their young on the shores of Chukchi Land, in extreme northeastern Asia. We saw them coasting along the beach near East Cape on the Siberian side of Bering Strait the first of July, and they must have been breeding in that district. When Nordenskiold wintered at Tapkan, on the Arctic coast of Siberia northwest of Bering Strait, he noted the arrival of these birds near his winter quarters as soon as the snow left the tundra in spring. This is the most western record we have of them in Siberia, but they no doubt range still farther. Their main wintering place appears to be on the Pacific, or southern, side of the Peninsula of Alaska and the Aleutian Islands. The Aleuts know them as "beach geese," owing to their persistent occupation of the seashore.

Stray individuals wander far down the American coast in winter, even to northern California, where several, mostly immature birds, have been captured. They also go as far as the Hawaiian Islands, for Henry W. Henshaw has recorded the capture of four on Hawaii, where they arrived, with other stray visitors, after a severe October gale, in 1902. On the coast of eastern Asia, we have records of them as far south as Bering Island, the mouth of the Anadyr River, and the coast of Kamchatka. On this coast, however, we do not know of their presence in any large numbers.

While I was preparing to go to Alaska, more years ago than I like to contemplate, the emperor goose, Steller's and Fischer's eiders, and the Aleutian tern, were names to conjure with; and the anticipation of studying these birds in their remote northern homes filled me with joy. In the North, my headquarters were at St. Michael, on the coast of Bering Sea, about sixty miles north of the Yukon Delta. Here emperor geese rarely occurred except in stray parties, visitors to the marshy coast-plain in fall. I made a sledge-journey one winter through the Yukon Delta and across the tundras southward to the Kuskokwim, and found the Eskimos in that district wearing parkas, or outer garments, made of the skins of emperor geese sewed together; and I heard that great numbers of these birds nested there each spring. From what I learned, it appeared evident that they rarely nested above the upper limit of the tide in the sluggish streams of this low plain. All available observations of the habits of this bird show it to be a strictly salt-water, coastal species, both in summer and winter. Its food is sought between tide-lines either on oozy flats, as at the Yukon mouth, or along the rocky beaches of the wild Aleutian shores.

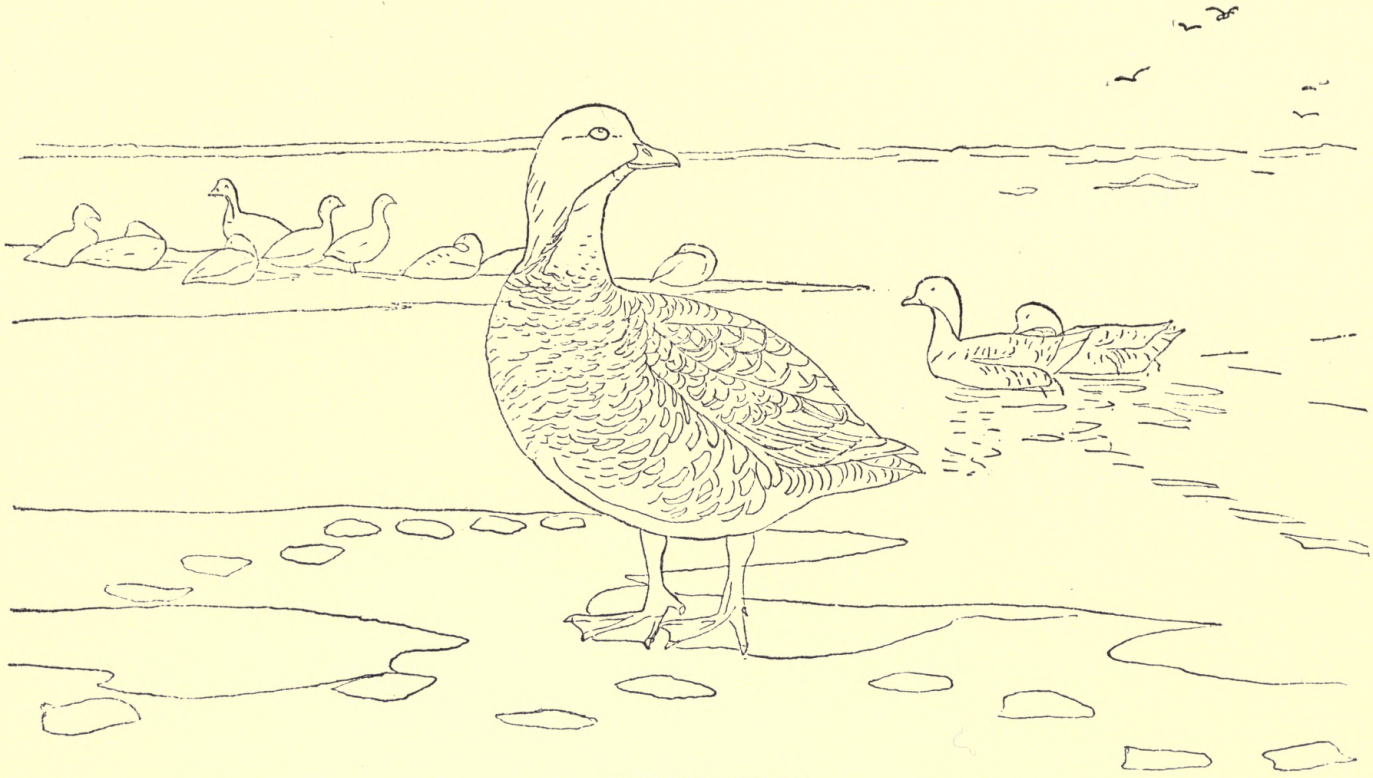
One spring, during my residence at St. Michael, it became possible to fulfil my long-cherished desire to visit the breeding-grounds of these geese, and of many other water-fowl in the Yukon Delta. To reach there in time to welcome the coming feathered host, I left St. Michael early in May with an Eskimo and a dog-sledge. The tundra was still clothed in winter white, except here and there a bare spot on the sunny side of a knoll, and the sea was covered with unbroken ice to the far horizon. The hoarse, crowing notes of the willow ptarmigan were beginning to be heard on the tundra, and occasional scouts from the coming army of white-fronted and cackling geese passed high overhead, spying out the land; yet the day I set out the temperature was well below zero.



EMPEROR GOOSE

Order—ANSERES
Genus—PHILACTE
Family—ANATIDÆ
Species—CANAGICA

National Association of Audubon Societies



EMPEROR GOOSE

Order—Anseres
Genus—Philacte

Family—Anatidæ
Species—Canagica

At the border of the Yukon Delta, Eskimos familiar with the country were employed to lead us to the desired nesting-ground of the emperor goose. Nearly half a day's journey among the maze of ice-covered channels of the delta brought us to a low, flat island, where our guide assured me many *nachau-thluk* would soon arrive to rear their young. It was a bare, desolate spot, with only a few scattered alders on the upper side of the islands, and an unbroken view out over the frozen sea to the west. A tent was put up on a slight rise and, after a stock of drift-wood had been gathered, the guides took the sledge and left me with my Eskimo companion to await the arrival of the birds. Later, when the ice went out, they returned for me with kyaks.

A few white-fronted and cackling geese gave noisy evidence of their presence, but it was not until May 22 that the Eskimo brought in the first emperor goose—a male in beautiful spring plumage. After this small flocks came in rapidly until they were plentiful all about us. They arrived quietly, skimming along near the ground quite unlike the other geese, which appeared high overhead with wild outbursts of clanging cries that were answered by those already on the ground. The river-channels and the sea were still covered with ice, and the tundra was half covered with snow, at the time of the first arrivals.

At first, the emperor geese were difficult to approach, but as their numbers increased they became less shy. When on the wing they were easily distinguished from the other geese, even at considerable distances, by their proportionately shorter necks and heavier bodies, as well as by their short, rapid wing-strokes, resembling those of the black brant. Like the latter, they usually flew near the ground, rarely more than thirty yards high, and commonly so close to the ground that their wing-tips almost touched the surface on the down stroke. While flying from place to place, they give at short intervals a harsh, strident call of two syllables, like *kla-ha, kla-ha, kla-ha,* entirely different from the note of any other goose I have ever heard. A group of them on a sand-bar or mud-flat often utter lower, more cackling notes in a conversational tone, which may be raised to welcome new arrivals. They are much less noisy than either the white-fronted or cackling geese, which often make the tundra resound with their excited cries. Occasionally I could cause a passing flock to leave its course and swing in close to my place of concealment by imitating their flight-notes.

Almost at once after their arrival on the islands, the emperor geese appeared to be mated, the males walking around the females, swinging their heads and uttering low love-notes, and incoming flocks quickly disintegrated into pairs which moved about together, though often congregating with many others on flats and sand-bars. The male was extremely jealous and pugnacious, however, and immediately resented the slightest approach of another toward his choice; and this spirit was shown equally when an individual of another species chanced to come near. When a pair were feeding, the male moved about restlessly, constantly on the alert, and at the first alarm the pair drew near each other, and just before taking wing uttered a deep, ringing *u-lugh, u-lugh;* these, like the flight-notes, having a peculiarly deep tone impossible to describe.

At low tide, as soon as the shore-ice disappeared, the broad mud-flats along shore were thronged with them in pairs and groups numbering up to thirty or forty individuals. They were industriously dabbling in the mud for food until satisfied, and then congregated on bars, where they sat dozing in the sun or lazily arranging their feathers. By lying flat on the ground and creeping cautiously forward I repeatedly approached within thirty or forty yards of parties near shore without their showing any uneasiness.

Early in June they began depositing eggs on the flat marshy islands bordering the sea all along the middle and southern part of the delta.

The nests were always most numerous in the marshes a short distance back from the muddy feeding-grounds, but stray pairs were found nesting here and there farther inland on the same tundra, with the other species of geese and various other water-fowl. Near the seashore, the eggs were frequently laid among the highest driftwood. wave-torn scraps of driftwood lying along the highest tide-marks. On June 5, a female was found on her eggs on a slight rise in the general level. A small gray-bleached fragment of driftwood lay close by. The goose must have lain with neck outstretched on the ground, as I afterward found was their custom when approached, for the Eskimo and I passed within a few feet on each side of her; but, in scanning the ground for nesting birds, the general similarity in tint of the bird and the obvious stick of driftwood had completely misled our sweeping glances. We had gone about twenty steps beyond when the goose uttered a loud alarm-note and flew swiftly away. The ground was so absolutely bare of any cover that the three eggs on which she had been sitting were plainly visible from where we stood.

They were lying in a slight depression without a trace of lining. The same ruse misled us several times; but on every occasion the parent betrayed her presence by a startled outcry and hasty departure soon after we had passed her and our backs were presented. They usually flew to a considerable distance, and showed little anxiety over our visit to the nests. The nests I examined usually contained from three to five eggs, but the full complement ranged up to eight. When first laid the eggs are pure white, but soon become soiled. They vary in shape from elongated oval to slightly pyriform, and are indistinguishable in size and shape from those of the white-fronted goose.

As the egg-laying approaches completion, the parent lines the depression in the ground with a soft, warm, bed of fine grass, leaves, and feathers from her own breast. The males were rarely seen near the nests, but usually gathered about the feeding-grounds with others of their kind, where they were joined now and then by their mates.

The young are hatched in late June or early July, and are led about by both parents until, in the last weeks of July, or the first of August, the old birds molt their quill-feathers, and, like the still unfledged young, become extremely helpless. At this time, myriads of other geese are in the same condition; and the Eskimos made a practice of setting up long lines of strong fish-nets on the tundras to form pound-traps, or enclosures with wide wings leading to them, into which thousands were driven and killed for food. The slaughter in this way was very great, for the young were killed at the same time and thrown away in order to get them out of the way of the next drive. The Eskimos of this region also gather large numbers of eggs of the breeding water-fowl for food; and, this practice, with the demand for eggs at the mining-camps, has constituted a serious menace to the existence of these and other water-fowl.

Fortunately, in 1909, President Roosevelt made a bird-reservation covering the delta of the Yukon and the tundra to the southward, which includes the main breeding-ground of the emperor goose, and thus took a long step toward perpetuating this fine bird.

THE HUDSONIAN CURLEW

BY A. C. BENT

A striking case of the survival of the fittest is seen when we compare the relative abundance of the three common species of North American curlews today with their status fifty years ago. Whereas, at that time the Hudsonian Curlew was the rarest of the three, it is now by far the commonest.

The reasons for the Hudsonian curlew's success in the struggle for existence are not hard to find. Its breeding-grounds are in the far North, where it is never disturbed; it has no dangerous migration-route; it does not, ordinarily, migrate in very large flocks, which are susceptible to vicissitudes of weather and great slaughter at the hands of gunners; but, above all, it is a shy, wary, wily bird, quite capable of taking care of itself and well-fitted to survive. Like the crow, it is more than a match for its enemies.

The Hudsonian curlew, Jack curlew, short-billed curlew, or Jack, as it is called, has often been mistaken by gunners for one of the other two species, and some confusion seems to have existed, in regard to it, among the early writers on ornithology.

There are certain characters, however, by which this species may be recognized at any age. The long-billed curlew is much larger, the crown of its head is uniformly streaked, without any median stripe, and its axillars have no distinct bars; whereas the Hudsonian has a dusky crown with a light median stripe, and its axillars are distinctly barred with dusky. The Eskimo curlew may readily be distinguished by its uniformly dusky primaries; whereas in the Hudsonian the primaries have distinct buff spots or partial bars on the inner webs. The bristle-thighed curlew bears a close superficial resemblance to the Hudsonian, but its primaries are like the Eskimo curlew's, and its general coloration above, especially on the tail, is much more rufous.

The Hudsonian curlew is widely distributed over nearly all of North America and part of South America. Its breeding-range has not been fully worked out, but it is known to breed on the Barren Grounds of northern Mackenzie, and on the coast of Alaska from the mouth of the Yukon to Kotzebue Sound. Its principal winter range is on the Pacific Coast of South America from Ecuador to southern Chile, where it is very abundant; it also winters from Lower California to the coasts of Guatemala and southern Honduras; on the

Atlantic Coast its winter range extends from British Guiana to the mouth of the Amazon River. Between these two ranges it migrates over all the intervening regions, where it can find suitable country, but mainly along the Pacific and Atlantic coasts. On the Pacific Coast the spring flight progresses slowly northward, reaches Alaska about the middle of May, and arrives on the breeding-grounds in northern Mackenzie by the end of May.

Very little seems to be known about the nesting-habits of the Hudsonian curlew. Mr. MacFarlane found them breeding on the treeless Arctic tundra near the mouth of the Anderson River, where he took several sets of eggs late in June and early in July; the nests were merely depressions in the ground lined with a few withered leaves J. O. Stringer described a nest which he found on the lower Mackenzie River as a pile of grass, moss, and weeds, on an island in the river. Joseph Grinnell reported this species as breeding in the Kowak Valley between June 14 and 20, 1899. The eggs vary in color from a creamy drab to a brownish buff, and are more or less heavily spotted with various shades of brown. The downy young have apparently never been described, and nothing seems to be known about the early plumage changes. Young birds in the fall can be distinguished from adults by their shorter bills and by the conspicuous buff spots on the upper parts.

The Hudsonian curlew is more of a littoral species than either of the others, and seems to prefer to frequent and feed on the seacoast. At low tide it resorts to the recently uncovered flats and beaches, where it can pick up marine insects, worms, and small crustaceans.

Like most of the northern-breeding shore-birds, the Hudsonian curlew moves off its breeding-grounds as soon as the young are able to shift for themselves, and begins its summer wanderings, or starts on its southward migration, early in July. The two main lines of flight are down the east and west coasts of the continent, but a more scattering flight passes through the central valleys and plains. As with all the shore-birds, the early flights are composed almost entirely of adult birds, and the flights of young birds follow, on an average, about a month later.

THE WILLOW PTARMIGAN

BY JOSEPH GRINNELL

The name ptarmigan is applied to several species and races of grouse-like birds comprising the genus *Lagopus*. Lagopus means "rabbit-foot," and refers to the chief character by which ptarmigans are distinguished from other members of the grouse family, namely, the heavy clothing of hair-like feathers which envelop the feet. In all but one of the species remarkable changes of plumage occur twice a year, and by the autumnal one a snow-white dress is acquired for the winter season. This, and the fact that ptarmigans live in the far north or on the tops of high mountains, where the climate is severe, makes appropriate the name snow grouse, used commonly in Alaska.

North America has three distinct species of ptarmigans. One of them, the white-tailed, lives upon the snowy summits of the Rocky Mountains as far south as northern New Mexico. The rock ptarmigan inhabits mountainous country in the far north, and, as represented by various subspecies, is found from Greenland across the continent and on nearly every one of the long chain of Aleutian Islands. The third American species, the willow ptarmigan, with which the present essay is concerned, is most abundant on that level or rolling arctic prairie-land, known as tundra, which lies between the forested interior and the Arctic Coast. In western and northern Alaska, these tundras are covered with a deep layer of moss and lichens. Here or there in 'draws' or shallow valleys, are tracts of dwarf willow and alder. In summer the tundras are boggy, and the many ponds and connecting channels make traveling difficult. In winter they are frozen solidly, and the wind-driven snow packs into the depressions so that the surface is nearly smooth.

Save for black tail-feathers, almost completely concealed when the bird is at rest, and the black of bill and eyes, the willow ptarmigan in the winter is pure white. When the white feathers first appear in the fall, they possess a perceptible, though faint, tinge of pink; but this soon fades out.

The purely white winter dress is believed to make the birds so inconspicuous against the white of the landscape that they many times escape discovery by their enemies, the arctic fox and gyrfalcon, as they certainly do by the human hunter. On a day when the sky is overcast with dense haze, obscuring the direct rays of the sun, and dispersing an intense, even light, the ptarmigans are extremely hard

to discern against the blank whiteness of their surroundings. Even when fresh foot-prints in the snow and occasional calls told of their near vicinity I have often found myself to be within but a few yards of the birds before they would take flight with startling whirr of wings and hoarse notes of alarm; then, as one would alight at some distance, it would seemingly vanish from the sight, not infrequently defying rediscovery altogether.

On the occasional cloudless day, when the sun shines unobstructed, even white objects are brought out in sharp relief by the long, dark shadows cast upon the snow. If approached at right angles to the rays from the sun, ptarmigans may then be discerned at several hundred yards distance; but they are then shy, for they have a marvelous way of appearing to know whether or not the hunter is actually aware of their exact whereabouts.

During the eight months of winter, the willow ptarmigans feed upon the buds and tender terminal twigs of the dwarf alder and willow, and virtually upon nothing else, save that quartz-gravel is regularly gathered from the river-bars where the wind bares the ground of snow.

The willow ptarmigan is by nature gregarious. Especially is this trait exhibited in the autumn months, when in the most northern localities a partial migration proceeds a few hundred miles to the south, or into great valleys where more food and better cover are afforded, for the birds show a predilection for the vicinity of brush-patches, or even of tracts of stunted spruce trees where these exist. Not infrequently they escape from the dash of a falcon by taking refuge in a bush among whose stems the snow rests lightly, and into which the frightened bird is able to plunge quite out of sight.

In the early spring, long before the thaw begins in earnest, the male ptarmigans begin to change to a rich chestnut-brown color on the head and chest, and a bright red comb develops above each eye. For a time, in April and early May, the males, with their deep brown mantles and white bodies, are very conspicuous. They are then more noisy than at any other season, uttering at frequent intervals until late dusk a low, harsh cackle, roughly imitated in the Eskimo name, *a-kaze-rh-gak.*

The male ptarmigans wear this special courting-plumage until June, when another change, involving the whole body-plumage, leads to a brown-black-and-buff plumage, which is worn until autumn. The females, meanwhile, change rapidly in early May, about the time the snow begins to disappear, to a mottled and barred black-and-brown

coloration. In this "summer protective" plumage the birds of both sexes are as difficult to see against the green, brown, and gray of the open tundra, as they were in winter plumage against the white landscape.

All these remarkable changes in appearance are the result of *molts*, by which feathers of one color fall out and new ones of a different color grow in. In the autumn exactly the same process leads from the brown and mottled coloration of both old birds and young-of-the-year to the pure white of winter dress. But while in the spring molt the feathers of the head, neck, and back are the first to be replaced, in the fall these are the last tracts affected; so that by the middle of October birds are to be seen with dark feathers still predominating in the head and back. This, of course, gives much the same effect as at an early stage of the spring molt.

The female ptarmigan selects the site for her nest during the third week of May, and by the second week of June full sets of eggs have been laid. The nest is a slight depression in the moss on the open ground; usually the summit of a hummock is selected, as being a drier situation during the period of early summer rains. A scanty lining of dry grasses in the nest keeps the eggs from actual contact with the saturated moss of the foundation.

The full set of eggs numbers from eleven to thirteen. They are very deeply and closely spotted and blotched with chestnut-brown, the effect being to render them difficult to distinguish from their surroundings, even when lying in plain view but a few feet from the observer. The female bird does all of the sitting, and when approached on the nest does not take flight until almost trodden upon. She then exhibits the greatest solicitude, tumbling about within a few yards of the intruder in the most distressing manner. The male bird sometimes appears, but keeps discreetly at a much greater distance.

After the eggs are hatched, the precocious youngsters are accompanied by both parents. They then have the faculty, so like that of young quails and grouse, of concealing themselves at a moment's notice, while the parents attempt to call the intruder's attention elsewhere. The young are at first clothed with down, of yellow and brown shades; but before they are half-grown this is entirely replaced by loose-textured feathers, and even before half-grown they are able to fly as readily as the adults.

In summer, the willow ptarmigan's bill of fare includes many sorts of insects, as well as green herbs. In the fall the abundant

crops of blueberries, heathberries, cranberries, and roseapples are freely resorted to, and these fruits again become available the following spring, when the retreating snow leaves them exposed.

The reader will already have marveled at the special and useful modifications in the habits and structure of the ptarmigan, which enable it to carry on a successful existence under such extremes in winter climate. Perhaps the most wonderful thing about the bird is its alternating adaptations to the opposite conditions of the short summer period. Not only is the summer plumage of a totally different general color, as already described, but it is much less dense than the winter plumage. The molts, however, do not affect the feathers of every part of the body. The wing and tail feathers are changed only at the time of the fall molt which, in fact, is the only complete molt. The feathers of the feet and legs are not replaced in the spring; but, as summer advances, the old feathers become brittle and *wear* off, until midsummer finds the birds with almost naked feet—a heavy feathering at that season probably being not only needless but a hindrance, especially when wet.

The toe-nails in winter are so long as to project considerably beyond the generous feathering of the feet and toes. They probably serve as "ice-creepers," of great use in walking or wallowing in crusty snow. But the extraordinary thing is that in summer the toe-nails drop off, or molt, new ones growing from the quick!

In winter plumage one set of feathers fails to conform to the general whiteness—the tail-feathers. When the bird is at rest the very long upper and under tail-coverts almost completely conceal these black tail-feathers, which are then closed together in narrow ranks; but when the bird takes flight, the tail is widely spread, and a black "directive" marking flashes forth against the white background. In summer, the wing-feathers, left unmolted from the winter dress, are unnoticed in the bird at rest; but, as the wings are spread in flight, they furnish again a conspicuous "directive" pattern against the dark landscape, the black tail-feathers being then ineffective.

The ptarmigans of the far northern frontier afford an even more important game-resource than did the native birds in the early days of the settlement of the States. The weight of a willow ptarmigan is one and one-half pounds, so that each bird gives as much food as four or five Bob-whites. It should be so cared for as to continue a permanent game-resource in a country where the food-value of game-birds is far more to be considered than any question of sport.

THE ALASKAN LONGSPUR

BY EDWARD W. NELSON

The Lapland longspur is a circumpolar bird, whose presence has been recorded in summer from many points visited by explorers in the treeless Arctic regions. It nests in Iceland, Greenland, and on a majority of the islands of the icy sea north to 73 degrees of latitude, as well as on the mainland. Owing probably to some climatic influence, the longspurs which breed west of the Mackenzie River, and throughout Alaska, as well as on the Aleutian and other islands of Bering Sea, are paler than those from the rest of the great range of this species, and have been distinguished as a geographic subspecies called the Alaska longspur (*Calcarius lapponicus alascensis*). These longspurs, however, are so nearly alike in appearance and habits throughout their range that in the present sketch they have been treated as one. In Alaska, they are extremely abundant and familiar birds on virtually all of the treeless tundras or Arctic barrens. They are perhaps most numerous on the mainland everywhere in suitable places, but are also common on the islands of Bering Sea. They are known in these northern haunts only in summer, when they breed from Kadiak Island north to Point Barrow.

The males reach Dawson, on the upper Yukon, from the 5th to 18th of April, in nearly perfect breeding-plumage. There appears to be no spring molt of these birds, but they obtain the breeding-dress by the wearing away of the light edgings of the feathers of the winter plumage. At the same time remaining parts of the feathers appear to become brighter and richer, as if suffused with added coloring-matter. There is considerable individual variation in color, due to a greater or less intensity rather than to any change in pattern.

During the last days of April and first of May, they arrive at St. Michael, on the coast of Bering Sea, and are known to reach southern Greenland at about the same time. Murdoch tells us that they are abundant in summer at Point Barrow, where they arrive about May 20; the first eggs are laid early in June, and the birds begin to migrate southward the last of August or first of September. On the western Aleutian Islands Dall found them to be abundant summer residents, and discovered a nest with four much-incubated eggs on June 18. They leave these islands in winter; and I may add that I do not know of a winter record from any part of Alaska.

During the summer of 1881 I found them nesting on St. Lawrence Island, in Bering Sea, and on both sides of Bering Strait, but I saw no trace of them on Wrangel and Herald islands. They are well known and abundant on the Fur Seal Islands, where they are the most beautiful songsters among the limited number of land-birds summering there. They winter through parts of central Europe and middle Asia to Japan, and through the middle-northern United States, mainly from the Great Lakes to Oregon and Washington, and sometimes extend as far south as Texas.

Early in May, the tundra on the Alaskan coast of Bering Sea is still mostly covered with snow, except in grassy spots on southern exposures and other favorably situated places. Here the first male longspurs suddenly appear in all the beauty of their summer dress. At this season, the males are beautiful birds, the head and breast being jet-black with white or buffy stripes back of the eyes, the back of the neck bright rufous, and the back streaked with black and brownish. The females, as usually among birds, are more obscurely marked, and reach the breeding-ground a little later than the males. They arrive on the coast of Norton Sound in flocks and spread rapidly over their breeding-ground. Despite the bleak surroundings and chilling winds, they are soon abundant after the first arrivals, and by the middle of May are in full song. As if conscious of their handsome appearance, the males choose the tops of projecting tussocks, rocks, or the small knolls that alone break the monotonous surface, where their bright colors render them conspicuous.

The Lapland longspur is one of the few birds, which, like the skylark and the bobolink, are so filled with the ecstasy of life in spring that they must rise into the air to pour forth their joy in singing. The males are scattered here and there over the tundra on their chosen projecting points, and at frequent intervals mount slowly on tremulous wings ten or fifteen yards into the air. There they pause a moment and then, with wings up-pointed, forming V-shaped figures, they float gently back to their perches, uttering, as they sink, their liquid notes, which fall in tinkling succession on the ear. It is an exquisite, slightly jingling melody, with less power than but slightly resembling the song of the bobolink. By the last of May each eager songster has procured for himself a mate, and they build a snug nest, well placed in the heart of a sheltering tussock or on a dry knoll, in which are placed from four to seven eggs. During my residence at St. Michael I examined many nests, and the number might readily have been doubled. One could scarcely walk about the

tundra for half an hour during the proper season without finding from one to half a dozen of them.

The nests are usually built in the driest parts of the tundra, in a hummock, a tuft of grass, or perhaps a little bunch of dwarf willow. As one comes upon it the female usually flutters off at one's feet, and is immediately joined by the male. Both hover about or fly restlessly from tussock to tussock, uttering protests at the intruder as long as he remains in the vicinity.

If the eggs are nearly ready to hatch the female shows the greatest solicitude, and when the young have hatched her anxiety is still more pronounced. In one instance the female was frightened from her eggs just as they were about to hatch, and ran along the ground a few yards uttering a plaintive *chee-chee-chee* in a fine, vibrating, metallic tone, at the same time dragging her outspread wings and tail on the ground and fluttering as if in mortal agony.

The nests vary in size, but average about two and three-fourths inches in depth by five inches across the top on the outside; the central cavity is about two inches deep and three inches across the top. The walls are sometimes thick and strong, composed of an abundance of material, or may be a mere cup-shaped shell, barely sufficient to hold the eggs. The majority of nests are composed of rather coarse grass, sometimes with moss interwoven, forming a thick layer, which was frequently found to be as thoroughly water-soaked as a wet sponge. The amount of material used depends upon the situation; in damp places a much greater amount is made use of, while in dry places the nests are much lighter. Though the outer part of the nest is frequently formed of old and often grimy or partly decayed vegetable matter, the interior invariably contains fine, soft, yellow blades of last year's grasses. These, in many instances, are unmixed with other materials, but are sometimes combined with feathers of ptarmigan or other wildfowl. In a few cases the lining of the nests examined by me consisted of a warm cup of feathers inclosed in fine grass, and one had a thick lining of feathers and dog's hair. Some nests are so small that they may be inclosed in the hand, while others can scarcely be inclosed in both hands; one of the smallest nests might be easily inserted in the cavity of a large one. The largest nest I found contained the largest eggs, and probably belonged to an unusually large bird. The eggs are heavily covered with blotches and zigzag lines of various shades of brown, and the ground-color, when visible, is a light clay with a pale greenish tinge.

The partly fledged birds, late in June or early in July, have the feathers of the crown, back, rump, breast, and throat with black or very dark-brown shaft-lines, which, on the breast and throat, are narrowed to about one-third the width of the feather. On the crown and back the black central markings occupy more than half the width. The feathers of the crown are edged with a dingy, yellowish buff; those of the nape with grayish or dull ashy; and of the back and rump with a dingy yellowish gray or buffy. There are two indistinct white wing-bars. The edges of the breast-feathers are yellowish, with a wash of the same on the feathers of the entire under surface. This state of plumage is scarcely attained before it begins to give place to the fall and winter dress with which we are familiar, when the birds come trooping down to the northern United States from the north at the commencement of winter.

Beginning on the lower parts, the feathers are gradually molted and replaced, the change extending slowly toward the bill. I am inclined to think that the molt commences about the tail and rump. It begins late in July or early in August, at which time the old birds are already far advanced in their autumnal change. Adult males were found with nearly complete winter dress on July 22, and probably some change even earlier than this. They usually begin to move south before they have fully molted, so that only the comparatively few individuals that have completed the molt in September are found in perfect winter dress on their northern breeding-grounds. The young are out on the wing sometimes as early as the 1st of July, but more generally by the 10th of this month, from which time they unite in small bands, most of them on the open plains, but many frequenting the vicinity of the trading-posts and native villages. They remain in great abundance until the last of August or first of September, when they commence their straggling departure for the South. While in the neighborhood of houses, they are extremely heedless of the presence of people, and are nearly as familiar as are the English sparrows in our cities. By the first of October, the last one has passed away southward.

In winter and early spring the longspurs are very common over the prairie-lands of the upper half of the Mississippi River Valley, and thence west to Oregon and Washington.

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FEDERAL BIRD-RESERVATIONS IN ALASKA, AS INDICATED ON THE MAP ON PAGE 9.

1. Chamisso Island. 2. Bering Sea (St. Matthew and Hull Islands). 3. Pribilof Islands. 4. Yukon Delta. 5. Bogoslof Islands. 6. Aleutian Islands (Unimak to Attú). 7. Tuxedni (Chisik and Egg Islands). 8. Fire Island (for moose). 9. Hazy Island. 10. Forrester Island (including Wolf Rock). 11. Saint Lazaria (Sitka Sound). All these have been established by the Government since 1909. The federal law relating to such Reservations says: "Whoever shall hunt, trap, capture, willfully disturb, or kill any bird of any kind whatever, or take the eggs of any such bird . . . except under such rules and regulations as the Secretary of Agriculture may, from time to time, prescribe, shall be fined not more than five hundred dollars, or imprisoned not more than six months, or both."