intimation of danger and will appear on a point of rock some distance away, where she will be joined by her mate. Altogether we collected four sets of this species. Three of these were of three eggs each and one of two eggs.

To secure two of these sets I had to swim thru a dangerous surf and land on jagged rocks; and the other two were on the top of rocky pinnacles which were all but inaccessible. The nests are placed on the lea side of a rock or projection sheltered from the prevailing wind, sometimes only a few feet above high water and at other times far above the reach of the flying spray. They are shallow cavities in the rock or thin soil, thickly lined with sharp chips of rock evidently carried by the birds. Numerous scratches on the shells of the eggs show that they are frequently turned over by the birds who probably rely to some extent on the heat of the sun as an assistance in incubation.

The birds subsist principally on mussels and limpets, and the ease with which they pry them from the rocks with the sharp, chisel-like bill furnishes a striking example of the natural law of adaptation to surroundings. The rocks around the nesting sites are covered with the shells of molluscs brought there by the birds.

The statement that this species nests on gravelly beaches is erroneous as regards this locality. The first set of eggs was taken May 14, and was about half incubated. It was situated on a large flat-topt rock very difficult of access. There were breeding on the top of the same rock four pairs of Western Gulls and a colony of Brandt Cormorants; while on the precipitous sides were numerous nests of the Baird Cormorant; and in the caves at the base of the rock were two or three pairs of Sea Pigeons. The other three sets were taken on May 15, 16 and 17, respectively, and were on isolated rocks, the Oystercatchers being the sole inhabitants.

In ground color the eggs vary from grayish olive to greenish, spotted and blotcht with black and dark brown, with lavender shell markings. Thirteen eggs measure in inches: Maximum, 2.38×1.58; minimum, 2.08×1.45; average 2.24×1.52.

Los Angeles, California.

A LIFE HISTORY OF THE NORTHERN BALD EAGLE

By JOSEPH DIXON

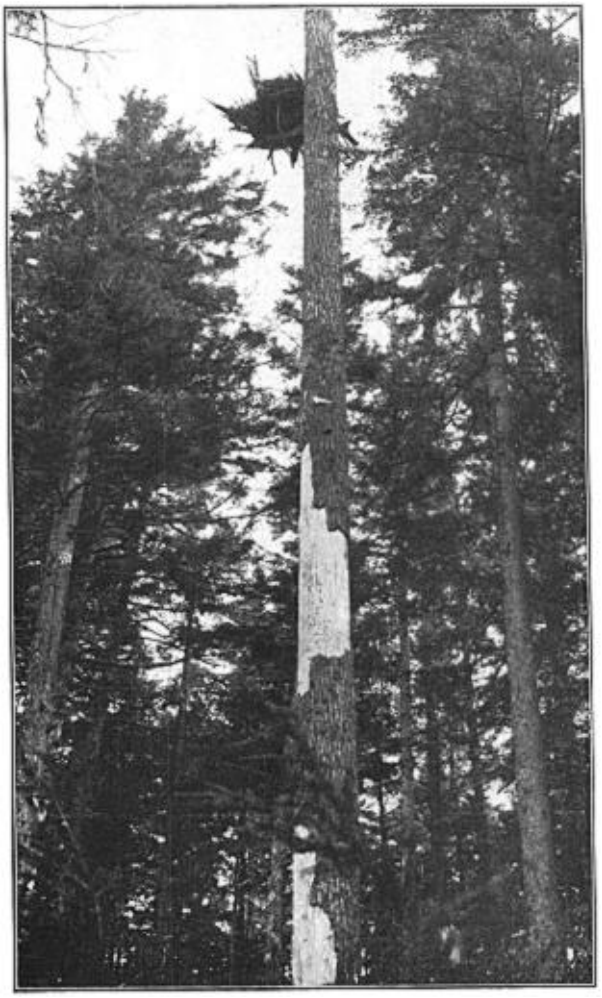
WITH FOUR PHOTOS BY ANNIE M. ALEXANDER

I KNOW of no other Alaskan bird which seems to be more in keeping with the country than the Northern Bald Eagle (*Haliæetus leucocephalus alascanus*). While this bird is by no means restricted to the shore line of the Pacific between the southern boundary of Alaska and the base of the Alaska Peninsula, still I believe that it may be truthfully stated that nowhere else does it find a more congenial home or breed in larger numbers than along this thousand-mile stretch of islands, inlets and glacier-scoured coast.

In size, this eagle is considerably the superior of its cousins in "the states", since it is not uncommon to find female eagles that are more than thirty-seven inches in length, with a spread of seven feet and a half, or better. The males are, of course, quite a little smaller than the females and rarely equal the smaller females in size. The largest female that I secured had a spread of seven feet and nine inches; length, thirty-seven inches. The males seemed to average about a foot less than this in spread, and were about thirty-six inches in length. I was inter-

ested in watching to see if this greater size of the female was accompanied by a corresponding courage when I invaded the nest; and in those cases where I had positive means of identification I usually found that it was the female that proved the most threatening, altho she might be away from the nest hunting when the male gave the alarm.

The dark bodies of the eagles blended very well with the dark green conifers in which they often percht; and the birds would have been past by many times had it not been for their white heads. This feature was the most useful recognition-mark about the bird, as it could be seen at three hundred yards, when the dark body could not be distinguisht from the surrounding foliage. We once saw more than fifteen eagles sitting in a single spruce tree waiting for a school of herring, and at a distance it appeared like a magnolia tree in blossom because only the white heads were discernible.



NEST OF NORTHERN BALD EAGLE ON ADMIRALTY ISLAND, ALASKA

In the early spring the feathers on the head and tail are clean and white, but as soon as the salmon begin to run they become greasy and yellowish from coming in contact with the fish when the bird is feeding.

The plumage of these birds forms a very efficient protection against the rain. I watcht one pair of birds during a storm that lasted a week; and altho it rained every day, the birds were able to care for their young. Most of their time, however, was spent perching in the top of a dead spruce tree, since they hunted very little during the storm.

The molting period seems to extend over a considerable time in these birds, so that even in the midst of the molt they are apparently in good plumage. One bird that I secured in the middle of August, had two new primaries coming in on each wing, and several new secondaries were just beginning to show up among the other feathers. There were not so many new feathers coming in on the body; and judging from this individual, the

feathers of the wings begin to molt first. I had no means of determining the exact length of the molting period.

An alarm note is the commonest vocal expression of this eagle during the

NEST OF NORTHERN BALD EAGLE (AT TOP CENTER) ON HAWKINS ISLAND, PRINCE WILLIAM SOUND, ALASKA

breeding season and consists of a series of short guttural sounds uttered in quick succession. It always seemed to me as tho the bird was chuckling, even in spite of

the evident tinge of anxiety in the note which became more intense as one approacht the nest. During the frequent quarrels over fish, the eagles often gave forth lusty screams; and they sometimes announced in the same manner their arrival at the nest when they returned from the bay with a fish.

Perhaps as much as any of the other Alaska birds, the bald eagle is confronted with feasts in the summer-time and frequent famines in the winter. After the fore part of July, when the salmon begin to run, no eagle need be without food. The brown bears may levy the first tribute on this numberless host from the ocean but the eagles will often be found congregated about the mouths of the larger streams even before the salmon begin to run. The Glacous-winged Gulls are fastidious about their salmon and will often pick the eyes out of a fish that gets stranded on a shoal, and may not even stop to kill it. The eagle is not guilty of this as far as I have been able to discover, but feeds on decayed or partially decayed fish almost as readily as on live ones that could readily be caught. The fact is, he is too lazy to catch fish when dead ones are lying about, and he does not care if they are somewhat tainted. The stomach capacity of this bird was a revelation to me. One large female that I shot weighed fifteen pounds; but I found that about three pounds of this was salmon, which, altho it had just been swallowed, was anything but fresh. This feasting upon salmon lasts until the gigantic table-spread, the first snow, is laid over the salmon strewn gravel bars in the rivers. By this time the eagles have become as oily, fishy and plump as the natives themselves.

From October to April the eagles have need for the fat that has been laid up by salmon feastings, as they have to live on what few water fowl and fish they can catch. I have been told that two or three of these eagles sometimes kill half-starved deer during the coldest, hardest part of the winter; and since my friend, whose truthfulness has never been doubted during two years of close association, was well acquainted with the birds, I do not discredit the story.

The agility and watchfulness of the bird was well illustrated by one which swoopt after a wounded Old-Squaw that fell just out of gunshot of the boat. The wounded duck escaped temporarily by diving; but the eagle was waiting every time that it came up and finally the dives become shorter and shorter until at last there were none and the eagle carried the duck off to the timber. Judging from the amount of duck feathers in and about a nest on April 30, these birds must live largely on ducks during the migrations.

By the first of May the eagles are on the lookout for schools of herring that usually make their appearance about this time. One afternoon I noticed a commotion out in the bay where a flock of loons were fishing, then an eagle left a nearby perch, swoopt down, struck a fish in the water and returned to his perch where he gave a shrill scream. At the sound, eagles began to come from all directions to the spot where he had secured his fish, and within five minutes there were more than twenty eagles assembled. Only the first ones secured fish, as the fish which had evidently been driven to the surface of the water by the loons, went down again; the eagles returned to their perches to begin another vigil and soon all was quiet again.

The accounts that I had read, and the few photos that I had seen, led me to picture in my mind a large bald eagle's nest placed, preferably, in some dead and decaying tree that stood out in the exposed portion of some wooded point. This may be the case in parts of the country, but it certainly does not apply to the bald eagle in Alaska. In the first place dead trees do not last long there. They are comparatively scarce and do not afford much protection from the wind. In the second place the birds rarely build at the extreme end of a point of timber, but go

back in the woods for fifty yards or so in order that the nest may be sheltered from the gales that rage at times. In addition to this the nest must be well placed and firmly supported; for it must bear up several hundred pounds of snow during the winter. Out of twenty-five nests observed, only two were in dead trees and one of these is shown in the first illustration accompanying this article.

The second photo shows a nest of this bird on Hawkins Island, Prince William Sound, Alaska. This nest was located in a large hemlock tree sixty-two feet from the ground. It will be noticed that the nest is not in the top of the tree, where it would be exposed to the full force of the wind. This was an immense pile of wood even for an eagle's nest. These are the actual measurements taken with a steel tape: outside diameter, eight by ten feet; depth, four feet; nest cavity, twelve by twelve inches; depth, four inches. The nest was firmly supported by an eight-inch forked limb; but the lower portion of the nest was fast moldering away, and a

YOUNG NORTHERN BALD EAGLES PHOTOGRAPHED IN NEST

green currant vine had become firmly anchored in the rotting wood and twined its graceful green tendrils around one side of the nest. The nest was practically level across the upper surface, which was carpeted with moss. The nest cavity was lined with gull feathers and fine dry moss. I stretcht out across the narrowest diameter of the nest but my arms and legs extended were not visible from below. This nest must support at least a ton of snow during the winter, so I had no hesitancy in venturing out upon it.

Another nest, at Windfall Harbor, Admiralty Island, Alaska, was situated in the highest branches of a broken-topt spruce tree one hundred and sixteen feet from the ground. This nest was not so well built, but measured six feet four inches, by six feet eleven inches over-all, and the outside depth was four feet.

The nest cavity was lined with duck feathers, dry moss and grasses. It measured sixteen inches in diameter and was four inches deep.

As far as I could learn both birds shared about equally the duties of nest-building and incubation. I watcht one pair of birds with a telescope and found that the female occupied the nest most of the time, but the male was not far away at any time. One thing that has always puzzled me was the comparative scarcity of breeding birds in southeastern Alaska in the spring of 1907. During the latter part of April and the first of May it was no uncommon sight to see fifteen or twenty eagles together waiting for a school of herring. I do not know that these birds did not breed later on; but I do not think that this was the case, as I found numerous nests, most of which were not occupied.

Two eggs is a normal set with these birds; and I have been led to believe, from the nests that I have examined, that not more than one set in ten consists of three eggs. A set of two eggs taken at Windfall Harbor, Alaska, on April 30, 1907, are rounded ovate in shape; the shell is rough, clear white and slightly nest-stained. These eggs are unusually large, measuring 78×58.5 and 75.5×60 millimeters. At

YOUNG NORTHERN BALD EAGLES ABOUT THREE WEEKS OLD; HAWKINS ISLAND, PRINCE WILLIAM SOUND, ALASKA

this date the eggs were practically fresh. I do not know the exact length of the period of incubation. The earliest nesting record that I have is April 30, and the latest about May 25.

The third illustration shows three young eagles in the nest on Hawkins Island which is illustrated in the second cut with this article. This photo was taken June 21, 1908, and I took the young birds to be about ten days old at this time. They were clothed in white natal down. Two freshly caught fish about a foot long were lying beside them. The young eaglets evidently took me for the old eagle when I invaded the nest; for they stuck up their heads uttering a rasping sound thru their wide-open mouths, and tried to swallow the end of my finger when it was inserted into their mouths. It might not be out of place to mention here that while I was thus employed, both parent birds were circling overhead uttering the chuckling alarm note; and altho seemingly much concerned about the fate of their young they made no effort to attack me and at no time came nearer than fifty yards. I have never known these birds to fight for their young and I believe that the valor

of this as well as that of the golden eagle, in protecting their young, has been unduly emphasized.

After photographing these young birds in the nest, I lowered them to the ground in a fish basket and kept them with me for some time so that I had a good opportunity to watch the feather development. They ate heartily many times a day, but were the most avaricious set of individuals that I ever had anything to do with. When they were taken from the nest there was a noticeable gradation in size, and the largest one immediately took advantage of this. Every time that I went to feed them he would peck and maul the other two until they stuck their heads down; then he would gobble everything in sight. I could not teach him better; and as soon as I removed him, the second largest one began to persecute the smallest one in the same way. Together the two larger ones killed the smallest one, and I think that this would probably have taken place in the nest in the natural course of events.

The white natal down began to give way to a sooty down when the birds were about three weeks old and this plumage was kept until it was replaced by the dark feathers of the immature bird. This dark immature plumage is not molted in the fall by the birds of the year but is kept at least until the following fall, so that the birds with the white heads and tails are two or more years old.

Palo Alto, California.

FURTHER NOTES FROM SAN CLEMENTE ISLAND

By C. B. LINTON

DURING 1908 I added the following species to my early list of the birds of San Clemente Island, California. (See CONDOR, vol. x, no. 2, p. 82.) I wish to tender my sincere thanks to Mr. Charles T. Howland, lessee of San Clemente Island; and to Mr. Robt. Howland and the "boys" of Mr. Howland's various ranches, for the many favors extended to myself and party while working this island.

Gavia pacifica. Pacific Loon. A few individuals were noted during the winter months; not common.

Cerorhinca monocerata. Rhinoceros Auklet. Two specimens collected. Among the skeletons strewn along the rocky beaches were several of this species.

Synthliboramphus antiquus. Ancient Murrelet. During November and December, 1908, several Ancient Murrelets were seen and two collected.

Brachyramphus hypoleucus. Xantus Murrelet. One specimen, only, was secured here, December, 1908.

Larus occidentalis. Western Gull. By an oversight this species was not recorded in my previous records. Common; several pairs breed near Northwest Harbor.

Puffinus opisthomelas. Black-vented Shearwater. Noted near the island.

Puffinus griseus. Sooty Shearwater. Noted near the island.

Mergus serrator. Red-breasted Merganser. Several stragglers observed.

Oidemia perspicillata. Surf Scoter. Several seen.

Porzana carolina. Carolina Rail. While hunting in one of the deep canyons near Mosquito Harbor I found the partly-eaten remains of a Sora! The wings and