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## NESTING OF THE SNOWY OWL

WITH EIGHT ILLUSTRATIONS

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In the course of an expedition, undertaken in the summer of 1924 jointly by the Bureau of Biological Survey, Mr. H. W. Brandt, of Cleveland, and Mr. H. B. Conover, of Chicago, to the Hooper Bay region near the mouth of the Yukon River, Alaska, one of the most interesting birds observed was the Snowy Owl (*Nyctea nyctea*). The following notes will give at least a portion of the life story of this Arctic species. Photographs are used through the courtesy of the Biological Survey.

Our headquarters were established at the Bureau of Education schoolhouse near the shore of Hooper Bay, giving us access to the rolling tundra extending inland, as well as to the tidal marshes bordering the bay. To the northward lies Igiak Bay, a smaller body of water also bordered with tide flats. The Askinuk Mountain range extends along the north side of Igiak Bay, projecting into Bering Sea and forming Cape Romanzof, thus adding to the variety of elements constituting the fauna of the region.

Our numerous tasks in this area of abundant and varied bird life prevented a thorough study of the snowy owl. Even though a complete record was not obtained, abundant scattered observations revealed a number of interesting facts in the nesting life of this owl. About forty nests were observed, a few of which were visited repeatedly in an effort to learn something of the bird's food habits and the sequence of events in its nesting.

**The Nest.** The snowy owl nested most abundantly on the high rolling tundra, but a certain number were found on the tide flats and others on the slopes of the Askinuk Mountains. In nearly all cases the birds chose a hummock for the nesting site. In a few instances a large hummock, rising prominently to a height of three or four feet, was selected, but ordinarily the nest was made on a less conspicuous rise, sometimes a very slight one. Often there were numerous other hummocks in the vicinity, many of them better defined and drier than the one containing the nest. On the high tundra, as well as on the tide flats, small lakes were plentiful, and the nests were consequently located near some body of water or marshy tract, usually on a long gentle slope. They were seldom found on the highest elevations. In the Askinuk Mountains nests were found on various parts of the slopes, one at least at an elevation of approximately 1000 feet. Other nests were seen on the salt-water marsh, which was partly inclosed by two spurs of the mountains.

The nest was merely a hollow scooped out of the top of the mossy knoll or mound, usually exposing the peaty earth underneath the vegetation. Normally there was no lining, but in a few instances moss, lichens, or grass was present in the nest. This had been plucked near the nest rim. One nest had been made on a small mound capped with tall grass. The owls had torn out enough of the grass to make room for the nest and had left the rest standing.



Fig. 1. NEST AND EGGS OF SNOWY OWL ON A GRASSY HUMMOCK NEAR HOOPER BAY, ALASKA, JULY 6, 1924.

In the Askinuk Range, three nests were found on huge granite boulders about four feet high and capped with moss and other vegetation in which the nest cavities had been scooped out. One nest was near the base of a slope, the other two at a much higher elevation on the upper slopes. Sometimes a second nest was found near the one occupied. One such nest consisted of a well-formed cavity; another had been started only. These were evidently false beginnings, abandoned when the owls had decided on a new location.

The nest cavity varied from 11 to 14 inches in diameter, the average being about 12 inches. The depth varied from  $2\frac{1}{2}$  to  $4\frac{1}{2}$  inches. The longer the nest was occupied the wider and flatter became the cavity. As the young hatched and grew the nest became littered with mouse fur, bird bones, and feathers (including owl feathers). Thus the nest with this accumulation in many cases became a mere platform for the

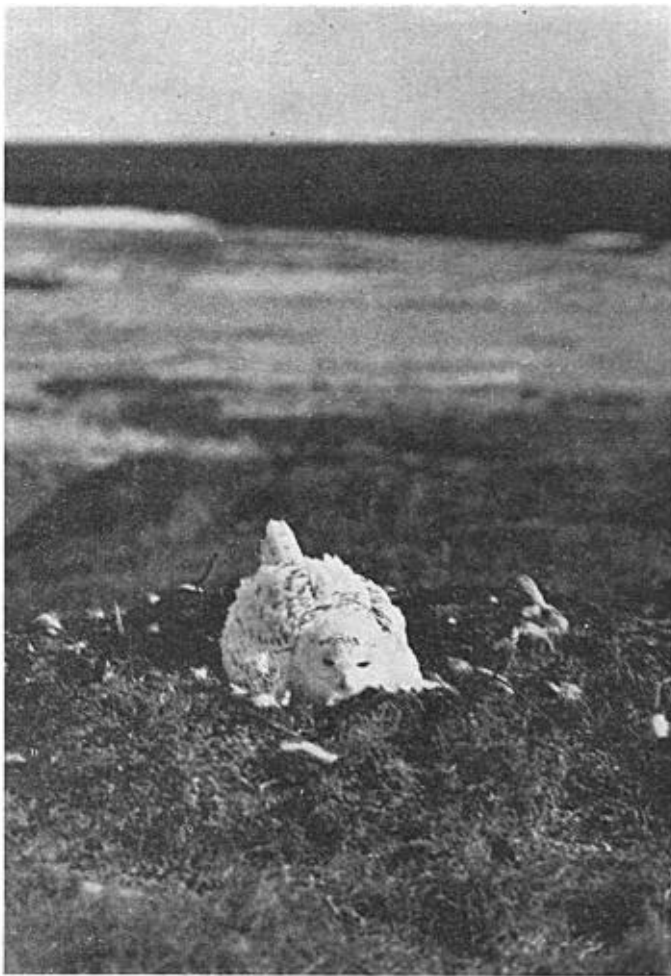


Fig. 2. BROODING FEMALE SNOWY OWL; PHOTOGRAPHED NEAR HOOPER BAY, ALASKA, MAY 29, 1924.

young until they were old enough to scramble out and crouch in the grass near by.

**Nesting Habits.** The nest of the snowy owl is easily found. The male is usually perched in a conspicuous position, and his white plumage can be seen at a great distance. When the bird is approached he will shift his position repeatedly, going farther and farther away; but usually the female may be observed leaving the nest, somewhere in the vicinity. If she escapes unobserved the nest may be located by the tell-tale white feathers that accumulate in and about it. When I approached a nest

closely, the male rushed to the attack and with a series of hoarse, barking hoots swooped at me repeatedly. This was often a vigorous demonstration, but as a rule the bird did not appear likely to strike and never did make a real attack. In a few cases the male persisted in this demonstration but generally lost some of his aggressiveness after a few minutes and would sail off to some convenient perch. The female was more timid. She sometimes joined in the outcry at a distance in a somewhat higher-pitched tone, but held aloof and did not attempt to intimidate the intruder.

There were individual differences of behavior among the birds, one extreme represented by a pair that appeared indifferent, in fact so wary that for a time I was uncertain as to their connection with the nest I found. The other extreme was illustrated when, at another nest, the male swooped so determinedly that I thought it



Fig. 3. NEWLY HATCHED SNOWY OWL, STILL WET, WITH ANOTHER A LITTLE OLDER; PHOTOGRAPHED JUNE 26, 1924.

was to be a real attack. When a nest had been under observation for some time and was visited repeatedly, the birds became accustomed to the intrusion and the customary initial outcry became rather perfunctory. In one case the mother returned to the nest many times, although the camera stood near by and I lay in view a little farther away prepared to pull the thread releasing the shutter. Finally she returned to the nest, while I sat with the camera within easy range.

In two instances both male and female fluttered over the ground, simulating injury, in an effort to decoy me away. This practice apparently was not universal among the snowy owls, and was used only briefly by the two pairs noted. Evidently a threat is more in keeping with snowy owl nature.

A curious reaction was sometimes exhibited. When I approached the nest the birds would raise an outcry as usual. Then, when the male chanced to fly by the female, which was sitting on the ground, he dropped to her side and mounted in the posture

of copulation, remaining so about ten seconds. Three different males performed in this manner, a striking example of confusion of instinctive responses.

One day a light rain was falling as I approached a nest. The mother bird flew away but soon returned to her eggs for a moment, although I was still walking toward her. On reaching the nest I found a few bits of moss on the eggs. Presumably the moss had been placed there accidentally, but there is the possibility of an imperfectly developed instinct to cover the eggs, in the face of an approaching enemy or rain. Her anxiety over the circumstances was evident from the fact that she did return to the nest even though I was steadily coming nearer. Her actions recalled a similar incident, when a female Steller eider climbed out on the shore of a pond when it began to rain, covered her eggs thoroughly, and then walked back into the water, while I stood within a few feet of the nest, photographing it.



Fig. 4. SNOWY OWLET JUST HATCHING; PHOTOGRAPHED JULY 6, 1924.

The sexes were easily distinguished at a distance. The males appeared immaculate, while the females were heavily barred. The males that were collected proved to have a few dark markings, but these were not apparent in life.

Division of labor between the sexes was clear cut. The female incubated the eggs, the male usually standing guard at a distance. I do not recall an instance when this arrangement did not prevail. Presumably the male did most of the hunting, and I believe fed his mate, to some extent at least. When the young were hatched it was the female that fed them, although the male probably furnished the food. Her face and breast were usually bloody and bedraggled as a result of her duties at the nest, while the male's plumage was clean.

**Incubation.** From 5 to 10 eggs are laid, averaging 8. The majority of nests examined contained 7 or 8 eggs. An egg is laid every other day in most cases, and they hatch in the same order, although there are definite exceptions to this rule. I wished

to collect several sets, and to prevent the first-laid eggs from hatching before the last one was laid I drilled holes in several and stirred the contents with a straw, hoping this would in some way arrest development. I was delayed in returning to some of these nests and found, when I did return, that all had hatched in spite of my tampering.

I found the first nest, with 2 eggs, on May 24. On the next day three more nests were found, containing 1, 3, and 5 eggs, and on May 29 three additional nests with 6, 4, and 2 eggs. Nesting was in full progress at this time. As late as June 4 a nest was found containing a single egg, probably a second laying, for the Eskimos were in the habit of gathering the eggs for food. If one judges by the nest contents and the rate of laying, egg-laying may be said to begin about May 20. The eggs varied considerably in size, even within the same set.

As nearly as could be determined the incubation period is about 32 days.



Fig. 5. SNOWY OWLETS OF SEVERAL SIZES, ONE BROOD; ONE EGG REMAINS; PHOTOGRAPHED JUNE 27, 1924.

**The Young.** On June 20, I found 2 eggs hatched in one nest, and from that time on, eggs were hatching regularly in the nests under observation. This was a prolonged process, however, for incubation had begun when the first egg was laid. Consequently, when the last white downy chick appeared, the first comer, sometimes two weeks his senior, had already grown to many times the size of the little one and had acquired the blue-gray downy plumage. The other nestlings furnished all the intermediate steps of the series in age and size.

I did not obtain a complete story of the growth of the young, but a few disconnected observations will indicate roughly the sequence of events in their development. A newly hatched young is covered with white down. The skin is mainly pink, with pink also on the feet and toes, and gray on the claws. The skin about the eyes and ears is blue; cere, flesh color; bill, pale blue-gray, with a slight suffusion of flesh tint.

Later, when pin feathers are appearing, the cere has become blue-gray, although still lighter than the bill. The claws have become more decidedly blue-gray, with light tips.

By the time the last egg was hatching in the average nest some of the older young were clothed in long blue-gray down. On July 10, I found several in the gray plumage with primaries just appearing. On July 14 another showed the primaries and on July 15, in a brood of seven, the two oldest were still farther advanced in this respect. We left the region too soon to see the first full plumage.

A young bird's eyes are not opened for a number of days after hatching. On June 27 a nest contained a pipped egg and four downy young. Three of these had opened the eyes very slightly, probably not enough for vision. The youngest kept the eyes



Fig. 6. YOUNG SNOWY OWL IN THE BLUE-GRAY DOWNY STAGE; PHOTOGRAPHED JULY 6, 1924.

closed. In a nest of five young and one pipped egg, the oldest one had opened its eyes enough to show clearly their color, which at that age is pale yellowish. At a somewhat earlier age the eyes are "pale yellowish clay color," as described in my note book.

**Mortality.** I was surprised to find a high mortality among the young. Most of the broods numbering 7 or 8 were eventually reduced to 4 or 5, while some were still further decimated. The factors involved are hard to determine, but a number of observations are suggestive. By the middle of July rains had set in and prevailed during the remainder of the season. During the rainy spells I found downy young, in the gray plumage, crouching in the grass, wet and bedraggled. They leave the nest when old enough to scramble about easily and can not then be sheltered by the parents. On July 6, in one nest that had been under observation, only one live bird remained

and near-by lay two others, dead. On July 15 at another nest the youngest owlet, soaked by rain, was dying. In the first instance feathers of a jaeger (probably *Stercorarius parasiticus*) were scattered near the nest. The owl may have killed one for food, but it is also possible that the jaeger had attempted to rifle the nest in the owner's absence and had been caught redhanded. Earlier in the season, on May 29, a nest was robbed by jaegers. One egg had been eaten and two or three others punctured, leaving an imprint of the jaeger's bill. No doubt the robbery had been interrupted by one of the parents. These particular owls were very timid and remained away from the nest so long and so far that it was difficult at first to decide whether the nest belonged to them. My own disturbance of this pair no doubt furnished the opportunity for the jaeger.

Probably several factors combine to reduce the numbers of the owl nestlings, ap-



Fig. 7. IMMATURE SNOWY OWL; BLUE-GRAY DOWN PREDOMINATING, BUT TRUE FEATHERS COMING IN; PHOTO TAKEN JULY 31, 1924.

parently a reduction of nearly 50 per cent in this case, although my data are not sufficient for a comprehensive statement. No doubt jaegers are able to obtain a few eggs, possibly also an occasional young bird, but I do not believe they constitute a big factor. It is likely that the drenching and chilling by rain have a greater effect, picking off the younger members of the family that lag so far behind their brothers and sisters in growth. Sometimes the young birds were found crouching in crevices in the earth and other natural shelters, and it was evident that the stronger ones, at least, were surviving the cold rain. Seasons vary and may have much to do with the fluctuation in the snowy owl population. The large number of eggs laid plays an important role in counteracting the mortality of the young.

**Food.** The food of the snowy owl varied with the character of the nesting ground. Those on the marsh in the immediate vicinity of great numbers of nesting



water-birds fed extensively on birds, both old and young. Others, nesting on drier ground farther from the concentration of waterfowl, maintained throughout the season a diet consisting almost exclusively of mice. In marshy areas remains of young emperor geese and cackling geese and adult old-squaws, eiders, and other ducks, were found. I have no record of adult geese having been killed. A pair of emperor geese built their nest in the margin of a pond, not more than 50 yards from the nest of a pair of snowy owls. One goose incubated the eggs, and I frequently saw its mate swimming near by. A pair of glaucous gulls nested on an island in the same pond. The owls evidently did not molest them. The geese hatched out their young and left the vicinity, after which I did not have them under observation.

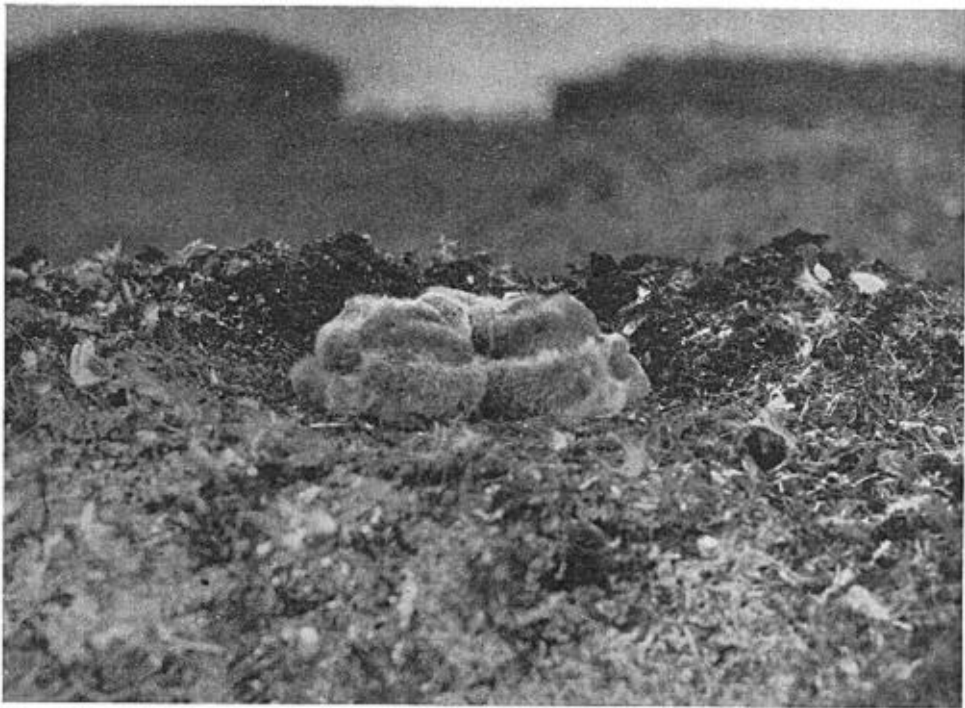


Fig. 8. FIVE YOUNG SNOWY OWLS IN BLUE-GRAY DOWN, HUDDLED TOGETHER IN THEIR NEST DURING STRONG WIND; PHOTO TAKEN JULY 6, 1924.

On July 14 a number of young cackling geese were banded. Later in the day remains of two of these were found at an owl's nest. In this case our own activities, disturbing the geese, may have been partly responsible. One owl had killed a short-billed gull. Several nests contained remains of ptarmigan. At one nest, among ptarmigan feathers and parts of old-squaws, were remains of a short-eared owl. On another occasion I found a short-eared owl with the head eaten. Throughout the marshy areas, in addition to the birds, the snowy owls caught many mice, including *Dicrostonyx*, *Lemmus*, and *Microtus*. The debris accumulating about the nest, a great mass of disintegrating pellets, was a good indication of the snowy owl's food habits. As the season advanced, such accumulation became extensive. In some instances this consisted largely of feathers and bird bones, but usually there was a strong foundation of mouse

fur, and in some cases practically the whole structure was mouse fur. From one to five mice were sometimes found at the nest.

In the Askinuk Range, above the nesting places of waterfowl, the owls fed almost exclusively on mice, although a few rock ptarmigan were obtained there.

All this indicates that the snowy owl feeds on whatever happens to be most abundant within easy reach of its nest. The relative abundance of birds and mice no doubt affects its menu. It was surprising to find no evidence that adult geese are killed, although three species nested plentifully in that district. It was also not to be expected that in areas where nesting birds were concentrated mice would still be an important item of food. If mice had been scarce this would not, of course, be the case.

The season of 1924 may have been unusual, and we were very fortunate to have this opportunity to observe, in such numbers, this bird of the far north.

*Bureau of Biological Survey, Washington, D. C., June 6, 1928.*