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## CONTRIBUTION TO THE LIFE HISTORY OF THE ALASKA WILLOW PTARMIGAN

WITH THIRTEEN ILLUSTRATIONS

By JOSEPH DIXON

UPON THE DAY of our arrival at Mount McKinley National Park, on May 19, 1926, we found three male Alaska Willow Ptarmigan (*Lagopus lagopus alascensis*), all in full nuptial plumage with chestnut heads and necks, but bodies pure white except for a few brown feathers just coming through on their backs. On the evening of May 24, at 6 o'clock, I heard a male Willow Ptarmigan "crow" and



Fig. 60. MALE PTARMIGAN PERCHED, ON GUARD, IN TREE TOP.

looking in the direction from which the sound came I saw what appeared to be a lump of snow on the flattened crown of a spruce tree about 200 yards from camp. Taking the binoculars I saw that the lump of snow was really the white body of a male ptarmigan. The spruce tree was bent and old and about thirty feet high (see fig. 60). The bird gave a couple of warning calls as I approached the tree, and then it dawned on me that he was probably standing guard while his nesting mate fed.

So I hunted around; and sure enough, I found the female ptarmigan feeding in some dwarf willows about twenty feet from where I stood. As soon as I started after the female the male ptarmigan flew down from the tree top and ran off ahead of me, trying in various ways to decoy me away from his mate. The buffy brown female was hungry and had evidently just come off her nest. When moving from one feeding station to the next bunch of willows she kept to the hollows and depressions and sneaked along, with body, head and tail

all low to the ground. When she remained motionless I had difficulty in making her out even when only twenty feet distant.

The behavior of the male was entirely different. He strutted about with tail sticking out stiffly behind. The head was carried erect and his neck was extended (fig. 61). The vivid coral red comb over each eye was carried erect and was conspicuous to a dis-

tance of fifty feet. He kept hiding by running behind trees, but when a little way off he would mount a tundra tussock or rock and give his coarse warning "cackle" which sounds like running a nail over a stiff comb.

The hungry female fed steadily on willow buds, and while she was thus engaged the male courted her by strutting around her with tail spread to the utmost; the wings were flexed downward, and the feathers of the body were fluffed out just as they are in a strutting turkey cock. This display was repeated several times (fig. 62), but the hen



Fig. 61. MALE PTARMIGAN ALARMED, WITH NECK EXTENDED AND COMBS ERECTED.

kept right on foraging. I followed the birds about for nearly an hour, hoping that the female would go onto her nest; but she was too wise for me and I finally lost her in a little thicket of willows.

About 7 o'clock in the evening of May 25 the sun shone brightly for a few minutes and looking over at the spruce grove we saw our cock ptarmigan perched in the tip top of one of the tallest trees. Then the snow began suddenly to fall and when we looked again he was gone. When we reached the lower edge of the grove we found him walking along quietly near the spot where we usually found the female. When the snow fell he fluffed out his feathers so that his body appeared almost as round and white as a pop-corn ball. He closed his eyes and acted just like a sleepy, contented chicken going to roost (fig. 63). When I moved he came suddenly to life, stretched his neck, cackled, and then ran away. He made no effort to fly and by working up very slowly I managed to

get within eight feet of him, at which distance I secured several photographs.

When the male ptarmigan is alarmed the red combs over his eyes stick up in a vertical position (fig. 61). When the bird is at rest, the combs are relaxed somewhat and are not nearly so noticeable (fig. 63). In repose, the feathers of the body are fluffed out, making the bird appear much larger than he really is. When frightened the feathers are drawn up close to the body.

The male ptarmigan spends the day hiding in little thickets, keeping within 50 or 100 feet of the nest. He has a definite form or nest of his own which he occupies when roosting. One reason for his staying so close is the danger of Short-billed Gulls finding the ptarmigan's nest. These egg thieves work in organized gangs, usually three to



Fig. 62. MALE (AT RIGHT) STRUTTING AROUND FEMALE (LOWER LEFT).



Fig. 63. MALE IN REPOSE; COMBS DEPRESSED, PLUMAGE FLUFFED OUT.

gether. One will swoop down at the female, trying to make her shift about on the nest so as to expose the eggs. The second or third gull following tries to slip in and grab an egg. As soon as the gulls appear, the hen ptarmigan gives a peculiar call for help. Upon hearing this the cock ptarmigan bursts forth like a rocket and charges the thieving gulls. He doesn't beat around the bush but flies directly at the intruders, knocking them down with the impact of his body. An average cock Willow Ptarmigan at this season weighs 507 grams, while one of the Short-billed Gulls which was shot weighed 358.2 grams. In addition to being one-third heavier than the gull the cock ptarmigan flies much the faster of the two, and when he hits a gull it is almost like a Duck Hawk striking a duck.

I had been told of an instance where a cock Willow Ptarmigan had attacked and routed a large grizzly bear that happened to stumble upon his nest. But even after seeing the ptarmigan drive off the gulls I did not fully appreciate the furiousness of the at-

tack, until June 23, when I came across an old hen ptarmigan with her brood of small young which were just able to fly. I rushed after the young, trying to catch one. Just as I was about to grab a chick, a willow bush in front of me exploded and the cock ptarmigan flew directly into my face, knocking my glasses to one side as he slapped my face with his beating wings. He then dropped to the ground, but instead of retreating flew directly into my face again; but this time I was ready for him and caught him with my bare hands when he became mixed up with my mosquito head net. The bird then tried to bite and to flap his way to freedom. As I started off with the cock under my arm the hen ptarmigan left her young and came rushing at me and then crawled feebly about at my feet as though in mortal agony. When I started away she rushed frantically about flapping my heels with her wings at every step. Every time she rushed at me she



Fig. 64. IN COMMAND OF THE FIELD.

hissed. When the male found he could not escape he uttered a few croaking notes and the hen left me at once and went back to her chicks.

I took the cock to camp, which was nearby, to photograph him. Then I carried him back to the place where I had caught him. When I turned him loose he wanted to fight me again. I thought such a valiant bird ought to be encouraged and perpetuated, so I backed off leaving him in command of the field (fig. 64).

A nest found May 21 was located in a thin bunch of brush right out in the open. It was placed on a clump of reddish moss which was almost the color of the female ptarmigan. It was very difficult to see the female on the nest even when the sitting bird was in plain sight at a distance of 15 feet. The female allowed me to take pictures of her on the nest at arm's length and I finally reached out and stroked her back and still she did not leave her nest.

On June 7 I again visited this ptarmigan nest. For the past three mornings the hen had been off the nest feeding at 6 o'clock, but this morning she was on the nest at

6:05 when I arrived. I looked about and at length found the cock ptarmigan hiding in a sort of nest wallowed out between two bushes about 40 feet from the real nest. This is his home, and he repairs to it regularly while the female is on the nest. I tried to get some photos of the male but he kept "cackling" and leading me away from the vicinity. He proved an excellent decoy.

I then flushed the hen from her nest which contained nine eggs (fig. 65). When forced off the nest the hen "clucked" and "fussed" about, even pretending that she was incubating her eggs (fig. 66). Finding that this ruse did not work, she arose, fluffed out her feathers, shook herself and scooted, with head and tail close to the ground, to the creek nearby. Here she waded boldly out into the water and drank thirstily (fig. 67). After drinking, she fed industriously for ten minutes on buds and leaves of willow and then returned in a round-about way to her nest (fig. 68). While the hen was on the nest I followed the cock about. When we were almost 100 yards distant the female on the nest called, and the cock arose promptly and flew back across the



Fig. 65. A TYPICAL NEST OF THE ALASKA WILLOW PTARMIGAN; MOUNT MCKINLEY NATIONAL PARK, JUNE 1, 1926.

creek to her. She then came off and they fed together, keeping up a low conversational clucking the while.

When this ptarmigan nest was found, on May 21, the female was on and the nest contained nine eggs which were nearly or quite fresh. The first egg hatched at 4 p. m. on June 14. Three hours later eight eggs had hatched, and the mother ptarmigan then left the nest with her brood of eight downy, but able-bodied young (fig. 69). One of the nine eggs failed to hatch and was abandoned and left in the nest (see fig. 70). The period of incubation was in this instance known to have been between 24 and 25 days.

When the ptarmigan chicks hatched, the egg-shells were broken around near the middle from the inside and the top of the shell was lifted off. These top portions of the shells were not found in the nest along with the other empty shells and the one un-



Fig. 66. WHEN FORCED OFF HER NEST, THE FEMALE PTARMIGAN FUSSED ABOUT LIKE A SITTING HEN.



Fig. 67. FEMALE PTARMIGAN DRINKING, HAVING WADED OUT INTO A SHALLOW STREAM.

hatched egg (fig. 70). I looked around near the nest but could find no trace of eggshells outside the nest. What became of these portions of the eggshells remains a mystery.

The hen spent the night hovering the young within fifty feet of the nest, but having once left the nest the family never returned to it. While the eggs were hatching the cock was on hand at the nest and appeared much excited. When several Short-billed Gulls appeared and tried to steal the young the male ptarmigan became almost beside himself with anger and flew directly at the gulls and drove them off.

The following morning at half past six we found the entire family, cock, hen and their eight downy young, all together in some low brush about 100 feet from the nest.



Fig. 68. THE BROODING FEMALE PTARMIGAN.

The hen was fluffed out with all eight chicks under her. One youngster stuck his head out from behind her wing, and another chick tried to crawl beneath her (fig. 71). Later, a chick perched on her back but slid off before I could photograph him. When we first came up, the cock was hidden in a bush about six feet from his mate. The hen and chicks were so protectively colored that it was difficult to make them out at a distance of ten feet, unless they moved. However, with the cock it was a different matter. His reddish-brown head, neck and back, and large size, made him relatively conspicuous. He seemed to realize that his presence was likely to handicap, or even to endanger, the rest of the family; consequently he sought to conceal himself as much as possible near the family where he could and did repel thieving gulls and other invaders. Upon our close approach, the hen rushed out to attack us, with drooping wings and feathers fluffed out just like a "sitting" hen. After making several feints or actual attacks she returned to her chicks and seemed to accept us as her friends.

The call notes of the mother, written down on the spot, were as follows:

1. Harsh *ke - ouk* — *ke - ouk* = warning! danger!
2. Soft purring *keer - er - erk* = hush-a-bye, when hovering young.
3. Clucking *cuck - cuck* = note used to call chicks to her so that she could hover them.





Fig. 69. A BROOD OF EIGHT, DAY-OLD PTARMIGAN CHICKS: COUNT THEM !



Fig. 70. EIGHT OUT OF NINE EGGS HATCHED.



The downy chicks uttered a soft *cheep cheep cheep*, especially when they were in distress or had become lost from the rest of the family. This faint call was not audible to my ears at a distance greater than twenty feet, but both cock and hen were able to hear it up to fully forty feet. The mother ptarmigan kept "talking" in a subdued tone to the chicks. This served as encouragement when the chicks became weary and lagged behind and at other times served as a lullaby to quiet them when she was hovering them. The cock was usually silent, but gave a hoarse throaty *c-o-a-k*, repeated several times in succession, when danger threatened. This warning note was always given as soon as the cock spied a Short-billed Gull in the neighborhood. We found that the cock kept a sharp lookout for gulls, and that he would often see them coming before we did. When the mother hovered the chicks the cock ptarmigan, after seeing that they were safe, seemed to realize that he was too conspicuous and hence a source of danger to the family. Accordingly he would always go off six to ten feet to one side and hide in the bushes. Here he would peer out cautiously and keep a sharp watch for gulls, foxes, or other sources of danger.

The cock ptarmigan is relatively ragged. His wedding suit is in tatters now, and he is a conventional family man with the rusty barred feathers of his summer plumage coming in on his head, neck and back. The chicks appear very much like young turkeys. They are covered clear to the toes with yellow down trimmed with stripes of brown. There is a broad brownish stripe on the top of the head which divides into two narrower stripes that extend down the center of the back. There is also a brown stripe back of the eye and a brown bar on the wing. All the brown stripes have a reddish tinge.

The adult birds feed on the tender green leaves of the dwarf willow with an occasional insect picked up whenever it comes handy. The eight chicks foraged in a loose flock covering an area about five feet wide and six feet long. They pursue small insects and mosquitoes which they run down or reach up for and pick off the grass. I watched one chick catch a crane-fly and after hammering and pecking at it awhile he concluded that it was too tough, gave it up as a bad job, and left it. The stomach of a four or five day old chick was preserved in alcohol and submitted to the Biological Survey for detailed examination. Here it was examined by Mr. Charles C. Sperry of the Food Habits Research Division who reports the stomach contents as follows: "Condition of stomach full; percentage of animal matter, 100; contents, 4 beetle larvae (*Chrysomelid?*), 8%; 1 plant louse (*Aphididae*), 1%; Diptera: 1 *Orthoclo dius* sp., 1 *Empis* sp., 1 *Rhamphomyia* sp., 1 *Helina* sp., 2 *Sciara* sp., 1 *Coenosia ansoba* and 3 *Spania*, 15%; 17 yellow caterpillars, 74%; 1 spider, trace; 15 *Thysanura*, 2%." It will be seen from this stomach examination that caterpillars formed the greater part of the stomach contents of this ptarmigan chick.

The family travelled as follows: First came two or three chicks in the thick grass, then the mother surrounded by the other chicks; the cock sometimes led and at other times brought up the rear. I timed them and found that they covered a lineal distance of 45 feet in five minutes. Following this there came a period of rest of five minutes, during which the mother hovered her brood of young. We never saw the cock hover the young; but when one of the chicks became entangled in a network of twigs he was right there and helped it get free. By noon the ptarmigan family had wandered out in the low bushes 100 yards from where they had hatched. The chicks were now nearly 24 hours old, and all of them were strong and lusty, each able to run about with agility and to secure food for itself.

At Copper Mountain, about 4 o'clock in the afternoon of July 12, a family of Willow Ptarmigan came feeding along through the dwarf willows near camp. There were six young about the size of quail. The cock kept a lookout for enemies from elevated



Fig. 71. CHICK CRAWLING BENEATH MOTHER PTARMIGAN; THE OTHER SEVEN CHICKS ARE ALREADY BENEATH HER.



Fig. 72. THE COCK PTARMIGAN IS AN IDEAL FATHER, SHARING EQUALLY WITH THE HEN THE RESPONSIBILITY OF WATCHING OUT FOR THE CHICKS.

positions while the hen herded the young along through the willows. The hen kept up a running conversation with the young as did also the cock. This liaison note was a loud *ke-ouck*, repeated at intervals of from five to ten seconds. The cock's call was somewhat coarser than that of the hen. I had difficulty in hearing the thin peeping of the chicks at a distance of fifty feet, but it served to keep them together. The young were very active, jumping up into the willows and catching insects over a foot off the ground.

At Copper Mountain, on July 13, I found a pair of Willow Ptarmigan wading about in the mud and shallow water where a glacial stream was flooding a portion of the valley. This rise in the water forced the bugs and insects to climb up into the tops of the low fireweed, and the ptarmigan were there able to wade about and pick the insects up with ease.

On June 7, in a bunch of willows, I found a gang of 25 Willow Ptarmigan, all of which were males. They were in a compact flock like quail. It seems that after the eggs are laid, and the females need less attention, the male ptarmigan often gather into flocks or "clubs" to feed, probably for mutual protection from foxes and other natural enemies. It is possible that some of these males may have been bachelors that failed to find mates, but examination of birds shot for specimens indicated that most of the males had bred recently. It is my opinion that these "stag" parties are only temporary, since the males were often heard flying about together and cackling hoarsely, usually late at night. Not all of the males joined these midnight parties, because where we found broods of downy young they were accompanied by both parents (fig. 72).

In going past a willow thicket I happened to sneeze, and in doing so made a noise very much like a red fox barking. At once one of the ptarmigan gave a warning cackle and then the whole flock of 25 ptarmigan flew up, perching in the tops of the willows, high off the ground. Here they craned their necks and looked about in every direction, evidently trying to locate the fox.

The enemies of the Willow Ptarmigan are numerous and varied. Perhaps the red fox heads the list of such enemies. We found four red fox dens near our camp. The ground about each of these dens was strewn with rabbit feet and ptarmigan wings. An examination of such remains showed that ptarmigan were captured more frequently by the foxes than was any other species of bird. The foxes capture many cock ptarmigan during the mating season.

After the young ptarmigan are out of the shell they are menaced by Black-billed Magpies as well as by the foxes. Thus on June 24 a family of four young and two adult magpies was found systematically working the willows in the Savage River bottom for ptarmigan chicks. When these magpies located a pair of adult ptarmigan they would retire stealthily and hide in the willows near by, until the ptarmigan chicks began to run about. Then the magpies swooped down and grabbed the chicks before they could hide, and then carried them off and ate them. A cock ptarmigan that I watched put one magpie to flight, but where there were six and in another case *nine* magpies working together against two adult ptarmigan the odds were overwhelming. As a result of this persecution by the magpies we found that by July 10 many families of young ptarmigan had been reduced to only one or two individuals. Gyrfalcons also levy continuous toll on ptarmigan; and since these large falcons are relatively numerous in the Mount McKinley district, the aggregate number of ptarmigan killed by them is considerable. It is thus easy to see why the hen ptarmigan lays from six to twelve eggs. If only one or two eggs were laid each season the species would soon become extinct.

*Museum of Vertebrate Zoology, University of California, Berkeley, June 6, 1927.*