

worry the parent in the least. However, if the eggs were moved more than about thirty inches from their rightful location, there was apt to be trouble before the bird realized that her eggs had moved away, and it would only settle after wandering about rather aimlessly when all the birds in the immediate vicinity had taken their places, and there were no other nests empty. Curious to know how many eggs a bird would cover, a nest was selected containing one egg, and the complement increased during the bird's absence, until in less than two hours the bird was sitting—not exactly comfortably, but sitting—upon seven eggs, evidently with the best of intentions. After she had become thoroughly used to this large complement, six of the eggs were removed at once: the disappearance of so large a part of her charge was taken, apparently, as a matter of course, for, with barely a second's inspection, she settled upon the nest, and began preening her feathers. Hence the statement that the bird returns to the spot rather than to the nest.

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A STUDY OF A WHITE-BREASTED NUTHATCH.¹

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IN regions where the White-breasted Nuthatch (*Sitta carolinensis carolinensis*) is a common resident bird, such as the country about Boston, Mass., I think it must often have been noticed how closely a bird of this species, or a pair of birds, remains in one restricted locality for weeks at a time. This habit is most noticeable in winter. Wherever the birds elect to settle for the cold season, they can generally be found within a few hundred yards of their chosen station. The chief requisites for their winter quarters are a food supply, cranies of rough bark in which to store food, or into which to wedge such food as has to be broken before being eaten, and

¹ Read on Jan. 17, 1916, at a meeting of the Nuttall Ornithological Club.

lastly (perhaps the greatest factor in holding the birds to one locality) a hole to sleep in.

All these advantages are to be found in the center of the town of Lexington, Mass.; the broad Common is bordered by ancient elms and white ash trees and on some of the adjoining lawns stand trees of these species whose history extends back nearly to Colonial times. Some of the oldest trees, notably the white ash, are slowly dying, and in many of their dead branches Downy Woodpeckers have drilled nesting holes. One of these holes, forty feet up in a gigantic ash tree, was, until last spring, within sight of our window and to the position of this cavity we owe much of our acquaintance with a White-breasted Nuthatch during the past year.

Nuthatches have to my knowledge made the vicinity of Lexington Common their headquarters in spring, autumn and winter for seven years. I have often seen two birds together here, but never more; occasionally a pair has nested so near that we have heard the song of the male during the summer.

In late August, 1913, a pair of Nuthatches visited our place daily. The Robins, Orioles and Rose-breasted Grosbeaks were rapidly stripping the cherry tree of its fruit, but as the Orioles and Grosbeaks did not swallow the stones, many had fallen to the roof of the piazza. The Nuthatches came for these discarded cherry stones. They flew with them either to the cherry tree or to one of the big white ash trees in the next yard. In the cherry tree they placed the stones on a horizontal surface, in the ash tree they wedged them into a crevice and hammered them with their beaks, sometimes adding force to the blows with a flap of the wings. They cracked the stones and swallowed the kernel. When they fixed a stone on an upright branch they always stood head downward on the bark above the stone. Returning to the roof of the porch, they often passed within arm's reach of us, so near indeed that the sharp whistle of their wings reminded us of a flushed Woodcock. We became so attached to the little birds that after the cherry stones had been exhausted we determined to induce the birds to remain near us. I fastened a

shelf to a second-story window-sill, and, ever since, Mrs. Tyler and I have kept it supplied with food,—suet and meat in winter, nuts in summer. Excepting the interval between June 6th and 16th, 1914, the male Nuthatch has come to the shelf practically every day for over a year. At the first trial he fed from our hands; he allows us to gaze at him from a distance of a foot or two; he seems as much at home on the food-shelf as on his native bark; he appears to consider the shelf as his own and he allows no other bird to use it in his presence.

Our male Nuthatch is a bird of decided character. He always impresses us with his independence and self-reliance. Although he feeds from our hands readily, he has apparently not the slightest confidence in us,—he comes near us solely because his appetite is stronger than his distrust. Unlike the Chickadees, he spent the whole winter alone; unlike the Juncos, he will not allow another bird to feed near him. He drives off Chickadees, Juncos, a Downy Woodpecker and a female Nuthatch. He will not allow the House Sparrows on the shelf;—indeed when they come near, he stands guard upon the shelf until they leave the vicinity. However, he never attacks a Hairy Woodpecker.

The Nuthatch comes to the shelf several times a day. He arrives at full speed apparently and alights clinging upright to the edge, then, resting on his toe-nails, hops to the food and attacks the nuts. All his motions are rapid,—so rapid that they appear jerky—but with all their quickness there is the certainty and precision of an expert. At each lightning-like dart of his beak a morsel of nut is picked up and swallowed. The smallest bits disappear as if by magic, the medium-sized pieces are swallowed more slowly,—one of small-pea-size, for instance, is fitted carefully into the throat before being allowed to slip down; larger pieces are generally carried to the corner of the shelf (as to a crevice of bark) and there broken apart. He strikes a vertical blow with his *closed* bill. The nut, as a rule, flies apart in two pieces, but if his bill has not pierced the nut, the bird appears to perceive it at once, and before withdrawing his bill, turns his head side-

ways and exerts a prying action on the nut, much as a man who has driven a pick-axe into the ground, raises the tip of the handle to free the pick and pry open the earth. Should a bit of the splintered nut fall over the edge of the shelf, the Nuthatch follows it like a flash, overtakes it in the air and catches it in his bill.

Until the latter part of December both Nuthatches came several times a day to the food-shelf. The female was distinctly larger and broader than her mate, but in spite of her greater size she seemed afraid of him; she always left the shelf when he approached and never attempted to return until he had gone.

The two birds, however, paid very little attention to each other,—they came to the shelf separately, ate what food they wanted, but rarely took any away. The female bird was last seen on December 26th, 1913. The male continued his regular visits throughout the winter. Until April 7th, 1914, his behavior was the same as it had been all winter;—he came to the shelf for food, ate what food he wanted, and flew off. On April 7th, however, his manner changed completely; he became all at once very busy and seemed full of importance. As soon as we put out a cracked nut he appeared on the shelf, snatched up and swallowed the smaller pieces of the meat and carried off the larger ones. These he wedged into cranies of bark and came back for more. As fast as we put out nuts, he transferred them to near by trees. The next day we discovered the reason for his change in actions,—a female Nuthatch was nonchalantly hopping about the branches near the window.

The male was all devotion; he carried bits of nut to her and placed them in her bill; he stored dozens of pieces in branches near at hand; he sang continually. Several times also he posed before her in courting attitude. This position, while rather awkward to human eyes, did reveal his plumage wonderfully. The full courting display is accompanied by song. The male bird, with the feathers of his nape puffed out so that they resemble a rough black mane, takes a stiff pose

with his back to the female. His head is set squarely back on his shoulders, with the beak parallel to the axis of the body. His whole body is raised and bent backward a little, the wings slightly open, with the tips dropped below the expanded tail. During the song, he slowly tilts the forepart of his body downward and the hinder part upward. If perched on a small branch, he may turn almost upside down. He straightens up to the erect position in silence, then tilts slowly forward while he repeats his song. He continues the deliberate tilting over and over again, always singing as he lowers his head and shoulders. The songs follow each other very regularly, with an interval between each one about equal to the duration of the song. The courting song can be recognized by this feature of regular, *ad libitum* repetition.

On other occasions the male approaches the female and, facing her, struts before her silently or with a low "chuck"; his neck is elongated, his crown feathers are flattened. This attitude is apparently identical to that used to intimidate the Sparrows.

Besides the courting song, our Nuthatch has two songs which are perfectly distinct. One of these, the more common one, is very similar in form to the song of the Flicker. It consists of eight or ten notes, all on one pitch (often the D next but one above middle C), each with a slight upward inflection; from a distance it suggests a man whistling to a dog; when heard near at hand, however, the notes have a deep, rich, woody resonance, with no whistle quality. These notes have been rendered by various syllables, for example, "hah-hah-hah," etc. (Chapman), "tway," etc. (Langille), "what," etc. (F. H. Allen, *Bird-Lore*, Vol. XIV, p. 317), "too," etc. (Hoffman). Although these syllables do not bear the slightest resemblance to each other, they are all, nevertheless, good renderings of the White-breasted Nuthatch's song, for the reason that they represent the song heard from different distances. Hoffman's "too" ("whoot," I think is still better) suggests the song heard near by, Langille's "tway" from far off, while the two other renderings recall

the song heard from intermediate distances. I have noted two modifications of this song: in one the pitch falls slightly at the end; in the other (the rarer) the pitch undulates up and down resembling, in change of pitch (but not at all in tone of voice) a common variation of the Black and White Warbler's song. In both forms the individual notes are delivered with the usual slight upward inflection.

The second main song is in every way like the common first song, except the number of notes and the rapidity with which they are delivered. In this rarely heard song about thirty notes are crowded into the same space of time as the eight or ten occupy in the ordinary song. I have noted no variation in this song and, as I have never heard any intermediate form between the two songs, I judge them to be distinct.

The Nuthatch sings every month in the year; even on the coldest days of January he occasionally sings a few times in the early morning—I have heard the song when the temperature was zero;—in February songs are more frequently heard, but singing during this month is still irregular. The chief singing period is from the first of March until the last of May; during these three months the male sings continually. June is a month of comparative silence (I have only five records of song); in July and August songs are heard almost as infrequently as in winter, and during the last four months of the year singing is still rarer. In winter, singing is confined to the early morning hours,—soon after sunrise—and even during the spring it is rare, before the first of April, to hear a Nuthatch sing in the afternoon. In autumn an occasional song is heard in the warmest part of the day.

In addition to his songs, our Nuthatch utters five different notes: (1) The simplest of these, and by far the most frequently used note of his vocabulary, is a high, short syllable, quietly pronounced, much aspirated, sounding like "hit." This note is given when the bird is perched and when he is in the air, both by a solitary bird and by the pair when they are together. It is both a soliloquising and a conversational

note and is associated as a rule with a calm mood. (2) The well known ejaculation "quank," a call at certain distances remarkably suggestive of the human voice, is often employed when the bird seems excited. At such times the note is delivered with much vigor; on other occasions it is apparently used as a call between a pair of birds. This note and the "hit" are the only notes I have heard from the female bird. The "quank" call is very often doubled and is frequently extended into a loud, rattling chatter. As in the case of the song, the "quank" appears very much rounder, fuller and more resonant when heard near at hand. At short range it has a rolling "r" sound. (3) A low-toned "chuck" is sometimes addressed to the female. (4) On several occasions I have heard the male bird utter a growl (deep in tone for a bird) as he dashed in attack at a Sparrow. (5) A note which I have heard but rarely is a long, high whistle with a rising, followed by a falling inflection. Our word "queer" recalls the note which bears a decided resemblance to one of the Pine Grosbeak's piping calls. The note has a ventriloquial property, appearing to come from a distance when, in reality, the bird is close by. I heard this note several times in late February and early March, generally between songs in the early morning.

Mr. H. W. Wright has shown (*Auk*, Vol. XXX, p. 531) that at morning awakening, the voice of the White-breasted Nuthatch is first heard among the latest bird-notes. He also demonstrates that the late-rising birds retire early. My experience with our bird is in accord with Mr. Wright's findings. Each afternoon he retired in broad daylight,—on fair days while the sun shone full on the roosting-hole,—oftenest about forty minutes before sunset. The time of retiring depended somewhat on the weather and temperature. In the most severe winter weather the bird sometimes used the hole during the daytime, but generally between his visits to the food-shelf he sat head-downward in a sunny hollow on the ash tree. On the one morning when I actually saw the bird leave the hole, he came out nineteen minutes after sunrise.

As the breeding-season drew near, the Nuthatch's roosting-hole became an attraction for a pair of Bluebirds and numerous House Sparrows. The male Nuthatch paid little attention to these invaders during the daytime, but toward sunset he remained near the hole and asserted his rights by excited "quanking." On April 16th, 1914, a cold, dark day, with snow blowing in from the East in the afternoon, an amusing incident occurred. The female Nuthatch retired to the hole soon after four o'clock. Half an hour later the male bird came to the shelf and, after eating plentifully of the nuts, as was his custom before retiring, flew to the hole. He looked in and, seeing the female, evidently, did not enter, but climbed about the branches near and scolded, acting as he did when the Bluebirds appeared. He soon moved off and did not return until the next day. Lack of room could not have prevented his entering, for this same cavity accommodated a brood of Bluebirds later in the season.

During the next week the great ash tree was taken down; its trunk was so far decayed that the tree was in danger of being blown down by the wind. The loss of this tree and the subsequent cutting away of other trees and shrubs in the vicinity were evidently not to the Nuthatch's liking, for during the following autumn he visited us rarely. That the pair of Nuthatches bred in the neighborhood is probable, however, for Mrs. Tyler saw on July 30th, 1914, an adult bird on the cherry tree feeding two young ones.

Lexington, Mass.

NOVEMBER BIRD-LIFE AT REELFOOT LAKE, TENN.

BY A. F. GANIER.

THANKSGIVING, 1915, and the three days following, November 26, 27 and 28, were spent at Reelfoot Lake, Tenn., by Prof. A. C. Webb, Dr. Geo. R. Mayfield, and the writer. The exact location of our headquarters was two miles east of Phillippy, the R. R. station, on the west bank of the lake, about ten miles south of the Kentucky line.