

the glow of sunset is gone I have heard the voice of the Dickcissel sound above the hoarse calls of the toads and the varied tones of the myriads of singing insects. The only other bird note I heard on those prairie fields after the last Dickcissels had settled for the night was the shriek of a Screech Owl awakening from his day nap in the tall hedge across the field.

During the first or second week of August the clover fields and meadows, which during June and July resounded with the calls of the Dickcissel, became quiet. By the middle of August you may find a number of females still busy feeding and caring for their young, but the males have deserted their haunts to join others now at the secluded roosts. Here they change their nuptial suit for a new and brighter plumage before beginning their annual fall migration. Though these birds remain in the north several weeks longer, the male song is now silenced for another year, and to the casual observer the Dickcissels seem to have left their prairie homes for the southland.

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*(To be continued.)*

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## A NESTING OF THE PHILADELPHIA VIREO.

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### INTRODUCTION.

IN June and July, 1919, a nesting of the Philadelphia Vireo (*Vireosylva philadelphia* Cass.) took place on the grounds of my residence at a distance of about thirty feet from my front door. By reason of this fortunate proximity I was able to make daily observations of the home life of this species, the results of which are here presented.

It should be stated that, prior to the occurrence of this nesting, I had not, to my knowledge, observed a Philadelphia Vireo in life, and that I possess no distinct recollection of mounted specimens which I may have seen. Nevertheless, as these adult nesting birds were repeatedly observed by me, with the aid of opera-

glasses, at distances of three to six feet, under a great variety of conditions with regard to position and light, I am positive of the identification in their case, and have no hesitation whatever in submitting it to the judgment of others. The living birds were compared in detail with descriptions of the species as given by Coues<sup>1</sup> and Chapman,<sup>2</sup> and the various characteristic particulars of coloration and of comparative size were noted. Comparison was also made with the colored plate of an individual which appears with a paper by Dwight,<sup>3</sup> which demonstrated a general agreement, although the yellow of the underparts was not as rich in the birds seen by me as in the plate. However, not only does the strength of this yellow wash appear very different in different lights, but, as will be shown later, there seems to be considerable individual variation in the richness of it, even in birds of the same brood.

To Mr. C. E. Dionne, of Laval University, Quebec, I am much indebted for his kindness in lending me literature concerning the Philadelphia Vireo and for his aid in the identification of some of the insect food of the birds.

As both sexes are colored alike in this species, and as the female sings to some extent, and as the male aids in incubation and in feeding the young, I was often unable to distinguish between the two birds. In this paper I have not recorded them as male and female unless I was practically certain of the sex at the time.

The time used throughout this paper is Eastern Standard Time, not "summer" or "daylight-saving" time.

#### LOCALITY.

My present residence, where this nesting occurred, is in the little village of Bergerville, in the Parish of St. Colomb de Sillery, in the immediate suburbs of the city of Quebec. Its elevation above sea-level is about three hundred feet. Southeast of it, at a distance of about half a mile, is the St. Lawrence River, which is here a tidal stream. No other stream or body of water of

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<sup>1</sup> Key to North American Birds, 5th ed., 1903.

<sup>2</sup> Handbook of Birds of Eastern N. A., Rev. ed., 1912.

<sup>3</sup> The Auk, XIV, 1897, pp. 259-272.

appreciable size exists within a radius of half a mile of the nesting-place.

The underlying rocks at this point belong to the Sillery formation of the Cambrian system.

The country immediately about the nesting-site is the gently undulating surface of the ridge at the end of which Quebec is built. My residence and the nesting-tree are on an elevation rising slightly and gradually above the general level of the vicinity. The quadrant lying west of the nesting-site, between southwest and northwest, is mainly occupied by rather open woods of Red Oak (*Quercus rubra* L.), and White Birches (*Betula pendula* Roth. and *B. alba* L.), mixed with a few trees of White Pine (*Pinus Strobus* L.), Balsam Fir (*Abies balsamea* (L.) Mill.), and Red Maple (*Acer rubrum* L.). This woodland area, which is two or three square miles in extent, approaches to within about thirty feet of the nesting-tree. The three other quadrants about the nesting-site contain fields and scattered dwellings, the latter surrounded by numerous shade trees, mostly Red Oak, White Pine, and Rock Maple (*Acer saccharum* Marsh.). No public highway passes very near to the nesting-place.

#### NESTING.

*June 11.* While walking to my garden in the afternoon I saw for a moment on the black roof of a shed a Vireo which seemed to be smaller and grayer than a Red-eyed Vireo. It flew away quickly and I was too busy at the time to follow it.

*June 12.* About 7:00 a. m. I saw a small, grayish Vireo on the roof of the porch of my house. It flew up under the eaves of the main roof, tore away with its bill a spider's white "cocoon" which was placed there, and alighted on the roof of the house with the "cocoon" streaming from its mouth. It then flew away with it to some Rock Maples nearby. Again I was too busy to follow it.

In the early evening, on the grounds of my residence, I saw one Vireo chasing another, and, by "squeaking," succeeded in attracting the attention of the pursuer, which alighted in a Rock Maple about six or seven feet from me. For three or four minutes I studied it through opera-glasses as it moved nervously about.

I was able to observe at this time that it was smaller than a Red-eyed Vireo, that its crown was grayish, without a black border, that there was a pronounced whitish line over the eye, that the wings appeared grayish, with some traces of olive-green, but without wing-bars, and that the throat, breast, and under tail-coverts showed distinctly yellowish, especially the throat and breast. The yellow appeared as a strong "wash," but not as the ground-color, which was white or nearly white. One or two separate notes only were heard. I became convinced that the bird was a Philadelphia Vireo.

*June 13.* About 6:00 a. m. one Philadelphia Vireo, presumably the female, was seen carrying nesting material repeatedly to a young Rock Maple about thirty feet from my front door. The material, which appeared to be dead grass, was gathered from the ground at a point about eighty feet from the nesting-tree. The other Philadelphia Vireo, supposed to be the male, accompanied his mate back and forth as she brought material to the nest, and, while perched, sang a good deal, rather slowly, in a low, sweet voice. When the pair were together, they uttered low conversational notes, and the male at one time scolded me a little. I observed that the yellow wash was present on his belly, and that his back was grayish.

After failing to discover the nest from the ground by looking into the nesting-tree from every side, I climbed the tree at 5:00 p. m. and found the nest quite high up and well hidden by the foliage. It was placed in the fork of a slender twig which sprang from the main bole of the tree. The top of the tree was so slender that, at the highest point which I could reach, my head was about a foot below the nest, so that I could not look into it. When I had descended I found that from one particular point it could be seen quite clearly from the ground. One of the Vireos was working at it almost as soon as I was away from the tree. At 6:00 p. m. I climbed the tree again and, by feeling in the nest, discovered that there were no eggs in it, and that it seemed to be unlined.

*June 14.* Beginning at 5:45 a. m., I watched the Philadelphia Vireos for about forty-five minutes. One bird, probably the female, was proceeding with the nest-building. She gathered

dead grass from the ground at a point about ten feet from the nesting-tree and also from other places out of my sight. At one time she went on the nest and remained quiet for several minutes. She seldom flew directly to the nest, preferring to alight once or twice on branches nearby and to reach the nest by a final short flight. The other bird, which was not heard to sing during the morning, stayed much in the lower part of the nesting-tree or in the maples near it. Sometimes he would accompany his mate on her trips for nesting-material, returning just behind her to the vicinity of their home. At other times he would remain not far from the nest, and, when he saw her coming, would fly out to meet her and escort her back to it. I did not see the male take any part in gathering material or in working on the nest, but I would point out again that I was not able to distinguish the sexes with absolute certainty, and that my only reasons for assuming that it was the female which did the work are that this seems the probability, since the females of most species of birds take the lead in such work, and that the bird which was not working sometimes sang. Various call notes were frequently heard during the morning, especially when the birds were together near the nest.

At 4.40 p. m. I climbed to the nest and observed that there were no eggs in it. Examination of its interior was commonly made, on this and subsequent occasions, by looking at the surface of a mirror held above it. No Vireos were seen while I was in the tree at this time. When I reached the ground again, I heard the song of the Philadelphia Vireo nearby. I fixed my gaze steadfastly on the willow from which the song seemed to come, and started to walk slowly toward it, but, when I had covered about half the distance, the song, which had not ceased, seemed suddenly to come from behind me. I turned sharply about and saw the singer, about three feet from my head, on a level with my eyes, perched on the bare branch of a small dead apple tree. It had continued to sing in that exposed position while I walked past, unseeing, within three feet of it. It sang again once or twice, then flew away.

*June 15.* Cloudy. Before I left the house in the morning, I heard the song of the Philadelphia Vireo between 5.50 and 6.00

o'clock. At 6.30 a. m. I sat down out-of-doors in sight of the nest. One bird was on the nest at the time, but it left silently after a minute or two. At 7.13 one bird went on the nest and sat there quietly until it flew off at 7.18 and met the other bird two or three feet away among dense foliage where I could not see them. The other bird had entered the tree unobserved by me, which it could do easily if it entered on the far side of the tree, as the foliage was very thick. One bird soon flew back to the nest and worked at it, now from this side, now from that, until 7.35, when it flew away quietly. At 7.50 one bird went on the nest. At 8.03 the other bird flew into the tree just below the nest and the bird on the nest left its position and went down two or three feet to meet its mate out of my sight among the leaves. Almost immediately one bird returned to the nest, while the other went to the lower part of the tree and then flew away. The bird at the nest worked at it almost continuously until 8.25, then departed. A slight sprinkle of rain began at 8.34. At 8.36 I observed a bird on the nest, though I did not actually see it go on. Soon afterward I heard the usual singing, which seemed to come from the sitting bird, although I was not sure that it might not be from another bird, concealed in the thick foliage nearby. This song which seemed to come from the sitting bird was heard at intervals during the morning. The bird was still on the nest when the shower ceased at 9.00 a. m. I then went indoors, noting that the temperature was 72° F.

At 11.40 a. m. I resumed my observations and found one bird on the nest. It again seemed that this bird was singing. After a few moments the other bird flew from behind me and entered the nesting-tree below the nest, thus proving that the song had been uttered by the sitting bird. The bird on the nest flew down to meet its mate in the thick foliage, then a moment later one bird went back to the nest, while the other flew away. On this and similar subsequent occasions I was unable to determine if one bird fed the other, or if they merely caressed and resumed their former occupations, or if they exchanged duties.

At 12.20 p. m. and at 12.50 p. m. a singing bird was observed on the nest, but at 1.25 p. m. no bird could be seen near it.

At 5.15 p. m. I climbed to the nest, saw that it contained one egg, and descended at once. One bird watched me anxiously from the next tree, but uttered no notes.

The song which I heard during this day from the bird on the nest was the same, almost throughout, as that heard on June 13 from one bird while the other was nest-building. It appears, therefore, that one or more of the following hypotheses is true: (a) the male and female of this species both sing this same song, or (b) the female sings this song on the nest and also sings it while the male builds the nest, or (c) the male sits on the nest and there sings a good deal on the day on which the first egg is laid (as well as on subsequent days). In the absence of definite proof I can say only that I feel very doubtful about (b), but cannot choose between (a) and (c).

*June 16.* Cloudy, temperature 56° F. at 6.30 a. m. The nest was observed from 6.00 a. m. to 6.30 a. m., during all of which time one bird remained quietly on it. Two or three phrases of its song were heard. When sitting, the bird frequently lifted its head to gaze about. The nest was also observed at 7.05 a. m., 7.25 a. m., 12.15 p. m., 12.40 p. m., 5.25 p. m., and 5.55 p. m., at each of which times a silent bird was seen on it. At 5.55 p. m. I climbed to the nest. After I began to climb I did not see or hear anything of either Vireo. The nest contained two eggs, which were seen to be white, with a few small, scattered dark brown spots about their larger ends only.

It seems that there is a good deal of incubation from the day on which the first egg is laid.

*June 17.* A Philadelphia Vireo was seen incubating at 6.00 a. m., at which hour I climbed to its nest. When my hand was about two feet below the sitting bird, it slipped away quietly. The nest was then seen to contain three eggs. On the third egg was one spot which was nearer the small end than the large end; all the other spots seen on it were nearer the large end. I descended, and at 6.12 a. m. a Vireo returned to the nest by short flights. On arriving at the nest it gave one glance therein, then settled down on it. It remained there quietly until 6.30 a. m., when I left the vicinity. Evidently the third egg was deposited between 5.55 p. m., June 16, and 6.00 a. m., June 17, probably in the early morning hours of June 17.

A bird, which was not heard to sing, was observed on the nest at 4.25 p. m., 5.30 p. m., 6.00 p. m., and 6.50 p. m. At 6.50 p. m. I again climbed to the nest, which then contained three eggs only. The sitting bird departed quietly when my head was about a foot below it, and perched, facing me, on a limb some six feet away, in full view, showing its yellow underparts very plainly.

*June 18.* When I climbed to the nest at 5.00 a. m., one Vireo was on the eggs. When I was about a foot away the bird quietly left the nest, which still contained three eggs only. I reached the ground again at 5.03. The Vireo returned to the nest at 5.14, and, after a characteristic momentary inspection of its contents, settled on it. It sat there quietly until 5.45 a. m., then suddenly began to sing a slow, sweet song. The tone and quality of this song were similar to those of the singing previously heard, but the notes were for the most part quite different from any notes which I heard from any bird of this species at any other time. The song ceased at 5.53, after a duration of eight minutes. At 5.56 the bird shifted about a good deal.

At 6.00 a. m. I climbed to the nest again. When I was about three feet below it I stopped and looked at the sitting bird, which leaned far over the edge of its home and opened its mouth wide at me. It continued to hold its mouth open, without a sound, during most of the minute or two of this mutual inspection, although it closed it for a moment once or twice. This was the only occasion on which I observed any action of this kind. When I climbed further, so that my face was but a foot below the bird, it flew away silently. The nest now contained a complete set of four eggs, the fourth egg resembling the first two in having the scattered dots on the observable surface near the large end only. As I did not touch the eggs, I could not tell how they were marked on their lower surfaces.

It is evident that the fourth egg was laid between 5.14 a. m. and 6.00 a. m. It is also certain that the female can sing, and that her song is sometimes, at least, made up of notes differing from any heard from the male. The song heard on this occasion seems to have been in the nature of a little hymn of gladness and thanksgiving on the part of the female after the laying of her egg. Whether or not it follows the deposition of the last egg only I do not know.

For comparison it may be stated that a full set of eggs was found by Brewster<sup>1</sup> at Lake Umbagog, on the border of Maine and New Hampshire, on June 14, 1903, one was found by Seton, as mentioned by Brewster,<sup>1</sup> at Duck Mt., Manitoba, June 9, 1884, and full sets were observed by Philipp and Bowdish<sup>2</sup> in Northumberland County, New Brunswick, on June 17, 1916, and June 27, 1918.

The nest was observed at 7.25 a. m., 12.00 m., 5.00 p. m., 6.30 p. m., and 7.12 p. m., and a bird was seen on it each time except at 6.30 p. m., although no song was heard.

*June 19.* A Vireo was sitting at 6.00 a. m., when I began observation. It turned about frequently on the nest. At 6.20 a. m. I climbed the nesting-tree. The bird left as usual when I reached a point about a foot below it. I found four eggs only in the nest.

The nest was observed at 12.00 m., 12.25 p. m., 4.45 p. m., 5.40 p. m., and 6.45 p. m., and each time a bird was seen incubating, but no song was heard. At 6.45 p. m., I climbed to the nest again and observed that the eggs in it did not appear to have any regular plan of arrangement. They lay indifferently on chords or radii of the nest-circle, those lying on radii having either end outward.

*June 20.* The nest, with sitting bird, was observed from 6.00 a. m. to 6.30 a. m. The bird sang its low, sweet song several times, and paid not the slightest heed to repeated "squeaking" on my part. A bird was also observed on the nest at 7.25 a. m., 12.05 p. m., 12.40 p. m., 5.45 p. m., and 6.15 p. m., but no song was heard at those hours.

*June 21.* One of the Vireos was observed on the nest at 6.40 a. m. I did not see it leave its position there, but at 6.45 I heard one of the call notes of the species, which drew my attention to the fact that the nest was unoccupied and that the bird uttering the note was in the top of a Rock Maple next to the nesting-tree. This bird uttered one or two notes of song, then went to the nest and settled on it, continuing to sing there at irregular

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<sup>1</sup> The Auk, XX, 1903, pp. 369-376.

<sup>2</sup> The Auk, XXXIV, 1917, pp. 265-275; and XXXVI, 1919, pp. 36-45.

intervals until I departed at 7.10 a. m. I am not sure whether or not this was a case of one bird relieving the other at incubation.

At 7.25 a. m., 12.45 p. m., 3.50 p. m., 5.50 p. m., and 7.15 p. m. a bird was seen on the nest, but no song was heard from it.

*June 22.* Cloudy, wind north, temperature 53° F. at 7.30 a. m. One Philadelphia Vireo was on the nest at 7.30 a. m., when I commenced observation. At 7.47 it quietly arose, stepped to a nearby twig, then flew away. I watched carefully for its return, but did not actually see it go on the nest, although it was there at 7.59 a. m., and I am sure that it was not there only a few seconds before. At 8.29 the bird quickly left the nest, seeming to fly directly from it to a nearby oak, where it fed. It returned at 8.34, and was still sitting at 8.55 a. m., when I left. It appears that at this stage of incubation, one week after the laying of the first egg, the nest is left uncovered while the incubating bird feeds. No song was heard during the morning.

At 3.45 p. m. a Philadelphia Vireo was heard singing in the oak woods, at a distance of four or five rods from the nesting-tree. At 4.03 p. m. the same song was being sung by a bird on the nest, which was probably the same bird. The song continued until 4.14 p. m., and when I observed the nest at 4.15 p. m. no bird was on it.

*June 23.* Cloudy, temperature 52° F. at 6.00 a. m. The nest was unoccupied at 6.00 a. m., when I began observation. I kept a careful watch for the Vireo, but failed to see it actually go on the nest, so inconspicuously did it return. It was on the nest at 6.13, but was not there a few seconds earlier. It remained there quietly until 6.30 a. m., when I left.

A bird was observed on the nest at 12.45 p. m., 5.20 p. m., and 6.00 p. m., but no song was heard from it.

*June 24.* A glance at the nest at 6.00 a. m. showed that a bird was on it. At 6.25 a. m. I resumed observation and found the nest uncovered. A bird returned to it at about 6.28 and remained there until 6.55 a. m. As its mate, during this time, was singing loudly and continually from the oak woods, it seems probable that the bird on the nest was the female. At 6.55 a. m. I climbed the nesting-tree. When my head was about five feet below the nest, I saw that the bird was no longer sitting, but

that it was perched on a small twig which sprang from the trunk about six inches below the nest. In these positions we looked at one another for some seconds, then I raised myself so that my head was about eighteen inches below the bird, which did not move except to turn its head slightly. The yellow of its underparts, though not at all pronounced, could then be seen plainly, and the lack of a black border to the crown was also noted again. After about twenty seconds of this close inspection, the bird flew silently away. On going to the nest I found that the four eggs appeared unchanged. At 6.59 I reached the ground again, and the bird went back to the nest at 7.06. It remained there until 7.45, when I ceased observing it for a time.

At 8.35 a. m. I returned to my observation-post. One Vireo (probably the female) was on the nest, while the other was singing loudly among the nearby oaks. At 9.02 no bird was on the nest, though I did not see the sitting bird leave. At 9.08 the female returned swiftly to the nest, while the song of the male, which had been sounding uninterruptedly from the oaks, was heard suddenly from the maple next to the nesting-tree. After a few seconds singing from the oaks was resumed. It is not clear whether the male had chased his mate back to her duties, or had simply escorted her back. The female was still incubating when I left at 9.35 a. m.

A bird was noted on the eggs at 11.45 a. m. At 7.10 p. m. one bird was on the nest, while its mate moved slowly through the branches from three to six feet away and sang sweetly for several minutes in an undertone.

*June 25.* At 5.58 a. m., when observation began, no bird was on the nest. I soon found the pair of Philadelphia Vireos feeding together in the woods, the male singing and following the female at a little distance as she flew from tree to tree. She seemed to lead him where she pleased, keeping to the lower branches of the trees. At 6.06 she returned to the nest, the male accompanying her to within a few feet of it, singing the while. He soon moved away again, still singing. I followed him to watch his feeding habits, and at 6.25 a. m. saw him suddenly fly to a point several rods away. As I pursued him I heard a scolding note once, followed by singing. I found that once more the female was feed-

ing, and that again he was following her through the branches. He did not seem to think of relieving her on the nest. It will be noted that in this part of the incubation period he did not appear to pay any attention to the absences of the female from the nest, except to follow her closely and sing while she fed. The female had not resumed incubation at 6.30 a. m., when I left. At 6.44 a. m. I happened to be near the nest again and saw the female return to it, escorted by the male in song.

A bird was seen on the nest at 12.00 m., at which time the male was heard singing nearby. He was still singing at 12.30 p. m., but no bird was then on the eggs. At 4.45 p. m., one bird was on the nest, and no song of this species could be heard.

At 6.41 p. m., when I climbed to the nest, the female was on it, while the male was in song about two rods away. The female continued to sit until some seconds after my head was a foot below her; then she peered over at me and flew off quietly. This was the first occasion on which she sat so closely. Before the eggs hatched the old birds never uttered a sound near the nest while I was examining it, nor did they usually appear at all after the one on the nest had left it. On this occasion the male, without approaching me, lowered his song to an undertone while I was examining the four eggs, which appeared unchanged.

*June 26.* A Vireo was observed on the nest from 6.10 a. m. to 6.25 a. m. and also at 12.00 m., 12.25 p. m., and 3.45 p. m. A light rain began about 12.15 p. m., and continued for the remainder of the day.

*June 27.* After a night of heavy rain, the day was cloudy and windy, without rain. The temperature at 6.00 a. m. was 67° F., but by 6.35 p. m. it had fallen to 56° F.

One bird, presumed to be the female, was observed on the nest at 6.00 a. m. At the same hour the male, whose song I had not heard earlier in the morning, began to sing in a loud voice from the top of a nearby oak. In less than a minute, still singing, he approached the nest rapidly by short flights from branch to branch. When he was about a foot below the brooding female she slipped quietly off the nest and flew directly away. The male then went to the nest and, after some turning and twisting about, settled himself upon the eggs, where he continued to sing at intervals in

an undertone. It will be observed that this first certain evidence of the male's participation in incubation was obtained twelve days after the laying of the first egg, which appears to have been coincident with the beginning of the incubation period.

At 6.16 the male began to sing more loudly, perhaps as a signal that he was ready to be relieved. At 6.17 he suddenly interrupted his song by a series of mouse-like squeakings and flew off the nest. His mate, who had approached the nest from the far side unobserved by me, then went on it immediately to brood. The birds did not actually meet one another during either of these exchanges of duties. The male proceeded to the oak woods, where he continued to sing loudly. The female remained on the nest until 6.30 a. m., when I left.

A bird was seen to be incubating at 12.00 m., 12.25 p. m., 3.30 p. m., 5.35 p. m., 6.35 p. m., and 7.10 p. m. The bird which was on the nest at 7.10 p. m. was heard to sing two or three times, and may have been the male. I climbed to the nest at 7.10 p. m., and found no visible change in the eggs.

*June 28.* One bird was observed on the nest at 5.57 a. m. A few seconds later the other bird, probably the male, approached the nest, uttering subdued musical notes. The sitting bird flew off and he took her place on the nest, where he sang at irregular intervals, now loudly, now softly.

At 6.04 I began to climb the tree, desiring to see if the male would sit as closely as did the female. He did so, remaining on the nest until after my head was but a foot below him, when he flew off in silence. The eggs showed no change. I descended at once, reaching the ground at 6.07. As I was climbing down the tree, I heard a few notes of song from the male in a nearby oak, and after I reached the ground these became louder and more frequent. At 6.09 a. m. the female went on the nest, while the male continued to sing loudly from his perch, making no move to escort her on.

At 6.29 a. m. I was watching the male singing in a small birch when his mate flew past me into the lower part of the tree. He immediately chased her into an oak and sang there for a minute or two, but at 6.31 he went on the nest himself and continued his singing there.

A bird was observed on the nest at 7.25 a. m., 12.45 p. m., 1.50 p. m., and 5.00 p. m., but no singing was heard after early morning.

*June 29.* The morning was fine and cool and the song of the Philadelphia Vireo was heard through the open window from 4.45 a. m. to about 6.30 a. m. At 7.34 a. m. I climbed to the nest and found in it four eggs, apparently unchanged.

A bird was seen on the nest at 11.46 a. m. At 11.50 I took my place to watch it. As it was singing slowly, I considered it to be the male. At 12.04 p. m. its mate approached with a mass of something, apparently food, in its bill. It perched within two or three inches of the nest, then flitted away a short distance, then went back to a perch beside the nest, then flew away again. The bird on the nest seemed to be undisturbed, and I could not see that the other bird fed it, or that it disposed in any way of the mass in its bill, or that the two birds touched one another at all. I have since wondered if this was the first noticeable result of an instinctive desire to feed the young, a desire which at this time could not be put into effective action. At 12.06 p. m. I was obliged to depart.

At 12.40 p. m., when I resumed observation of the nest, one bird was on it, and no song of this species was to be heard. At 12.52 the male began to sing in a low voice from the oaks, and at 1.05 he quietly replaced the female on the nest, where he continued to sing. At 1.11 the female relieved him and he resumed his singing in the oaks. At 1.14 I ceased observation for a moment, and when I returned at 1.15 the bird on the nest was singing, so that I presume that the male had resumed incubation during my absence. He was relieved by the female at 1.20, and he relieved her again at 1.36. She relieved him at 1.40, and he relieved her at 1.43. At 1.54 p. m. he left the nest and went to the oaks, where he sang a little. The nest was left uncovered until 2.02, when a bird went on it which I presumed to be the female, as it remained silent. I ceased observing at 2.05. During the hour and twenty-five minutes between 12.40 p. m. and 2.05 p. m. the pair had exchanged places on the nest eight times, the intervals between reliefs being sometimes as short as three, four, or six minutes. It is interesting to note that Allen<sup>1</sup> describes a

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<sup>1</sup> The Auk, XXXIII, 1916, pp. 53-56.

similar rapid exchange of duties on the part of a pair of Rose-breasted Grosbeaks on the afternoon on which their young were hatched.

A bird was observed on the nest at 4.30 p. m. and again at 7.20 p. m., at which latter hour I climbed the nesting-tree. The bird on the nest sat as closely as had been usual for several previous days, but finally departed without uttering a sound. The nest contained three eggs and one young bird, but no pieces of egg-shell. I have not yet discovered how this species disposes of the shells of hatched eggs. The young bird did not raise its head while I looked at it. I descended quickly and the parent bird soon returned to the nest.

*June 30.* At 4.35 a. m. I climbed to the nest, frightening off the female, and found that it still contained three eggs and one young bird. When I touched the nest the young bird lifted its head and opened its yellow mouth for a moment, then dropped back to its prostrate position and would not stir again.

A bird was seen on the nest at 4.25 p. m. and again at 5.05 p. m. At the latter hour I went up to the nest and found that it held two eggs and two young birds.

*July 1.* One of the Vireos was observed on the nest at 9.27 a. m., and at 9.28 I climbed the nesting-tree. After I had reached my highest point, with my head about a foot below the nest, the sitting female still remained at her post, turning her head from side to side and eyeing me intently. The male was singing loudly at this time from the oak trees. Finally I raised my hand toward the female, which left the nest silently, disclosing one egg and three young birds. The young did not raise their heads or move at all when the nest was touched. Although they had been hatched on three successive days, I was unable, by looking at my mirror, to tell them apart. As far as I could see, they were all entirely naked, except that all had gray down on the upper surfaces of their wings and a few tufts of similar down on their heads.

The nest was observed at 11.00 a. m. and at 12.20 p. m., and a bird was seen on it each time.

At 4.30 p. m. I climbed to the nest and found no bird on it, although the male was singing nearby. About the time I reached the nest the female flew into the next tree and perched on a bare

branch in plain sight about ten feet away from me, where she watched me closely, but made no sound. In her bill she carried food, which looked like a small, whitish, naked caterpillar, and which she herself swallowed after a minute or two of watching. In the nest I could see no egg, simply a huddled mass of naked young birds. I inserted one finger among them and felt gently about until I assured myself that there was no egg there. At 4.35 p. m. I descended.

It will be noted that the first, second, and third young birds were hatched in fourteen days after the laying of the first, second, and third eggs, respectively. The time required for the incubation of the fourth egg lies somewhere between thirteen days, three hours, twenty-eight minutes and thirteen days, eleven hours, sixteen minutes. If all the eggs were warmed alike when a bird was incubating, and if the several eggs required equal amounts of incubation to cause hatching, it would appear that incubation began as soon as the first egg was laid, but that it was more broken and ineffective between the laying of the third and the fourth eggs than at other times.

At 4.37 p. m. the female returned to the nest, inspected its contents, and then flew away. At 4.41 she returned, carrying in her bill what appeared to be a small, dark, naked caterpillar. After feeding this to the young, she began brooding them. At 5.16 p. m. she suddenly left the nest and flew to another branch of the tree, but returned immediately to her brooding. At 5.38 p. m. she left the nest, being immediately replaced by the male, as I suppose. This bird left the nest at 6.18. At 6.21 a *Vireo* came to the nest and sat on its edge. It may have fed the young, but I could not see it clearly. After a few seconds it flew away again, but a bird came back at 6.24 and immediately resumed brooding. It left the nest at 7.14 and a bird went on the nest at 7.16. It left at 7.28 and one went on at 7.32. I cannot say whether these last observations were of two birds exchanging places or of one bird going and returning. During these three hours from 4.30 p. m. to 7.30 p. m. on this date the young were fed once, or perhaps twice at most. I ceased observing at 7.33 p. m.

*July 2.* The female was on the nest at 6.00 a. m., but the male replaced her at 6.27 and continued brooding until 6.34 a. m., when I departed.

A bird was observed on the nest at 12.00 m., 12.25 p. m., 6.10 p. m., and 7.09 p. m., indicating very steady brooding at this age of the young.

At 7.09 p. m. I climbed to the nest, the female Vireo sitting on it as closely as she had done on the previous day, but finally leaving in silence. The male in the oak trees sang steadily while I was climbing the tree, but became silent after the female had left the nest. The four young birds could now be plainly distinguished, although they still lay huddled together in an inert mass, with backs uppermost and with head and wings drooping, as though they were utterly exhausted. They were noticeably larger at this time than they were on July 1, and the down on them was more conspicuous. When the nest was touched one bird only lifted its head and silently opened its mouth for a moment, then collapsed again. On account of the way in which the birds were crowded together I was unable to observe whether or not they differed noticeably in size. I descended at 7.14. At 7.21 the female resumed brooding, and she was still on the nest when I left the vicinity at 7.26 p. m.

*July 3.* On this date I witnessed what appeared to be a family quarrel, although it may have been interference by some third adult bird. During it all I saw and heard but two Philadelphia Vireos in the vicinity, however, and they were quite evidently a male and a female.

Observation began at 6.16 a. m., when one bird was on the nest, while no song of the species was to be heard. No change was noticed until 6.24 a. m., when the male began singing among the oaks. A moment later, still singing, he flew to a perch near the nest. The next instant there was a series of excited squeakings, and both birds were away in a mad chase, fighting at frequent intervals with one another, apparently without mercy. They would circle around and around, passing repeatedly through the nesting-tree, then turn face to face in the air and struggle furiously, with much fluttering of wings and sharp clicking of bills, until often they fell nearly to the ground. After the first

few seconds the squeakings stopped and shortly afterward the male began to sing as he fought. As the birds passed through the tree they would sometimes alight for a moment, two or three feet apart. After the briefest of pauses the female would attempt to fly back to the nest, when the male would dash after her again and the fight would be resumed.

At 6.28 a. m., after four minutes of conflict, the female succeeded in getting back on the nest, where she uttered some song notes in a voice so low that they were scarcely audible. At the same time the male sang from a perch a few feet from her. At 6.29 he approached the nest, the female flew off, and another sharp struggle ensued. At about 6.30 the male flew to a distant oak, where he continued to sing, while the female disappeared. The female returned quietly to brooding the young at 6.36. At 6.44 the male ceased his singing and drew near to the nest by short flights from branch to branch. When he was but two or three feet away, the female flew from the nest, and the pair fought again, while the male sang. Mingled with the song I this time heard repeated squeakings and one utterance of the scolding note. At 6.45 the female went on the nest, where she uttered two loud song notes, while the male, in full song, returned to the oaks. At 6.46 the female left the nest and flew away, not going near her singing mate. The male soon stopped singing, but at 6.54 he began to sing from a tree near the nest, after which he went on the nest to brood, and there sang repeatedly in a low voice. A minute or so later he flew back to the oaks, where he sang loudly.

At 6.59 a. m. I climbed to the nest. Before I left the ground I could see no bird brooding, but when I arrived near the nest I found the female on it. She did not sit quite as closely as she did on the two previous days. The young birds appeared little changed, although the down on their heads was noticeably thicker and darker. When the nest was first touched two of them raised their heads and silently opened their mouths for a moment, but they would not repeat the movement.

A bird was seen on the nest at 7.25 a. m., 12.00 m., and 12.25 p. m. The nest was observed to be uncovered at 5.07 p. m., 6.06 p. m., and 6.38 p. m. At the last-named hour I climbed the

nesting-tree and found the young noticeably larger; fully twice the size that they were when first hatched. The down on their heads had increased and down had appeared across their backs between their wings. For the first time they were heard to utter a note, a simple "Peep, peep, peep," etc., very low and faint. It was loud enough to bring the female to my side, however, while the male began to sing from the oaks. Instead of being silent, as always when I was at the nest before, the female uttered excited squeakings (not the true scolding-note) from a perch within three feet of me. She soon became silent and disappeared. I reached the ground at 6.46 p. m., and, on stepping back to look at the nest, saw that the female had already returned to it.

(To be continued.)

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## NOTES ON ORTALIS VETULA AND ITS ALLIES.

BY W. DEW. MILLER AND LUDLOW GRISCOM.

### A. THE STATUS OF ORTALIS V. MCCALLII BAIRD.

IN 'Isis,' 1830, page 1112, Wagler described *Penelope vetula*. A translation of the Latin is as follows: "Olivaceous; the head and ears slaty gray; the flanks, crissum, and tibia brownish; the epigastrium and belly subrufescent; tail feathers above bronzy green with snow-white tips. The length, 18 inches; longest tail feathers, 9.70; the shortest, 6.50. Mexico."

In 1858 Baird<sup>1</sup> described *Ortalida mcallii*, the length being given as 23.50; wing, 8.50; tail, 11 inches. He admitted feeling considerable uncertainty as to the proper specific name of his subject. His description was based on one specimen from Nuevo Leon with no other Mexican material for comparison.

Ridgway<sup>2</sup> gives a synopsis of the races of *Ortalis vetula*. *O. v. mcallii* is given from Vera Cruz north to lower Rio Grande Valley; *O. v. plumbiceps*, described by Gray in 1867, from southern Mexico to Guatemala; and last he describes *O. v. pallidiventris* from Yucatan. It is significant that no *O. v. vetula* is given. In a footnote

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<sup>1</sup> Rep. Expl. & Surv. R. R. Pac., IX, 1858, 611.

<sup>2</sup> Manual of North American Birds, 1887.