

mainly of pieces of dry grass and a quantity of cowhair and formed a dense mat two or three inches thick covering the bottom of the box.

This nest box was located eight feet up on a telephone pole close to a garden fence where members of the family passed frequently. Mr. Hand was there most frequently and the birds seemed to show especial confidence in him, going to the nest within a few feet of his head, though they showed practically no alarm at the presence of anyone in the garden.

Mr. Hand also tells me of a nest that he watched some years ago which was built in an old wooden pump, propped against a house, the birds going in and out through the hole where the handle operated.

Glenolden, Pa.



THE KIRTLAND'S WARBLER IN ITS SUMMER HOME.

BY N. F. LEOPOLD, JR.

Plates VII-VIII.

DURING the spring of 1922, it was my privilege to work under Mr. Norman A. Wood of the University of Michigan Museum, the discoverer of the breeding range of Kirtland's Warbler, and at his suggestion I determined to make a trip to the region where he had discovered the type nest and egg of the species. Consequently on June 24, 1922, in company with Mr. James D. Watson of Chicago, I started in my automobile bound for Luzerne, Oscoda County, Michigan.

The first night was spent at Pentwater, Michigan, at a distance of about 280 miles from Chicago, and at noon of June 25, we arrived at Traverse City. From this point it was necessary to strike due east across the state over well-nigh impassable roads, and as a result we were compelled to spend the night at Grayling, still at some distance from our destination, but at least in the same character of country in which we expected to search for our bird. Needless to say we were constantly on the lookout for unfamiliar songs and birds, but although we traversed many suitable stretches

of jack-pine we were unable to discover any trace of the Warbler. On June 26 we left Grayling and went, via Roscommon, to the little town of Luzerne, on the banks of the Au Sable. Here we were fortunate enough to discover that Mr. George A. Hickey was the proprietor of two one-room log cabins which he rented out to fishing parties, and which were situated on the north bank of the Au Sable about 8 miles north and east of Luzerne, and within a few hundred rods of Mr. Parmalee's home where Mr. Wood had secured specimens in 1903. At this point then we decided to make our headquarters.

On the afternoon of the 26th we started out from our cabin (graced by the name of Buckhorn Lodge) and worked west past Mr. Parmalee's house. However, we saw no sign of the bird either then nor during our entire stay. The reason for this failure may be looked for chiefly in the change in the character of the country which had taken place since Mr. Wood's expedition. One of the peculiarities of *Dendroica kirtlandi* as we afterwards learned, is that it nests entirely in jack-pine from five to twelve feet in height. Consequently, the very trees which twenty years before, at the time of Mr. Wood's expedition, had offered ideal nesting sites for the Warbler, had by the time of our arrival attained a much greater height, and were no longer a likely home for the bird. Further, as we later learned, the area had been swept by fires which doubtless also had their effect. We remained in the neighborhood five days, working in both directions, and on both banks of the river. Then we drove to the North Branch of the Au Sable where Mr. Wood had also found the bird, but here, too, we were unsuccessful. Therefore on June 30 we left the area, driving north to Charlevoix, and thence home.

Later in the summer of 1922, I learned from Mr. Wood that in driving to Alpena, Alpena County, on the Lake Huron shore, he had run across another sizeable colony of the birds near Oscoda, Iosco County, and also knew of another colony near Higgins Lake, Kalkaska County: whereas the late Dr. Barrows of the Michigan Agricultural College had discovered a colony, near the little town of Winterfield, in the extreme northwestern corner of Clare County. It would seem then that all the known breeding colonies of the bird lie in a belt about fifty miles in breadth stretched

across the State of Michigan from Traverse City on the west to Oscoda on the east.

In the spring of 1923, I again determined to visit this region, and if possible, make a study of one of the breeding colonies. However, after the failure of the previous expedition, I decided this year to arrange matters differently. First I planned the trip for a week earlier than the previous year, and second I allowed myself enough time to visit all the known colonies if necessary. Consequently at 5:00 A. M. of the 16th of June, 1923, I started from Chicago in company with Messrs. James Dewey Watson, Sydney Stein, Jr., and Henry B. Steele, Jr., all of Chicago, bound for Oscoda, Iosco County.

After a long drive the first day out we reached Bay City on the Lake Huron shore, just 100 miles south of our destination, and spent the night there. June 17 we started off again, and at noon arrived in Oscoda. Here we found an excellent hotel, Van Ettan Lodge on Van Ettan Lake, about two and a half miles north of Oscoda. According to the instruction which Mr. Wood was kind enough to furnish, we started off at 12:30 P. M. to drive to Foote Dam on the Au Sable River and about seven miles from the lodge. We drove north about three quarters of a mile on M-10, the state trunk line, and then turned due west over a little sand road leading to Foote Dam. Hardly had we driven 500 yards on this road when Mr. Stein called our attention to a song which was unfamiliar to all of us, and we got out of the car to investigate. We fought our way several hundred yards through extremely dense jack-pine when Mr. Watson and the writer simultaneously caught a view of the singer perched in a large pine tree. The bird turned out to be a fine adult male *D. kirtlandi* in full nuptial plumage. Perhaps the most striking feature of the song was its great carrying quality. The bird perches on a limb, every muscle in his body tense, points his head toward the sky and lets out a burst of clear, bubbling song, easily audible at a distance of a quarter mile. In singing, so much effort and vigor are put forth that the tension of the jugulum and throat is very noticeable and it seems as though the singer's throat will burst from the sheer force of the song.

According to the descriptions of the song, we expected a clear, Oriole-like whistle,¹ but neither on this occasion, nor during our entire stay, was any member of the party able to detect anything suggesting the Oriole. As we heard the song it seemed extremely Wren-like, combining the bubbling quality of the song of the House Wren with clear, sharply defined syllables.

After watching this first male for some twenty minutes, we resumed our trip west toward the river, our object being to locate more or less definitely the limits of the colony. For about three-quarters of a mile farther, we were greeted by the cheery song, coming from both sides of the main road. Here, however, the nature of the region changed, and although we continued all the way to the river, no more birds were heard. On our return we stopped and studied a few more singing males and then returned to our hotel.

June 18, we were in the field at 5:00 A. M. We first returned to the site of our first bird and spent several hours attempting to locate his nest by watching his movements. This bird was one of the few which were never observed with food in their mouths, and although we saw several other birds, some perhaps females, we were entirely unsuccessful in finding his nest, and decided to explore further. Consequently we struck due east and found a sizeable colony at a distance of about a mile in similar jack-pine growth east of M-10. Here we divided into pairs and spent the morning in attempts to locate a nest and in studying the habits of the bird generally. It appears that each male has a favorite perch, generally a dead branch of some description on a tree somewhat taller than the surrounding short jack-pine and to this he returns both before and after feeding, to sing. After a short sally forth the male returns to this perch holding food in his mouth and here lets forth his wonderful ringing song. Sometimes he will sing thus as long as thirty-five minutes, holding the food securely in his bill, before he goes to feed the young. According to Mr. N. A. Wood, in his pamphlet on the 'Discovery of the Breeding Area of the Kirtland's

¹ Elliot Blackwelder, 'Auk', XVI, p. 359, describes the song as Oriole-like, as also does N. A. Wood, in 'Discovery of the Breeding Range of the Kirtland's Warbler.' Rather the best published description of the song is that of Edward Arnold, 'Auk', XXI, 487, who describes it " *trp, trp, terp, terp, terp, serkwit, er, wer*, all but first two notes uttered rapidly." He also mentions shorter songs.

Warbler', the bird sings about once every 30 seconds or at even longer intervals. According to our observations, however, made with a stop watch, the bird sang with the utmost regularity between six and seven times to the minute; in other words, about every eight seconds, each song lasting about a second and three-quarters.

One peculiar habit of the bird when he has returned to his perch after disposing of his food is distinctly sparrow-like. He perches on his branch, casts a look about in each direction, and then carefully strikes or whets his bill on the branch, first on one side, then on the other. This, together with his bill, much larger than in most of the Warblers, reminds one very strongly of the Finches.¹

After spending the morning in making general observations and attempting to syllabize the song (which will be given later), we returned to the hotel to dinner.

At about 1:30 P. M. we returned to the original site, and walked west toward the river. When we had gone about a quarter of a mile we discovered another singing male, and while Mr. Watson was walking through the pine attempting to get a look at the bird, he started a female from the ground about two feet from where he was standing. The bird half flew and half hopped a few feet, and then hopped slowly into the shrubbery, dragging one wing as though it were broken. This so-called broken wing ruse is, of course, common enough among many other birds, notably the Meadowlark, but to my knowledge has never been observed before in the case of the Kirtland's Warbler. The male in the meantime was perched in a clump of low pine trees where he was chipping excitedly and wagging his tail very much after the manner of the Palm Warbler. As we afterward had occasion to learn, both birds chip only when nervous, and flit their tails when nervous or attempting to decide on the next move.

We were convinced that the nest would be found in this immediate vicinity, and after a few moments' fruitless search, decided to post ourselves at three different points where we could command the entire vicinity, and await developments. The spot was located

¹ Blackwelder. 'Auk', XVI, p. 359, mentions that the bird appears un-Warbler-like because of its habit of staying for some time in one place. This habit seems to me only slightly more pronounced in the case of *kirtlandi* than with certain other Warblers during the breeding season.



KIRTLAND'S WARBLER AND NEST.
(From Motion Picture by James McGillivray Courtesy. Dept. of Conservation of Michigan.)

about twenty yards south of the main road, and separated from it by a rather thick growth of pine. There in the midst of a more or less open area was located a thick clump of jack-pine, ranging from six to twelve feet in height, and composing a circle with a radius of perhaps ten feet. It was in this clump that both parent birds took their stand, hopping nervously from branch to branch, chipping and flirting their tails. The male held a small caterpillar which we took to be a span-worm in its mouth. After about twenty minutes of nervous flitting about the male dropped to a small twig on the ground about twenty feet to the northeast, but reappeared almost immediately with the food still in his bill. After about twenty-five minutes more the male dropped to the ground at a point almost directly in the center of the little clump and reappeared after about a minute and a half, having disposed of his food. We decided that this must be the location of the nest, and so, crawling on my hands and knees, I started to make a minute examination of the ground.

The ground which is sandy but covered with a thin layer of black earth, is thickly overgrown with a mat of evergreen and ferns of various kinds and is so thickly strewn with branches, pine cones and other debris as to make very difficult the finding of the nest. However, after I had advanced a few feet, I flushed the female who had been concealed but a few inches from my hand, and on careful examination found a nest containing four young about three days old. The nest was very completely concealed; a branch, about half an inch in diameter being directly over it, and a mass of vegetation, living and dead, covering it almost completely. The parent birds were flying about very close to me and seemed much perturbed; so, after marking the tree, we decided to return to the hotel in order not to disturb the birds further.

June 19, we determined to spend the morning making a study of the habits of the bird at the nest. Consequently we started out about 9:30 A. M. and arrived at the site of the nest at 9:45. We divided into two parties, each taking a turn at observing the nest and taking notes of the proceedings. Mr. Watson and the writer were to have the first turn, consequently we approached the nest from the southeast, and concealed ourselves on the ground at a distance of four to five feet from the nest. I quote from our notes, taken at the time.

Arrived at nest at 9:45 A. M. After difficulty in discovering nest, flushed male from its side. He flew about four feet to a small jack-pine and eyed us suspiciously for a moment—then burst into song. Moved closer to nest, with a bug in his mouth, watching us and singing. Female sat on a bush at a distance of 15 feet, chipping and wagging her tail. Male seemed at ease—the female not at all. Male sang—

chip, chip,—chip, chip, chip,—chip, chip wheeou
crescendo piu accel.
accelerando

9:50—Male moved nearer nest, singing six times a minute. Head always raised in song. Movement of throat very noticeable. Female flew nearer into same clump. Food held tenaciously in mouth of male for fifteen minutes during song.

9:57—Male fed young. The young birds have not made a noise.

10:06—Male hopped from nest, looked about an instant and commenced singing.

10:09—Male left clump (in search of food), and flew to a neighboring tree at a distance of thirty feet, where he sang.

10:13—Male reentered clump with food, *singing*. Approached nest as before and fed.

10:14—Seems much less shy. This time stayed only 45 seconds before reappearing, having disposed of his food. As before, remained in clump singing for several minutes before departing in search of food. Female chipping much more softly and much less frequently. Seems to have become accustomed to our presence. Female wags her tail *much* more frequently than male.

10:24—Male approached within two feet. Not at all suspicious singing. Has two alarm notes, one slightly softer than the other. Female approached within a foot of the nest and then withdrew, wagging tail continually. Also circles around watching us very intently.

10:29—Female within six inches of nest, with food.

10:33—Male in bush to right of us, singing. Female keeps coming within six inches of nest, withdrawing each time. She wags her tail much more than male.

10:38—Male enters nest. Immediately leaves. Female also enters nest after watching male. Also leaves immediately.

10:41—Female enters nest. She has been within six inches of the nest twenty-eight times before entering for the first time.

(Relieved by Messrs. Steele and Stein.)

10:50—Female just approaching nest. Very nervous. Tail wagging continuously.

10:55—Male approaching as female nears nest with food. Male has food too. He is much less nervous and feeds young; then leaves while female is still inspecting surroundings.

10:57—Male still singing on stump nearby.

11:00—Female still carrying food. Has approached nest twice but not fed young yet.

11:03—Female still hopping about. Six trials so far and has not fed young yet. Seems to have a very definite route by which to approach the nest.

11:04—As male approaches, female drops into the nest to feed but comes out three times during the process to look about.

11:07—Female within four feet of us for inspection, male nearby singing. Exchange positions. Female off for food. Male sings as he approaches nest with food.

11:09—Female returns. No food, however. Male feeds. No elaborate performance, goes directly about his business and at

11:11—leaves nest, after feeding.

11:14—Male singing about two feet directly above the nest. Sings eight times a minute.

11:15—Male much interested, female scared by noise occasioned by changing film in camera. Male approaches boldly within three feet and sings, while female hops about nervously.

11:17—Female left and returned with food. Male singing. Female resumes same tactics to feed.

11:20—Accidentally snapped a twig and female left. Male not even disturbed. Food seems to be a long black worm, shiny like a centipede.

11:26—Male singing loudly in back of us, then approaches directly over our heads. Apparently oblivious to us.

11:27—Female has not returned.

11:30—Length of song, one and a half to two seconds. Still singing 7-8 times a minute.

Female caught food on wing.

June 20, 1923.

At about noon we went to the town of Oscoda and here chanced to meet Mr. James McGillivray of the State Conservation Commission. Upon telling him of our find he readily assented to photograph the bird at the nest. It was decided, however, that conditions for photography were rather unfavorable at the site of the first nest, and as the sky was overcast and the light poor, we thought it better to spend the afternoon searching for another nest more adapted perhaps to photography.

We started out therefore at 2 P. M. and drove to a point a few hundred feet east of location of our first nest. Hearing a singing male a quarter of a mile to the south, we went in search of the bird, and were fortunate in finding the character of the country much more open than in the previous case.

Our bird proved to be singing with food in his mouth, on the dead branch of a tall pine tree, but again near a clump of small jack-pine. We sat at a distance and observed the male make several flights to the ground, but each time in a different direction. However, after a time he did twice go in the same direction—thus giving us a clew as to the approximate location of the nest. After about twenty minutes of watching the bird from a distance, we had localized the nest as being situated in a clump of jack-pine about three times as large in area as that which harbored the first nest. With this information we made a closer approach and surrounded the clump completely, lying on the ground awaiting developments. This male seemed considerably more nervous and agitated by our presence than was the first. So much so, that he sat on a perch for thirty-five minutes holding food in his bill. For about the first ten minutes he twitched his tail continually, chipped at short intervals, singing only infrequently. Thereupon he became more composed, the chipping decreasing in frequency and the song increasing. An interesting observation at this point was that before deciding to fly to another branch, the bird looked about in all directions and twitched his tail vehemently. This was so noticeable that one might really be able to guess the state of the bird's mind by the amount of twitching of the tail.

After about twenty minutes the male finally became partially accustomed to us and started hopping in the form of a rough square



FEEDING THE KIRTLAND'S WARBLER AT THE NEST.
(From Motion Picture by James McGillivray, Courtesy Dept. of Conservation
of Michigan.)

from tree to tree. Still we were afraid to move, for at a false motion on the part of any of us, the male assumed absolute rigidity as birds often do when they sight a hawk. As a twig cracked, he cowered absolutely motionless at a distance about four or five feet from us and on a level with our eyes. Then, after several moments, he returned to his original perch, sang, looked about, and after a last reconnoitre finally dropped to the ground at the foot of a small jack-pine. Crawling on our hands and knees we approached within a foot of the tree. The female finally flushed from the site of the nest but stayed so close to us that she might easily have been caught alive in the hand by any of us.¹ In fact, during the whole afternoon neither parent ever went further than four or five feet from the nest, chipping incessantly while we made careful blazes in order to locate it.

The nest contained two fledglings, one very small with eyes closed, the other much larger and with eyes opened. The latter we later ascertained to be a Cowbird. After marking the tree, we retired in order not to disturb the family. In this case as in the other, the nest was very close to one of the sand roads which crisscrossed through the jack-pine. This observation holds true so far as I know also for all the birds observed by Wood and Barrows. In fact, one might name this bird the "Road-side Warbler."

June 21, 1923.

After locating nest number two yesterday, we made arrangements to meet Mr. McGillivray at 9:00 o'clock. We called for him and took him to the site. It was necessary to remove two small jack-pines and sundry other small foliage in order to permit the sunlight to enter the nest. We found beside the two nestlings one large speckled egg, probably a Cowbird egg. The birds were surprisingly tame, not even particularly disturbed by the sawing of trees, clearing of the site in general, or by the setting and leveling of the motion picture machine. We spent the entire morning taking pictures of the young ones and parents feeding. As in the previous case, the female was very timid, feeding only once in two-and-a-half hours. By one o'clock, we decided to remove the young Cowbird as it was getting all the food and crowding

¹ Arnold, 'Auk', XXI, p. 487, made same observation. Female was a close sitter and might easily have been caught.

the young Kirtland's. We did this and then returned to the hotel for lunch.

On our return at about one-thirty, there was no sign of the parents for the first half hour. Finally the male approached, singing, but made no attempt to feed. He seemed, however, to be quite at ease. Being a little alarmed at the lack of attention of the parent, we decided to take matters in our own hands and feed the young bird ourselves. Consequently, we caught several of the large horse-flies which, unfortunately, are extremely abundant. Taking one of these in my right hand and lying down on my side at the nest, I succeeded in feeding the nestling two flies very much to his satisfaction. During this operation the adult male approached very near me and scrutinized me carefully, apparently not alarmed as indicated by the infrequent twitching of his tail.

At Mr. McGillivray's suggestion I lay very still and extended a fly held between the fingers of my left hand slowly toward the bird. To my great surprise after about two or three approaches and withdrawals, the bird perched on a twig within a few inches of my hand and snatched the fly, which he ate. I lay very still, and after a short time the bird became quite accustomed to me. Apparently he took this as an easy way of securing food, for he ate in all seventeen flies in this manner. Even more, he perched on my shoe, once on my thigh and again on the tip of my shoe. Mr. McGillivray meantime was attempting to photograph the proceedings and took in all twelve exposures of the incident. However in order to focus properly it was necessary to tilt the camera at an abrupt angle and, due to some fault in one of the parts, eleven of the exposures were spoiled, due to buckling of the film.

During the whole day the female flitted about at a short distance, apparently trying to screw up her courage to the point of enjoying the free repast. However, at no time would she venture close enough to feed. The male rapidly learned to perch on a particular dead twig when coming for his flies, and soon appeared irritated when we were unable to supply flies fast enough. He appeared to have an insatiable appetite. At about four o'clock the light became too bad for work, and we retired.

June 22, 1923.

We were forced, much against our will, to leave the area. We drove north to Alpena and down the west side of the state along the Lake Michigan shore, and although we passed any number of apparently ideal locations, we did not hear another individual during the entire trip.

Afterward heard from Mr. McGillivray, who continued to observe the nest, that after two days someone had discovered the nest and carried off the egg and fledgling.

GENERAL NOTES.

The Kirtland's Warbler was named in 1852 from a specimen collected in 1851, but, although specimens had been taken in its winter range, namely the Bahamas, and a few occasional migration records were turned in from the United States, its breeding range was not known until 1903 when it was rather accidentally discovered by Messrs. E. R. Frothingham and T. G. Gale, who took the first summer specimen near Luzerne, Oscoda County, Michigan.¹

Mr. Norman A. Wood, commissioned by the University of Michigan Museum, immediately went to the site and made an excellent study of this, the first known breeding colony of the Kirtland's Warbler, where he collected the type, nest, and egg.²

Since that time three other colonies have been located: one visited by the writer, the other two (as I have said before) in the western part of the state, one in Clare County and the other in Kalkaska County. In all these areas the bird nests exclusively in jack-pines from four to ten feet high.³ The ground floor is

¹ Frank M. Chapman, 'Auk,' XV, p. 289, states that in 1898 nineteen specimens had been recorded from the United States and fifteen from the Bahamas. The nesting range and eggs were unknown. Several migration records had been reported from Michigan, Illinois, Missouri, Ohio, and Minnesota. Chapman sums up in this article all the information to 1898. Widmann had observed the wagging of the tail and likened it to the same habit of *Dendroica palmarum*. He also compared *Dendroica kirtlandi* to *Oporornis agilis* because of its sneaking habits. The song is described rather indefinitely by Walter Hoxie although he did notice that there were two low introductory notes.

² Discovery of the Breeding Area of the Kirtland's Warbler—N. A. Wood.

³ The only published record of a nest of *Dendroica kirtlandi* anywhere but under a pine tree is that of Edward Arnold, 'Auk,' XXI, p. 487, who notes one nest found under an oak. He says that the vegetation was very heavy and the nest extremely well concealed as is the case with those nests found under pines.

covered by a heavy growth of wintergreen, ferns and creepers. The nest is built on the ground, generally not more than a foot from the base of a jack-pine. A remarkable characteristic of the bird is that no nest yet discovered (to my knowledge) has been more than a few hundred yards distant from some road. While the male may sing while perched on a tall tree, no nest has been found at any other place than in the midst of a clump of small jack-pine. The nest is always well concealed and covered over by vegetation and debris. It is sunk in the ground about two inches, is almost perfectly circular and about two inches in diameter. It is made of fine twigs and grass woven together in a compact whole. The number of eggs is generally three or four. In its actions the bird is rather slow and deliberate, often decidedly Finch-like¹—the most noticeable example is the whetting of the bill on a twig, as mentioned.

In song every muscle in the bird's body seems to be tense, the head and neck are stretched upward pointing almost directly to the sky, the tail is stretched down and the whole body inclined forward. So vigorous is the song that the expansion and contraction of the throat are noticeable even from some distance. The bill is open wide, it being remarkable that food can be retained therein during song. The song consists generally of 7 notes. The first two are low and throaty, serving as an introduction. Then follow three high, clear crescendo notes, which form a second phrase. Then another set of three, even higher and more rapid, the last being a slur either upward, or up and down again. The quality is very Wren-like, and the song has tremendous carrying quality. Ordinarily, the syllables may be written "*chip, chip—chip, chip, chip—chip, chip, wheeou.*"² Of the numerous variations the following are the more important. In the first place, instead of two introductory notes, there may be but one followed by a pause or hesitation. When the observer is at a distance these notes may easily be overlooked because of their low, throaty quality. When the bird is nervous he may commence his song but may stop after

There are in all of the suitable areas of jack-pine a few small scrub oaks and it would seem likely enough that an occasional nest might be found at the base of one of these rather than a pine.

¹ Cf. Blackwelder, 'Auk,' XVI, p. 359.

² Cf. Arnold, 'Auk,' XXI, p. 487.

any number of notes have been sung. The last or slur note is always rising in scale but it may end at its highest point or may drop several tones. I should say that the highest note of the song is approximately a tone and a half higher than the last, the latter being at a very high pitch. So much force and vigor are used in the song that the tail of the bird indicates muscular vibration, apparently entirely involuntary and completely distinct from the voluntary wagging.

It has been said that the bird walks a great deal,¹ much as the Ovenbird. This, according to our observation, is not accurate.² The commonest means of locomotion, even on the ground, is by hopping, and the bird was seen to take only a very few steps during our entire stay. The female keeps the nest absolutely clean, removing all pellets and other debris either with her bill or her feet. Apparently, they eat the egg shell as no traces thereof were discovered at either nest site.

The food consists largely of centipedes, worms, and caterpillars. However, the birds also eat deer and horse flies, grasshoppers, crickets, white and dusky millers, with relish, the reason for their rather inconspicuous place on their menu being, apparently, the difficulty of capture. The birds also eat or drink the white pitch-like fluid which exudes from the branches of the pine. When nervous, the female pecks at the branches of small trees in an irritated manner. The birds chip most and also twitch tails most when excited. Consequently, these are more common traits of the female than of the male.

So far as I know these two nests are the fourth and fifth known to science.

It has long been a subject of speculation why the Kirtland's Warbler which raises as large a brood as most other Warblers, and which apparently has no more natural enemies than the other Warblers, should continue to be so extremely scarce. I suggest as a reason for this the fact that the bird is largely preyed upon by the Cowbirds (*Molothrus ater*). Wherever we saw a singing male Kirtland's there were a number of Cowbirds perched about in the tall dead trees, apparently in quest of the same thing for which

¹ Wood: 'Discovery of the Breeding Area of the Kirtland's Warbler'.

² Blackwelder, 'Auk,' XVI, p. 359, makes the same observation.

we were looking. I am afraid that our first nest represented the exception, and the second where there was but one baby Kirtland, a baby Cowbird and a Cowbird's egg, the rule. It seems that the Cowbird had disposed of three or four baby Kirtland's which must have been in the nest originally. This seems the most plausible explanation.

According to comparative estimates made by Mr. Wood last year, and ourselves this year, the bird is decreasing in numbers. It is greatly to be feared that *Dendroica kirtlandi* may soon be another of the American birds on the extinct list.

I do not think it out of place here to make a brief mention of the predominant flora and fauna of the immediate region in which our colonies were found. The commonest tree by far was the jack-pine. Besides this there were some white and Norway pine, a few yellow oak and a few aspen. The commonest shrub was the wintergreen, although there was also a great deal of blueberry, squawberry and partridge berry. The commonest birds in the immediate area were the Cowbird (*Molothrus a. ater*), Vesper Sparrow (*Pooecetes g. gramineus*), Chipping Sparrow (*Spizella p. passerina*), Slate-colored Junco (*Junco h. hyemalis*), Towhee (*Pipilo e. erythrophthalmus*), Brown Thrasher (*Toxostoma rufum*), Wood Thrush (*Hylocichla mustelina*) and Bluebird (*Sialia s. sialis*). We also found, but in far fewer numbers, the Broad-winged Hawk (*Buteo platypterus*), Sparrow Hawk (*Falco s. sparverius*), Night-hawk (*Chordeiles v. virginianus*), Kingbird (*Tyrannus tyrannus*), Olive-sided Flycatcher (*Nuttallornis borealis*), Wood Pewee (*Myiochanes virens*), Blue Jay (*Cyanocitta c. cristata*), Crow (*Corvus b. brachyrhynchus*), Meadowlark (*Sturnella m. magna*), Goldfinch (*Astragalinus t. tristis*), Song Sparrow (*Melospiza m. melodia*), Black-throated Green Warbler (*Dendroica virens*)—common wherever taller pine trees were present, Pine Warbler (*Dendroica vigorsii*), House Wren (*Troglodytes a. aedon*), Chickadee (*Penthestes a. atricapilla*), and Robin (*Planesticus m. migratorius*).

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