

Some Observations on the Life History of the
Parula Warbler

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Side of Michigan and Point has a sandy shore backed pine
land that is sparsely covered with Juniperus horizontalis
horizontalis duplex, often by a dense edge where white
pine (Pinus strobus), and pine (Pinus resinosa), spruce (Picea
mariana), white pine (Pinus strobus), white cedar (Thuja occidentalis)
occidentalis, and Thuja occidentalis (Thuja occidentalis)
occidentalis.

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Introduction

While conducting a distributional study of the birds of Wilderness State Park from June 9 to August 5, 1949, we had opportunity to make a series of observations on the nesting of Parula Warblers (Parula americana). In addition to the time spent in locating nests and in making daily routine checks on nesting progress, two half days were devoted to watching the process of nest-building, one and a half days to incubation, and one and a half days to the care of the young by the parents.

The Park, located in Emmet County of northwestern Lower Michigan, occupies 7,800 acres including Waugoschance Point which is a narrow peninsula extending westward into Lake Michigan and forming the northern boundary of Sturgeon Bay. The north side of Waugoschance Point has a sandy shore backed first by small dunes sparsely covered with Juniperus horizontalis and Arctostaphylos uva-ursi, then by a forest edge where white pine (Pinus strobus), red pine (P. resinosa), spruce (Picea sp.), balsam (Abies balsamea), white cedar (Thuja occidentalis), aspen (Populus sp.), and white birch (Betula papyrifera) predominate. The south side of the Point and Sturgeon Bay have a rocky shore with Scirpus marshes extending about 50 yards inland to a forest edge. The trees of the forest edge are primarily cedar with scattered spruce, aspen, and birch.

We found Parula Warblers entirely confined to the forest edges of the Point and Sturgeon Bay but not elsewhere in the Park.

Altogether 15 different males were heard singing; 12 on the north shore of the Point, one on the south side of the Point, and two on Sturgeon Bay. Our observations were made on four occupied nests, all of which were found on the north side of the Point.

Description of Nests

The four nests (Nos. 1,2,3,4) were all very much alike in their location. Each was situated on the east side of a dead or nearly dead balsam (Abies balsamea) on a small not very steady limb where Usnea grew in strands 5 to 12 inches long. The entrance through the Usnea generally used was on the side next to the tree trunk, but at times the birds would force their way through the canopy of lichen in another direction. The average nesting height was about 10 feet. Usually the nest was hidden in the streamers of Usnea so that to see it one had to stand directly underneath. The tree holding the nest was openly exposed and unshaded.

The nests were well-woven, compact, pensile structures resembling those of orioles. They were made of Usnea and a few fine pieces of grass 2 to 3 inches long. They had no lining material.

Table I gives the height from the ground and measurements of each nest. Also given are the distances between nests.

Table I

Nest	Height	Nest Measurements				Distance Between Nests
		Inside Diam.	Outside Diam.	Inside Diam.	Outside Diam.	
1	*10'	4.5 cm.	7.5 cm.	5 cm.	7.5 cm.	--
2	10'8"	4.9 cm.	6.5 cm.	4.5 cm.	5.8 cm.	839 feet between 2 and 3
3	8'10"	4.0 cm.	7.0 cm.	4.5 cm.	5.5 cm.	
4	9'3"	4.1 cm.	7.0 cm.	5.2 cm.	5.7 cm.	592 feet between 3 and 4

* Approximate height.

Nest 1 was found June 28 and had two young birds which left it July 3.

Nest 2 was just being built when found July 11. This was the only nest made entirely of Usnea without any grass in it. An old nest was seen in the same tree about three feet away and 18 feet from the ground. Perhaps this was the first nest of the season and the one being built the second, since Wilde (1897:291) gives the middle of May as the time the nests are built and Mousley (1926: 134) reported a nest being built as early as May 25.

Nest 3 had one egg when found July 12. Two more were laid July 13 and 14.

Nest 4 had two eggs on July 12 and another was laid July 13.

These clutches seem to be small compared to the average of four given by Wilde (1897: 295) and three to five given by both Barrows (1912: 591) and Chapman (1912: 447).

Redstarts (Setophaga ruticilla), Song Sparrows (Melospiza melodia), Myrtle Warblers (Dendroica coronata), and Oven-birds (Seiurus aurocapillus) were nesting near the Parula nests. A Badger (Taxidea taxus)

White-tailed Deer (Odocoileus virginianus), and Red Squirrels (Tamiasciurus hudsonicus) were seen while observing the nesting activities.

A noticeable color variation was noted in both sexes of Parula. Two males were quite handsome with wide red and blue bands on their throats while another could scarcely be distinguished from its mate. One female had a narrow band of blue across her throat with a hint of reddish color in it, while the others had clear yellow throats.

Building of the Nest

On July 11, between 11:00 a.m. and 12:00 m., we watched the female in the process of building Nest 2. It was apparent that she had begun the nest on this day. On July 12, between 8:33 a.m. and 12:30 p.m., we watched her continue the process. (See Appendix I for a copy of our original field notes.)

Following is a summary of the more interesting activities observed.

The female was first seen on July 11 to fly into a cluster of Usnea, then to pull and weave the fibers together with her bill in a shuttling action which was extremely rapid. When the fibers had been pulled together into a circular curtain, she began going to other trees and other places in the nest tree to gather Usnea. A large white pine about six feet from the nest had tufts of Usnea growing on its trunk. Quite often she flew to this tree and, hopping down its trunk in the manner of a nuthatch, pulled a few fibers (2 to 5 inches long) from the bark and carried them crosswise in her bill to the nest. After

Weaving these in, quite often she hopped out to the entrance and cocked her head from side to side as though considering the effect. Once she hopped along an adjacent limb in the nest tree, saw a desirable fiber, and proceeded to work at the base of it with her bill, cutting it loose. As it fell to limb below, she flew down and caught it up. On other occasions she leaned over a nearby limb and pulled at a fiber, lost her balance, fell off, and swung fluttering in mid-air still hanging onto it with her bill. In one instance, we saw her swing upside-down from the limb, chickadee-fashion, to work at the bottom of the nest from the outside.

On one occasion the male came and watched the female working. After a few minutes he flew to the nest. There immediately ensued a series of clacking noises like a snapping of bills. Immediately thereafter both flew away. After a short time, they alighted in a tree six feet from us and chipped. Later the male came again and chipped at us but did not go to the nest, although the female was working on it at the time. She continued working, seemingly paying no attention to his chip. Most of the time during our observations the male could be heard singing about every 20 seconds in the birches 20 to 30 yards from the nest. By the end of the day the nest had taken on its shape, but was very thin walled. One could see through the bottom.

The next day, July 12, the walls and bottom were thickened with Usnea gathered nearby. The male was in the vicinity (we heard him sing three times) but did not appear until another Parula

male flew into a tree about 10 feet from the nest. Both male and female flew to this tree and gave angry buzzing notes. The visitor left, pursued by the male. The female returned to the nest. Her course this day was to gather Usnea, put it in the nest and leave immediately, spending only 10 to 15 seconds at the nest each time. Once she remained in the nest six minutes arranging the material. All of her time was spent very strenuously gathering material, making trips at 1 to 1½ minute intervals. When she paused to feed it was in small conifers near the nest.

The male visited the nest once when she was gone; he looked at it from all angles and even entered, then with a few scarcely audible chips flew away. At another time he came and coaxed the female to leave with him. She followed a short distance and then flew back to the nest. The male alighted in a tree ten feet from us and chipped. She flew to him and, with a clacking vibration of bills, both flew out of sight.

A wandering band of Black-capped Chickadees (Parus atricapillus) excited the male when they approached, but the female started to gather Usnea as usual. Finally she abandoned the project when the male continued to chip.

The female seemed to work more slowly in the first part of the morning prior to 10:30 a.m. Four periods with the number of trips the bird made carrying nesting material are given in Table II.

Table II

Time	Number of trips
8:33 a.m.--3:53 a.m.	4
9:36 a.m.--9:56 a.m.	10
10:40 a.m.--11:00 a.m.	17
11:40 a.m.--12:00 a.m.	9

Incubation Period

Nest 3 contained one egg when found on July 12. It was noted that this egg was cracked, and later found to be sterile. A second egg was laid by 11:30 a.m. on the morning of the thirteenth, and a third which completed the clutch was laid the following morning.

We believe that incubation began with the second egg, as the bird was not found in the vicinity of the nest on the day of the laying of the first egg, but was flushed from the nest twice the following day.

The second egg hatched on July 26. (The first egg did not hatch because it was sterile.) The third egg hatched the following morning, thus the incubation period of both eggs was thirteen days.

Nest 4 contained two eggs when found on July 12, and a third had appeared by the following morning. Unfortunately none of the eggs were marked. On the morning of July 24, the female of this nest seemed unusually excited and reluctant to leave the nest. On the following morning a young bird was found, and the egg-shells had been removed. The two remaining eggs did not hatch, so the incubation period is determinable only to certain limits, i.e. between 12 and 14 days.

Incubation Habits

Attempts were made to observe two nests during incubation, but the excitable nature of the female of Nest 3 kept us from obtaining data on that nest. The time which we spent at this

nest is worth reporting on, however, because of the psychological variation in the two birds. For a copy of our original notes, see Appendix II.

On July 21 (the eighth day of incubation), at 7:30 a.m., the female of Nest 3 was flushed from her clutch of three eggs. She feigned injury as she left the nest, spreading her tail and flying close to the ground, then rising to a perch ten feet from the nest tree where she began chirping excitedly. She continued the alarm for twenty minutes before leaving the area.

In the next two hours and twenty minutes, the bird came to the nest tree repeatedly at intervals from one to twenty minutes, but did not enter the nest, though once she flew directly to it. Once the bird returned after an absence of two minutes in the company of the male. He flew to the top of the nest tree, then to a perch above the observer, chirped a few times, and left. This was the only instance in which the male was observed at the nest tree during the incubation period.

The marked excitability of the female of this nest was hours of continued manifested in several characteristic actions, the commonest of which was her habit of wiping the sides of her bill on some branch, as if cleaning it. This was done even when no food had been taken, and appeared to be a nervous reaction to the intruder. After the eggs had remained uncovered two hours and forty minutes, observation was discontinued.

Observation of Nest 4 began at 7:20 a.m., July 21, the ninth day of incubation, at which time a bird was on the nest. See Appendix III.

Only a single individual was ever seen at this nest. The bird, which we believe to be a female, was very handsome for this sex. She possessed a narrow though distinct blue band across the upper breast, and was the only female we encountered with this male-like plumage; all others had clear yellow breasts. The bird was as strikingly marked as the male of Nest 1, though much less so than the males of two other nests.

Only once was a male heard singing near this nest, and then only for a few seconds, at a time when the female was incubating.

The incubation rhythm was quite regular, and varied only a few minutes at different times of the day. During the seven hours of observation on July 21, the bird left the nest for thirteen periods, the longest thirty-seven minutes, and the shortest, five. The average time spent away from the eggs each trip was 11 minutes, while the average period spent on the eggs was 24 minutes. Five of the seven hours were spent incubating.

This picture was altered somewhat by 15 hours of continuous observation (5:15 a.m.--3:15 p.m.) on the following day. See Appendix IV. During this time the incubating bird left the nest 36 times for an average period of only four minutes, and incubated during the remaining intervals. The longest time spent off of the nest was six minutes, and the shortest, two. The attentive periods varied between 10 and 43 minutes, the average being 21 minutes.

Both the periods of incubation and rest tended to be longer in the morning, though not markedly so. A marked variation did occur in the incubation rhythm after 7:00 p.m., when both periods became increasingly shorter. What the climax was to be we can only surmise, for at 8:15 it was necessary to leave the nest site. The sun was already below the horizon, and the nest was a dark silhouette, yet only ten minutes previous to our leaving, the bird had been away from the nest. It seems probable that this was close to the last trip of the day. Twelve and a half of the fifteen hours had been spent by the bird in covering the eggs.

The activity of the bird during these periods of observation followed a very uniform pattern. She left and returned to the nest quickly and quietly. In leaving the nest she almost invariably flew inland in the same direction, and returned via the same route, usually flying to a favorite perch below the nest, from which she hopped to the side entrance. We frequently noted movement in the nest from one to three minutes before the bird actually departed. This may have been due to the turning of the eggs. ~~They were removed by an unknown predator.~~

The activity of the bird during rest periods was never witnessed, though in these short intervals she could not have gone far. Very often upon returning the bird would wipe her bill on a branch of the nest tree, cleaning it before entering the nest.

At this late season there were numerous bands of wandering

Black-capped Chickadees, Golden-crowned Kinglets, and warblers. Several times one or more of these were seen hopping about the nest tree within two or three feet of the incubating bird, yet no attempt was made to drive them away nor was any interest shown in the nest by the intruders.

Hatching

In the three July nests a total of seven eggs were laid, of which only three hatched after a full incubation period. The cause of this high percentage of infertility is open to speculation. Possibly the lateness of the season was a factor. The fact that all three were in about the same stages at this late date, (July 24), might indicate that they were second broods, or perhaps late renesting attempts after earlier failures. Actual nesting success (that is, the number of young which left the nest) was even lower. From the four nests found only three young were known to leave: two birds from the June nest (Nest 1) and one from the earliest July nest (Nest 4). The two nestlings of Nest 3 were within three days of leaving the nest when they were removed by an unknown predator.

Appearance of the Young in Early Stages

On July 27, when the second young of Nest 3 was less than 24 hours old, it was examined, though no measurements were taken. The bird was almost naked with only a sparse patch of rather long, silky, white down on the head and along the

mid-dorsal line. The naked skin, the bill, and legs were all much the same pinkish-yellow color. Tiny black quills could be seen through the skin of the wings. Late the following day some change could be seen in the young birds. The bill was now more yellow, and the feather tracts more obvious. The down on head and back had darkened to a light grey color. The next day the down appeared to be even darker.

Care of Young

On July 27, a total of twelve hours were spent observing the activities of Nests 3 and 4, and on August 4, two additional hours were spent at Nest 4. See Appendix V.

Our notes on the June nest (Nest 1) are rather sketchy, but should be considered here, because they provide some data on the role of the male in the care of the young. The young of this nest were almost half-feathered when found, and both adults were feeding. The adults of this nest were almost identical, so it's fortunate that they frequently appeared at the nest all the time with food at the same time.

The males of the other nests seemed to play a much less active role in the care of young. No male was ever seen at Nest 4.

The different character of the adults of Nests 3 and 4, makes it necessary to consider them separately.

The rather wild nature of the female of Nest 3 has already been pointed out, and this character probably accounts for the

differences in activity at the two nests. This bird brought food to her two nestlings only twelve times during a five-hour period. The longest interval between feedings was 48 minutes, and the shortest, five, with an average of 17 minutes. The young were brooded only once for a period of 19 minutes. The male approached the nest with food only once, and was within a few inches of the entrance, when the female flew swiftly toward him, and drove him from the nest tree. In the remaining two hours of observation the male was not seen again. Though we were stationed over 50 feet from the nest tree, our presence was obviously irritating to the female, and influenced her behavior considerably, so that this picture is not characteristic of the natural behavior. Often she entered the nest to brood, then left after setting but an instant. At other times we saw the bird carry food to the nest tree, and hop about the nest, then swallow the food herself, as if fearing to reveal the nest location.

The food gathering habits of the female at Nest 3 resembled closely those of the female at Nest 4. Nearly all the hunting was carried on within a few yards of the nest tree, usually in the adjacent conifers. The action of the birds was very kinglet-like, as they moved quietly over the branches, scrutinizing them, or fluttered at the end of a twig. The young in both nests were often fed on green Lepidoptera larvae, which were taken among the leaves of pine trees. Some may-flies, and other winged insects which abounded along the shore were also fed.

At no time was a fecal sac ever seen to be removed from

either of the nests. This was also the experience of Mousley (1924: 268). It seems likely that the adult swallows the excreta, while its head is out of sight within the nest.

The female of Nest 4 was feeding only one nestling, yet her feeding rate was almost as fast as that of the other female. Over a seven hour period, 16 feeding trips were made, with an average of 21 minutes between feedings; the shortest interval being 1 minute, and the longest, 85. The nestling was brooded after nearly every feeding, for a total of about four hours in 14 periods which averaged 17 minutes. The shortest brooding period lasted six minutes, and the longest, 27.

On the morning of August 4, the single juvenile of Nest 4 left the nest after we disturbed it. It was fully feathered, and quite capable of moving about the limbs of the nest tree. The bird was ten days old, and in handsome juvenal plumage, being white below, and blue-grey on back and wings, with some blue-green in the middle of the back. Distinct white wing bars contrasted with the wing color.

The young bird had left the nest during the adult's absence, and upon returning she began chipping sharply, as she hopped to the nest with a may-fly in her bill. The young bird sat quietly on a branch next to the nest, and did not beg though the adult was quite close. The adult looked at the fledgling, and peered back into the nest three times before hopping to him and poking the food at his bill. No begging response was evoked, and the insect was finally swallowed by the adult, after which

she left. In ten minutes she returned with a large brown larva, and went directly to the nest, looked in, then moved to the young bird, fed it, and left. After this departure, the juvenile moved close to the trunk of the tree. The female returned with food, and attempted unsuccessfully to feed the young, after which she moved to the nest, entered it and remained for over eight minutes, apparently brooding an empty nest. The bird sat quietly for eight minutes, then began moving restlessly, and finally flew out, and away. She returned quickly with food, and this time was greeted by the begging juvenile, which jumped to the branch on which the adult had alighted, and was fed.

The adult brought food every three to five minutes, and frequently went to the nest before noticing the fledgling. In less than an hour her interest in the nest waned so that she no longer went to it, but straight to the young bird.

After one feeding the adult picked a fecal sac as it was being passed, and carried it away. At other feedings, she looked for sacs, but none was passed.

During the absence of the female, the juvenile efficiently preened itself, and changed its position frequently, though it did remain near the trunk. It matched its homesite remarkably well. The two lichens, Usnea cavernosa, and Parmelia physodes, which abound on the branches of the Parula nest tree have blue-grey colors very much like those of the juvenile warbler.

Summary

1. Parula warblers were found nesting along the northern shore of Wilderness State Park, Emmet Co., Michigan. The distribution of the warblers seemed to be governed by the growth of lichens (Usnea cavernosa) on the dead trees along the shore.
2. Four active nests were found. The average height above ground was 10 feet. All nests were semipensile resembling oriole nests and were made of Usnea, usually with a few pieces of grass woven in the lichen.
3. The building of one nest was observed. The female alone built the nest, taking four days to complete it. Her mate remained nearby defending the territory from other Parulas.
4. Three clutches of 1, 3, and 3 eggs, respectively, were found.
5. The incubation period was 13 days.
6. There was a high percentage of infertility (57.2%) in the eggs of these late nests. Only three of the seven eggs hatched.
7. The incubation rhythm was quite regular. Incubation was carried out exclusively by the female who left the nest for a few minutes every 20 to 30 minutes.
8. Both sexes feed the young, though the male was less active in this respect.
9. One young Parula left the nest at the age of ten days.

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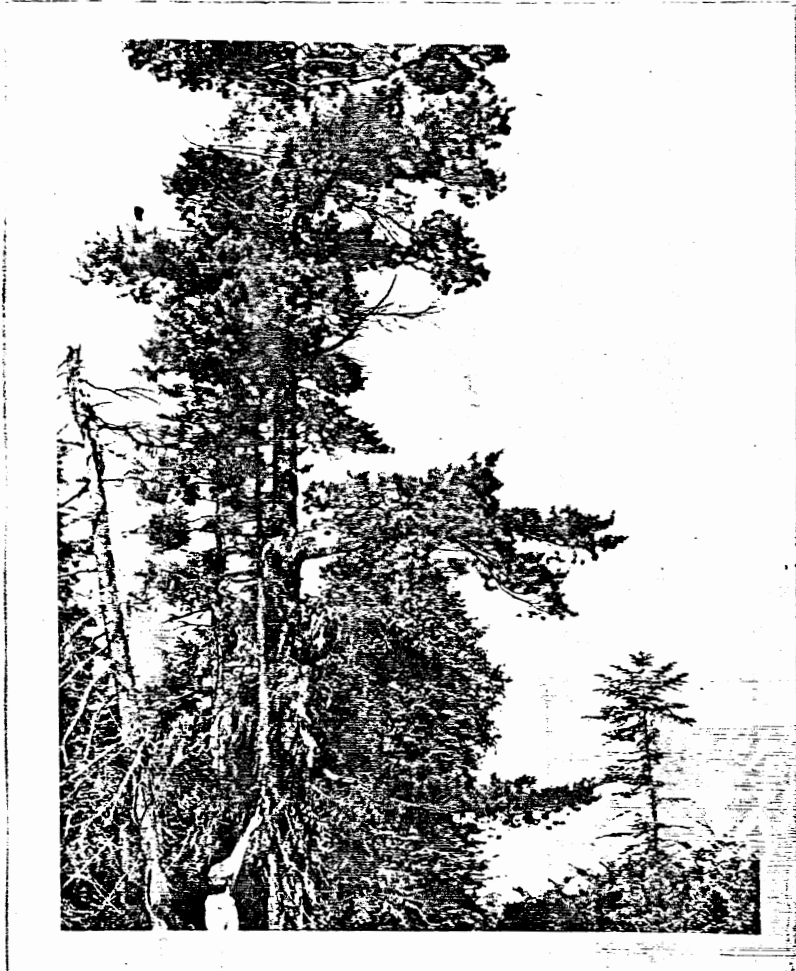
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The tree in which nest I was found.



The tree in which Nest 1 was found.



Nest 1 at red arrow.



Female of Nest 1.

June 28, 1949

Found Parula ^{warbler} nest with young. Saw ♂ feeding them. Nest 10 feet above ground on dead limb of small balsam. (whole tree dead). Limb covered with Usnea. Nest well concealed by it. Nest 60 yards west of camp to old bucket on beach, then in to marker.

June 29, 1949

Visited Parula nest. ♂ carrying food to young. Dr. C.S. Pittungill, Jr. with us.

June 30, 1949

Saw ♂ and ♀ Parula at nest. Took habitat photos of nest.

July 3, 1949

Parula warbler young left nest. Collected one and the nest. There were only 2 young. One was much larger than the other.

July 7, 1949

Found empty Parula nest just east of cabin on Cecil Bay on shore — tree, a dead balsam covered with Usnea.

July 11, 1949

#2 Found Parula warbler building nest in tree that formerly had old nest by cabin on Cecil Bay.

Watched process:

♀ came about every 2-3 minutes sometimes she was gone as long as five minutes. She got in a thick bed of Usnea and using her bill pulled and wove at it. Sometimes her bill shuttled back and forth so rapidly as to seem to almost vibrate.

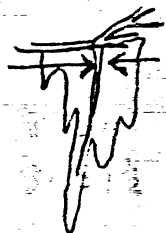
The ♂ is quite handsome with much color on throat. He seems to be quite large for a Parula too. He came to the nest twice. Both times he watched the ♀ cocking his head from side to side. Then shortly he flew to the nest and with a clacking like a snapping of bills both left the place abruptly. The first time they both flew to a tree 6 feet from where I was watching and chipped at me.

July 11, 1949.

The second time they left the area completely. But soon the ♀ came back and began working. The ♂ once came and chipped at me but did not go to the nest, the ♀ was building at the time and did not seem to notice that he was chipping at me. Most of the time the ♂ sings regularly about every 20 seconds about 60 feet in the woods from the nest tree.

The nest site is about 10 feet up on tip of limb which bends downward. The Uenea hangs in ribbons 6-8 inches long there. The tree is a 20 foot dead balsam within sight of the shore upon the first dunes at the edge of the forest. The nest site is in full sunlight not protected overhead by any other branches. The female alights on the limb that the nest is on about 3 feet away hops down to the nest site. As yet not much form can be seen to the nest. She works at it about 1/2-1 minute at a time.

She wove the Uenea in a circle fastened together. Then she flew to a big white pine 6 feet away from the nest tree and proceeded to hop head down the tree like a nuthatch and got Uenea by pulling it from the trunk of the tree and carried it to the nest to weave it in. The fibers were about 2-3 inches long, and were taken from about 5 feet up on trunk. She also



got some from the trunk of the tree the nest is in. She carried only a few fibers at a time and carried them crosswise in her bill. Several times she wove them in and then hops ~~off~~ to look at the effect. Once she swung from the branch "chickadee-fashion" (head-down) and worked at the bottom of the nest from the outside. She now is at the nest almost constantly. Perhaps she was timid about my presence at first. The ♂ takes no part as yet in the building.

Watched for about one hour at about 11:00^{a.m.}-12:00 noon.

July 12, 1949.

8:33 a.m. Parula ♀ at nest for 15 sec. Nest has taken

July 12, 1949

shape of basket but is still very thin - can see through it.

- 8:35 a.m. ♂ heard singing ~~in~~th woods. Sang 3 times in rapid succession.
- 8:42-8:44 ♀ came to nest for 10 sec. Hopped outside and looked from side to side and left. Returned in 10 sec. and left again immediately. Returned in 10 sec. and left again after about 12 sec. Flew toward shore each time.
- 8:46 a.m. Returned with mouth-full of Usnea stayed 10 sec. Went to same tree nest is in and pulled Usnea from limb and carried it into nest twice. Left again.
- 8:48 Returned and stayed in nest $1\frac{1}{4}$ min. Appears to be thickening ^{nest} walls with bits of Usnea gathered from other places.
- 8:51 Returned stayed 10 sec. Left came back almost immediately with Usnea.
- 8:52 Returned with more Usnea. Left in 10 sec. Flew directly over my head.
- 8:53 ♂ chased another ♂ away from tree 10 feet away from nest tree. ♀ was also in same tree. Angry Parula buzz notes.
- 8:54 ♀ back to nest with Usnea. Left in 10 sec.
- 8:54 $\frac{1}{2}$ ♀ " " " " " Limb quivers when she lands on it. Left in 10 sec. Flew low over my head.
- 8:57 ♀ back with Usnea. Stayed 5 sec. Left. Not at all disturbed by my presence.
- 8:59 ♀ back with Usnea. Stayed 3 sec.
- 9:01 ♀ returned - no Usnea. Went in nest and came out looked it over from outside and left. Returned again likewise.
- 9:05 Went to tree nest is in and pulled long Usnea (3 inches) strand from limb where it was hanging down and carried it to nest. Cut strands at base caught fibers as they fell on limb below. Sat at nest $1\frac{1}{2}$ min. (in front of it).
- ~~9:06~~
- 9:07 Went to trunk of nest tree and pulled at strands of Usnea until she got some and took it to nest. Cut more strands of Usnea from nest tree and took them into nest.
- 9:08

July 12, 1949

- 9:09 ditto 9:08. f flew off.
- 9:11½ ♀ came with Usnea. Left after 10 sec. flew over my head quite low.
- 9:12 Returned same route with Usnea put it in nest & left.
- 9:13 Returned without Usnea. Stayed ½ min. working in nest. Heard ♂ sing nearby.
- 9:14½ ♂ flew over to tree 5 feet from me.
- 9:15 ♀ returned to nest 30 sec. hopped out preened briefly (5 sec.) went back to work in nest. Seems to be pulling fibers through from inside on bottom. Left after about 1 min.
- 9:18 ♂ sang 4 times nearby. Sang once in tree between me and nest.
- 9:23 ♀ came with Usnea went in nest.
↓ in nest
- 9:29 Came out of nest, got Usnea fiber from front of nest and went back in. At times I can see her bill shuttling back and forth at the edge.
- 9:31 Came out and worked at outside 2 sec. went to tip of limb and got a fiber and took it inside.
- 9:32 Left nest. Paused briefly in tree 12 feet away, then flew on.
- 9:32½ Returned. Left at 9:35.
- 9:36 ♀ returned with fibre and left after leaving it in nest.
- 9:38 ditto.
- 9:39 ditto.
- 9:41 ditto. flew over my head.
- 9:48 Returned with Usnea. Left after 10 sec. flew up in same tree (nest tree) tugged until she got a few fibers and returned to nest.
- 9:49 went up to same branch and got more Usnea.
- 9:50 ditto. Branch 5 feet from nest.
- 9:51 Went down lower in nest tree and got Usnea and took it in. Stayed in nest 1:05 min.
- 9:54 Returned with more Usnea and left again.
- 9:55 Returned stayed 10 sec. Left.
- 9:56 Returned without material worked at nest 15 sec. & left
- 9:58 Returned " " " " 5 sec. " "

July 12, 1949

- 10:44 ♀ brought Ureca & left. Went toward shore.
- 10:45 " " " " " " " " " "
- 10:46 " " " " " " " " " "
- 10:48½ " " " " " " " " " "
- 10:49 " " " " " " " " " "
- 10:50½ Returned to nest. Entered from either side. Left went to tree just west of nest got fibers and left them in nest.
- 10:52 ♀ again at nest. Left and went to pine.
- 10:53½ ♀ returned with Ureca. Went west from nest. ♂ singing in nearby woods south of nest.
- 10:55 ♀ returned to nest. Stayed 2 sec. and left toward west. Entered from opposite side.
- 10:56½ ditto.
- 10:57½ ditto.
- 10:58½ Returned with Ureca. Left immediately.
- 10:59½ ditto. Went to pine.
- 11:00 nest site in full sunlight.
- 11:14 ♂ sang twice nearby.
- ~~11:14~~ ♀ came with Ureca and left it in nest and hopped up on another limb in nest tree and got some more and carried it in. Then left toward pine.
- 11:16½ ♀ brought a large amount of Ureca stayed in nest one minute. Left. Flew over my head (east).
- 11:22 ♂ came to nest (♀ not there). He looked at it from all angles hopping around it and looked ^(went in) inside it, then with a few scarcely audible chips hopped away & flew from nest tree toward east.
- 11:25 ♀ came and looked in nest. She carried no material, left flew toward east also.
- 11:25½ ♀ came to nest & left toward east - did not see whether she carried material.
- 11:26 ditto.
- 11:26½ ditto.
- 11:29 ♂ & ♀ in tree 5 feet from me. ♂ chips and coops ♀ eastward ♀ followed a little way then flew back to nest. Male came to tree between me and nest and chipped. She left nest, flew to him. Vibrated her bill at him, then both flew out of sight to west

July 12, 1949

- 11:31 Heard either ♂ or another singing west of nest tree quite a ways
- 11:41 ♀ brought Ureca for nest. Left it & hopped up to another branch and got some more. Twice she held on to a strand with her bill hanging in mid-air, with wings fluttering.
- 11:44 Got more Ureca from nest tree took it to nest.
- 11:45 Got " " from same " " " ". Left flying over my head (east).
- 11:45½ Returned with Ureca, left it and went eastward again.
- 11:47 Returned with more Ureca, " " " " " "
- 11:48 Ditto.
- 11:49 Ditto. (Flew over my head). She stays just long enough to dispose of material (2-10 sec.) and leaves again.
- 11:50 Ditto.
- 11:59½ ♀ returned to nest. Could not tell whether she was carrying nest material or not. Left toward shore.
- 12:01½ ♀ returned with Ureca. Left and went to limb on nest tree to pull loose a few fibers and carry them into nest.
- 12:02 ♀ again got fibers from nest tree & took to nest.
- 12:02½ Ditto.
- 12:03 ♀ flew into Thuja in search of food?
- 12:14 ♀ flew to nest, looked in and at outside and flew toward shore
- 12:14½ ♀ brought few Ureca strands to nest flew toward shore
- 12:15 Ditto:
- 12:15½ ditto
- 12:16 Ditto
- 12:16½ Ditto
- 12:17½ Ditto
- 12:18 Ditto
- 12:19 Ditto. Hopped up limb 6 inches from nest and got Ureca and put it in nest, flew off into woods, southeast.
- 12:30 Observations were discontinued.

#5 found another nest 9 feet up in almost dead balsam. Ureca 3-6 inches long. Along shore near cabins. Nest is 6 inches from end of twig. Empty. At sign 300 feet west of cabin on Cecil Bay.

July 12, 1949

#3 Found Parula nest $6\frac{1}{2}$ feet in dead Balsam leaning against another dead tree. Uenea 6-8 inches long on both trees. One egg. Egg pinkish-white with red-brown speckles ⁱⁿ near larger end. Adults near nest chipping. (measured height of this nest = 9.10 inches.) Distance between this nest and the one being built is 889 feet. Distance between this nest and one above is 300 feet.

#4 Found Parula nest 9 feet up in partially dead Balsam. Top of tree still alive. Has 2 eggs. Adult ♀ left nest. (measured height of this nest 9.3 inches). Distance between this nest & one above 392 feet.

July 13, 1949

Checked nest at cabin on Cecil Bay. No egg yet (5:30 a.m.) ♀ chipped at us.

Checked Parula nests: 11:30 a.m.

- # 2 at cabin - no eggs yet. Adult ♀ chipped near nest.
- # 3 west of cabin - 2 eggs. adult chipped nearby.
- # 4 farther west - 3 eggs. adult flushed from nest.

July 14, 1949

Checked nests.

- # 2 - No eggs yet. Wall of nest thicker. No birds seen.
- # 3 - 3 eggs. No bird seen.
- # 4 - 3 eggs. Adult on nest.

#5 Collected old nest west of cabin. It is made of Uenea and a few fine pieces of grass. Located on east side of dead Balsam.

July 15, 1949

2 one egg in nest. Bird flushed from nest.

July 16, 1949

2 one egg in nest. Bird flushed from nest in evening about 6:30 p.m.

July 17, 1949

2 - one egg. Bird flushed from nest in mid-morning.

July 21, 1949

2 - Bird sitting on one egg.

3 - Bird sitting on 3 eggs, flushed from nest at 7:20 a.m. Displayed ^{as she left nest} by spreading tail and flying down close to ground. Chipped at me. Flew into a tree 10 feet from nest at 7:40, bobbed tail and chipped very excitedly. At 8:00 after chipping all the time, ♀ left and flew toward woods. I could still hear her chipping in the distance. She returned and continued to hop in trees around nest and chip. Sometimes she was in the top of the nest tree.

At 8:33 she left and went into the woods. Two minutes later ♂ & ♀ came back. The ♂ went to the top of the nest tree and cocked his head. Then he flew to a tree 10 feet from me & looked me over. He chipped in tree over my head & the female approached nest but did not go closer than about 5 feet in ~~tree~~ above nest.

Then ♂ left. ♀ continued to chip. At 9:05 ♀ approached nest & sat directly over it (about 3 inches above it on limb it was attached to) but did not enter.

A redstart ♀ came to the nest tree once about 8:45 a.m. but ♀ Parula did nothing but sit in nearby tree and chip.

At 9:10 ♀ Parula flew into woods. She has an interesting habit of wiping her bill on limb as if cleaning it. She does it quite often & I think it is a nervous reaction.

At 9:25 she returned to nest tree and flitted around it ~~at~~ but did not go closer than 3 feet to the nest. Then she flew to tree near me and chipped.

at 9:32 she flew directly to nest entrance but left immediately.

At 9:45 she approached the nest but then flew up above it and sat preening in the sunlight for about

July 21, 1949

2 min. Then she flew into tree over my head and clipped again.

at 10:00 I quit watching her. For 2 hours and 40 min. she had not incubated.

I went to nest # 2 :

1:25 p.m. observations started.

1:42 Bird left nest quietly, flew to tree west of nest & disappeared

1:52 ♀ came to nest. Preened briefly and hopped into nest.

2:31 Bird left nest.

Observations ceased.

Observations on Parula # 4

7:20 adult incubating

7:25 Group of chickadees passing through.

7:30 A chickadee lit in nest tree about 3 feet from nest repeating call 4-5 times. A chip above and behind me -

♂ Parula(?)

7:40 Red Squirrel scolded very close went to get him, but he got away. Back at 8:00.

8:02 Parula just left nest. It flew straight s.w. into woods.

8:11 A bird clipped sharply, flew into red pine about 10 feet s.w. of nest tree. It is very handsome with 1/8" blue stripe. Which sex I don't know. It flew to nest tree alighting on limb above nest then dropping below nest. Made one false flight to entrance, nest entered and remain.

8:25 ♂ singing off to the west. I don't know if it is associated with nest or not.

8:27 A low chipping to the west, coming closer.

8:34 Bird left nest quickly and quietly in same direction.

8:40 Bird returned same route, entered nest quickly with a few chips.

9:17 The same bird returned via same route - apparently left without my knowledge.

9:35 Bird left in usual manner to red pine & southwest.

9:40 Returned without a chip and entered nest as before.

9:53 Small group of kinglets passing, 2 lit in nest tree.

9:56 Bird left nest flying southward quietly

July 21, 1949

- 10:02 Bird returned wiped bill on jumping perch (limb from which she entered nest), chipped once and entered nest. A Redstart ♂ chipped nearby.
- 10:32 ♀ left nest quietly flew southward.
- 10:40 ♀ returned to nest. Flew to tree, hopped to limb below nest, then up into nest. Settled herself upon the nest. no sound was made. This ♀ has a bluish band on neck. This is not the case in the other 3 ♀♀'s we have observed.
- 10:58 ♀ left nest quietly flew southward.
- 11:05 ♀ returned to nest. Flew to perch. Glanced around and hopped into nest.
- 11:07 Left nest flew to nearby tree. Chipped. Dick was approaching.
- 11:17 ♀ entered nest after nervously approaching it. Wiped bill and twitched while hopping up to nest.
- 11:32 Bird left in usual manner.
- 11:44 A bird showing a reddish color on breast returned to nest very cautiously taking over a minute to fly from Jhuja (west of nest tree) to the nest tree.
- 12:02 Bird left nest.
- 12:15 Same bird as above returned cautiously but quickly.
- 12:35 Bird left nest.
- 1:12 ♀ returned from west chipped twice and entered nest
- 1:44 I approached nest to see if bird was on it yet and she flushed and flew into adjacent spruce in which she hopped about for minute, then flew off to the east.
- 1:50 ♀ lit in top of nest tree, then hopped about for a minute, chipped sharply and entered nest. Another bird which sounds like a Parula is chipping toward the west.
- 2:15 Bird left nest.

Observations discontinued.

July 22, 1949 (very windy, quite cool day)

- 5:15 Bird on nest.
- 5:20 Bird fighting, moving about & turning head in nest.
- 5:24 Bird left quietly flew southward.

July 22, 1949

- 5:30 ♀ approached nest rather nervously, chipped a few times and entered and began sitting.
- 6:13 Bird left nest quietly, flew southward. The wind is blowing strongly in from shore (north) and it sways the tree and jiggles the nest about quite violently. I could see the bird readjusting its position after each shake-up. For about 10 minutes before the bird left, it was restless; then a momentary calm came (when the nest was not being shaken so hard by the wind) and the bird left.
- 6:18 ♀ returned chipped 3 times and entered nest almost immediately.
- 6:27 ♀ Redstart came to nest tree and hopped all around (within 3 feet of nest) the Parula remain quiet upon nest. Redstart or singing nearby.
- 6:49 Bird left nest quietly flew southward. She drops from nest to limb one foot below nest and fly off.
- 6:54½ ♀ returned chipped 2 times and immediately got on nest.
- 7:18 Bird left at Dick's approach.
- 7:22 ♀ returned and went immediately to nest after chipping a few times
- 7:32 Bird left nest, chipped twice as it flew southeast. For several minutes some birds had been chipping in that direction.
- 7:37 ♀ returned hopped about 2 or 3 times nervously, wiped bill on branch and went into nest.
- 7:43 Bird chipping behind me. may be ♂. ♀ on nest. Bird chipped until 7:57.
- 7:57 ♀ left nest. Bird behind me quit chipping.
- 8:03 ♀ came to nest tree, chipped once and entered nest.
- 8:31 Bird left nest quietly, flew southward.
- 8:36 ♀ returned, chipped once, and hopped from top of nest tree down to limb from which it enters nest.
- 8:56 ♀ left nest flew up in tree to east, chipped once and flew south.
- 9:01 Bird returned chipped, wiped bill, chipped and hopped right into nest.
- 9:24 Bird restless in nest.
- 9:26 Bird left nest by coming thru the side, ^{toward me} pushing thru the under canopy over the nest.
- 9:31 Bird returned chipped once, and went into nest.
- 9:52 Bird left nest flew southward.

July 22, 1949

9:58 ♀ returned, lit on limb opposite nest, wiped bill and hopped down to limb from which she enters nest and went in. The limb from which she enters nest is about 1 foot below the nest and 1/4 turn to south from nest limb.

10:20 Bird left nest quietly flew southward.

10:25 ♀ returned chirped, wiped bill, chirped and went into nest.

10:50 Bird left nest in usual manner.

10:54 1/2 Bird returned, wiped bill, chirped and entered nest.

11:20 Bird left nest quietly. flew south.

11:23 1/2 Bird returned to nest, wiped bill 2 times and entered nest without a sound.

11:46. Bird left in usual manner.

11:51. Returned, wiped her bill once and got into nest. She is very business like in her return, does not tarry much at all.

12:4 1/2 Bird left in usual manner.

12:18. Returned to nest without a pause.

12:39 Bird left nest.

1:08 Bird flew into nest tree from east. A song sparrow was chirping near the shore, and it seemed to excite the warbler. It hopped about in the nest tree and adjacent spruces, chirped once, then entered nest.

1:10 A red squirrel chattered behind me and I shot it. I didn't see if the bird was frightened off or not.

1:28 Apparently, she did not leave, for at this time, there was movement inside the nest.

1:30 Bird apparently left as Jean approached.

1:35 Bird returned, chirped twice, and entered nest.

1:52 Bird left nest.

1:55. Returned, entered quickly and quietly.

2:11. Movement in the nest.

2:14. Bird left nest.

2:18. Returned flying about the nest tree as if fly catching, then lit and wiped her bill on limb below nest and entered at 2:20.

2:35 Bird left nest.

2:40 Bird returned, wiped bill on branch of nest tree and entered nest quietly.

3:00 Bird left nest.

3:04 1/2 Bird returned, wiped bill on branch and entered nest.

3:27 Bird left nest.

- 3:31 1/2 Bird returned, wiped bill twice, and hopped down to limb and entered nest.
- 3:55 Bird left nest.
- 3:59 Bird returned, entered.
- 4:21 Bird left nest.
- 4:25 Bird returned quickly and quietly.
- 4:45 Bird wiped bill, hopped into nest.
- 5:02 Bird flew from nest toward me.
- 5:07 Bird returned, lit on branch opposite nest, wiped bill, hopped down to limb from which it enters nest wiped bill again and entered nest.
- 5:30 Bird left in usual manner.
- 5:32 Bird returned.
- 5:53 Bird flew from nest
- 5:55 Bird returned to perch above nest, wiped bill, flew to limb below, and entered nest.
- 6:11 Bird flew from nest
- 6:17 Bird wiped bill and flew into nest.
- 6:37 Bird left nest in usual manner.
- 6:40 Bird returned wiped bill, ~~flew~~^{hopped} down 3 perches to and entered nest.
- 6:56 Bird left nest.
- 6:59 Bird returned to nest - lit on limb and entered immediately.
- 7:17 Bird left nest.
- 7:19 Bird returned. flew to perch and entered immediately.
- 7:34 Bird left nest.
- 7:36 1/2 Bird lit, wiped bill twice, flew to perch, then into nest.
- 7:50 Bird left nest.
- 7:53 Bird returned, wiped bill twice, flew to perch and into nest.
- 8:03 Bird left nest.
- 8:05 Bird returned to nest.
- 8:15 Observations ceased (15 hrs.)

July 23, Checked Parula nests # 2, 3 and 4. all being incubated at noon.

July 24. Checked Parula nest # 4. Bird seems reluctant to leave nest. 3 eggs at 10:00 am.

July 25, at 10:00 am. Parula nest # 4 contained 1 young, and 2 eggs. no egg shells in nest.

Other nests being incubated. # 3 with 3 eggs.

July 26, Parula # 4 still contains 2 eggs and one young.

" # 3 now contains 1 young and 2 eggs.

July 26, 1949

Parula nest #2 still with one egg. Bird incubating.

July 27, 1949
(cloudy)

Parula 2 with one egg, still incubating

Parula 3 A second young was hatched, there are now 2 young, and a bad egg. This egg has a crack in it and was the first egg layed. It has been cracked since the discovery of the nest.

Parula 4, still has only one young, the two eggs which are left must be sterile.

Notes on Nest 3 begun 7:19 am. - concluded 12:05 pm.

7:17 am. Nest c two ~~eggs~~ young and 1 egg, no adult present

7:20 Bird with clean yellow throat and breast (♀, probably), flew to small pine 10 yards west of nest tree, clipped faintly but persistently. Very perturbed by my presence.

7:23 am. Bird left area, still carrying green larva she had been

7:26 am. She returned, either with same green larva or different one, to tree, 6 ft south of nest tree, then hopped about, clipping in nearby trees.

7:29 am. Flock of birds coming thru. Chickadees and warblers. A Black and White Warbler is now in the nest tree.

7:29 am. Parula to nest tree, but did not get closer than 6" to the ~~nest~~. Her chirp is very sharp, but faint. She left.

7:33 ♀ hopping about in pines + spruces east of nest tree. She has no food

7:35 ♀ now gone out of sight.

7:36 Myrtle warbler in nest tree.

7:48. A chirp from the south. ♀ appears with small green insect. She clips continuously, hopping up and down the nest tree, and adjacent trees. Her clipping increases in volume.

8:09 Leaves my sight.

8:10 Back in view clipping again, she is hunting for food in pine east of nest tree. Hanging upside down chickadee fashion on pine stem, she picks up ^{small} insect, then renews clipping and hopping about.

8:17 ♀ hopping about nest tree. I think I can hear the young birds clipping faintly in the nest.

8:20 I withdrew to a position 50 feet from the nest tree.

July 27, 1949

- 8:24 am. ♀ returned, chirping again, hopping about nest tree.
- 8:25-8:28 In nest tree, she is not carrying food. approaches within a few inches of nest, then hops away, and picks up small insect, eats it. Hopped a few inches above nest cocks head and looks in. She gave 3-4 thick clips and darted off.
- 8:38 ♀ in nest tree. when immediately to nest rim, peered in then popped in and out again almost instantly. I don't think she had food. She hopped away then returned, and repeated performance, hopped in and out again instantly. Hopped about a foot away from nest, and preened for a minute, then sat quietly another, and left.
- 8:46 ♀ to tree, quickly & quietly to nest & green larva. Perched on rim of nest, head and neck disappear a few seconds into nest. Then she hops down from rim to perch below a few seconds. She still has the insect, so did not feed. Feeding attempted three times before she gets rid of insect. She then entered nest and popped out again.
- 8:49 She entered nest and remained. brooding young, and sticking head out occasionally.
- 9:05 Bird left quietly.
- 9:11 Female returned to adjacent Pine with green larva hopped and fedged about then flew to nest tree and at 9:15 poked head in nest entrance a few seconds, then flew away. Don't know if feeding occurred.
- 9:25 ♀ flew almost directly to nest with insect, hopped to rim, leaned in and apparently fed. Then flew to adjacent sapling and disappeared.
- 9:50 ♀ flew to nest tree, moved quickly to nest rim, looked in, then hopped down. She nervously repeated this action seven times, without feeding the green larva she carried. She then hopped about in nest tree, and ate insect herself, and left by 9:57.
- 10:21 ♀ appeared with small insect, hopped about in adjacent trees, chirping excitedly.
- 10:28. She hopped to perch by nest, then entered turned about, and hopped out, and then, then back to rim, peered in then hopped down and about nest tree.

July 27,

10:33 She then flew way way, chipped twice as she passed.
I don't believe she fed young.

10:40 ♀ seen leaving nest, I didn't see her come, so don't know if she fed. Twice more she entered and left immediately.

10:50 ♀ flew to nest tree - insect and quickly entered nest, leaving food very quickly, hopped out and about the nest.

The male arrived, flying to within 2' of the nest near trunk. He is a larger bird with a nearly all blue throat.

He carried an insect but either ate it or dropped it, for he flew to another branch and picked up another insect, and hopped toward nest. When within 8" of the nest, the ♀ flew at him driving him from the tree.

Both birds left. The male is not as nervous and seems to move more slowly and deliberately than the ♀. The blue on his throat appears dull.

11:05 ♀ brought insect to nest, fed young, did not enter nest, then hopped about in nest tree and adjacent trees.

11:10 ♀ brought small insect, stuck head in nest, then flew to adjacent large pine, and hunted over its branches in the fashion of a nuthatch or Black & White Warbler.

11:19 ♀ with food flew directly to her dead limb perch beside the nest and sat there very quietly looking back and forth until 11:22 when she hopped up a limb, then to the nest, feeding young. Did not enter she left.

12:05 ♀ returned, fed, then left. Observation ceased.

notes on nest ⁴ ~~5~~.

5:35 a.m. Bird flushed from nest. One young bird and 2 eggs.

5:40 Bird returned to nest as soon as Dick left and sat quietly.

6:01 Bird left nest quietly.

6:11 Returned, chipped, had small green winged insect. Alighted in tree above nest. Caught an insect in tree and carried both into nest. Fed and brooded young. Did not see any evidence of removal of fecal sac.

6:30 Bird left. Did not carry fecal sac.

6:37 Bird returned with several small insects in bill and fed young. Sat to brood. May have eaten fecal sac?

6:48 Bird left nest. nothing in bill.

July 27, 1949

6:53 a.m.

♀ Bird brought food and left (did not carry fecal sac).

7:02

Bird came, fed, & brooded.

7:17

♀ left nest

7:19

Brought food, fed, & left.

7:20

" " " " " " did not carry fecal sac.

7:25

Bird went on nest.

7:44

Bird left nest. Nothing in bill. She had been sitting with her tail sticking out through the Veneer and this position seemed to bother her for she squirmed around while sitting.

7:48

♀ returned with food, chirped & entered nest, fed young & settled upon nest.

7:58

Bird left nest.

8:04

♀ Returned carrying insect food. Fed & settled upon nest.

8:19

♀ left nest. She was not carrying anything.

8:22

She returned with food, fed and flew into white pine near nest tree and caught insects. One time she caught a green caterpillar which she ate herself. Then she flew into white pine behind me and shortly came to the nest with another green Lepidoptera larva for the young. She fed it and brooded.

8:25

8:35

Left nest. Nothing in her bill.

8:38

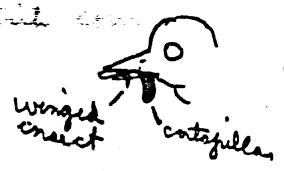
Returned with green caterpillar, fed & brooded.

8:45

Bird left nest.

8:51

♀ returned with small winged insect and green caterpillar. Fed young, feeding taking over a minute. She ate something, the winged insect I think, altho how she could do this I don't know as it was in the tip of her bill, unless she dropped it in the nest, fed the caterpillar to the young, then picked it up. (It may have been fecal matter that she ate.) She then settled on the nest.



9:18.

♀ left nest. Searched three small spruces and Thuja near nest. There is something very kinglet-like in the way this warbler flutters in the branches searching for food.

9:25

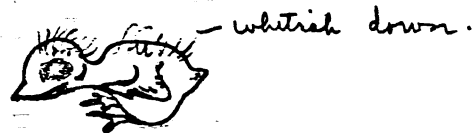
♀ Brought some small winged insects to young &

July 27, 1949

- 9:51 a.m. ♀ left nest.
Seven Blue Jays & a Red-eyed Vireo came past the nest tree.
- 10:14 a.m. Bird[♀] returned chipped several times as she flew in and out of tree near nest.
- 10:16 a.m. ♀ flew into nest without food and settled on nest.
- 10:40 Left nest. At times she ~~seemed~~ seemed to be weaving at venea around entrance while she sat on nest.
- 10:50 After flitting around in trees near nest for some time, ♀ brought a small fly to young and left immediately. A flock of birds wandered thru area and 2 ^{Red-eyed} Nuthatches alighted in trees close to nest which seemed to agitate the Parula.
- 10:51 Bird ♀ back at nest (did not see whether she had food) brooded.
- 11:08 Left nest.
- 11:18 Returned with green caterpillars, fed young & brooded.
- 11:45 ? left nest
- 11:50 ♀ brought small insect to young & stayed.
- 11:56 ♀ left nest.
- 12:00 Observation discontinued. Checked nest: 2 eggs, 1 young.

Checked Parula Nest 3.

Collected egg - first egg layed was cracked when we found it. Examined one of 2 young. (10 2 days old) Young are very small and have a sparse covering of whitish down. Skin, legs, bill all same pinkish-yellow color. Some black quills can be seen under skin of wings where primaries & secondaries will come in.



July 28, 1949

Checked nests:

- # 2 - 1 egg. Bird on nest.
- # 3 - 2 young. Young now have very yellow bill and feather
- " 1 - tracks show up nicely in black quills. Down appears grey now.
- # 4 - Has one young. Removed 2 sterile eggs from nest.

July 29, 1949

Checked Nests:

2 - 1 egg. Bird left nest.

3 - 2 eggs.

Didn't check nest # 4.

Aug 1, 1949 - nest # 2 empty, # 3 - 2 young, # 4 - 1 young.

~~Aug 4, 1949~~ measured nest height.

# 2	- 10.8 inches	} 889 feet between nests
# 3	- 8.10 inches	
# 4	- 9.3 inches	} 392 feet between nests.

Aug 4, 1949.

Parula # 3 empty.

Banded young bird in # 4 nest - Band no. 46-18008

Observed young & ♀ after putting him in nest again:
We arrived a few minutes before 9:00 a.m. and removed
the nearly fully feathered young & banded it. We replaced
the bird and moved back to watch. The ♀ appeared
a few minutes after our arrival & chipped excitedly. She
was carrying a mayfly (Ephemera) and seeing us
began her sharp chipping. She came within a foot of
my hand while ^{I was} at the nest. (She ate the mayfly & left).
The young bird hopped out of the nest to the east
side a few inches and then to the west side.
The ♀ came & looked around in nest (without food) and
left.

She came & went to nest 3 times ignoring the young
bird sitting on the limb about 4 inches from the nest.
Finally she went to the young bird. It refused to beg
and after poking the food at it, she went back to
the nest, then came back & poked food at the
~~young~~ again. Finally she flew up above & ate the
food herself.

After about 10 min. she came with a large brown
larva & went directly to the nest. Then to the young
which was begging. She fed it and left.

Shortly she was back and went directly to the young
bird & fed it a mayfly. Then left:

She returned with food and went to young which
had moved close to the trunk of the tree and was

Aug 4, 1949

rather inaccessible so she went to the, then to him, then to nest, then to him, then to the nest, entered and sat on nest for $8\frac{1}{2}$ minutes brooding an empty nest.

The young one looks just the color of the lichen and the other lichen in the tree.

The young stretches and preens occasionally. She came in about 6 minutes with a large larva and he popped out from the resting place against the trunk and turned around begging. She fed him and left without looking in the nest.

The young one hopped up against the trunk.

9:31 after 11 minutes the ♀ came directly to the young who started to beg when she approached. She fed him and flew directly away.

The young hopped up on small twig and voided excreta then hopped to another resting spot. She came again after 3 min. and went to where the young had first been sitting. Then she hopped up and looked the situation over and finally flew to begging young, which was only 6" away from former perch, and fed it.

Then she hopped up looked about, and wiped her bill several times. Then hopped around in tree, preened, and flew off.

9:40 She returned with food, went directly to young and fed him two insects. Young is sitting on small limb and tries to preen, but has trouble balancing on smaller branch.

9:43. ♀ Brought young ^a winged insect (Came and left quickly and quietly. Then juvenile moved another 6" to different branch.

9:46 ♀ went directly to young and fed him, then hopped up on looked at me, then went to nest, and looked in from outside. then flew away from nest. The young sat and preened occasionally. He preens rather well. (efficiently)

10:08 The young one begged as soon as she approached (before I ever saw her) She came and fed him. Picked up the excreta sac which was passed, and carried it away. She returned immediately, fed him and looked for excreta sac. She hopped around and he begged some more, she went in search of food in nearby tree, found a small insect, and ate it, then went on hunting.

10:13 She came and fed him 2 small insects and left quickly. She does not go far away to look for food.

10:18 She came but had no food; the juv. begged. Then she left.

10:21 Returned with small insect and looked for excreta sac then left.

10:26 Fed young and left.

10:28 Fed ^{young}, then hopped about nest tree a few seconds before leaving.

10:40 ♀ came and fed young, hopped up a limb wiped bill, and left.

10:41 1/2 ♀ came, fed young, left immediately.

10:42 1/2 ♀ came, fed young, hopped to different branch, wiped bill twice, then left.

10:48 ♀ came, fed young, left immediately.

10:50 ♀ " " " " "

10:51 ♀ brought green larva, fed young, and left.

Observations ceased