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NESTING HABITS OF THE HERMIT THRUSH IN NORTHERN MICHIGAN

by

DAYTON STONER

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UNIVERSITY OF IOWA STUDIES IN NATURAL HISTORY

Professor CHARLES CLEVELAND NUTTING, M. A., Editor

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VOLUME IX

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NESTING HABITS OF THE HERMIT THRUSH IN NORTHERN MICHIGAN

by

DAYTON STONER, PH. D.

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THE NESTING HABITS OF THE HERMIT THRUSH *Hylocichla guttata pallasii* (Cab.) IN NORTHERN MICHIGAN

By DAYTON STONER

INTRODUCTION

The data which serve as a basis for this paper were obtained at the University of Michigan Biological Station on Douglas Lake while the writer was a member of the station staff. Observations were made during the latter part of July and the first few days of August, 1919. In addition to the writer's own observations and notes, the assistance of the members of the class in ornithology was requisitioned. Several other members of the camp also very kindly rendered service in various ways. To all of these obligation is gratefully acknowledged.

The Douglas Lake region lies in the extreme northern part of the southern peninsula of Michigan about seventeen miles from Lake Huron on the east, the Straits of Mackinac on the north and Lake Michigan on the west. The soil is exceedingly sandy. The topography is strongly rolling and was formerly covered by hardwoods and conifers but large areas have been cut over and burned over so that little of the original forest now remains. There are numerous lakes in the region of Douglas Lake which is about two hundred feet above sea level and some two and one-half miles wide by four miles long; its greatest depth is about ninety feet. Its shores are variable as to height and slope but are everywhere wooded.

Near the Biological Station camp on the east side of the lake where the following observations were made, the shores are low and gradually receding with a long, clean, sandy beach. Conifers, maples, birches and aspens, mostly second growth, are found though not in abundance. Blueberry bushes and brake fern make up the characteristic smaller vegetation.

Naturally such situations afford unusual inducements for nesting birds of various species. Here song sparrows, oven-birds, slate-colored juncos, towhees, red-eyed vireos, cedar wax-

wings and many others find suitable sites for homes and the rearing of their young. The hermit thrush is one of the commoner summer birds of the region and several nests were discovered during the course of the eight weeks' summer session beginning June 30.

Although numerous papers have been written concerning the nesting behavior of the hermit thrush, the observations made by Norman McClintock¹ in the Huron Mountains forty miles northwest of Marquette, Michigan, are the most complete and detailed of any that the writer has seen. However, the observations herein recorded are, in some respects, somewhat at variance with those of McClintock and additional data are also included in this paper.

The particular nest here discussed was accidentally discovered on July 5 by one of the members of the ornithology class but it was not under more than casual observation until July 25 when a blind was first put into position for the observers. The nest itself was built on the ground in a partly shaded area about twenty yards from the lake shore and the same distance from the mess tent which was visited three times a day by thirty-nine people. It was partially hidden among the blueberry bushes and brake fern and was composed almost entirely of pine needles with a few dead twigs at the top and on the outside for support.

The observation blind of faded, olive-green canvas was erected on two T-poles. It was about forty inches in height by twenty inches in width by thirty-eight inches in length and was placed thirty inches from the nest. Observation of the birds and nest was made possible through a slit about six inches long in the canvas and through a round hole two inches in diameter. Entrance to the blind was gained on the side away from the nest and it was left in position continuously from the time it was erected until August 8, when the birds left their home. During the process of setting up the blind the female hermit thrush flew away thus exposing the five eggs; as soon as the canvas was in place the observer left. The next morning the writer visited the blind but remained only long enough to make sure that the female was incubating. During the following night a heavy

¹ McClintock, Norman, *A Hermit Thrush Study*, *Auk*, XXVII, 1910, 409-418.

wind disarranged the blind and while it was being repaired and readjusted on the morning of the 27th the female remained on the nest apparently little excited by the procedure.

The female remained constantly on duty until 6:00 P. M. on July 30 when she was flushed, and four nestlings, not more than twenty-four hours old, were disclosed. The fifth egg proved to be addled but remained in the nest during the entire subsequent brooding period.

BROODING

So far as our observations are concerned all the brooding was done by the female. When the young were first hatched the female seldom left them for long intervals, but toward the close of our period of observation the time spent by the adult on or at the nest was much reduced. However, it seemed that both parents were near and ready to swoop down to recover a voided excreta sac.

During the first part of the brooding the female would often rise slightly in the nest and look down at the youngsters solicitously. This occurred oftener on warm days and was probably for the purpose of giving the nestlings air. Sometimes when in this attitude the female would peck none too gently the heads and eyelids of the nestlings.

At times, while brooding, the female reached down into the bottom of the nest with her bill and shaking her head rapidly up and down or from side to side appeared to be loosening the packed-down materials. As the young grew larger the female did not sit on them but hovered over them, clinging with her feet to the sides of the nest. During the last two days of our observations she remained on its edge seldom attempting to brood the nestlings. In brooding the female always rested with her head toward the blind.

The male was much more nervous and noisy in his actions than the female. Although he took no part in the brooding he was particularly active in securing food for the young birds. Usually he left almost immediately after delivering the food, often touching the blind with the tips of his wings in his hasty departure.

FOOD AND FEEDING HABITS

Perhaps the most interesting part of the entire study was concerned with the food and feeding habits. Probably the larger share of all the food fed to the young was gleaned within a few yards of the nest.

On the writer's appearance near the blind at 7:30 A. M. of July 31 the male from a near by tree gave a sharp call, and three minutes later a rustling in the leaves on the side of the nest away from the blind betrayed his approach. The brooding female turned her head upward and backward and accepted a bit of food from him. It was impossible to identify this food for the male inserted his bill well down into the wide open mouth of the female. This was the first and, with two exceptions, the only time that one adult bird was observed to feed the other.

The following tables, chronologically arranged, will serve to show the principal details regarding the feeding of the young by the parents as well as to give data on nest sanitation. A word of explanation concerning the characters and abbreviations employed in the tables may be opportune at this point.

Lepid. larva indicates a lepidopterous larva of some kind.

Acridiid refers to any of the several species of short-horned grasshoppers which formed a substantial part of the diet of the young.

Gryllid refers to whatever species of cricket may have been served as food.

Ad. refers to one of the adults, sex undetermined.

Juv. refers to one of the nestlings.

? inserted in the "Kind of food" column indicates that the food which was brought could not be determined either from lack of ability to see it sufficiently or to properly identify it.

A blank space in any column indicates that such part of the observation was not made.

The usual signs ♂ (male) and ♀ (female) are used freely.

Table I—*July 31*

Time of feeding	Kind of food	Remarks	Disposition of excreta	Remarks
7:49 A. M.	?	♂ feeds 2 juvs.		
8:04 A. M.	Lepid. larva	♀ feeds 1 juv.	None	
8:09 A. M.	?	♂ gives food to brooding ♀ who feeds 1 juv.	Deposited in nest	Picked up and swallowed by ♀
4:10 P. M.	Lepid. larva 1½" long	♀ divides larva between 2 juvs.	None	
4:12 P. M.	Acridiid	♀ feeds 1 juv.	By 2 juvs.	Received directly; swallowed by ♀
4:35 P. M.	?	♂ feeds 1 juv.	By 1 juv.	Received directly; swallowed by ♂
4:50 P. M.	Larva partly crushed	♀ feeds 2 juvs.	By 1 juv.	Received directly; swallowed by ♀
4:52 P. M.	?	♂ feeds 1 juv.	None	
4:58 P. M.	Cutworm	♀ feeds 3 juvs.	None	
5:08 P. M.	3 Acridiids	♂ feeds 3 juvs.	None	
5:17 P. M.	?	♂ feeds 1 juv.	By 1 juv.	
5:18 P. M.	?	♀ feeds 1 juv.	By 1 juv.	

General Remarks on Table I

Observations were made between the hours of 7:00 and 9:30 A. M. and 4:00 and 5:22 P. M., a total period of four hours and fifty-two minutes, during which the young were fed twelve times.

At 8:39 A. M. the brooding female partly arose from the nest and picked up an excreta sac which had been deposited by one of the young. While in most cases the parent was on the lookout at the time the excreta sac was voided, this was not invariably true. After feeding a nestling the parent bird sometimes waited for from several seconds to a minute at the edge of the nest to see if the excreta sac would be voided. Whenever it was expelled the adult ordinarily immediately swallowed it before it fell. As near as could be ascertained this excreta sac was swallowed by the parent at the nest until about noon on August 3, when the adult was first seen to carry the sac away.

The excreta sac was not always voided by a nestling immediately after it had been fed as is indicated in numerous instances in the tables. Usually when the young voided the excrement both the head and the vent were raised, although on some occasions the head was lowered in this act. The excrement ap-

peared to be contained within this gelatinous sac during the entire time that the young were in the nest.

TABLE II—*August 1*

Time of feeding	Kind of food	Remarks	Disposition of excreta	Remarks
9:06 A. M.	2 Lepid. larvae	♀ feeds both to 1 juv.	By same juv.	Act occurred immediately after being fed. Swallowed by ♀
9:26 A. M.	?	♂ feeds 2 juvs.	By 1 juv.	Swallowed by ♂
9:35 A. M.	?	♀ feeds 1 juv.	By 1 juv.	Swallowed by ♀
9:46 A. M.	Acridiids	♂ feeds 4 juvs.	By 1 juv.	Swallowed by ♂; leaves at once
9:52 A. M.	?	♀ feeds 2 juvs.	By 1 juv.	
9:58 A. M.	3 Acridiid nymphs	♀ feeds 2 juvs.	By 1 juv.	
10:14 A. M.	Lepid. larva 2" long	♂ feeds 1 juv.	By 1 juv.	Swallowed by ♂; leaves at once
11:14 A. M.	Acridiid	♀ feeds 1 juv.	By 1 juv.	
11:15 A. M.	Acridiid	♂ feeds 1 juv.	By 2 juvs.	Received and swallowed by ♂
11:16 A. M.	Hairy Lepid. larva	♀ feeds 1 juv.		

General Remarks on Table II

Observations were made on this date only between the hours of 9:00 and 11:18 A. M. during which period the young were fed ten times.

From what the writer saw on this and subsequent occasions he is led to the belief that the parent birds, both of whom fed the young and removed the excreta, exercised very little choice or discrimination in selecting a certain nestling to receive whatever food was brought. One nestling might receive food two or three times in succession, while another might have to go hungry for as many visits.

During the first days of feeding the nestlings both parents announced their arrival in the vicinity by a low trill or chirp. Invariably upon hearing this note the mouths of all the youngsters were opened widely. The female ordinarily alighted about five feet from the nest, surveyed the situation for an instant, then ran toward the waiting young. The male usually arrived at or very near the nest with a considerable flutter of wings.

The hairy lepidopterous larva fed at 11:36 was an unusual

morsel for the nestlings; during the entire time that the birds were under observation a hairy caterpillar was not again offered.

The larva which was brought to the young by the male at 10:14 was offered to one nestling who made a vigorous but unsuccessful attempt to swallow it. The parent seeing the dilemma of the youngster took it from his throat and ran the larva slowly and carefully through his own mandibles, in this way crushing it; he then fed it to a different nestling who also attempted the impossible. After removing the larva from his throat and crushing it still further and in the same manner as before the parent offered the now sadly bedraggled larva to the original recipient who succeeded in his efforts at swallowing it. The entire performance lasted about three minutes.

As again illustrating the fact that the young void the excrement at other times than immediately after being fed the following excerpt from the writer's notes of this date may be quoted: "At 9:19, after the female had been brooding for several minutes, she arose in the nest and took a bit of excrement from one of the nestlings."

The hour between 10:14 and 11:14 when the young were not fed was occupied partly by the female in brooding although she did not return to the nest until 10:28 at which time she brought no food.

TABLE III—August 2

Time of feeding	Kind of food	Remarks	Disposition of excreta	Remarks
7:06 A. M.	?	♀ feeds 1 juv.		
7:18 A. M.	Larva	♂ feeds both ♀ and juv.		
7:25 A. M.	?	♂ feeds both ♀ and juv.		
8:08 A. M.	Insect	♀ feeds 1 juv.		
8:09 A. M.	Larva	♂ feeds 1 juv.		
8:21 A. M.	Larva	♀ feeds 1 juv.		
8:24 A. M.	Larva	♂ feeds 1 juv.		
8:26 A. M.	Larva	♀ feeds 1 juv.		
8:42 A. M.	Larva	♀ feeds 1 juv.		
8:50 A. M.	Larva	♂ feeds 1 juv.		
9:02 A. M.	Larva	♂ feeds 2 juvs.		
9:30 A. M.	?	♀ feeds 2 juvs.		
10:01 A. M.	Insect	♂ feeds 3 juvs.	By 1 juv.	
10:31 A. M.	Insect	♂ feeds 2 juvs.	By 1 juv.	
10:40 A. M.	Gryllid & Acridiid	♂ feeds 1 juv.	By 1 juv.	
10:41 A. M.	?	♀ feeds 1 juv.	By 1 juv.	Swallowed by ♀
11:12 A. M.	Larva	♂ feeds 1 juv.	By 1 juv.	Swallowed by ♂
11:27 A. M.	?	♀ feeds 1 juv.	By 1 juv.	Swallowed by ♀
11:34 A. M.	Acridiid	♂ feeds 3 juvs. ♀ feeds 2 juvs.	By 1 juv.	Swallowed by ♀
11:57 A. M.	?	♂ feeds 1 juv.		
12:01 P. M.	Lepid larva	♀ feeds 1 juv.		
2:03 P. M.	?	♂ feeds 2 juvs.	By 2 juvs.	Swallowed by ♂
2:12 P. M.	?	♂ feeds 2 juvs.	By 2 juvs.	Swallowed by ♂
2:23 P. M.	Lepid. larva	♂ feeds 1 juv.	None	
2:28 P. M.	?	♂ feeds 1 juv.	None	
2:29 P. M.	?	♂ feeds 3 juvs.	None	
3:15 P. M.	Leg of Acridiid	♀ feeds 1 juv.	None	
3:23 P. M.	Fragment of Acridiid	♀ feeds 1 juv.	By 1 juv.	Swallowed by ♀
3:25 P. M.	?	♂ feeds 1 juv.	None	
3:35 P. M.	?	♀ feeds 1 juv.	None	
3:46 P. M.	?	♂ feeds 1 juv.	By 1 juv.	Swallowed by ♂
4:21 P. M.	Lepid. larva	♀ feeds 1 juv.	By 1 juv.	Swallowed by ♀
4:39 P. M.	?	♂ feeds 2 juvs.	By 1 juv.	Swallowed by ♂
4:45 P. M.	Moth	♀ feeds 2 juvs.	None	
4:52 P. M.	Gryllid	♀ feeds 1 juv.	None	
5:06 P. M.	Insect	♀ feeds 1 juv.	None	
5:16 P. M.	Green Lepid. larva	♀ feeds 1 juv.	None	

General Remarks on Table III

On this date observations were made between 9:00 A. M. and 12:01 P. M. and between 2:00 and 5:18 P. M. during which period thirty-eight feedings were administered.

The insect fed to the nestling at 8:08 was secured by the female not more than a foot from the nest. She left her brooding only long enough to capture the insect and to feed it to the nestling then resumed her place on the nest.

At 11:34 both parents appeared at the nest with food at about the same time, an unusual occurrence.

At 11:52 A. M. and again at 3:02 P. M. one of the nestlings defecated without having been fed. The excreta sac was taken from the vent of the nestling and swallowed by the brooding female on both occasions.

At 4:50 the female picked and ate blueberries near the nest but offered none to the nestlings. At no time during our observations were the young offered berries or fruit.

TABLE IV—August 3

Time of feeding	Kind of food	Remarks	Disposition of excreta	Remarks
9:12 A. M.	?	♂ feeds 2 juvs.		
9:17 A. M.	?	♀ feeds 2 juvs.	By 1 juv.	Swallowed by ♀
9:35 A. M.	Lepid. larva & 2 Acridiids	♂ feeds 2 juvs.	By 1 juv.	Swallowed by ♂
9:43 A. M.	2 Gryllids	♂ feeds 2 juvs.	None	
9:54 A. M.	1 Gryllid	♂ feeds 1 juv.	None	
9:56 A. M.	1 Gryllid	♀ feeds 1 juv.	By 1 juv.	Swallowed by ♀
9:57 A. M.	Spider	♂ feeds 1 juv.	None	
10:14 A. M.	2 Gryllids	♂ feeds 1 juv.	By 1 juv.	Swallowed by ♂
10:15 A. M.	2 Gryllids	♀ feeds 1 juv.	By 2 juvs.	Swallowed by ♀
10:27 A. M.	1 Gryllid & 1 Acridiid	♂ feeds 1 juv.	By 1 juv.	Swallowed by ♂ as he flew away
10:42 A. M.	Lepid. larva & Gryllid	♂ feeds 1 juv.	By 1 juv. (not the one fed)	Swallowed by ♂
10:43 A. M.	?	♀ feeds 1 juv.	None	
10:50 A. M.	Gryllid	♂ feeds 1 juv.	None	
10:54 A. M.	1 Acridiid & 1 Gryllid	♀ feeds 1 juv. both insects at same time	By 1 juv. (not the one fed)	♀ flies away with excrement in bill
3:10 P. M.	Insect	♀ feeds 1 juv.	None	
3:28 P. M.	Insect	♀ feeds 1 juv.		
3:42 P. M.	3 insects	♀ feeds 4 juvs.		
3:45 P. M.	Insect	♀ feeds 1 juv.		
3:58 P. M.	?	♂ feeds 1 juv.	None	
4:08 P. M.	Several insects	♂ feeds 2 juvs.		
4:11 P. M.	Larva	♀ feeds 3 juvs.		Excreta swallowed by ♀
4:22 P. M.	?	♂ feeds 2 juvs.		
4:30 P. M.	?	♀ feeds 2 juvs. (not the ones just fed)		
4:35 P. M.	?	♂ feeds 1 juv.		
4:52 P. M.	Insect	♀ feeds 3 juvs.		
4:59 P. M.	?	♂ feeds 1 juv.		

General Remarks on Table IV

The observations on this date covered the time between 8:55 and 11:00 A. M. and 3:05 and 5:06 P. M. during which twenty-six feedings were administered.

The male usually announced his arrival by a low trill and as soon as the brooding female heard it she left the nest. Almost immediately after feeding the young he flew away again. This behavior was fairly constant throughout our observations.

The foregoing table shows a greater variety of food brought to the nestlings than heretofore.

At 9:57 both parents were at the nest with food. At 4:58 the female after having been absent for four minutes returned without food.

Apparently the young defecate only when one of the parent birds is at the nest.

TABLE V—August 4

Time of feeding	Kind of food	Remarks	Disposition of excreta	Remarks
7:25 A. M.	?	♀ feeds 4 juvs.	By 1 juv.	
7:31 A. M.	Lepid. larva	♀ feeds 4 juvs.		
7:34 A. M.	?	♂ feeds 1 juv.		
7:50 A. M.	Lepid. larva	♂ feeds 2 juvs.	By 2 juvs.	Swallowed by ♂
8:02 A. M.	?	♀ feeds 1 juv.	♀ picks bit of excrement from bottom of nest and swallows it	
8:16 A. M.	Lepid. larva	♂ feeds 1 juv. (leaves at once).		
8:26 A. M.	Green lepid. larva	♀ feeds 2 juvs.	By 1 juv.	♀ flies away with it
8:32 A. M.	?	♂ feeds 3 juvs. (leaves at once)		
8:40 A. M.	?	♂ feeds 2 juvs. (leaves at once)		
8:43 A. M.	?	♀ feeds 3 juvs.		
8:46 A. M.	Larva	♂ feeds 1 juv. (leaves at once)		
8:50 A. M.	?	♂ feeds 1 juv.	By 1 juv	Removed by ♂
8:51 A. M.	?	♀ feeds 2 juvs.		
8:52 A. M.	?	♂ feeds 1 juv.		
9:07 A. M.	Larva	♂ feeds 3 juvs.		
9:09 A. M.	?	♀ feeds 1 juv.	By 1 juv.	Swallowed by ♀
9:16 A. M.	?	♂ feeds 2 juvs.	None	
9:32 A. M.	?	♀ feeds 1 juv.	By 1 juv.	Swallowed by ♀
9:42 A. M.	?	♀ feeds 3 juvs.		
9:45 A. M.	Green lepid. larva	♂ feeds 1 juv. (leaves at once)		
10:03 A. M.	Insect	♀ feeds 2 juvs.	By 1 juv.	Swallowed by ♀
10:06 A. M.	Gryllid	♂ feeds 2 juvs.	By 1 juv.	♂ flies away with excrement in bill
10:18 A. M.	Green lepid. larva	♂ feeds 2 juvs.		
10:25 A. M.	Green lepid. larva	♀ feeds 1 juv.	By 1 juv.	♀ flies away with excrement in bill
10:48 A. M.	Green lepid. larva	♀ feeds 1 juv.	By 1 juv.	Swallowed by ♀
10:55 A. M.	?	♀ feeds 1 juv.	By 1 juv.	Swallowed by ♀
3:12 P. M.	?	♂ feeds 1 juv.		

3:20 P. M.	Insect	Ad. feeds 3 juvs. (leaves at once)		
3:31 P. M.	Insect	♂ feeds 1 juv. By same juv. as fed	Swallowed by ♂	
3:34 P. M.	?	♀ feeds 1 juv. (leaves at once)		
3:48 P. M.	?	Ad. feeds 1 juv. By 1 juv.	Ad. leaves with ex- crement in bill	
4:02 P. M.	?	♂ feeds 1 juv. By 1 juv.	Swallowed by ♂	
4:03 P. M.	?	♀ feeds 1 juv.		
4:08 P. M.	?	♂ feeds 1 juv. By 1 juv.	♂ flies away with ex- crement in bill	
4:35 P. M.	?	♀ feeds 1 juv. By 1 juv.	Swallowed by ♀	
4:41 P. M.	?	♂ feeds 2 juvs.		
5:52 P. M.	?	Ad. feeds 1 juv.		
5:53 P. M.	?	♀ feeds 1 juv.		
5:55 P. M.	?	♂ feeds 1 juv. By 1 juv.	♂ flies away with ex- crement in bill	

General Remarks on Table V

The observations on this date were made between 7:05 and 11:05 A. M. and between 3:00 and 6:02 P. M. during which period the young were fed thirty-nine times. As before, the male usually announced his arrival at or near the nest by a low trill.

Under the caption "excreta sac removed by ♂" the observer was not sure whether the excreta was swallowed or simply removed. In some cases the adults flew away with the excreta sac in the bill. Whether it was subsequently swallowed was not ascertained.

The nestling fed at 9:09 was one of the three that had been fed by the male at 9:07. It still seemed that the parents used little selection or discrimination in feeding the young. At 9:16 the nestling first fed was the one that had been neglected at the two preceding feedings.

At 3:25 both parents were away from the nest and the nestlings were apparently suffering from the heat. Neither adult was at the nest between 4:43 and 5:52, an unusually long absence.

TABLE VI—August 5

Time of feeding	Kind of food	Remarks	Disposition of excreta	Remarks
9:40 A. M.	?	♀ feeds 1 juv.	By 1 juv.	Swallowed by ♀
9:45 A. M.	?	♂ feeds 1 juv.	By 1 juv.	Swallowed by ♂ (leaves at once)
9:50 A. M.	?	♀ feeds 1 juv.		
9:55 A. M.	?	♀ feeds 1 juv.		
10:02 A. M.	Larva	♂ feeds 1 juv. (leaves at once)		
10:10 A. M.	?	♀ feeds 1 juv. (leaves at once)		
10:14 A. M.	Insect	♂ feeds 1 juv.	By 1 juv.	♂ leaves with excrement in bill
10:16 A. M.	Gryllids	♂ feeds 2 juvs.	♂ picks up	excrement from bottom of nest and flies away
10:27 A. M.	?	♀ feeds 1 juv.		♀ flies away with excrement in bill
11:14 A. M.	Gryllids	♂ feeds 1 juv. (leaves at once)		
11:16 A. M.	Insect	♀ feeds 1 juv.		
11:18 A. M.	Green larva	♀ feeds 1 juv. (flies away at 11:19)		
11:22 A. M.	Gryllid	♂ feeds 1 juv.		
11:24 A. M.	?	♂ feeds 1 juv.		
11:25 A. M.	?	♀ feeds 1 juv.		
2:02 P. M.	Gray Lepid. larva	♂ feeds 1 juv. (leaves at once)		
2:07 P. M.	?	♂ feeds 1 juv. (leaves at once)		
2:17 P. M.	3 Gryllids	♀ feeds 3 juvs.	1 juv. deposits pellet of excrement in nest; seized by ♀ who flies away at once	
2:22 P. M.	1 Gryllid	♀ feeds 1 juv.	By one juv.—not the one fed—swallowed by ♀	
2:41 P. M.	1 Gryllid	♂ feeds 1 juv. (leaves at once)		
2:51 P. M.	1 Gryllid & 1 Acridiid	♂ feeds 2 juvs.	♂ received pellet of excrement and flew away	
2:57 P. M.	Gryllid	♀ feeds 1 juv.	♀ waits a few seconds for pellet of excrement and flies away	
3:05 P. M.	Gryllid	♀ feeds 1 juv.		
3:17 P. M.	1 Gryllid & 2 Acridiids	♀ feeds 3 juvs.	♀ receives pellet of excrement from 1 juv. and flies away	
3:30 P. M.	?	♀ feeds 1 juv.	♀ swallows pellet of excrement and flies away	
3:31 P. M.	?	♂ feeds 1 juv.	♂ swallows pellet of excrement and flies away	
4:00 P. M.	Green lepid. larva	♂ feeds 1 juv.	♂ swallows pellet of excrement and flies away	

General Remarks on Table VI

Observations were made on this date between 9:30 and 11:30 A. M. and between 2:00 and 4:02 P. M. during which time the young received twenty-seven feedings.

The nestlings appeared more active than at any previous date, moving about in the nest, scratching their heads and eyes with their feet and pecking at their own plumage as if dressing and preening it.

At 10:35 the female, after an absence of eight minutes, arrived at the nest without food but remained for only three minutes; this time she occupied in pulling and pushing the nest materials about as if to make the home more tidy.

At 11:27 the observer noted the female chasing a grasshopper near the nest; she was unsuccessful in her attempts to catch the insect.

Again at 3:57 P. M. the female arrived without food; upon her arrival all the mouths opened as usual and the adult pecked the inside of the mouth of one nestling as if to make him believe he were being fed. The ruse seemed to have the effect of quieting the youngster.

TABLE VII—August 6

Time of feeding	Kind of food	Remarks	Disposition of excreta	Remarks
3:11 P. M.	?	♀ feeds 1 juv.		
3:23 P.M.	Insect	♂ feeds 1 juv.	♂ receives pellet of excrement and flies away	
3:48 P. M.	Larva	♀ feeds 2 juvs.	None	
3:51 P. M.	Insect	♂ feeds 1 juv.		
4:10 P. M.	Insects	♀ feeds 3 juvs		
4:55 P. M.	Insect	♀ feeds 1 juv.		

General Remarks on Table VII

Observations were conducted only between the hours of 3:05 and 5:06 P. M. during which time the young received six feedings.

The adults remained away from their brood a great deal of the time, and the number of feedings was somewhat reduced, averaging but three per hour.

The nestlings were now so large as to occupy almost the en-

tire space within the nest, leaving little room for the parent who often sat at the edge looking at her brood. The young birds were well feathered and appeared more alert to outside disturbances than before. They flapped their wings from time to time in an apparent attempt to leave the nest and pulled and tugged at their plumage as if to clean it.

At 3:47 the female returned without food, remained but a moment, then flew away. Again at 4:32 the female returned without food and remained sitting on the edge of the nest looking at the nestlings.

TABLE VIII—August 7

Time of feeding	Kind of food	Remarks	Disposition of excreta	Remarks
7:25 A. M.	?	Ad. feeds 1 juv.	Ad. leaves after picking up excrement	
8:00 A. M.	?	Ad. feeds 3 juvs.	Ad. flies away at once with excrement in bill	
8:07 A. M.	?	Ad. feeds 2 juvs.	Ad. waits in vain 2 minutes for juv. to defecate—flies away	
8:17 A. M.	?	Ad. feeds 1 juv.	Ad. flies away with excrement	
8:22 A. M.	?	Ad. feeds 1 juv.	Ad. flies away with excrement	
8:24 A. M.	?	Ad. feeds 1 juv.	Ad. flies away with excrement	
8:26 A. M.	Acridiid	Ad. feeds same juv. as at 8:17	Ad. flies away with excrement	
8:31 A. M.	?	Ad. feeds 1 juv.		
8:40 A. M.	?	Ad. feeds 1 juv.		
8:57 A. M.	?	Ad. feeds same juv. as at 8:40		
10:24 A. M.	?	Ad. feeds 1 juv.	None	
10:30 A. M.	Larva	♀ feeds 3 juvs.	By 1 juv. ♀ flies away with it	
10:37 A. M.	Black insect & Acridiid	♀ feeds 1 juv.	By 1 juv. ♀ flies away with it	
10:40 A. M.	Acridiid	Ad. feeds 1 juv.		
3:50 P. M.	?	♂ feeds 1 juv.	By 1 juv. ♂ flies away with it	
3:55 P. M.	?	♂ feeds 1 juv.	By 1 juv. ♂ flies away with it	
3:57 P. M.	Larvae	♀ feeds 3 juvs.	Not until 4:01 ♀ swallows it	
4:30 P. M.	?	♂ feeds 1 juv.		

General Remarks on Table VIII

Observations were conducted between the hours of 7:20 and 11:00 A. M. and between 3:00 and 5:00 P. M. during which period eighteen feedings were administered and excreta sacs were voided twenty-one times.

The nestlings appeared even more restless than on the preceding day. They were continually shifting their positions, preening their feathers, trying their wings and pecking the side of the nest or one another.

The adults absented themselves for considerable periods of time. Neither parent visited the young between 3:00 and 3:30 P. M. at which time the male returned without food and remained at the edge of the nest for twelve minutes.

At 9:16 one of the adult birds suddenly swooped down from a nearby perch, picked up a voided excreta sac and carried it away; again at 9:24 and 9:38 this performance was repeated. At 9:46 the female returned cautiously, obtained a voided excreta sac and flew away. Excreta sacs were removed by the adults also at the following hours: 10:07, at which time two sacs were voided by different birds, 10:15, 3:45, 4:04 and 4:44. At none of these times were the adults on the nest but apparently they were on watch near by. Food was not brought on any of these visits which were apparently solely for the removal of the excreta sacs.

At 8:43 a chipmunk appeared near the blind and immediately upon discovering it the female dashed at the rodent from a near by log. She followed the intruder with much pecking and flapping of wings until he sought the friendly refuge of the mess tent a few yards away.

OBSERVATIONS ON AUGUST 8

On August 8 observations were begun at 7:00 A. M. when both parents were absent from the nest. While the writer was attempting to lift up one of the young birds in his hands it escaped, and, at the same time, two of the other nestlings with much squawking, fluttered off through the ferns and bushes amid the excited cries of the parents in the low branches of trees a few feet away. In its effort to repel the intruder one of the adult birds flapped him on the head with its wings. Dur-

ing all this excitement one nestling remained on the nest, but at 7:03 it too left, half flying, half running through the blueberry bushes. The young were by this time well scattered and the adult birds called every few seconds for over an hour, the nestlings answering at intervals.

At 7:07 the female returned to the nest which now contained only the addled egg and three excreta sacs with one of which she immediately flew away. At 7:10 she returned for another sac and a minute later she flew back for a third sac which she carried away. She did not seem excited at the absence of the nestlings and apparently was preparing the nest for further use.

The female visited the nest again for a moment at 7:13 and at 7:48 she returned, pecked two or three times in the bottom, walked across it and flew away, returning once more at 7:53 when the same performance was noted.

At 8:10 one of the adults with food in its bill alighted on a low limb of a birch tree near by; every few seconds it called to the young. Fifteen minutes later an adult bird carrying food was again observed in the vicinity. It uttered an unbroken series of low clucks and after a moment flew to the ground where one of the young was calling and probably fed it, for not a sound was heard from this spot for more than a minute.

Although the family was now dispersed the adults seemed to be as active as ever in feeding the nestlings and not much time was lost in idleness once the disturbance of the morning had abated.

The nest and vicinity were again inspected in the evening but no trace of the adults or young was discovered; only the addled egg remained. Our observations were thus brought to a rather sudden and untimely end. However, it seems certain that in another twenty-four hours the young would have left the nest of their own accord instead of in the rather unsummary and irregular manner herein described.

Although nothing was seen of the young thrushes subsequent to this episode it is likely that they remained in the vicinity for a time or at least until they could fly well. Concerning the habits of this species after deserting the nest Audubon re-

marks.² "The young run after the parents, on the ground, for several days after they leave the nest." Similar and corroborative observations have since been made on this point although the writer was unable to follow up this phase of the study to his own satisfaction.

TABLE IX—TABULAR SUMMARY

Date	No. hrs. observation	No. times food was brought to young
July 31	4 hrs. 52 min.	12, ♂ 6, ♀ 6
August 1	2 hrs. 18 min.	10, ♂ 4, ♀ 6
August 2	8 hrs. 18 min.	38, ♂ 20, ♀ 18
August 3	4 hrs. 6 min.	26, ♂ 15, ♀ 11
August 4	7 hrs. 2 min.	39, ♂ 21, ♀ 15 sex undetermined on 3 occasions
August 5	4 hrs. 2 min.	27, ♂ 11, ♀ 16
August 6	2 hrs. 1 min.	6, ♂ 2, ♀ 4
August 7	5 hrs. 40 min.	18, ♂ 3, ♀ 3 sex undetermined on 12 occasions
Total	38 hrs. 29 min.	176

GENERAL SUMMARY

1. Observations on the young in the nest were conducted over a period of thirty-eight hours and twenty-nine minutes between July 31 and August 8. During this time 176 feedings were administered.

2. Brooding was carried on only by the female.

3. At no time during our observations were the young indulged with a vegetarian diet, although the adults were seen to eat blueberries on at least two occasions. The food of the nestlings was entirely of insects either in the larval or adult stage.

4. On many occasions the parent bird fed more than one nestling. At no time was feeding by regurgitation observed.

5. At no time during our observation was the male hermit thrush heard to sing, although the familiar high-pitched call very like that of the cedar waxwing was given often.

6. The nestlings did not always void the excreta sac immediately after being fed, sometimes not for several minutes or even longer after the act of feeding occurred.

7. During approximately the first half of the nestling period the adults swallowed the excreta sac. During the latter half of

² Audubon, John James, *American Ornithological Biography*, I, 1831, 303.

the period the sac was usually, although not invariably, carried away. The female was seen to swallow an excreta sac at the nest on August 7.

8. Toward the close of the nestling period the adults remained away from the nest for considerable intervals. Sometimes the adults returned to the nest without food and only for the purpose of carrying away the voided excreta sacs.

9. The male and female each had their own particular mode of approach to the nest, the female usually alighting a few feet from it and running quietly up to the young while the male usually alighted almost immediately at the nest with food. He was more nervous and noisy in his actions than the female.



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