HATCHING OF EGGS OF HAND-REARED WOOD THRUSHES

BY H. ROY IVOR

INCUBATION of the eggs and brooding of the young is, among many species of songbirds, the duty of the female. Whether the male knows when the young have hatched, by seeing them in the nest or knows in some other way, has been a controversial subject among many who study birds. The following record of the hatching of the young of a pair of Wood Thrushes, *Hylocichla mustelina*, may throw further light on the question.

The birds I keep for study are enclosed during the winter in a heated songbird observatory. This building, facing south, is 44 feet long—14 feet of this length being a storeroom—10 feet wide and 8 feet high. Almost the entire south wall is made up of windows with removable, double sash. In the spring these windows are taken out and the birds have access to a flight cage of almost the same size as the observatory. This flight space is connected to the breeding observatory, some 60 feet to the southeast, by a flyway made of half-inch mesh screen wire. This observatory is octagonal, 25 feet in diameter, and 10 feet high at the center. Eight large breeding compartments are arranged around the center flight area which is reserved for unmated birds. Arbor vitae and spruce form most of the planted shrubbery used for roosting and nesting sites. (See Ivor, Wilson Bull., 56:91–104, 1944, for further details).

When a nest is built and the first egg laid, a small gate over a platform is opened in the compartment so that the pair may seek food for the nestlings outside the observatory. Until the eggs have hatched the birds are closed in each evening. So that the parents may feed them natural food, as soon as the first nestling has hatched, the gate is left open at all times until the nestlings become independent.

The reason for giving liberty to the nesting pair as soon as the first egg is laid is that if the female does not readily find her way back through the small exit gate, the chilling of the first egg will not prevent hatching, whereas severe chilling of eggs after incubation has begun might do so. For various reasons I did not follow this procedure with this pair of thrushes but, instead, opened their gate late in the morning of the day I expected the first egg to hatch.

In this record I shall identify these two mated thrushes by naming the male "Vor" and the female "Vee."

At 10 a.m. on June 15, 1948, I opened the gate of exit and entrance. Five minutes later Vor learned it was open. After 20 minutes of in-

tensive searching for grubs he returned. Although he had had great difficulty in locating the entrance when first given liberty the year before, he found his way in at once. Only once during the next two and a half hours did he leave his compartment and return.

At 12 p.m. I went to their compartment and, later, minute by minute, entered in a notebook every move made by each—when Vee turned the eggs, pecked at the tiny, widening openings in the shells, or merely looked at the eggs, or when she left the nest to eat or drink or bathe.

THE RECORD

12:25 p.m.—Vee leaves the nest and as I stand close by, I can see a pin-point hole in one egg. Vor flies to rim of nest and looks at eggs, as often he had done before. Vee returns to nest after being off for a little less than a minute.

12:40—Vee is still on nest and Vor on branch two feet away. Vee stands up in nest and pecks gently at what must be the tiny hole which at present I cannot see. She utters a low note as she settles on her eggs, apparently calling Vor to the nest. He hops to the rim and I hear low notes uttered by each. Vor's bill is full of saliva which he appears to want to give to the nestlings which have not yet hatched. Vee refuses to rise and Vor gives her some of the saliva. She then rises high enough to allow him to look at the eggs. While he is watching she pecks at one which shows a hole about an eighth of an inch in size. She seems to be pecking gently at either the shell or the lining. It may be that before she called Vor she had felt the moving beak of the unhatched chick through the small hole and had called her mate at that moment. Vor shows evidence of excitement by continually erecting the feathers of his crown. This behavior seems to indicate that he is aware of the beginning of hatching.

1:43—Vee leaves nest to feed and to drink. Now I see a hole in a second egg nearly the same size as in the first egg.

1:44—Vee returns to nest, looks at eggs, but does not touch them.

1:51—Vee rises slightly and pecks at the eggs twice within the next minute.

1:56—Again Vee stands in nest and twice more picks at the two eggs showing holes. Although she "trusts" me well—not so well as does Vor—I have to stand very still or she will at once cover her eggs with her breast. All this time Vor has been singing, mostly in a low voice, but he has not left the compartment since 12:25 p. m.

2:01—Vee looks at her eggs, then pecks at the shells.

2:09—Vee rises, preens her feathers, then touches and perhaps turns her eggs.

2:12—She rises and touches the eggs with her bill.

2:15—She rises and merely looks at the eggs.

2:17—She leaves her nest. I can see the tiny bill of one nestling showing through the hole which does not seem much larger. Vor stands on the edge of the nest while Vee leaves to feed.

2:19—Vor leaves the rim of the nest while Vee bathes.

2:21—Vor flies to rim of nest while Vee is drying her feathers.

2:25—Vee leaves her nest to bathe again.

2:27—Vee flies to rim of nest, looks at the eggs, and then covers them. She must still be damp after her bath.

2:29—She rises, looks at the eggs, and just touches them.

2:30–2:55—I am unable to be present.

2:56—Vee leaves nest. I cannot see the holes in either egg; she must have turned them while I was away.

2:59—Vee stands on edge of nest for one minute, intently watching the eggs but not touching them. After the minute she covers the eggs.

3:00–3:05—I am not present.

3:07—As I approach to within two feet I can see Vee apparently pecking at the eggs, but cannot see clearly what she is doing.

3:10—Again Vee rises and examines the eggs. I am now better able to observe her actions. So far she has always crouched on her nest when I go close enough—18 inches—to allow of intimate examination, but this time she allows me to watch. She is picking tiny bits of shell lining from around the holes and eating these pieces. The holes do not appear much larger.

3:20—Irregularly, at intervals of from one to two minutes, she repeats the above performance except during eight minutes when I apparently stand too close to suit her. During this time she will not rise. After eight minutes have passed, I move a little farther away, yet am still close. Then until 3:55 she pecks at the shell and lining every 10 to 20 seconds. Apparently the shell is breaking all the way around, although I am not close enough to be certain.

3:55—Vee leaves her nest. I can see that one nestling is entirely out of the shell. The other is still in the shell which has separated all the way around except for about a quarter of an inch. This nestling is moving almost continually and can readily be seen through the break in the shell. The first nestling is naked except for tiny tufts of down which look more like hair than down. At times, it weakly throws itself around in the nest. Vee is hopping around the compartment, occasionally helping herself to food. Vor does not go to the nest but runs and flies around the compartment, excited, with crown feathers raised.

3:59—Vee flies to nest and covers eggs and nestlings.

4:15—Vee leaves nest. Second nestling is clear of shell. Vee now takes the shells from the nest. Vor finds a soft-bodied worm in the compartment, which he masticates with his bill. Then he flies to the rim of the nest, and, after considerable coaxing to make the nestling gape, feeds it to one young. This is the first time Vor has seen the nestlings, yet it seems obvious that he knew they were out of the shell and ready for food. At 3:05 only a very small hole was evident in each egg. Now, as I look into the nest, Vor appears greatly excited and gives me plainly to understand, or so it seems to me, that I must not go too close to his nestlings. So far as I can determine, the chicks hatched 20 hours after the first pin-point hole showed in the shell, for I feel sure I could see such a pin-point about eight o'clock in the evening of June 14.

4:32—Vee leaves her nest and finds the open gate through which she goes to seek food for the newly-hatched young ones. While she is out, Vor stays for the most part on the rim of the nest. The minutes pass. This is the test and an anxious time. Twenty minutes have passed and Vee is flying around the observatory trying to locate the entrance, and without success. I touch the eggs and find they are becoming cold. I take them out of the nest and place them under Sherr, the male Rose-breasted Grosbeak, *Pheucticus ludovicianus*, who is taking his turn on his nest. I return and take the two nestlings to hold and warm in my hand. Vor is very much concerned when I put my hand into the nest. He murmurs low notes and gently touches my fingers as I hold his nestlings. Evidently he is very "anxious," as he is singing, apparently using this song to call Vee to her nest. She responds by flying excitedly around and around the observatory which is 90 feet in circumference, still unable to find her way in.

5:05—Just as Vee is opposite the gate Vor flies in front of it and she sees the entrance, runs through, and flies up to the nest while I am placing the nestlings there. She looks at them for a moment, then settles down on the nest. Four minutes later Vor leaves the compartment and in less than two minutes returns with a bill full of tiny insects. Both parents then coax with throaty notes, seemingly trying to induce the infants to open their bills. The little ones seem very weak and it is taking a great deal of coaxing to get them to gape. At last the parents succeed and the nestlings are fed. Only three times more this day does Vor leave the compartment to seek food for the young, and each time it is necessary for him and Vee to coax for a considerable length of time before they respond. Many authorities assert that feeding reactions in the parents are incited by the gaping of the young. Here is definite proof that this is an error, at least so far as the Wood Thrush is concerned, and I have found the same reactions among other songbirds. Now I take one of Vee's eggs from the grosbeaks—leaving the other with them as it has become evident that their own eggs are not now going to hatch—and place it under Vee.

6:15 a. m., June 16—This morning, although the temperature is not low, the sky is heavily clouded; there is a rather dense fog and a chilly breeze from the southwest. Vee is sitting on the nest, Vor outside seeking food. Three times during the next hour and three-quarters he brings food for the nestlings, but Vee does not leave the compartment.

9:18—I can see that Vee's third egg has a hole in the shell about three-eighths of an inch in diameter, and I can also see the bill of the nestling.

9:25—I gently raise the female Rose-breasted Grosbeak sufficiently to see that Vee's fourth egg is hatching. I can see the bill of this nestling.

1:55 p. m.—Vee's third nestling is out of the shell.

4:00—Vee's fourth nestling, under the grosbeak, has hatched. Part of the shell is sticking to the down on top of its head. The female grosbeak is exceedingly careful in removing this shell. She pulls it a little, then lets it drop, then pulls it a little again. Seven exceedingly gentle pulls and it comes off. She seems to know that the shell should not be pulled off with a jerk. The pair of grosbeaks, both of which have been hunting food in the trees, is trying to feed the newly-hatched nestling, but not with much success. Their feeding methods are much different from those of the Wood Thrush; they are so careful that the swallowing muscles are grasping the food; they give and withdraw it so often that the little thrush is too tired to gape further and thus remains unfed. Both try again and again to feed it, but without success; so, at 7 p. m. I take it from them and return it to its mother.

June 17 is cloudy, damp, and chilly. Heavy rain falls all morning. When I enter the Wood Thrush compartment and look into the nest, all four nestlings appear dead. Vee must have gone out very early and been unable to find her way in. I take them to the house and revive the three oldest by placing them in a nest in the oven. When they seem fully warmed I place them in their nest, as Vee has found her way in. Apparently she had been in for some time while I was warming the nestlings, but, finding none in the nest, she will now neither feed them nor brood them. Vor flies to the nest with food and tries, with much coaxing, to feed them. They are seemingly too weak to open their bills for the food he has brought. Several times, as I find they are chilled, I take them to the house to be warmed; and three times, when I put them back in the nest, Vor tries to feed them—each time without any success. For the fourth time I have placed them in the nest, but now neither Vee nor Vor offers to feed them, although both go often and look in. Both are much excited and worried, carrying food in their bills, and running around on the

ground as though hunting their nestlings there. There seems one thing only to do—take the young thrushes into the house and try to rear them myself, an almost impossible job. I gather soft-bodied caterpillars and place these deep in their throats and they swallow, but nestlings so young seem to need the parent's saliva as well. Before evening has ended all three are dead.

Neither Vee nor Vor left the compartment again that day. Each kept hunting all over the ground, flying often to the nest to look in. For eight days each carried food in its bill, visiting the nest in the seeming expectation of feeding nestlings that still should be there. Usually when the nestlings in a nest are destroyed, birds build again. Vee did not attempt to build again so I closed the pair in for that year.

SUMMARY

In an attempt to determine how a particular male of one species of passerine bird knew when the young had hatched, a pair of observatory-conditioned Wood Thrushes was used in the experiment and a fairly continuous watch of the activities of the female was kept from the time the first pin-point hole appeared in one egg until the nestlings had hatched.

It was found that from the time the first pin-hole appeared until the chick was out of the shell, the female's activities consisted of rising to look at the eggs, pecking at the hole, touching the eggs with her bill, seeking food from a food dish, and bathing.

The time elapsing between each of these activities varied, with few exceptions, from ten seconds to eight minutes. The time elapsing between the first puncture of the shell by the beak of the unhatched nestling and its emergence from the shell was approximately 20 hours, so far as could be determined.

I am certain the male Wood Thrush did not see the nestlings hatch nor see the female feeding them, yet he gave evidence of knowing they had hatched.

The nesting rhythm may, under certain circumstances, be so upset that the nestlings will die of exposure and starvation. The feeding reactions persisted for eight days after the young died.

Erindale, Ontario, Canada, March 8, 1951.