

A DETAILED STUDY OF A FAMILY OF ROBINS

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DURING 1935 two nests of a pair of Robins (*Turdus migratorius*) were ideally located for observation on the porch of our home in Columbus, Ohio. Electrical apparatus was used to announce and record the arrivals at the two nests so that it was impossible for the adults to come to the nest without ringing an electric bell or making a recording on paper tape. The controlling switches were installed the second and first night respectively after the first and second nests were started. I usually spent from one to 16 hours each day in direct observation, my family assisting me greatly in this study by their thoughtful cooperation and indulgence. The third and last nest was built in a nearby apple tree where observation was difficult. The abnormally warm weather of March apparently hastened the beginning of the breeding season from one to two weeks. The mean temperature for the month was 47.8°F. compared with 39.0°F. normal (i.e. the mean from 1880 to 1935 at Columbus, Ohio).

We distinguished our pair of adult Robins from the others of the immediate neighborhood by coloration of plumage and more or less by personality. The female had two white tertiaries in her right wing; the male had brighter breast plumage and noticeably more white above his eyes than another male who occasionally used the same territory. Aluminum bands were applied to the nestlings of the first brood when they were about 11 days old so they might be identified away from the nest. Dye was applied to each nestling of the second brood as it hatched and on the sixth day aluminum bands were attached. The third brood was not marked for identification, but two of the fledglings associated closely with the adults for 11 days.

SUMMARY OF THE THREE BROODS

First egg	Number laid	Hatched	Young left nest Date	No.	Number reared to independence
March 30	3	Apr. 13-14	Apr. 29	3	1
May 7	4	May 21-22	June 4-5	4	2
June 9	3	(June 23)	July 7	3	2

NEST BUILDING

Female first visits porch. Around midnight, March 19, a female Robin, after apparently being routed from sleep, was attracted to the porch by the electric light. She finally settled down there for the remainder of the night and returned there the next evening.

Nest Construction. Early in the morning, March 21, she began to carry nesting material to the inner top ledges of the three porch columns but soon favored the eastern one. She ceased work by noon the first day; worked slowly all of the second and third days; started lining the

nest the fourth, ceasing work before noon; she completed the nest the fifth day, March 25, by adding three bunches of dead grass.

On May 1, two days after the first brood was fledged, she selected a similar location on the other end of the porch for the second nest. It required less construction time to build, even though she was helping care for the fledglings at the time. Less fibrous foundation material was used than in the first nest. She worked a short time the morning of the first day; slowly all of the second and third; and completed it by noon of the fourth day, May 4. She became soiled on the crissum, chin, and throat while adding mud to the nests.

THE MALE'S INTEREST IN THE NESTS

The male did not aid in nest construction nor accompany the female as she worked. He only visited the first nest once before it was completed but seemed much interested the few minutes he perched close beside the female as she worked. He visited it again two days after it was completed. He awkwardly tucked at the nesting material and vigorously shuffled around counter-clockwise with tail and bill down over the rim.

On March 31 and April 3, during deep twilight, he again visited the nest. He seemed relieved afterwards for he no longer complained. He did not visit the nest again until the eggs began to hatch. The day after the first brood was fledged, the male frequently visited the elbow of a nearby drain pipe where he moved about much in the same manner as he had in the cavity of the first nest. He continued this make-believe at intervals until he visited the second nest, the day after it was completed. He came to the nest twice that day, at 7:10 and 7:36 A.M. Each time he secured a long coarse stem from the top ledge of the center porch column and tried awkwardly to get it into the nest cavity. His movements at times resembled bathing, and the lining became frazzled at the rim.

EGG LAYING

Interval between nest completion and the first egg. Five days elapsed before an egg was deposited in the first nest. The birds did not visit it the day following completion; both came once the second day; and the female visited it once in the early morning of the third and fourth days.

Three days elapsed before the first egg was deposited in the second nest. The male visited it twice the day after completion while the female lingered nearby; and neither came the second day.

Deposition of the eggs. The female seemed uneasy the morning that the first egg was deposited in the first nest. She first came to the nest at 7:55 A.M., then left the porch three times and the nest four other times. Her movements were nervous. She was absent from the nest

between 8:46 and 9:45 A.M. She then stayed quietly on the nest sixty-four minutes before the first egg was deposited at 10:58 A.M. She left the nest at once without looking at the egg and did not return until next day.

She was only slightly less nervous before the second egg was deposited between 2 and 2:15 P.M. the next day. The third and last egg was laid the following day.

She behaved similarly before depositing the first egg in the second nest between 9:55 and 10:10 A.M., May 7, but remained on the nest a few minutes afterwards. Three more eggs were deposited during the next three days.

INCUBATION

Incubation and hatching. Without exception, incubation began the evening after the second egg was deposited and lasted for about thirteen days. The female alone incubated. The male did not at any time cover the eggs or nestlings. He visited the nest at once just as soon as the eggs began to hatch. Both birds seemed very interested as they frequently peered low into the nest at that time and turned the eggs and new nestling.

The 4 eggs of the second brood were known to have hatched in the order deposited; the first and second a few hours apart, forenoon and afternoon respectively of May 21; the third at 10:41 P.M. the same day; and the fourth 1:20 P.M. the next day. (In two other Robins' nests, the second eggs hatched first.)

Distinct taps usually from 25 to 31 times per minute could be heard at intervals as the bird was breaking the shell to emerge.

The fourth bird required longer to emerge than the others, almost 18 hours from the time the shell began to crack.

Six minutes after emerging, the third bird first begged for food, but was not fed. Two hours and thirty-seven minutes later it was so hungry that it responded often and almost incessantly peeped.

Periods at and away from the nest during incubation. The male did not at any time offer the female food during incubation. She left the nest from 13 to 19 times each day or an average of 16.2 times for 6 days during the first incubation and from 10 to 18 times each day or an average of 16.3 times per day for 10 days during the second incubation. The third was not checked.

A close check was kept on the visits to the first two nests, but unfortunately I did not realize the value of securing information about the actual time of the periods off and on the nest each day. However, an analysis of 40 of these periods made by direct observation and taken at random during the second incubation after the first two days may be enlightening. This analysis shows that the female left the nest on the average of once every 44.15 minutes and was away 11.3 minutes.

This would imply her spending approximately 80 per cent of the day-time on the nest and 20 per cent away. The periods ranged from 23 to 74 minutes on the nest and from 2 to 22 minutes away. Table 1 shows the average, minimum, and maximum time, and the time of day of these 40 periods off and on the nest during the second incubation.

TABLE 1. LENGTH OF FORTY PERIODS ON AND OFF THE NEST DURING THE SECOND INCUBATION

Hours	On nest		Away from nest	
	Average	Min and Max.	Average	Min and Max.
5 to 8 A.M. ...	27 minutes	23-30	12.0 minutes	2-22
8 to 10 A.M. ..	53 minutes	47-70	6.2 minutes	4-8
10 to 12 M ...	47 minutes	37-67	7.5 minutes	5-9
12 to 6 P.M. ..	47 minutes	30-74	8.1 minutes	3-14
6 to 7 P.M. ...	32 minutes	28-36	10.3 minutes	6-13

The female spent a longer time away from the nest on her first absence the day after incubation began than on any of the other days. She was absent 97 and 120 (plus) minutes respectively the first mornings of the first two incubations as compared with 16 to 48 minutes on the later mornings (for 8 days). In Tables 2 and 3 are shown some of the hours that the female first left the nest for the day and the hours of first and last return with notes on weather for the first two nestings. These Tables also give the number of returns per day as recorded by the electrical apparatus, and many were verified by direct observation, for 17 days of the first nesting and for 24 days of the second nesting.

Table 4 gives the number of returns to the nest for each hour of the day for 21 days during the second nesting. If the birds returned at 4:03, 4:15 and 5:01 in the morning, this would be listed for that particular date as 2 returns for the hour of 4 A.M. and 1 return for the hour of 5 A.M. This Table was interesting to me because, like Table 1, it shows that the maximum number of trips per hour during the second incubation were in early morning and late evening.

Ability to see in the darkness. The female had difficulty in locating the nest in the darkness of early morning and late evening. At 8:08 P.M. May 26, the female missed the top of the center porch column, her usual first stop on the way to the nest, and collided with the wall which happened to guide her to the nest. She then called louder and louder trying to feed the nestling the small amount of food which she happened not to drop. The male arrived 3 minutes later and fed at once perfectly. The female then began to feel about with her bill and covered the nestlings without feeding them.

Such behavior was not unusual for her; and a few times after she had fluttered about awkwardly trying to get to the nest, the electric light was switched on and she responded at once.

The male did not have such difficulty. His ability to see in the darkness was better than mine.

TABLE 2. VISITS OF PARENTS TO NEST DURING FIRST NESTING

	Date	First left nest	Re-turned (A.M.)	Minutes away	Sun-rise	Weather		Sun-set	Last re-turn (P.M.)	Total re-turns for day
						at sunrise	at sunset			
Incubation Period	Apr. 1	4:51	7:28	97	6:16	foggy				
	Apr. 2		6:49		6:14	cloudy				
	Apr. 3	5:46	6:34	48	6:12	clear				
	Apr. 4	5:28	6:16	48	6:11	clear				
	Apr. 5	5:36	6:14	38	6:09	cloudy				
	Apr. 6		6:12		6:08	cloudy	cloudy	7:01	6:58	17
	Apr. 7	5:40	5:56	16	6:06	cloudy	cloudy	7:02	6:44	19
	Apr. 8		5:59		6:05	cloudy	cloudy	7:03	6:07	16
	Apr. 9		5:30		6:03	cloudy	cloudy	7:04	7:07	13
	Apr. 10	5:27	6:00	33	6:02	cloudy	cloudy	7:05	6:31	13
	Apr. 11		6:07		6:00	cloudy				
	Apr. 12	6:02	6:28	26	5:58	cloudy				19
Hatching	Apr. 13	*	6:11*		5:57	cloudy				
	Apr. 14	*	6:29		5:55	clear	cloudy	7:09	7:10	30
Nesting Period	Apr. 15		5:52		5:54	cloudy				
	Apr. 16					freezing	cloudy	7:11	7:03	82
	Apr. 17	5:47	5:56	9	5:51	cloudy	cloudy	7:12	7:09	
	Apr. 18		5:45		5:50	cloudy	cloudy	7:13	7:22	83
	Apr. 19	5:36	5:49	13	5:48	cloudy	cloudy	7:14	7:28	89
	Apr. 20	5:30*	5:32	2	5:47	cloudy	cloudy	7:15	7:23	82
	Apr. 21	5:20			5:45	cloudy	clear	7:16	7:24	90
	Apr. 22	4:54*	5:04*	10	5:44	cloudy				90
	Apr. 23		5:31		5:42	cloudy	cloudy	7:18	7:29	84
	Apr. 24	5:18*	5:24†	6	5:41	cloudy	cloudy	7:19	7:40†	95
	Apr. 25		5:18		5:40	clear	cloudy	7:20	7:10‡	
	Apr. 27		5:18		5:37	clear				99
Apr. 28		5:07		5:36	clear				98	
Apr. 29		5:10		5:34	cloudy					

* Twenty-five watt light on porch burning.

† So awkward in the darkness that porch light was switched on.

‡ Did not remain on nest tonight, fed and left.

CARE OF THE YOUNG

Feeding the newly hatched nestlings. During the early afternoon, April 13, one egg of the first nest hatched and the other two the following day. The male brought food twice in late afternoon and willingly gave it to the female who fed. He previously had visited the nest during her absence, peered low and then gently changed the position of the two eggs and little bird. The female returned to the nest without food.

The next day the male brought the first food at 7:48 A.M. and the female fed it to the young. He did not visit the nest between 12:08 and 5:48 P.M. but remained very close. During this time the female fed 6 times and returned twice without food. Her longest absence for this period was 29 minutes and the average 10 minutes. Twenty-one of the 30 trips for the day were carefully checked. The male came 5 times with food and the female 9 times. The male also came twice without food and the female 5 times. At times both had difficulty; they had to offer the food frequently as they called loudly and one time the adult had to give up and eat the food instead of feeding the young.

TABLE 3. VISITS OF PARENTS TO NEST DURING SECOND NESTING

	Date	First left nest	Re-turned (A.M.)	Min-utes away	Sun-rise	Weather		Sun-set	Last re-turn (P.M.)	Total re- turns for day
						at sunrise	at sunset			
Incubation Period	May 9		8:09	120	5:22	cloudy	cloudy	7:34	7:51	10
	May 10	5:07	5:29	22	5:21	clear	clear	7:35	8:02†	18
	May 11		5:27		5:20	clear	cloudy	7:36	7:57	18
	May 14	*	5:22*		5:17	cloudy	cloudy	7:39	7:34	17
	May 15		5:14		5:16	clear	cloudy	7:40	7:18	15
	May 16		5:16		5:16	cloudy	cloudy	7:41	7:37	18
	May 17		5:07		5:15	cloudy	clear	7:42	7:08	17
	May 18		5:15		5:14	clear	clear	7:43	7:40	17
	May 19	5:36	5:45	9	5:13	cloudy	cloudy	7:44	7:31	16
	May 20		5:45		5:12	cloudy	cloudy	7:45	7:18	17
Hatching	May 21						cloudy	7:46	8:00	30
	May 22		5:01‡		5:11	cloudy	cloudy	7:46	7:27	65
Nesting Period	May 23	4:42			5:10	cloudy	clear	7:47	7:33	81
	May 24		5:08		5:09	clear	clear	7:48	7:34	84
	May 25	4:46	4:53	7	5:09	clear	clear			90
	May 26		4:54		5:08	clear	cloudy	7:50	8:08‡	102
	May 27	4:51	4:58	7	5:07	clear	cloudy			113
	May 28	4:45	4:53	8	5:07	cloudy	cloudy	7:51	8:08	96
	May 29		4:57		5:06	cloudy	cloudy	7:52	7:58	103
	May 30	4:35	4:57	12	5:06	clear	cloudy	7:53	7:41§	92
	May 31		4:51		5:05	cloudy	cloudy	7:54	7:52§	101
	June 1		4:48		5:05	clear	clear	7:55	7:55§	95
June 2						cloudy	7:55	7:38§	102	
June 3		4:55		5:04	cloudy	cloudy	7:56	7:36§	97	

* Twenty-five watt light on porch burning.

† So awkward in darkness that porch light was switched on.

‡ Female had much difficulty feeding due to darkness.

§ Female did not remain on nest at night; fed and left.

Feeding difficulties. At hatching time the female did most of the feeding. The male fed very little of the food that he brought. One time he stubbornly evaded her repeated attempts to get the morsel and finally

TABLE 4. NUMBER OF RETURNS TO NEST PER HOUR DURING SECOND NESTING

Hour	Incubation Period																			Nesting Period												Average per hour			
	May																			May													June		
	9	10	11	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	1	2	3											
4 A.M.	0	0	0	0	0	0	0	0	0	1	3	0	5	2	2	2	1	1	1	1	3	3	1	2.1											
5 A.M.	0	1	1	1	2	3	2	2	1	1	6	8	4	9	13	10	10	9	7	8	9	7	8	8.5											
6 A.M.	0	1	1	2	0	0	2	2	0	2	6	7	5	5	8	5	10	9	5	10	11	7	7	7.3											
7 A.M.	0	2	2	2	2	2	1	1	1	0	6	6	6	9	11	3	5	6	11	7	7	7	7	7.0											
8 A.M.	1	2	1	1	1	1	1	1	2	1	6	2	4	5	6	8	6	6	8	8	7	7	7	6.0											
9 A.M.	1	1	1	1	1	2	0	1	0	2	6	6	5	6	6	6	7	12	7	7	5	4	4	6.4											
10 A.M.	0	0	1	1	0	0	1	1	2	1	6	5	8	9	9	7	9	8	8	7	6	6	6	6.7											
11 A.M.	1	1	2	1	1	1	1	0	2	1	7	5	8	7	6	8	7	5	9	6	7	6	7	6.7											
12 M.	1	1	1	1	1	1	1	1	0	1	1	7	4	2	6	3	3	4	6	6	6	6	6	4.3											
1 P.M.	0	1	0	1	1	0	1	0	2	2	4	4	6	7	7	8	8	8	4	8	8	8	8	6.5											
2 P.M.	1	2	2	1	1	1	1	1	0	1	4	8	3	8	4	8	6	5	6	3	7	7	7	5.6											
3 P.M.	1	1	1	0	1	1	1	2	1	0	4	6	6	3	11	7	7	2	6	4	7	7	7	5.6											
4 P.M.	1	0	1	1	0	2	2	1	1	1	5	4	4	8	5	7	5	7	6	5	4	4	4	5.4											
5 P.M.	1	1	1	1	1	1	1	1	2	1	9	4	6	5	7	5	4	5	5	6	6	6	6	5.6											
6 P.M.	1	1	2	1	2	1	1	1	1	1	4	5	12	9	5	4	5	4	3	5	5	5	5	5.6											
7 P.M.	1	2	1	2	1	2	1	2	1	1	4	7	4	6	6	3	5	5	5	5	3	3	3	4.8											
8 P.M.	0	1	0	0	0	0	0	0	0	0	0	0	0	2	1	1	0	0	0	0	0	0	0	0.3											
Total for each day	10	18	18	17	15	18	17	17	16	17	81	84	90	102	113	96	103	92	101	95	97	97	97	Gross Average 95.8 per day											

Gross Average 16.3 per day

it fell into the nest. Both attempted to regain it, and the female got it and collided with the porch wall in hurriedly departing. Another time she kept the nestlings covered as the male called and offered the food. She did this another time but when he attempted to push a May beetle beneath her, she grabbed it and tore off a piece which she promptly swallowed as he left the nest in a hurry with the other part. Often the male hurriedly gave the food to the female; other times when he lingered, she returned part or all of it to him. Occasionally she ate the food herself after a little or no effort at feeding the young. She took the food one time and left the nest after he had gotten no response from the nestlings. Such behavior occurred to some extent during all of the nestling periods, but was not common.

The male once ate a black swallow-tail butterfly (*Papilio polyxenes*) and evinced distaste by wiping his bill and gulping. Next day when he suddenly approached several of these butterflies congregated on the pink flowers of a prostrate *Saponaria* plant, he flung away a large mouthful of food and wiped his bill in the air and on the walk. It certainly looked as though he had remembered the experience of the previous day. He afterward picked up the scattered food.

Appeasing hunger without food. Both birds used their empty bills in apparent attempts to pacify the hungry nestlings, but were not always successful. The female often did this when returning to the nest for the night without food or whenever she raised herself up, day or night, and the nestlings responded.

Relative feeding ability of the adults. Except for the first and last two days of the nestling period, the male provided as much, if not more, food than the female. In all three nests he noticeably shirked feeding on the day before the nestlings were fledged. He usually lingered near the nest, often with food, or visited it without feeding but never shirked removing excreta on these visits. The female was kept very active providing food plentifully during this time. After the young were fledged, he again provided food rather well for a few days. It must be remembered that the female spent more time at the nest than the male, and so had less time in which to collect food. She often spent much time on the nest during cool mornings when food was usually more easily obtained than later in the day when she had more time away from the nest.

Outside influences on type and amount of food. The number of trips to the nest are not a reliable index to the amount of food the nestlings received. On one trip five times as much food might be carried as on the next. Such things as weather, spading of soil, mowing of lawns, time of day, physical conditions of the adults, disturbances, and other factors often influenced the types and amounts of food. One day the adults suddenly changed from the main item of caterpillars to the

larvae of May beetles. Investigation disclosed that a neighbor had just spread out an old compost heap.

Both birds at times slowed down their feeding activities. One afternoon the fluttering of a foot-long strip of white cloth so disturbed the male that he often neglected to feed. The female occasionally joined him in feebly protesting, but evidently did not know the reason, for she perched directly beneath the waving cloth. The male soon became quiet when the cloth ceased to move.

Feeding of the young as shown by Tables 2, 3, and 4. In Tables 2 and 3 is shown the records by electrical apparatus for 10 days during the first nesting period and for 12 days during the second. Many of these were verified by direct observation.

The first 2 days of both records show 81 to 84 meals or trips per day; on the third day there were 89 and 90 meals respectively for the first and second brood; while afterwards the first brood of 3 young received 82 to 99 meals per day and the second brood of 4 young received 92 to 113 meals.

There was little variation in the number of meals brought throughout the nestling period. Occasionally during the first 3 days of the period more food was carried to the nest than was consumed by the young so that the adults had to consume part of it themselves or carry it away from the nest. This was especially true with the first brood. During the third and fourth days the amount of food brought to the nest at a time seemed to be increasing. The adults seemed in such a hurry that often angleworms, caterpillars, May beetle larvae, and possibly other insects were much alive when fed to the young. In fact, at times I felt anxiety for the young when live larvae of the May beetle were fed but the birds seemed none the worse. Although the nestlings in each brood varied noticeably in size, all seemed to receive sufficient food.

Table 4 gives the number of returns to the second nest per hour for 21 days. The averages for 11 days during the nestling period ranged from a minimum of 4.8 trips per hour in the late evening to a maximum of 8.5 per hour in early morning.

A further check was made over this period to determine at which time of the day the birds fed most busily. It was found that there were no absences between trips longer than 25 minutes for the entire period between 9:54 and 11:22 A.M. but during the other hours of the day it ranged from 25 to 60 minutes.

Table 4 shows that the 4 nestlings of the second brood averaged receiving 95.8 meals per day over the period of 11 days which the Table covers. The 3 nestlings of the first brood averaged 89.2 meals per day for a period of 10 days. There was an average of about 13.4 hours of possible daylight during the 10 day period and 14.7 hours for the 11 day period. Therefore the 3 nestlings of the first brood received

a meal each 9 minutes of the possible daylight, and the 4 nestlings of the second brood received a meal each 9.2 minutes of the possible daylight.

DEPARTURE FROM THE NEST

April 29, 15 and 16 days after hatching, the three nestlings of the first brood left the nest all within a few minutes of 10:30 A.M. The two largest ones dropped out of sight at once but we found that the male was caring for them in the rear yard across the street. The smallest one was fed by its mother for 11 days, after which she ceased to feed it and the father only fed it occasionally. Even though the bird was capable of securing its own food, it often chased after the adult Robins of the neighborhood cheeping and with wings quivering. Several times it followed the male Robin of the neighboring nest to the corner yard, where he often gave it the food he was getting for his own offspring still in the nest! However, his mate did not feed the strange young bird and seemed to take its pleadings as dangerous threats. One day she arrived at the bath while the young one was there and when it opened its mouth and quivered its wings, she sprang into the air about two feet and dropped on the lawn beside the bath. This performance was repeated several times before the young Robin seemed to become angry and clapped its bill at her each time she returned to the bath. After several minutes more she flew away complaining. By the eleventh day away from the nest, the bird became haughty and greeted Robins and other birds with clapping bills and spread tail when they came to the bird bath which it monopolized. Its threats were very effective against all the Robins, English Sparrows, and a Starling. One day the bird in chasing a male English Sparrow away collided with a small elm and cried loudly. Several species of birds collected to scold. Our male Robin lingered long after the others and alternately sang and scolded.

On June 4, 14 days after hatching, the oldest nestling of the second brood left the nest at 7:57 A.M. and flew 33 feet to a perfect landing in a small elm tree. Two others flew about 20 feet on leaving the nest.

The three young of the third brood left the nest July 7, about 14 days after hatching and remained very close to the nest for several days. Two of the birds remained very closely associated with the adults for 11 days. This brood remained closer to the nest than the others and the adults seemed to care for them longer. The fledglings, however, did not beg for food like the one of the first nest.

GENERAL HABITS

Preening. The female always preened first after leaving the nest in the mornings during incubation and later searched for food. During the nestling periods she usually preened a very short time before searching for food. She frequently preened in the nest, day or night, during both periods but never made any vigorous movements.

Dust bathing. Neither of the adult Robins were interested in the dust bathing so much enjoyed by the English Sparrows. At times the male was seen preening on the ground near the sparrows in the dust but he never showed an inclination to join them.

Sun bathing. Both adults often spread themselves in the sunshine. The female on warm sunny afternoons usually spent a short time away from the nest leaning to one side, with body feathers open, and upper wing and tail spread to the sunshine.

Water bathing. Both bathed frequently in the bird bath and were not always dry before taking up duties of the nest again. The male was observed to bathe during drizzling weather and even at twilight on such days. He was also seen to hop through deep puddles of water on rainy days and go to the bird bath and bathe.

RELATIONSHIP WITH OTHER BIRDS

Early in the season four or five male Robins could be seen about our yard but as the nesting season approached, there was a general skirmish between the birds. They would follow each other about and finally climb into the air as they came together in a fight. This behavior soon ceased and our male was never bothered by other Robins encroaching.

The territory of our male was an irregular area of about 35,000 square feet with the north and south boundary never actually determined by us. On the northeast and southwest border he often trespassed and was chased away by other Robins but without a fight. He regularly trespassed on some of the ground which we thought belonged to the neighboring male. Neither male seemed to resent the other, although each kept at a distance.

During the second incubation another female Robin attempted to build a nest on the top ledge of the center column of the porch but our female dashed at her each time she came with nesting material. A few times she perched on top of the column until the other female arrived. The next morning the other female selected a very conspicuous site on a neighbor's porch about 30 feet from our nest.

Our female did not patronize the adjoining lawn as much as did the other female. Whenever they were on the lawn at the same time, they appeared to be following each other about. When one female was cornered in the shrubbery, she crouched slightly with tail spread and bill smacking. This was a signal for retreat and the other bird took her turn being followed. They never actually fought. The neighboring male kept remarkably free of the vicinity of his own nest except when actually visiting it or bathing. His other two nests were built within his own boundaries. His mate was very bold and often contested the lawn with our male. She seemed most interested in fighting when our male carried food. During incubation it appeared that she sometimes left her nest seemingly at the sight of our male Robin with food. It

was disgusting to see our male so foolish as to attack her whenever he carried food for he always lost it, piece at a time. They climbed into the air as they fought, just as the males had done earlier in the season. Our male usually was the one to fly away first and then sometimes after preening on the walk for a few minutes, the female would return directly to her nest.

Last summer I saw the same behavior between a male and female Robin over rich biscuit mixture which was placed beneath a large drop trap near the rear steps. A male English Sparrow often was at hand to benefit, for the Robins soon dropped their mouthfuls of food outside the trap under which the sparrow would not go.

Our male Robin adopted a possessive attitude towards the three trees near his third nest and protested the presence of adult Robins, Blue Jays, Catbirds, and Bronzed Grackles. He disregarded Flickers, Downy Woodpeckers, English Sparrows and Song Sparrows.

One day as he was on his way to the nest with food, he swerved sharply to dip towards a Bronzed Grackle on the lawn. The Grackle spread its wings until the tips touched the lawn in a peculiar manner. During the third nesting a pair of Blue Jays visited the trees near the nest of the Robin. This was very annoying and often caused a fight. The Jays evaded the Robins in the trees but in the open our male Robin clinched with them at once and the female soon joined in the fight. The Jays finally retreated, with the Robins following them for several hundred feet. After the young Robins were fledged this trouble ceased.

One day I heard a commotion and found the Robins and Jays almost side by side protesting the presence of a male Sparrow Hawk. The Jays soon drove the hawk away with the aid of the Robins. During this time the Robins seemed entirely friendly with the Jays.

SUMMARY

1. The abnormally warm weather of March 1935 started the nesting season earlier than usual. The female selected the sites and built three nests without the aid of the male.

2. Incubation began in all nests the evening following the depositing of the second egg and lasted for $12\frac{1}{2}$ to 13 days. The male did not cover the eggs or young at any time nor feed the incubating female.

3. The first egg of the first set was laid at 10:58 A.M., the second between 2 and 2:15 P.M. the following day.

4. One bird gave the food reaction when 6 minutes old; at $2\frac{1}{2}$ hours it peeped incessantly.

5. During incubation the female left the nest from 10 to 19 times a day, averaging 16.3 times. Forty periods on and off the nest averaged

44 minutes on and 11 minutes off (i.e. 80 per cent of daylight hours on the nest).

6. The male could see well in dim light, but the female could not.

7. For the first two days with both broods the young received between 81 and 84 meals per day; the third day they were given 89 and 90 meals respectively. During the rest of the time the first brood of 3 young received 82 to 99 meals per day and the second brood with 4 young 92 to 113 meals.

8. The young left when 14 to 16 days old. One could not fly as far as 14 feet, while two flew 20 feet and another 33 feet.

9. One Robin 4 weeks old monopolized the bird bath, threatening adults of 3 species.

10. A nesting female often left her eggs and attacked a neighboring male as he carried food to his young.

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