

OBSERVATIONS ON THE BEHAVIOR OF A YOUNG CEDAR WAXWING

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On July 28, 1940, in Pelham, Massachusetts, I adopted a young Cedar Waxwing (*Bombycilla cedrorum*) with the intention of studying the behavior of a young bird of a markedly social species, most of my previous studies having been devoted to a non-social species, the Song Sparrow. I took only one bird in hopes that its social reactions would be transferred to me, but in this I was disappointed, for, although the waxwing remained fearless in relation to people, its social needs were satisfied by two young Song Sparrows kept in the same room.

I first became aware of the parents of my birds on June 19 when I heard what I took to be incessant begging from a baby bird; it proved to be the female waxwing begging from her mate with voice and violent wing movement. He fed her four times, but she continued to beg, crowding against him. Later I saw a waxwing take a piece of nesting material into a near-by cedar. On the 20th she was again begging for ten to fifteen minutes at a time. Later one of the birds carried material, while the other perched on a neighboring cedar. Unfortunately it was impossible to get any satisfactory view of the nest. On July 26 and 27 large young were being fed in the nest and on the 28th they left.

A number of observers have reported on the nesting of the Cedar Waxwing. It is apt to nest in groups, and we have found this to be true in an orchard at Pelham, although in 1940 this particular pair nested alone. Saunders (1911:328), records seventeen nests within a radius of 150 yards, and Gross (1929:178) three nests within 100 feet of each other. Crouch (1936:1) suggests that "nesting territory . . . extends no further than a few feet from the nest itself." That the social bond is still strong is shown by Saunders' statement that "the parent birds from different nests made trips for food in small flocks, usually of four or five." At one nest a third waxwing came within eight feet, a catbird within two feet, and a chickadee to the nest itself with almost no hostile demonstration from the nesting birds (Crouch); but at another nest a waxwing and birds of other species were chased from the vicinity (Post, 1916).

Several writers state that both birds build, one bringing material, the other arranging it. Incubation lasts 14 days (Gross), and is regularly performed by the female (Crouch; Saunders; Herrick, 1935), but occasionally by both birds (Gross). Crouch gives excellent pictures of the male feeding his incubating mate; Gross says this takes place about every half hour. Brief notes are given on feather development by Saunders who found that the young were brooded at night by the female until they were 12 days old. Feeding takes place by "regurgitation," at intervals of about 20 minutes (Gross), from 15 minutes to an hour or more (Saunders). The latter author believes (p. 326) "that the method of feeding from the throat is not true regurgitation but is merely a convenient method of carrying more food at a time than could be taken in the bill . . ." It is not comparable to regurgitation in a goldfinch, for instance. The young leave at the age of 14 to 18 days, usually at 16 to 17, those that are fed more often leaving the earliest (Saunders).

On July 28 the four young of the Pelham nest were standing close together in a bush some 30 meters from the nest. At our approach they stood stiffly erect with feathers compressed, then flew. We caught three and found to our surprise that blueberries were at once accepted by the little birds while they were being held in our hands. Similar behavior has been reported by Maynard (1928) and by Mrs. Whittle (1928) with a bird trapped in November. I decided to keep the youngest of the brood, estimating its age from comparisons with pictures and descriptions at about 15 days.

Motor coordinations.—On the first day out of the nest the waxwing flew some three meters; five days later it flew from one end of the large room to the other, but it still had difficulty in landing, which was not fully mastered until the bird was almost four weeks old. It stretched in the typical ways—both wings up and one wing sidewise. On July 28 and 29 it also stretched both wings down at the same time, a temporary co-

ordination which I have noted in young Song Sparrows, a Cowbird, Ovenbird and European Cuckoo. It shook itself gently, never in the thorough way of the Song Sparrow. At night it slept with its bill in the scapulars, at first standing on both feet. It was not until August 14 that I noticed it balancing on one leg.

Although a vessel of water was constantly present and the Song Sparrows bathed, it was not until August 4 (about 22 days of age) that the waxwing took its first bath. Following the example of the Song Sparrows it stepped in, dipped its head and quivered its wings a few times, after which it dried itself fairly well. It never bathed as frequently nor as vigorously as did the Song Sparrows.

The birds were often in the sun, but neither "sunned" until over a month old, the Song Sparrow on August 12 (38 days), the Cedar Waxwing on August 18 (about 36 days). On the first occasion the waxwing stood with its back to the sun, its head held sidewise, its bill open. The next two days it "sunned" more thoroughly, lying down and spreading out its wings and tail.

Feeding behavior.—Rather unexpectedly this young waxwing never used any wing action when it begged, nor did it often call for food. A bird of this species, perhaps three weeks old, which Dr. Charles Walker had at the Stone Laboratory, Put-in-Bay, Ohio, waved both wings violently when begging and also called fairly constantly. Two well-grown young were begging in this demonstrative manner from a parent in Pelham in mid-August. My bird begged from the Song Sparrows by opening its bill to its widest extent and holding it directed toward them. From July 30 on, it would sometimes shake its body slightly as it begged. It did not gape to me when I offered it food, but either took the food or held its bill closed. From August 6 on, it occasionally gaped to my hand. I last recorded it gaping to the Song Sparrow on August 15 (about 33 days).

When the waxwing's gullet was filled to the brim with berries and it would take nothing more from me, its mouth would fly wide open in an apparently automatic manner if a Song Sparrow hopped up beside it. Herrick (1901: 62) states that if the young do not respond to the approach of the female, she gives a "peculiar clucking sound. . . . At this signal every mouth is opened wide, even if the gullet is already full."

As to the food given Cedar Waxwings in nature, a brood in Michigan (Post, 1916) was fed "animal food" for the first three days, but after that partly berries and partly insects until they left the nest, whereupon they were fed almost entirely fruit; in the course of an entire day two young 18 to 19 days old were fed "93 berries and cherries." A brood in New Jersey was given fruit in the nest and insects after they left it (Littlefield and Lemkau, 1928). My bird took blueberries eagerly, but at first refused insects. (Blueberries and huckleberries were extremely abundant near the nest.) Taking a hint from Mrs. Whittle's experiences (*loc. cit.*), I put small crickets and grasshoppers partly inside blueberries, and in this form they were accepted. By the afternoon of July 30 insects by themselves were readily taken. On July 29 the bird watched a ladybug; it pecked at a small insect, but did not pick up a blueberry I put before it. The next day it jumped into the berry basket and fed itself (17 days); by August 3 (21 days) it fed itself well. Miss Post's captive waxwings first fed themselves at 16 to 17 days of age.

At first my waxwing's favorite foods were blueberries and huckleberries. On July 29 it pecked vigorously at the blue band on one of the Song Sparrows, but ignored the yellow band of the other Song Sparrow. On August 1 I offered it chokecherries, which it took eagerly, but it showed no reaction to small greenish blueberries. Mrs. Whittle wrote that her bird was always attracted by "cherry-color" and Maynard (*loc. cit.*) reports a young bird's apparent attraction to a red handkerchief. On September 5 I placed an aluminum band on one leg of my bird and a red celluloid band on the other;

it worked for some time on the red band, almost completely ignoring the colorless band.

When my bird was about a month old, I noted that it would get hold of berries on branches and shake them until they came loose. On August 15 I brought in some sprigs of blueberry bushes; the waxwing (34 days old) flew directly toward me. Later in the morning I held up a sprig and the bird tried to snatch a berry in flight, succeeding in the second attempt and soon picking off three others, one by one, fluttering in front of the branch.

The waxwing's techniques with insects were much less efficient than were those of the Song Sparrows. It was always awkward in dealing with grasshoppers which I gave it; it would shake them for a bit, then usually drop them several times (I would have to pick them up) before finally swallowing them. On August 24 I put mealworms in a small cold cream jar by the birds' food and water; a Song Sparrow promptly discovered them and ate them one by one, but the waxwing did not notice the cache all morning. Six days later the waxwing came to the jar and threw out three mealworms, whereupon I came, caught them and replaced them. It returned, got a mealworm, tossed it around and swallowed it, then threw out three more.

Herrick (1901: 62) states after watching several nests of this species from a blind that "indigestible substances pass through the alimentary canal, and are never regurgitated in either young or adults." This was true of my bird, but Maynard's (1928) two young birds did regurgitate cherry pits.

The digestion of Cedar Waxwings is unusually rapid. Maynard says that he found on dissecting specimens that "the intestines were much shorter than in any other bird of like size that I had ever examined." Cherries passed through his birds in 20 minutes. I tried three tests with my waxwing; in the first case it had had no berries for several hours, although mealworms, ant eggs and "nestling food" were available; in the other tests an ample supply of blueberries had been on hand. The number of minutes from the taking of food to its excretion were as follows: August 25, blueberries, 28 minutes; August 30, chokecherries (*Prunus virginiana*), 40 minutes; September 1, wild black cherries (*Prunus serotina*), 16 and 24 minutes. Stevenson (1933) in two tests with raspberries on a young Cedar Waxwing found a much longer average period, namely 100 minutes, which was 8 minutes longer than the average time of digestion in 57 tests with 8 species of the Fringillidae. It would be of interest to test this matter with different kinds of fruits and with insects. Heinroth (1924) writes that berries pass through the Bohemian Waxwing (*Bombycilla garrula*) in a few minutes. Waxwings are often called gluttonous, but since the nutritive value of fruit is slight, it is necessary for them to take large amounts. Since the seeds and stones pass through them rapidly and unchanged, these birds must serve as important agents in the dissemination of fruit-bearing plants.

My waxwing excreted frequently during the day—3, 5 and 6 times during sample half hours, but seldom at night. From 8:30 p.m. to 6:30 a.m., August 22-23, the waxwing excreted once, a Song Sparrow 3 times; the next night the corresponding figures were 2 and 4.

Social behavior.—As social companions to this bird the following were important: Cedar Waxwings out-of-doors; people and the two Song Sparrows indoors. On July 29 a waxwing came 4 times, perching near the room and calling; the young bird answered loudly, squeezed out of its cage and tried to get to the window. From August 1 to 6 it seemed fairly indifferent to calls of its species; from the 11th to the 13th it answered with loud calls and flew against the screen. On the 18th I noted that waxwing calls might leave my bird indifferent, but on the 22nd it flew rapidly about the room. This is

the last record I have of waxwing calls, but on August 30 my bird called loudly and flew about rapidly, apparently in response to call notes of a group of migrating warblers and other birds.

Mrs. Whittle's (1928: 83) captive female Cedar Waxwing's "gregarious instincts seemed to express themselves in making the most of human companionship"; she answered when her name was spoken and (p. 85) she "had a particularly demonstrative greeting for me when I appeared each morning, or after other absence." My bird was indifferent toward people except as sources of food. Once there seemed to be some discrimination between me and a stranger, when on August 19 the bird refused to take berries from a young woman who was visiting.

The Cedar Waxwing's social reactions were directed toward the two hand-raised male Song Sparrows, T and A, some 8 and 9 days older than it. (T died suddenly on August 1.) I first installed the waxwing in a cage by itself, but it was able to get through the bars and went through the open door of the Song Sparrow cage. Here it stayed, opening its ruby gape to the widest extent whenever a Song Sparrow entered and hopped up beside it. As a rule the Song Sparrows promptly left, but sometimes they pecked inside the waxwing's mouth, whereupon the latter would try to take the Song Sparrow's bill in its own beak. Although the Song Sparrows never fed the waxwing, twice on July 31 the waxwing was able to snatch insects out of T's mouth.

On July 29 T came into the cage very quickly and hopped up beside the waxwing, who attacked him. They pecked back and forth, then T hopped to the floor and the waxwing begged from him. Waxwings are notoriously slow in their movements and T's sudden actions may have stimulated this young bird to react as to an enemy.

On August 5 while A was taking a bath, the waxwing hurried over to him, stepped into the dish, facing the opposite direction from A, and turned to beg. The waxwing took a few dips and begged once more, while A was absorbed in his ablutions. Much the same thing happened two days later. On August 15 it was plain that the two birds had a strong social bond; they lay in the sun together, preened at the same time, visited the lunch counter together, etc. The next day A was shut in the cage for an hour, and during all this time the waxwing perched on top.

On the 18th and 19th (A 46 days old, waxwing about 38) A occasionally gave a note of antagonism, whereas on the 22nd he pecked at the waxwing; yet they stayed together most of the day. On the 23rd, when the waxwing was about six weeks old, the dominance shifted, and the waxwing opened its bill at A in a mildly antagonistic way. The next day I kept track for ten minutes of the number of times each followed the lead of the other and to my surprise found that the waxwing had followed the Song Sparrow 7 times, while the opposite had happened only once. Certainly here the "despot" was not the leader. This matter of "following" probably depended both on the greater sociability of the waxwing and on the greater activity of the Song Sparrow, which was always doing something new, the waxwing following suit for company. For six nights, from August 28 through September 2, the birds went to roost side by side on a picture frame. On September 3 and 4, A was still on the frame, but W had found new perches. I do not know whether this change had anything to do with a second shift of dominance, but on September 3 when the waxwing pecked at A, the latter drove it off rather vigorously.

Fear.—The extreme attitude of alarm was not seen after the Cedar Waxwing was first taken from the wild. On August 7 it stood erect at the sound of an automobile and on the next day at the squeak of a Morris chair. It paid no attention to a mounted Barred Owl that was shown to it at intervals in August and on September 5. On August

13 a brown cocker spaniel was brought into the room; the waxwing stood erect, then flew about the room and against the screen. Nine days later when the dog was again brought in, the bird merely stood erect. On August 13 (about 31 days old) it paid no attention to A's fear note, *tik tik*. Two days later when A was in the west window and the waxwing in the east window, A gave the fear note and dropped to the floor and hid; the waxwing "froze" with a berry in its bill for almost a minute. Mrs. Whittle states that when the birds at her feeding shelf "froze," her waxwing froze too, once remaining motionless for 20 minutes, although it dropped a juniper berry from its bill after 4 minutes. On August 29, when A gave the fear note and hid, the waxwing stood erect and stiff with depressed crest.

Mrs. Whittle (1928: 82) mentions the loud "piercing danger note . . . sibilant in quality" of her bird. This I heard only four times. On August 22 (about 40 days) I noted the following: "6 a.m. W gave the alarm *seep* for the first time to my knowledge; it is very high and penetrating. 8:30. Gave it again, standing on the cage in the middle of the room. W is erect and elongated, then flies rapidly about. 11:15. W gives the alarm note, stretching out horizontally. Is on top of the mirror and possibly saw something out the window." A did not react to these notes. On August 25 I wished to catch the waxwing, but to my surprise found it difficult. It took mealworms from me, but each time before I could close my hands on it, it escaped above or below. Finally I was successful and the bird gave a high, shrill note that caused the Song Sparrow to drop to the floor and hide instantly.

Notes.—All notes heard from my bird were variations of the well-known waxwing *seeee*. This was habitually given when the bird took off in flight, except that the first few flights in the morning were usually undertaken silently. When ready to bathe, the usual note was given quickly and softly. At times, when with the Song Sparrow, the waxwing gave notes that seemed conversational in quality. The alarm note has already been described. At about 43 and 48 days the waxwing gave what seemed to be a primitive kind of whisper song, a low *zip-zip-zip-zip*, in the meantime standing on one foot. Mrs. Whittle's bird (1928: 82-83) had a "wealth" of notes: "danger," "complaining," "dinner," "bedtime," "nesting," "conversational," and, most surprising of all, "little, trilly sibilant songs of considerable variety"; during the fall and winter she "sang practically all day."

Releasing the waxwing.—On September 6 I carried the waxwing outdoors in a cage; it reacted to the new experience by making itself tall and thin. I took it out of the cage by a huckleberry patch and tried to get it to eat as it sat on my hand. It moved its tongue and mandibles, but did not take a berry. After about 4 minutes it flew with a loud *seeee* to the top of the nearest cedar. A few minutes later with an even louder *seeee* it took off in a wild flight over the trees and out of sight. We never saw it again.

Discussion.—The Cedar Waxwing is a markedly social bird throughout its life; the Song Sparrow is somewhat social during the first months of its life and in fall and winter. There was a close bond between my two young birds despite the active ways of the Song Sparrow and the deliberate ways of the waxwing. Once, on July 31, this difference led to a misunderstanding and a fight; usually it meant that the waxwing, even though dominant, followed the lead of the sparrow. It is probable that the greater sociability of the waxwing also played a role. (One of the most striking instances of this sociability is given by Feltes (1936), who states that if 2 or 3 waxwings were left in a large trap, the entire flock outside, up to 2500 or 3000 birds, would enter.)

A peculiarity of the Cedar Waxwing was its habitual use of the characteristic note whenever it took flight. This species has nothing in its plumage resembling "banner

markings"; its "flight note" is evidently an important device for keeping the flock together, and must be particularly valuable with this bird that is apt suddenly to take off on long flights.

Most young passerines, adopted after leaving the nest, will not take food immediately from a human caretaker. This the waxwing did so far as familiar food was concerned. That I did not fill the place of the "parent companion" (Lorenz, 1937) was evident from the fact that the waxwing did not gape to me nor to the forceps, but reacted to me somewhat as to a food counter. The Song Sparrows, however, more nearly approximated in size, shape, color and general behavior, what had been the parent companion, even though with two exceptions no food was procured from them. The fact that after ten days' stay the waxwing sometimes gaped to my hand might have been partly a matter of confusion at the sudden appearance of something about the size of an adult waxwing, and partly a matter of conditioning, since the bird was fed by me many times a day.

It is impossible to decide without prolonged experiment whether the attraction to blue (in this bird) and red (in this bird and two others) is inborn or learned. Several writers (Herrick, 1901; Allison, 1906) note that the assumption when alarmed of the erect, elongated, motionless attitude causes the bird to resemble a dead branch and thus must be of survival value.

SUMMARY

1. A young Cedar Waxwing that had just left the nest was kept under observation for six weeks.
2. Courtship feeding had been noted during the nest building of the parents.
3. A brief summary is given of the social nesting habits of this species as reported by other observers.
4. The young waxwing took its first bath at about 22 days of age and was first seen to "sun" itself at about 37 days.
5. The molt of the body feathers started at about six weeks.
6. Until nearly five weeks old, the bird gaped regularly to the hand-raised Song Sparrows which were about 8 days older than it, but it seldom gaped to me. It would gape to the Song Sparrows in a seemingly automatic manner after its gullet was entirely filled with berries.
7. Its technique in dealing with grasshoppers and mealworms was awkward.
8. It was attracted by blue and red objects, but ignored a yellow celluloid band and greenish, unripe berries.
9. Fruit passed through the digestive system in 16, 24, 28 and 40 minutes. This rapid and incomplete digestion makes it clear that the Bombycillidae are important disseminators of fruit-bearing plants.
10. In its relation to people this bird showed only "food-tameness." There was a strong social bond between it and the surviving Song Sparrow, the waxwing usually following the sparrow. From August 18 to 22 the Song Sparrow was dominant; after that the waxwing was dominant until September 3.
11. On August 15 the waxwing reacted to signs of fear in the Song Sparrow. On August 22 it was first heard to give the alarm note; on the 25th when it gave it loudly, the Song Sparrow reacted instantly.
12. During the daytime the Cedar Waxwing almost invariably gave its note as it took off in flight, but in the early morning the first few flights were usually silent.

LITERATURE CITED

- Allison, A.
1906. Notes from Hancock County, Mississippi. *Auk*, 23:232-233.
- Crouch, J. E.
1936. Nesting habits of the cedar waxwing (*Bombycilla cedrorum*). *Auk*, 53:1-8.
- Feltes, C. H.
1936. Trapping cedar waxwings in the San Joaquin Valley, California. *Condor*, 38:18-23.
- Gross, W. A.
1929. A cedar waxwing study in Northern Michigan. *Bird-Lore*, 31:178-182.
- Heinroth, O. and M.
1924. *Die Vögel Mitteleuropas* (Berlin, Hugo Bermühler) 1:57-58.
- Herrick, F. H.
1901. *The home life of wild birds* (New York, G. P. Putnam's Sons), xix + 148 pp.
1935. *Wild birds at home* (New York, D. Appleton-Century Company), xxii + 345 pp.
- Littlefield, M. J., and Lemkau, F.
1928. History of a cedar waxwing family. *Bull. Northeastern Bird-Banding Assoc.*, 4:85-89.
- Lorenz, K.
1937. The companion in the bird's world. *Auk*, 54:245-273.
- Maynard, C. J.
1928. Notes on the cedar waxwing (*Bombycilla cedrorum*). *Bull. Northeastern Bird-Banding Assoc.*, 4:73-76.
- Post, K. C.
1916. The cedar waxwing (*Bombycilla cedrorum*) during July and August, 1916. *Wilson Bull.*, 28:175-193.
- Saunders, A. A.
1911. A study of the nesting of the cedar waxwing. *Auk*, 28:323-329.
- Stevenson, J.
1933. Experiments on the digestion of food by birds. *Wilson Bull.*, 45:155-167.
- Whittle, H. G.
1928. The biography of a cedar waxwing. *Bull. Northeastern Bird-Banding Assoc.*, 4:77-85.
- Chicago, Illinois, October 17, 1940.*