

OBSERVATIONS ON THE BEHAVIOR OF A YOUNG COWBIRD

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ON June 12, 1939, in a small spruce on the W. K. Kellogg Bird Sanctuary at Augusta, Michigan, I found a Cowbird (*Molothrus ater*), apparently one day old, in the nest of a Chipping Sparrow (*Spizella passerina*). The nest contained three young of the host, one apparently just hatched, the others probably a day old. The next day the youngest sparrow was gone. On June 17 the nest was found tilted and empty and the three little birds were on the ground begging for food. After reinforcing the nest and ascertaining that the adults were caring for the young, I took the Cowbird out for a while, putting it in an empty nest to photograph it; in this situation it gave the "location note"—yip—several times.

DEVELOPMENT OF THE HAND-RAISED COWBIRD

The next day I took the seven day Cowbird into the house and put it into a Song Sparrow nest in a strawberry basket. Two days later I gave it a six day Song Sparrow (*Melospiza melodia*) for a companion. The Cowbird readily took the insects, dried ant eggs, hard-boiled eggs and bread crumbs which I fed it about once an hour. It reacted to jarring of the nest, to the approach of the caretaker, and after 24 hours to the sight of the forceps. On the whole it was a phlegmatic, inactive bird. When it was nine days old I found that it had lost nearly a gram in weight since its adoption (from 21 to 20.4 grams). I therefore returned it to its foster parents where it gained two grams in six hours. Upon finding that it still begged for food when it saw the forceps, I took it home again.

The age at which different activities were observed is shown in Table 1. The dates for six of the activities (marked with a single asterisk) are late, due partly to the lack of continuous observation and partly to the fact that the bird was not as well nourished in captivity as it would have been in the wild.

Fear, evidenced by cowering, was seen at 7, 8 and 9 days, particularly when the bird was taken out-of-doors for purposes of photography.

Wing movement, when begging, was first seen at 7 days; it was a lateral movement involving only the manus and carpus (Friedmann, 1929:276). This became more pronounced and was still strongly in evidence up to the age of 25 days when the bird died by accident. At 11 and 12 days, however, wing action was more violent and the humerus was involved; motion pictures of this activity were obtained by Dr. Miles Pirnie. I have examined 11½ feet (3.5 meters) of this film, counting the frames which show motion of the wings. In the 28 seconds covered by this piece of film, wing flapping occurred 18 times,

each spell lasting from one to 19 frames, the great majority lasting from 3 to 6 frames, the median being 4. Since 16 frames are taken each second, this means that the wings were usually moved for a fifth to a fourth of a second, then kept quiet for perhaps twice as long before being again fluttered. The Cowbird practically always used both wings simultaneously, whereas a Song Sparrow often uses only one.

TABLE 1

FIRST APPEARANCE OF SOME ACTIVITIES OF YOUNG COWBIRD			
6 days	Location call.	13 days	Took one step
7 days	Shivered wings when begging. †Cowered (7-9 days)	14 days	Wiped bill Pecked at insect
8 days	*Stretched wings up *Stretched up on legs *Stretched wing sidewise Stood on tarsi Stood on one foot Fanned wings	15 days	Walked and ran *Scratched head
		16 days	Bathed Yawned Drank out of dish
9 days	*Preened †Stretched both wings down (9-10 days)	17 days	Picked up food
		18 days	Pecked at young Song Sparrows
10 days	Left nest	21 days	Antagonism note
11 days	†Hopped (11-14 days) Flew Shook self †Fluttered wings when begging (11-12 days) Assumed adult sleeping posture	22 days	Caught mealworm
		23 days	*Squealed
		24 days	Pointed bill up

* These dates are somewhat late. Shaver's Cowbird "began to stretch and preen his feathers" at 6 days (1918:10). Friedmann recorded preening on the "sixth or seventh day" (1929:273). He noted scratching of the head apparently before the bird left the nest (1929:276). He says, "Fear is first observed at about the ninth or tenth day although even then it is hardly developed" (1929:278). He does not mention any "squeal." Although young Song Sparrows often scream when banded, only one of the 42 nestling Cowbirds I banded in Ohio did so; this was a nine day old bird which I had kept in the house over night.

† These four activities were of temporary duration.

At 8 days it stretched its wings in the two ways common to all carinate birds—both wings up, and one wing sidewise. Later in the day it stretched upward on its legs. Occasionally it stood on the tarsi and once on one foot, but for the most part it lay in the nest.

A temporary stage in stretching was shown at 9 and 10 days, namely, stretching of both wings down. This does not seem to have been described in the literature (Heinroth, 1930, 1938), but I have noted it in four species: in Common Redstarts (*Phoenicurus phoenicurus*)

at 12 and 13 days and a European Cuckoo (*Cuculus canorus*) at about 3 weeks when I was studying with Dr. Konrad Lorenz in Altenberg, Austria in June 1938, and also in 5 different Song Sparrows at 8 and 9 days in Massachusetts and Michigan.

Fanning of the wings was first noted at 8 days. Two days later a violent spell of fanning carried it out of the nest, but I got it to return. The next morning it hopped out and then flew 30 centimeters to the spot where I was feeding the Song Sparrows. For three days it entered either of the nests and spent considerable time in them with the Song Sparrows.

The Cowbird hopped at first. At 13 days I saw it take one step, but hopping was its mode of progression until the age of 15 days when it no longer hopped, but walked and ran. The Prairie Horned Lark (*Otocoris alpestris praticola*) hops on leaving the nest at 10 to 11 days. "Walking is not learned for several days and when first attempted is a slow waddle with legs spread widely" (Pickwell, 1931:193). Ovenbirds (*Seiurus aurocapillus*) also hop from the age of 8 to 11 days. At 10 days one brood "took steps about half of the time," while a bird of 11 days "flew, ran and hopped" (Hann 1937: 193-4).

The Heinroths (1924-32) give information on this subject in 8 passerine species that normally walk as adults. Six hop at first: Sky Lark (*Alauda arvensis*), Crested Lark (*Galerida cristata*); Savi's Warbler (*Locustella luscinioides*), Magpie (*Pica pica*), Hooded Crow (*Corvus cornix*) and Raven (*Corvus corax*). These leave the nest at the following ages in days—9, 9, 12-14, 21, 35, and 40 respectively. Two species, however, walked from the beginning: Grasshopper Warbler (*Locustella naevia*) leaving the nest at 11 days, and the Rock Sparrow (*Petronia petronia*) which left at 3 weeks. Lorenz (1937b) mentions the early hopping of Corvidae, pipits and larks as an atavistic trait.

The Cowbird was far less active than the Song Sparrows that were 3 and 4 days younger. At 11 days it flew 30 centimeters and later 130 centimeters from the table to the floor; at 15 days it flew 160 centimeters. It had not perfected landing even at 23 days.

On June 23 the Cowbird often hopped into the Song Sparrows' nest or on to the edge while they were being fed. In the latter situation the 8 and 9 day Song Sparrows begged from the Cowbird and it from them. The next day the oldest Song Sparrow left the nest; it begged from the Cowbird, pursuing it and hopping on it, while the Cowbird reciprocated by begging from the Song Sparrow.

It was first offered a bath at 16 days. It climbed into the dish and drank for the first time by dipping the beak in and raising it, although from the age of 13 days it had drunk water from my finger. It crouched down, but not enough to touch the water with its body, and went through the bathing movements above the water. It then crouched down further, bathing in proper style, using the wings simultaneously, afterwards using them alternately. It shook itself, but failed

to continue with activities which would tend to dry it. That afternoon when sprinkled with water it bathed while Dr. Pirnie took motion pictures. It did not bathe again although a pan was constantly on hand.

When the Cowbird was 17 days old and the Song Sparrows 13 and 14 we brought them to Chicago. My adult, hand-raised male Song Sparrow, Y, at once came to the cage; the Cowbird shivered its wings and called, but the young Song Sparrows gave no reaction. (They had not been fed by a bird since the age of 6 days.) As long as it lived it continued to beg with unabated zeal from the adult and young Song Sparrows whenever they approached, although it never received food from any of them. It also begged at the approach of any person.

It first started to pick up food at 17 days, but it did this very little until the age of 22 days.

At 18 days I saw the first sign of hostility on the Cowbird's part; it pecked the young Song Sparrows when they landed on its back. At 21 days it gave a "snarling" note at one of the young birds and the next day at Y (the adult Song Sparrow).

At 23 days I recorded a new note: "Cowbird flies over on top of Y's cage and begs. Y attacks, Cowbird squeals and stays. Y approaches again; Cowbird looks down and begs and begs. Cowbird then flies around the room giving another squeal. Is very awkward in comparison with the young Song Sparrows."

At 24 days after it had begged from two young Song Sparrows, it raised its head and pointed its bill at the ceiling, suggesting the behavior of adult male Cowbirds on meeting one another.

WEIGHTS

The Cowbird weighed 21 grams at 7 days, 20.5 at 11 days, 29 at 21 days and 29.8 at 23 days. These weights are much lower than those given by Friedmann (1929:263-266) where three birds ranged from 24 to 31 grams at 7 days, one reaching 33 grams at 9 days. Pickwell's bird weighed only 16.8 grams at 7 days, Herrick's (1935:71) two individuals weighed 21.4 and 23.4 grams at 7 days, the latter reaching 30.8 at 10 days. Five Cowbirds weighed by Hann averaged 24.8 at 7 days, and averaged 26.6 at leaving the nest. At Columbus, Ohio, the following weights were recorded: 27.2 grams at 6 days; 23.3, 24.5 and 26 grams at 7 days; 24.5 and 31 grams at 8 days; 17 grams at 9 days; and 29.7 and 31.5 at 10 days (Nice, 1937:223).

A number of factors probably play a part in these differences in weight. "Parental" care would seem to be the most important. Size of the egg has an influence, at any rate in the early days. I found fresh eggs ranged in weight from 2.7 to 4 grams. Still another possible factor is sex. Adult females at Columbus averaged only 76 per cent as heavy as adult males (Nice, 1938); it may well be that a differential growth rate operates even with nestlings. This is true with some hawks.

INSTINCTIVE AND LEARNED BEHAVIOR

The activities listed in the Table are instinctive actions. They are not modified in form by learning or experience. Some appeared later with my bird than under natural conditions because of its retardation in growth due to artificial feeding.

From the age of 7 to 11 days the Cowbird's environment differed from natural conditions chiefly in the change of parent Kumpan (Lorenz, 1935, 1937a) from a bird to a human being; yet its stay of six hours at the age of 9 days with its foster parents must not be forgotten. After it left the nest, its environment consisted largely of a cage, a table, dishes for food and water, and household furniture; instead of being alone and being fed by Chipping Sparrows, it had the company of Song Sparrows a few days younger and was fed by people. In this situation it reacted to Song Sparrows aged 8 to 21 days and an adult, and also to human beings, as its parent Kumpan. The sight of an approaching bird released its begging reactions and constant frustrations from the age of 12 to 24 days seemingly had no influence towards inhibiting this response. The reaction to persons was learned. The stay with the foster parents when 9 days old may have had something to do with the persistence of the innate perceptual pattern (Craig, 1938) of a bird as the parent Kumpan; this might have been the opportune time for imprinting (*Prägung*) (Lorenz, 1935, 1937a).

We once tried to capture a Cowbird about three weeks old that was being fed by Wood Pewees (*Myiochanes virens*) but it would not allow us to approach nearer than 5 meters.

It has often been observed that the nestling Cowbird does not react to the alarm notes of its foster parents (Friedmann, 1929: 273; Hudson, 1920, I:84 with *M. bonarensis*); how then does the somewhat older bird learn to fear human beings? Three possibilities suggest themselves. Fear might be suggested to the young bird by the action (precipitate flight) of the foster parent. Or an understanding of the alarm note of the foster parent might come to the young bird at some time between leaving the nest and independence—a matter of maturation; it is common knowledge that adult birds understand the alarm cries of many other species. Or it might simply be that any large moving object is feared until proved harmless. It would be interesting to know how Cowbirds are attracted to cows. Is it a matter of tradition, the young following adult example? Friedmann (1929:279) mentions a flock of about 300 Cowbirds on August 22 in the "Buffalo Enclosure" at the New York Zoological Park. "There was not a single adult bird in the flock, all being young birds in the process of molting."

DOES THE YOUNG COWBIRD SHOW ANY ADAPTATION TO
NEST-PARASITISM?

The Cowbird's egg does not show adaptation to parasitism. It is

normal in size instead of reduced as is the European Cuckoo's. Its incubation period—11 to 12 days with the Ovenbird (Hann) and Song Sparrow (Nice, 1937) as hosts—corresponds with that of its relative the Red-winged Blackbird (*Agelaius phoeniceus*). Despite the reiterated statement that the incubation period is only ten days, I have yet to see a definite instance of an incubation period of the Cowbird shorter than eleven days.

It has been said that, "The young Cowbird usually tries to trample on the other young in the nest." (Friedmann, 1929:276.) I have never found this to be true, either in my extended experience in Ohio with the Cowbird as parasite of the Song Sparrow, or in the intensive observation on this hand-reared bird. Hostility—and then only to a slight degree—first appeared at 18 days, one day later than I have noted it in the Song Sparrows.

Unlike the young European Cuckoo, the young Cowbird has no instinct to evict the other occupants of the nest. I have always found it a peaceable occupant of the nest. Its large size, however, may bring death to some or all of its nest-mates, either by crushing or starvation. The near-disaster mentioned in the first paragraph was presumably due to the activity of the Cowbird in an unusually frail nest.

The only respect in which my young Cowbird seemed adapted for a parasitic life was its persistent begging from every Song Sparrow old or young. We do not know, however, how much this was conditioned by the individual experience of this bird, nor how persistently, for instance, a Song Sparrow under like circumstances would beg from other birds. We need many more experiments before we can say whether or not the young Cowbird shows any adaptation for a parasitic life.

SUMMARY

A Cowbird was kept in the house from the age of 7 to 25 days, and the first appearance of different instinctive actions noted.

Weights of nestling Cowbirds are given from five sources and the question raised as to the possibility of a sex difference in size during nest life.

The matter of instinctive and learned behavior is discussed.

The eggs of the Cowbird show no adaptation for parasitism.

There appears to be no conclusive evidence that the young Cowbird shows any such adaptation.

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