

Finch (*Carpodacus purpureus*) but with an occasional harsh jaylike note. A certain ventriloquistic quality made it seem to be coming from trees farther off. The song lasted about 25 to 30 seconds. References in the literature to this type of song are rare indeed. Probably the closest description to the one we heard is that given by Warren (*Auk*, 16: 14, 1899). Lawrence (*Auk*, 74: 260, 1957; *Audubon Mag.*, 62: 287, 1960) described a similar song, which she called "displacement singing," uttered in moments of frustration when there arises "a conflict between two drives which possessed the jay, the urge to feed and the urge to flee, caused by hunger and the finding of food in an unapproachable place." The latter situation was probably the case with our bird. However, Lawrence's assumption that there is a correlation between this song and the breeding season can hardly be applicable in the present instance.—O. E. DEVITT, 83 Harding Blvd., Richmond Hill, Ontario.

The Effect of Parasitism by the Brown-headed Cowbird on Empidonax Flycatchers in Michigan.—In Michigan three of the four *Empidonax* flycatchers are periodically parasitized by the Brown-headed Cowbird (*Molothrus ater ater*). The incubation period of the Cowbird eggs in two Field Sparrow (*Spizella pusilla*) nests that I followed in June 1945 was 12, possibly 13, days. Following is a summary of my observations of many nests of the four *Empidonax* flycatchers in Michigan.

YELLOW-BELLIED FLYCATCHER (*E. flaviventris*). I have observed six nests of this species of which none were parasitized by Cowbirds. Due to the type of habitat used, usually spruce-sphagnum bogs or alder-grown areas, the species is seldom parasitized. The incubation period at one nest in Schoolcraft County in June-July 1956 was 15 days.

ACADIAN FLYCATCHER (*E. virescens*). In 67 nests, the contents of which were known, 16 (24 per cent) were parasitized by Cowbirds. Table 1 shows in more detail this parasitism.

All nests had only one egg, except for one that had three Cowbird eggs. Three nests containing three host and three Cowbird eggs were deserted. Two Cowbird eggs disappeared from nests, one of which could have fallen through the bottom of the nest; the other could probably have been removed by the host. Two eggs were built into the bottom of the nests in which they were found. Thus seven eggs had no chance of survival. Of the remaining 11 eggs six hatched, and all six fledged, one from each of six nests. In all six cases no Acadian Flycatcher young fledged. In all but possibly one case no flycatcher eggs even hatched.

In six nests in which the incubation period (the period between the laying and hatching of the last egg) of the Acadian Flycatcher was known in Calhoun County, two were 13 days; three, 14 days; one, 15 days. In one nest in Oceana County this period was 14 days. Nestling periods of the Acadian Flycatcher in Calhoun County have been: one, 12 days; one, 13 days; five, 14 days. In Muskegon County, one was 13 days.

When the young Cowbird hatched, always prior to the hatching of the host eggs, the Acadian Flycatcher abandoned continuous incubation, and its eggs failed to hatch. In most cases its eggs remained in the nest even when the young Cowbird fledged.

In all parasitized nests the Cowbird eggs were laid in June. Among banded birds I have found several instances of the Acadian Flycatcher raising two broods

during one season. The eggs of the second brood are usually laid in mid-July, and in no case have I found a second set that contained a Cowbird egg.

TRAILL'S FLYCATCHER (*E. traillii traillii*). In 53 nests that I have observed, only four (7.5 per cent) have been parasitized by Cowbirds.

One Cowbird egg was laid in each of these four nests. One was destroyed; a second was built in the bottom of the nest and deserted; two each produced only one young Cowbird, and in one nest, three of the host eggs remained in the nest even after the young Cowbird left the nest. None of them hatched.

Since the Traill's Flycatcher nests along marsh borders in small shrubs, it is much less susceptible to parasitism by Cowbirds than is the Acadian Flycatcher.

LEAST FLYCATCHER (*E. minimus*). Although many nests of the Least Flycatcher were found, the contents of many nests were not known. I found only two (9 per cent) of 22 nests parasitized by the Cowbird. One was immediately deserted; the other produced only a young Cowbird. These nests were in cutover woodland, and most of them were in Muskegon, Oceana, Schoolcraft, and Alger counties. At one nest in Charlevoix County the incubation period of the Least Flycatcher was 13 days. At a nest in Muskegon County the nest was destroyed 12 days after the laying of the last egg, and the eggs still had live embryos when I

TABLE 1
SUCCESS OF ACADIAN FLYCATCHER EGGS AND NESTS

County in Michigan	Nests	Nests in which eggs hatched	Nests in which young left	Eggs laid	Eggs hatched	Per cent	Young fledged	Per cent
<i>Unparasitized</i>								
Calhoun	21	15	14	57	36	63.14	33	57.89
Muskegon	24	22	18	67	50	74.63	44	65.67
Others ¹	5	4	3	14	9		7	
Total	50	41	35	138	95	68.84	84	60.87
<i>Parasitized</i>								
Calhoun	9	1	1	15 11 ²	2 5 ²	13.33 45.45	2 5 ²	13.33 45.45
Muskegon	5	3	3	13 5 ²	4 1 ²	30.77 20.00	4 1 ²	30.77 20.00
Others ²	2	0	0	2 2 ²	0 0		0 0	
Total	16	4	4	30 18 ²	6 6 ²	20.00 33.33	6 6 ²	20.00 33.33
Complete Total	66	45	39	168	101	60.12	90	53.57

¹ Allegan, Barry, Jackson, and Oceana counties.

² Branch and Kalamazoo counties.

³ Cowbird egg or young.

The Barry, Calhoun, Jackson, and Kalamazoo county areas were woods, unpastured but surrounded by tilled farmland. The Muskegon, Oceana, and Allegan areas were natural, unpastured, wilderness areas. The Branch County area was along a river in a village.

TABLE 2

SURVIVAL OF NESTS AND EGGS OF THE EMPIDONAX FLYCATCHERS IN MICHIGAN

Species	Nests	Nests in		Per cent	Eggs laid	Eggs hatched	Per cent	Young fledged	Per cent
		which eggs hatched	which young fledged						
<i>E. flaviventris</i>	4	4	—		16	15	(100)	—	—
<i>E. virescens</i>	66	45	39 ²	(59.1)	163	101	(60.1)	90	(53.6)
<i>E. traillii</i>	43	23	23 ³	(53.5)	139	80	(57.5)	76	(53.9)
<i>E. minimus</i>	16	10	9 ⁴	(56.2)	56	42	(75.0)	34	(60.7)
Total ¹	125	78	71	(56.8)	363	223	(61.4)	200	(55.1)

¹ *E. flaviventris* not in totals (the 100 per cent hatch was because the 16th egg was collected).

² Six nests of *E. virescens* produced no young Acadian Flycatchers, but each produced one young Cowbird.

³ Two nests of *E. traillii* produced no host young but each one Cowbird.

⁴ One nest of *E. minimus* produced no host young but one Cowbird.

examined them where they lay on the ground beneath the nest site and would have hatched in about a day. All nests of the Least Flycatcher were built in tall, spindly trees except two built out on horizontal branches high above the ground.

SUMMARY

In Michigan three of the four *Empidonax* flycatchers have been found parasitized by the Brown-headed Cowbird (*Molothrus ater*). The fourth, *E. flaviventris*, nests on the ground in bogs or damp, alder-grown areas in the northern part of the state so at present is not susceptible. Only six nests of this species have been found in Michigan, and all were without Cowbird eggs.

The Acadian Flycatcher (*E. virescens*), which nests in dense, unpastured woodlands primarily in beech and hemlock in southern and western Michigan and only in the southern part of the state, is the most susceptible to parasitism by Cowbirds. In 67 nests, 16 (24 per cent) were parasitized. Traill's Flycatcher (*E. traillii*) is less susceptible. Only four of 53 nests (7.5 per cent) were parasitized. Only two of the 22 nests examined of the Least Flycatcher (*E. minimus*) were parasitized. Of these 22 parasitized nests nine produced one Cowbird each. Yet in all nine nests not one flycatcher was fledged, and in all but possibly one nest the host eggs did not even hatch.

The Brown-headed Cowbird with a shorter incubation period hatched in all cases prior to the hatching of the flycatcher eggs. Apparently, the female flycatcher abandons steady incubation by the next day, and the flycatcher eggs then fail to hatch. The flycatcher incubation periods have ranged from 13 to 15 days, while the Cowbird incubation period was 12-13 days.

In three cases the Cowbird egg was built right into the bottom of the nest (*E. virescens*, 2; *E. traillii*, 1). Five nests were deserted (all three species), and in one nest of *virescens* an egg disappeared, indicating that it was pushed out by the flycatcher.—LAWRENCE H. WALKINSHAW, 819 North Ave., Battle Creek, Michigan.