

A NESTING OF THE LEAST FLYCATCHER

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IN 1954 we found a nest of *Empidonax minimus* at Delta, Manitoba, conveniently situated for observation. Although both of us were primarily engaged in studies on precocial birds, this discovery seemed to us an excellent opportunity to become better acquainted with the habits of these engaging little birds.

At that time little had been published on the nesting behavior of this species. Saunders (1938) had reported on 13½ hours of watching by his students at a nest in Allegany State Park, New York. De Kiriline (1948) had given a general picture of the nesting behavior of eight pairs, only one of which raised its brood, at Pimisi Bay, Ontario. MacQueen (1950) had studied a "colony" of these birds for three summers at Douglas Lake, Michigan; she found 44 nests, but her paper deals almost entirely with territory and song, with a brief summary of the events of the nesting cycle.

In 1959, however, Davis published an important paper on a "colony" of Least Flycatchers studied by him and his students at Mountain Lake, Virginia from 13 June to 18 July 1956. Besides treating territorial behavior and voice, he summarizes the results of 36 hours' observation of rhythm of incubation in a number of nests and 103 hours' observation of the care of the young in seven nests; these hours were well distributed throughout the day from 0430 to 2000. He also kindly gave me further details on those nests watched while holding young.

Our nest was discovered on 23 June 1954, 1.5 meters up in an alder next to the library of the Delta Waterfowl Research Station. This pair had no near neighbors of the same species, so there was no opportunity to observe territorial behavior. Four eggs were laid from 27 to 30 June; steady incubation was in progress by the 29th. One nestling hatched between 0900 and 1100 on 13 July; at 2000 the nest still held one chick and three eggs. At 0800 the next morning there were two nestlings and one egg; this egg never hatched. As the eggs were not marked, the length of incubation in this nest is uncertain. De Kiriline reports it as 15 days; MacQueen as 15 to 16. The young left on 27 July at 13 and 14 days of age.

A burlap blind was constructed by Collias so that the nest could be watched from a distance of about 1 meter. He observed the nest for two hours on 28 June, and he and Elsie C. Collias watched it for four hours from 14 to 18 July. My daughter Constance and I watched the nest every day for one to three hours from 14 to 27 July, a total of

20 hours. Eleven of the 24 hours spent by all of us at the nest in July were in the morning and 13 in the afternoon, the latest ending at 1742. The parents were distinguishable by appearance as well as by behavior and voice; only the female had an eye ring, and, furthermore, was lighter in color than was her mate.

VOICE

All of us recorded soft *tsips* and *whits* from both parents, as well as twitters and chatters, and also a gentle and melodious trill lasting one or two seconds and barely audible from the blind. All these notes seemed to be greetings to the mate or young. Collias experimented with a nestling the day after it hatched; it responded to a low, soft whistle by promptly gaping, but paid no attention to a clucking sound. This experiment was repeated 10 times and gave identical results. Both parents often gave a sharp, explosive *quit* when alarmed by human beings or other potential enemies.

The daytime song of the Least Flycatcher is the well-known *che-bec*, which Davis considers the "male position note." Our bird gave it often when approaching and leaving the nest.

The twilight song of the Least Flycatcher received special attention from MacQueen; she describes it as a rhythmic, continual series of *che-becs* uttered about 60 times a minute. Winsor M. Tyler (Bent, 1942: 222) counted 60 and 75 songs per minute from a bird that started singing at 0318 on 18 June 1912. MacQueen (1950: 201) gives a very interesting table showing the beginning and ending of the twilight song in the Least Flycatchers for 10 mornings from 29 June to 2 August 1946, as well as times of civil twilight and sunrise. On five days she adds the beginning and end of the Eastern Kingbird's (*Tyrannus tyrannus*) twilight song. On 29 June 15 Least Flycatchers were singing, by 18 July their number had decreased to 10, by 22 July to 4, and on 1 August to 1. On 18 July the kingbird began 60 minutes before sunrise and sang for 30 minutes; the flycatchers began 30 minutes before sunrise and sang for 25 minutes.

Unfortunately, we did not watch for this song from our bird until 18 July. I started to listen at 0330; at 0401 there was a single *che-bec* and that was all from our flycatcher. An Eastern Kingbird gave his twilight song from 0402 to 0414. I watched the sunrise at 0420. Our bird evidently had given up his twilight song. MacQueen noted that "Many males singing in adjoining territories seem to stimulate one another." Such stimulus was lacking for our bird. Davis (1959:

77-78) describes the varying amounts of singing of 13 males, but gives few details on the twilight song.

EGG LAYING

On 28 June Collias watched the nest from 0510-0710. The female laid her second egg between 0525 and 0540, pressing down her tail and pumping it slightly; she raised her rump feathers and once seemed to "strain" forward. She returned to the nest five times before 0710. Once the male fed her. The next morning she was incubating steadily. She alone incubated, as has proved true in all species of the Tyrannidae that have been carefully studied (see Skutch, 1960: 575).

CARE OF THE YOUNG

After the second young hatched, the nest was watched each day for one to four hours until the young birds left. Only the female brooded. During the first four days she brooded from 70 to 80 per cent of the time watched, on the next two days 65 per cent of the time. After that there was no brooding, but some shading by the female from the seventh to the 11th day. Davis reports much the same amount of brooding for the first five days—from 72.9 to 77.3 per cent. The sessions on and off the nest of our bird were usually short; 68 of the former during the first week lasted from 1 to 35 minutes, the median being four minutes; 63 of the latter during the same period lasted from 1 to 10 minutes, the median being three minutes.

Very small insects were brought, apparently no more than one at a time. The rate of feeding increased from an average of 5.7 per hour during the first five days to 8.4 during the next five days to 12 during the last three days. Like Davis, we found that the rate of feeding "more than doubles from early to late nestling stages." The highest hourly rate of feeding was 13, recorded both on days 8 and 12.

In 23 hours of observation with two young in the nest, the male brought 92 meals and his mate 70, a total of 162, an average of seven per brood per hour. Interestingly enough, this corresponds closely with Davis' results of 25.5 hours throughout nest life on a brood of two—namely 7.2 times. In two nests with three young watched for 15 hours, and three nests with four young watched for 62 hours, the average for the 77 hours was almost double—14.2 per hour.

The rate of feeding per bird throughout nest life was 3.5 times an hour for both Davis' and our birds. This corresponds well with the median of 3.7 meals per young for 14 broods of 10 species of passerines

in Table XXV in my monograph (1943: 235) on the behavior of the Song Sparrow.

De Kiriline observed feeding rates of four young Least Flycatchers of 6.4 times per hour early in nest life and 24 times per hour for three hours when the young were 12 days old. The female brought two-thirds of the meals. At Saunders' nest with two young only the female was present; she fed from 7-37 times an hour, averaging 24 times in 13½ hours. An amazingly high figure from MacQueen's manuscript is given by Kendeigh (1952: 239), namely an *average* of 33.8 meals per hour for three nestlings from 2-13 days of age, the male parent making two-thirds of the trips. Most of the observations must have come late in nest life.

As to sanitation at our nest, the male was seen to swallow 15 excreta during the first five days, the female seven in the first six days. The male removed 15 in the last eight days, the female six. Thus excreta were disposed of after 28 per cent of the feedings, a figure that compares well with the median rate of 25 per cent for 35 studies in 28 species (Nice, 1943: 237).

DEVELOPMENT OF THE YOUNG

One of the Least Flycatcher nestlings was taken by Collias ". . . for a while from the nest early on the second day after it had hatched, and it gave very light notes, each sounding like *tsip*, whenever it was shaken gently (in imitation of the parent landing on the nest), or rubbed gently on the head and foreback (in imitation of parental brooding), or on being warmed after having cooled a bit."

As to comfort movements, preening was first seen at seven and eight days; it was vigorously performed at 12 to 13 days. Wing fanning was first noted at 10 days, stretching wings and legs up and also wing and leg sidewise at 11 days, stretching both wings down at 12 and 13 days, scratching the face over the wing at 12 days and shaking selves at 13 days. Pecking at feathers on the rim of the nest and at the supporting branch was seen at 12 and 13 days.

On 27 July the 14-day nestling had left before 0937. Fourteen days is the age of departure given by de Kiriline and MacQueen; Davis says this occurs about the 15th-16th day. The 13-day nestling was sitting on the edge of the nest, fanning its wings, stretching both wings down, napping with head in the scapulars and preening. It did not flutter its wings when fed. It snuggled down into the nest but soon was up again on the edge, fanning madly; it jerked its short tail up and down, then hopped across the nest. The parents brought eight

meals in 47 minutes. At 1026 it climbed out, fluttered 25 cm. up the branch, then flew 30 cm. to a small branch. A parent came to the nest, took two fecal sacs and left. The baby sat 60 cm. away preening. Six minutes later—at 1032—it turned about and flew out of sight. It was not possible for us to find either of the fledglings again.

SUMMARY

A nest of the Least Flycatcher with two young was watched from one to four hours each day for 13 days for a total of 23 hours. The female brooded during the first four days from 70 to 80 per cent of the time watched; during the next two days she brooded 65 per cent. The brood was fed by both parents on an average of 5.7 times an hour during the first five days, 8.4 times an hour during the next five days, and 12 times during the last three days, the average for the whole time being seven. This compares closely with Davis' (1959) average of 7.2 times an hour for 25.5 hours' observation at a nest with two young. Excreta were eaten or removed after 28 per cent of the feedings. Vocal signals used by parents and young at the nest are described. Ages at which seven comfort movements were first seen are given, as well as an account of the nest leaving of the last fledgling at the age of 13 days.

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