

NESTING OF THE GRAY FLYCATCHER<sup>1</sup>

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THE history of the flycatchers of the genus *Empidonax* of the southwestern United States is confused. For *Tyrannula obscura* Swainson, Baird (in Baird, Cassin, and Lawrence, 1858: 200) proposed *Empidonax wrightii* as a substitute and designated a type specimen from El Paso, Texas. Among the group going under this name, Brewster (1889: 87) recognized the Gray Flycatcher as *Empidonax griseus* and the existence of two species became acknowledged. Under the name *E. griseus*, the Gray Flycatcher ran into further confusion.

Grinnell (1908: 78-82) reported it breeding in the San Bernardino Mountains of southern California, giving natural-history notes. He later discovered (1915: 93) that the species as envisaged at the earlier date was a composite including "in part *E. obscurus*, *E. wrightii*, and *E. canescens*" and observed that so far as known *E. griseus* occurred in California only in the southern deserts in winter. His natural-history notes from the San Bernardino Mountains must therefore apply to the more northern form, the Wright's Flycatcher.

Willett (1912: 65), in the meantime, considered all previous records of *E. griseus* in southern California as referable to *E. wrightii*. Dawson (1923: 896-900) after reviewing the literature and his own experiences, concluded that in southern California, "*griseus* is evidently the bird of the open sage and *wrightii* is the bird of the timbered mountains." He describes the nest and eggs of the Gray Flycatcher clearly for the first time.

Even at late as 1928, Mrs. F. M. Bailey (1928: 440) seems to have the habitat, nest and egg descriptions of the Gray Flycatcher hopelessly mixed with those of the Wright's Flycatcher, probably having adopted them from Grinnell (1908, op. cit.), the only reference she gave.

Linsdale (1936: 77) characterizes the Gray Flycatcher in Nevada as a "summer resident; restricted to sage-covered areas during the time of nesting, but wanders more widely in migrations"—clearly the same situation as in southern California.

Finally, Phillips (1939: 311) reports the discovery that Baird's type specimen of *Empidonax wrightii* is in fact a Gray Flycatcher necessitating a new name for the northern form called the Wright's Flycatcher, and relegating the very useful name, *E. griseus*, to the synonymy of *E. wrightii*.

<sup>1</sup> Contribution of the 1938 Rainbow Bridge-Monument Valley Expedition of the American Exploration Society.

The bird with which the present writers are concerned is the Gray Flycatcher, *E. wrightii* of Baird and *Empidonax griseus* of the 1931 'Check-list.'

In view of all this confusion, it is hardly surprising that the natural history of the Gray Flycatcher has not been clearly described. Dawson and Linsdale are undoubtedly correct about the bird breeding in the sage of southern California and Nevada. Our own experiences farther eastward have been rather different. We have had the opportunity of studying the Gray Flycatcher in the field in southeastern Utah and northeastern Arizona each summer from 1934 to 1938, and were fortunate enough in 1938 to find a nest in the making and to follow it through to completion of nesting activities. Various members of the expeditions have collected a dozen specimens of adults, juveniles, and nestlings, and have made many observations in the field.

It is a difficult bird to distinguish in the field from the other small *Empidonaces*, especially Wright's Flycatcher. The long narrow bill, almost completely yellow mandible, nearly completely white belly, and the very narrow, almost obsolete eye ring help in the identification. In young birds with fresh plumage, the white outer web of the outer tail-feathers is distinctive. Fortunately, the Gray Flycatcher is the only member of the genus seen in the pygmy conifers in July.

In the region studied we have found the bird to be fairly common in summer and well distributed in a specialized habitat. During the nesting season we have never seen it anywhere except in the pygmy-conifer forest (junipers and pinyons), in sharp contrast to its reported habits in California and Nevada. We did not find it in the sagebrush and greasewood flats until August.

Just how long it spends on the nesting ground we do not know, but broods of full-grown young deserted by their parents at the end of June indicate that a first nesting started before mid-May. A great scattering to the low flats greatly depletes the numbers in the pygmy conifers by mid-August. During this stay, according to our observations, two broods are raised, leaving the nest in June and early August, respectively. This is indicated by the presence of many broods out of their nest, being fed by adults in late June and early July when our expeditions generally reach the field, and is corroborated by our nesting observations of the second brood. We feel that the paucity of accurate information about the Gray Flycatcher justifies our reporting their nesting in some detail.

We observed a second brood from June 29 to August 3, 1938, from which we estimate that it takes about seven weeks to raise a brood.

A summary of the data and the schedule of development shows the following:

Nest building	June 29, 30, July 1	3 days
Egg laying	July 2, 3, 4	3 days
Incubation	July 5 to 18	14 days
Nestlings	July 18 to August 3	16 days
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Feeding young out of nest (estimated)		36 days
		14 days
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<b>Total</b>		<b>50 days</b>

The nest was set on a horizontal branch of a juniper tree about four feet above the ground and on the south side of the tree. It was so well protected by the foliage as to be visible only from a small sector on the south side. The tree was located on a juniper-pinyon-covered slope near the foot of the Black Mesa, about one quarter mile south-east of our base camp at Marsh Pass, Navajo Co., Arizona, and some 500 feet higher, elevation about 6,700 feet.

The nest was discovered on June 29, 1938, and was about half completed. It was betrayed by a bird flying directly to it, remaining half hidden there for a minute or so in moderate activity and then departing by the same route to the south. At this stage the nest was nothing but a rather large, flat platform composed entirely of strips of juniper bark. On the following day the nest was nearly completed, but not lined. A bird visited the nest with a new strip of juniper bark about once in every ten minutes. On the third day, July 1, the nest was completed but empty and no bird was seen nearby. It is not known whether two birds or only one took part in the nest construction.

The bird or birds building the nest were bothered occasionally by some young birds which appeared to be begging for food. These were interpreted as members of a first brood which had not been completely weaned. By the time egg laying was in progress, however, the brood seems to have scattered, as several young birds were seen singly here and there among the junipers and pinyons nearby.

The finished nest was a rather rough, flattish, nearly circular affair not too compactly woven, which appeared rather too large for the bird. It was composed almost exclusively of strips of juniper bark, neatly lined with sheep's wool on the inside and draped on the outside with spider webs. It was so completely concolor with the juniper branch as to pass for a knot. It measured outside 100 by 80 by 52 mm. (4 by 3 $\frac{1}{8}$  by 2 inches), and inside 52 by 44 by 25 mm. (2 by 1 $\frac{3}{4}$  by 1 inch).

The first two eggs were laid on July 2 and July 3, respectively, and the third, and last, on the following day, although the nest was not visited on that day. However, on July 5 the set was complete and incubation in progress. On the occasions of the visits on July 2 and 3, the nest was deserted and there was no evidence of any flycatcher in the vicinity.

The eggs were immaculate white and somewhat translucent, giving them a definite pinkish tinge similar to that of the Mourning Dove's (*Zenaidura macroura*) egg. They were nearly elliptical in outline with but little tendency to enlargement toward one end. They measured 13.5 by 17.5 mm. (0.69 by 0.53 inches), 13.5 by 16 mm. (0.63 by 0.53 inches), and 14 by 17 mm. (0.67 by 0.55 inches). For purposes of identification the eggs were marked with one, two, and three black dots respectively.

Incubation began some time between 5.00 p.m. July 3 (two eggs), and 7.00 p.m. July 5 (three eggs), presumably after the third egg was laid some time on July 4, and continued until the morning of July 18. The nest was visited on July 5, 6, 7, 10, 15, 16, 17 and 18 during incubation and copious notes were taken. Careful watching of the nest, at first from 100 feet but later from 25 feet, continued on July 7 all morning from 8.00 a.m. to 12.17 p.m.; on July 10 all afternoon from 1.15 p.m. to 6.10 p.m., but only about half an hour on the other days.

So far as we could tell, the female alone incubated the eggs. Never at any time was there any evidence that the male assisted in any way. Only once did a bird believed to be the male approach the nesting area. He alighted in a tree about ten yards from the nest just at noon on July 7, and stayed there singing for about eight minutes. When he arrived, the female's head was already turned in that direction and she gave no indication by movement or otherwise that she was cognizant of his presence. Once again, on July 16, about 7.50 a.m., a male was heard singing about 200 yards from the nest.

Temperature problems at this time of year caused the female bird a good deal of trouble. In the early morning when it was cool, the bird appeared comfortable and sat quietly on the nest, but when a spot of sunshine penetrating the foliage above began creeping over her she commenced to show distress. The air temperature was 24° C. (76° F.), but in response to the sunshine she rose a little higher in the nest, spread the wings slightly and opened the mouth as if panting. From time to time the mouth was closed for a moment as if moistening the tongue or swallowing. During the three-quarters of an hour that it took the sun spot to pass, she opened and closed her wings several

times as if changing air, and shifted position in the nest with apparent intention of getting as much shade as possible. During these shiftings on the nest to avoid the sunshine, she sometimes assumed peculiar and awkward positions. On one occasion the tail was caught on a projection above the nest and as she turned, it remained in position until the tail and wing were crossed in an extremely grotesque fashion.

During the morning of July 7, the bird left the nest only once for a period of eleven minutes (8.59 to 9.10 a.m.), but during the afternoon of July 10 she left five times for periods ranging from 9 to 17 minutes, with an average of 15. The greater number in the afternoon was probably due in part to the apparent discomfort from the excessive heat, indicated by much shifting of position, panting, rising in the nest and shuffling of the wings. What the bird did on these occasions while off the nest was difficult to determine. On several occasions, she could not be followed. However, on two occasions, an adult bird catching insects strengthened our inference that she was off after food at least part of the time.

When leaving the nest, in nearly every case she flew southeast across an open space at a height of about four to six feet above the ground and disappeared between the trees (below the main bulge of the branches) about fifty yards distant. Upon returning, she nearly always appeared in an approach tree about ten yards west of the nest tree, but occasionally used other approach trees. After lingering from a few seconds to a few minutes, she usually flew to a dry limb in the top of the nest tree where she lingered for a similar period of time. Dropping down into the foliage, she became lost to sight and usually appeared at the nest limb in one or two minutes and went directly to the nest. She hopped up on the side and down into the nest immediately. We watched particularly to see if she consciously turned the eggs, but on no occasion did she put her bill down into the nest. She did, however, on nearly every entrance into the nest, stand there apparently shuffling her feet several times as if arranging them in a comfortable position, undoubtedly moving the eggs in doing so. Whether it was an intentional attempt to move the eggs, we were unable to determine, but by watching the position of the black dots on the eggs, we were able to determine that the eggs were being continually changed in position.

When the nest was visited at 8.15 on the morning of July 18, the bird was found sitting on the east side of the nest shading the nest cavity where the eggs were hatching. The nest contained one young

bird with its sparse down not yet dry, one egg pipped on its upper surface a score or more times and one egg just starting to pip. The eggs laid on three different days were hatching almost simultaneously about fourteen days after the last one was laid. There were no shell fragments of the hatched egg in the nest.

We did not visit the nest again until a week later, July 25, when the nest was watched all morning from 8.00 to 12.00. Our last visit was made on July 29, but in our absence after that date Professor Charles D. Winning, Field Director of the expedition, and Blaine Cutler, cook, very kindly visited the nest daily from July 30 to August 4 and watched the debut of the fledglings.

When the nestlings were a week old (July 25), they were about one-third grown and the new feathers bearing the sparse down on their tips were conspicuous on wings and backs. The young were large enough to consume considerable quantities of food and kept the parents busy gathering food most of the time. During the four hours of observation, the young were fed 30 times, an average of eight minutes between food-bringing visits to the nest and an average of ten feedings per nestling. This means that each young bird was fed on an average once every twenty-four minutes.

The periods between feedings were by no means regular. They varied in length from one to twenty-eight minutes and were shorter and much more regular in the early morning than toward noon. After ten o'clock there were four periods of fifteen to twenty-eight minutes, during which an adult bird was usually observed at the nest or perched nearby a good deal of the time, probably either resting or protecting the young birds from sunshine. The duration of the shorter periods (one to nine minutes) appeared to depend largely upon the success of the adult birds in catching insects. On one occasion, an adult bird that had just fed the young caught another insect immediately and was back in one minute.

So far as we could tell, the food consisted entirely of insects. It varied in size from tiny beetles to a butterfly so large that the young could scarcely take it, and included such recognizable forms as grasshopper, yellow wasp, moth, and ant-lion.

Both parents seemed to take part in the feeding despite the solitary incubation of the female. We watched carefully to determine this point. On several occasions, two adult birds were seen in the vicinity of the nest, and on two separate occasions, while one bird was feeding the young at nest, the other bird was seen approaching with food in the bill and was watched as it brought the food to the nest. This

point received additional corroboration when another nest containing three fledglings was found on July 16 and both parents were on hand around the nest.

Once only, the parent bird was observed to carry away a fecal sac of the nestlings from the nest (11.29 a.m., July 25). Once while incubating, the adult bird was observed to raise the rump and defecate over the edge of the nest (5.40 p.m., July 16). The nest, after it was deserted, was fairly clean.

High temperature from spots of sunshine on the nest disturbed the nestlings as it did the incubating adult. On several occasions they were observed to be panting and exhibited restlessness whenever the sunshine was directly upon them. Two or three times the parent sat on the edge of the nest as much as fifteen to twenty-five minutes sheltering the young ones from the sun, and once the female was observed standing in the nest among them with partly outspread wings giving them protection.

The behavior in approaching and leaving the nest seemed to indicate a definite characteristic pattern, which was usually followed both in incubation and in feeding, although in the latter case with so many visits to make it was somewhat varied. The incubating bird, when leaving the nest, without any previous indication, suddenly stepped upon the edge of the nest and flew low over the ground through the open space directly away from the nesting tree to the southeast. This same route was often followed when leaving the nest after feeding, but sometimes the bird deviated in the open space and turned in various directions. Occasionally other routes away from the tree were followed.

In returning to the nest the birds nearly always used an approach tree for a temporary perch, as in incubation, before coming to the nest tree, although on one or two occasions, an adult bird was observed to come directly to the nest tree first. Any one of the surrounding trees might be used as the approach in feeding, whereas the one to the west was nearly always used in incubation. Otherwise, the procedure in approach was quite similar except that in feeding, it was often quicker and sometimes more direct. We thought we detected more carelessness during the last days of feeding when parents were so harassed by food calls.

The size of the nesting territory was not accurately determined but the adult birds hunting insects were often seen within fifty to one hundred yards of the nest tree. So far as observed, we did not find any neighbors to interfere with their spreading out as far as desired.

After leaving the nest the family undoubtedly wandered much more widely.

On two occasions, other birds were observed in the nest tree. On July 17, at 5.41 p.m., the day before the eggs hatched, as the adult bird was returning to the nest and was perched in the top of the tree, a Gray Titmouse, *Baeolophus inornatus griseus*, flew into the tree and began hunting up and down the limbs. The flycatcher shifted position so that both the titmouse and the human observer were in sight, perched a minute or two, and then went on its usual course down through the foliage to the nest limb where it immediately entered the nest leaving the titmouse hunting through the foliage. When the young birds were a week old, an adult Baird's Wren, *Thryomanes bewicki eremophilus*, approached within two feet of the nest where the adult flycatcher was tending the young. The wren was driven a few feet farther away but allowed to remain in the nest tree, while the flycatcher perched about six feet from the nest.

So far as we could determine, there seemed to be three distinct songs or notes used by the adult birds in addition to the chipping food calls of the nestlings. The song of the adult male usually consisted of two syllables with the accent on the second and with some variation of the first. This may be rendered in English as approaching *tu-weet*, *tu-sweet*, or *ts-weet*, with a high musical quality. By contrast, the song of the Hellmayr's Flycatcher, *Empidonax difficilis hellmayri*, of the heads of the higher canyons in Transition or Canadian Zones, may be rendered as *per'tee* or *per'-ty*, with a similar musical quality but with the accent on the first syllable.

A second note of the Gray Flycatcher, usually heard in incubation both when the adult bird was on and when it was off the nest, consisted of a single syllable very similar to the song but much shorter. It may be rendered as *tseet*. The third note was a simple *prit* made by the adult bird (female?) from the rim of the nest after feeding the young at 11.32 a.m., July 25. The call was repeated several times. In doing so, the bill was scarcely opened at all, but a little patch of throat feathers was puffed out slightly each time.

The reaction to human intruders around the nest seemed to have a definite characteristic pattern, consisting of a feigned weakness or listlessness which did not appear to be as emphatic as 'injury.' During incubation the reaction was exhibited several times to different observers, and was repeated during the nestling stage. The incubating bird did not seem to be disturbed by people passing within a few feet and usually did not even turn the head to watch as they passed.



The bird usually remained undisturbed when a person standing within three feet of the nest put out his hand until it was within a foot of the bird, when it flushed. It then flopped to the ground a few feet from the observer simulating weakness with wings drooping and head low. Here the pattern varied a little. If the intruder started to follow, the bird hopped or flew weakly a short distance ahead, gradually faster and farther in advance until far enough away, when it flew off among the trees. On two occasions when the intruder did not attempt to follow, the bird, after flopping to the ground and getting no response to the weakness feigning, actually turned around and came back nearly to the feet of the observer and tried a second time to attract his attention. While the eleven-day-old nestlings were being inspected on July 29 and one of them had been lifted from the nest, an adult bird appeared, flew to a branch near the observer, flopped to the ground about four feet distant feigning weakness and attempted to lead the observer away from the nest as already described.

The down plumage at the time of hatching was very scanty, consisting mainly of a sparse sprinkling along the sides of the crown and on the scapular and dorsal tracts. It was replaced rapidly by the pin-feathers. The eyes were closed at hatching, but by the age of seven days, on July 25, were capable of being opened as a narrow slit. The young birds were very well feathered and grown by July 29, their eleventh day, and we were surprised that they remained in the nest so long afterward. The plumage in which they left the nest was the very distinctive pale-gray back with clear white belly and tail with white outer webs to the lateral feathers that make the young of this species unmistakable at a glance in the field.

#### SUMMARY

1. The Gray Flycatcher, *Empidonax wrighti*, is a fairly common summer resident and breeder in the pygmy-conifer forest of north-eastern Arizona and southeastern Utah.
2. Two broods appear to be the rule, each requiring about seven weeks and leaving the nest approximately in late June and in early August, respectively.
3. Observations on two nests indicate that they are made chiefly of juniper bark with other lining material and placed in juniper trees.
4. Observations on a single nest indicate that the female lays three immaculate white eggs on successive days; that one parent incubates alone for fourteen days; and that both parents feed the young in the nest for sixteen days.

5. Numerous observations indicate that parents feed the young outside the nest for several days, estimated at two weeks.

6. During incubation and nestling care the parent birds exhibit a primitive type of weakness or 'injury-feigning' behavior.

7. The down plumage at time of hatching consists mainly of a sparse sprinkling along the sides of the crown and on the dorsal and scapular tracts. It is rapidly replaced by pin-feathers and the fledglings are well feathered at eleven days.

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