

## THE BIRDS OF A BULL'S HORN ACACIA<sup>1</sup>

BY OLIN SEWALL PETTINGILL, JR.

THE bull's horn acacia is a common shrub of the low country of southwestern Tamaulipas, Mexico. In general appearance it is much like other shrubs of the '*huisache*' brushland, but close scrutiny reveals the fact that its thorns are large, paired, and hollow; and that at the tips of the leaflets there are tiny, yellowish, pear-shaped "Beltian bodies" (see Schimper, 1903: 141). These bodies are rich in albumen and, together with a sugary fluid produced by the shrub's petiolar glands, form the food supply of certain red-and-black ants (probably *Pseudomyrma* sp.) which spend their entire lives on the shrub, rearing their young in the hollow thorns. The ants and the shrub live in perfect symbiosis, the former benefiting by the thorns and the food, the latter being defended by the ants. Touch a branch of the acacia and see what happens! Out pours a formidable army, each ant ready to bite and sting in defense of self and home.

Not far from the headquarters house of the 1941 Cornell University-Carleton College Expedition<sup>2</sup> grew one of these dense, broad-topped acacias. It was about twelve feet high. In April it was covered with fresh foliage and golden yellow flowers. Its huge, straw-colored thorns were generously tenanted with *Pseudomyrma*. In the warm sunlight the ants coursed busily over the entire plant—the main trunk, the branches, the leaves, and the flowers. Breaking the paired thorns apart at the point of union revealed the presence of eggs, larvae and excited, bellicose adults.

This particular acacia might never have been noticed had not a pair of Derby Flycatchers (*Pitangus sulphuratus texanus*) chosen to nest in its top. Here, early on the morning of April 1, both birds were discovered carrying big mouthfuls of grass and weed-stalks. The nest had obviously just been started. The birds stopped building shortly after they were discovered and departed without a syllable of protest.

During the following three days the flycatchers were seen several times within a short distance of the acacia, but no building was observed and the nest's foundation remained crude and scanty. On April 5 building was resumed for two hours, both male and female participating energetically. Together the pair flew in from a distance, alighting on a tall tree near the acacia. After some minutes of hesitation at this lookout post, one bird swooped gracefully down to the acacia and set to work. Somewhat clumsily the mouthful of grass was added, pressed down with feet and belly, and molded to the contours of the body. The bird turned

<sup>1</sup> I appreciate the careful criticism of this paper by George Miksch Sutton and Margaret M. Nice.

<sup>2</sup> On the Rancho Rinconada, near Gomez Farias, Tamaulipas.

almost incessantly, now and then lifting the edges of the foundation with its bill, thus beginning the walls. Cries continued to come from both birds; low, conversational syllables from the builder; loud, piercing notes of *geep, geep career!* from the mate on lookout. When one bird was through at the nest, the other descended with its mouthful. Sometimes their mouthfuls were so bulky that they flew awkwardly. Occasionally only one bird brought nest material; again, both brought material, one depositing it while the other waited its turn, with mouth full, only a few inches away. They were never out of sight of each other while building; nor were they silent for more than a few seconds at a time.



Figure 1. Derby Flycatcher carrying nesting material. The bird is sitting on a branch of the bull's horn acacia.

During this two-hour period of activity motion pictures were obtained without the aid of a blind at a distance of *fifteen feet*. Little did I realize that this one spurt of nest building was the most intensive I would witness.

The flycatchers visited their nest infrequently during the next two days, their coming invariably being announced by loud cries. Even by April 7 the nest had changed but little. From April 8 to 14 the birds

came to the acacia now and then, but they showed little interest in it. A few loud calls, prolonged vigil at the lookout tree, swoops to the nest with wisps of material, long absences: these were the usual thing. The nest gradually increased in size, of course. The walls rose. A thin dome with ample entrance at one side became vaguely visible. By April 14 the nest was large and conspicuous, almost as visible as the acacia itself!

On the morning of April 14 we erected a tower blind about fifty feet from the acacia. The blind itself was eight feet from the ground and was covered with firm, light weight, green tent-cloth. On each of its four sides a spindle-shaped aperture was cut.

On April 16, I was surprised to discover long strands of palmetto fiber *within this blind*. Some were dangling slack, half pulled through the apertures; others were scattered on the floor; still others, in an upper corner and oddly entangled, were suspended from two fibers looped through the fabric as if by an upholsterer with sickle needle! My astonishment was by no means lessened when, fifteen minutes later, a female Hooded Oriole (*Icterus cucullatus cucullatus*) suddenly appeared at an opening, perceived the photographer, and hastily departed, dropping the fiber in her retreat. From a tree close by she scolded harshly. Soon her mate appeared and both birds scolded. The cloth roof of the blind, it appeared, had been chosen in preference to that time-honored nesting site—the under side of a palmetto leaf. Never had a higher compliment been paid to a blind-maker! But, although delighted with this wholly unexpected turn of events, I was obliged to face the fact that this sanctum was no longer a hide. What the blind might do to conceal me, the orioles now would promptly undo!

For seven days the flycatchers continued with their dilatory building, but the oriole went on diligently selecting her fibers with care and carrying all material by herself. Her mate sang persistently and often escorted her to and fro but did not once enter nor alight on the blind.

The oriole nest was attached to the cloth in four places where from six to eight fibers were looped through holes punched by the bird's bill. The loose ends of these fibers were drawn together and interwoven, thus forming a strong hammock in which the cup was placed. In reaching the cup the bird was obliged to squeeze through the narrow space between the nest's rim and the roof of the blind.

On April 23 the flycatchers' nest appeared to be finished. The roof was now thick and compact, the opening distinct, the interior dark. But what was in it? No one cared to climb the ant-guarded acacia. The blind would have to be moved, that was obvious. Oriole or no oriole, close-up photographs of the flycatchers would have to be taken, and a platform was needed for determining the contents of the nest. The blind was moved at noon. Both Hooded Orioles were away. The flycatcher's nest was empty. As the blind was set in its new position close against the acacia the big, vociferous Derbies were nowhere to be seen.

When, in mid-afternoon, I approached the blind (now about fifty feet from its original position) the female oriole flew out with her usual flurry and protested vigorously. Within half an hour the Derbies returned to their lookout. One promptly flew down to the nest with some grasses in its beak, entered, deliberately added these bits to the lining, and remained. The other departed. After a stay of perhaps a quarter of an hour the bird at the nest slipped away quietly.

While the Derbies were off a pair of Social Flycatchers (*Myiozetetes similis texensis*), which for several days had been noted about the



Figure 2. Social Flycatcher on the bull's horn acacia.

Rancho, suddenly alighted on the acacia. In their beaks were tufts of soft, yellowish, plant down which they hurriedly stuck into a thorny crotch about five feet from the Derby Flycatcher nest. Apparently this was not their first visit, for foundation material of a similar sort was already in place. The Derbies did not return. The Social Flycatchers went on with their work. The Hooded Orioles flitted about, scolding harshly, but at this the Social Flycatchers showed neither offense nor alarm. That evening the blind was moved to the other side of the tree whence the newcomers could be watched to better advantage. In the big Derby nest there was now one egg. It had been laid since mid-afternoon.

The next morning, April 24, the Hooded Oriole was in the blind (now in its *third* position). The Social Flycatchers were extremely active. They chattered constantly, were erratic in manner, as usual, fluttering their wings as if nervous or frightened, in all ways furnishing a marked contrast to the stolid Derbies. Their fidgetiness—their almost comical refusal to keep still—called to mind some form of *hyperthyroidism!*

Four times during the three hours of observation that morning the Derby Flycatchers returned to their nest, one bird bearing each time a few wisps of grass and remaining in the nest from fifteen to twenty minutes, the other staying at the lookout. Only once did they display resentment toward the *Myiozetetes*. The bird on the lookout suddenly swooped, chased one of the smaller flycatchers with loudly snapping mandibles, and disappeared. The *Myiozetetes* resumed work as soon as the Derby was out of sight.

The Social Flycatchers' nest-building habits were much like those of the Derbies. The male and female invariably went about together, each one carrying material and placing it in the nest. The nest was much like the Derbies' too, with the entrance at the side. It was considerably smaller, however, and the materials used were noticeably softer.

On the morning of April 28 both the Derby and the Social Flycatchers were at the acacia, but all four birds were comparatively inactive. That afternoon neither species of flycatcher was in evidence, but the oriole was hard at work, her nest now almost finished. During one quarter-hour period she was seen to enter the blind with fibers several times.

Wishing to photograph the oriole as she entered the blind, I set my camera up twenty feet away and carefully pinned shut all the openings save that facing me. Soon the oriole appeared, flew to the top of the blind, uttered a few alarm notes, and disappeared on the other side. A few moments passed and all at once out flew the oriole through the unpinned opening at the front! Determined creature that she was, she had forced her way through one of the *pinned* openings. The openings were now pinned shut anew, with their edges overlapped. Photographic success came at last when the oriole, failing to force an entrance elsewhere, finally gathered courage and entered at the desired place. This time the movie camera was exposing film!

On April 29, the last date on which observations at the acacia were made, the Derby Flycatcher nest held five eggs and the Social Flycatcher nest appeared to be about half finished.

#### DISCUSSION

1. At no time during the observations were ants seen to annoy any bird that perched on the acacia, or to enter either flycatcher nest. Carriker (1910: 715) reports finding a *Myiozetetes texensis columbianus* nest in a "Cornusuela" tree—presumably an acacia—that must

have been, like the acacia at the Rancho, a myrmecophytic species, for it was tenanted by a "medium-sized black ant." The flycatcher nest held two slightly incubated eggs, so ants and birds must have lived without troubling one another. The slightest disturbance to any part of the tree, however, caused the ants to pour out ready for warfare!

In Salvador, Van Rossem (1914: 11-12) found Derby Flycatchers choosing for some of their nesting sites small mesquite-like trees with "greatly enlarged and swollen thorns" which almost without exception harbored ants. The ants "seemed to cause the birds no inconvenience."

In British Guiana, Cleare (1923: 182) reported Derby Flycatchers building their "nests close to large nests of wasps." Presumably the wasps caused the flycatchers no annoyance.

At the Rancho Rinconada the ants were ready to move onto any human being that disturbed *living parts* of the acacia. Whether they would have attacked when dead twigs of the acacia were touched is questionable. Perhaps the deadness of the flycatchers' nest-material furnished the nests with some protection.

2. I was much impressed with the fact that the Derby Flycatchers took *24 days* to finish their nest. Reviewing my notes covering this period (April 1 to 24) I was convinced that the most intense activity was shown on the fifth day. As for the *Myiozetetes*, they were very active during what was thought to be the first two days of nest-building, but it will be remembered that when the pair were first observed at the acacia the nest was already started. The Hooded Oriole showed more or less intense activity throughout the observed nest-building period of 11 days.

A pair of Derby Flycatchers watched by Van Rossem (1914: 11) in Salvador required "nearly a month" for completing their nest.

Observations as to the time taken by the Derbies in completing their nests tend to substantiate the generalization that tropical birds, particularly passerine birds, are much more deliberate in their nidification than allied forms of more northerly latitudes. Sutton (1928: 151) has reported on the nest of a Kingbird (*Tyrannus tyrannus*) built in Pennsylvania in thirteen days. Gillespie (1927: 53) has presented four Pennsylvania nesting records of the Crested Flycatcher (*Myiarchus crinitus*) which show that the period between the beginning of nest building and the laying of the eggs varies from seven to nine days. DeGroot (1934: 9) has observed that a Western Wood Pewee (*Myiochanes richardsoni*) in California completed a second nest of the year in three days. Information on the second nesting of an Alder Flycatcher (*Empidonax trailli trailli*) in Quebec has been obtained by Mousley (1931: 551), "the time occupied in building a new nest and laying a second set of eggs being ten days approximately." Chapman (1928: 165) found that Wagler's Oropendolas (*Zarkhynchus wagleri*) of Barro Colorado Island, in the Canal Zone, required "about one

month" to complete the nest, while Herrick (1911: 364) determined that the main period of construction in the case of a Baltimore Oriole (*Icterus galbula*) observed in Ohio necessitated "about 4½ days." Perhaps the most convincing proof that nidification requires less time in northern than in southern latitudes has recently been presented by Blanchard (1941). After studying the annual cycle of two races of White-crowned Sparrow—*Zonotrichia leucophrys pugetensis*, at Friday Harbor, Washington, and *Z. l. nuttalli* at Berkeley, California—she concluded (p. 49) that birds nesting in the "short-seasoned latitudes of the Canadian border compress the active part of their reproductive cycle into less than two-thirds the time consumed by the populations of central California. In 1936 the birds at Friday Harbor segregated into pairs, established territories, and fledged three broods in less than four months. In the four years from 1935 to 1938 inclusive, the Berkeley birds consumed from 6 to 6½ months (an average of 6.3 months) to achieve the same fraction of the cycle."

3. Both sexes of the Derby and Social Flycatchers participated in nidification. So far as I know, females of Tyrannidae breeding in temperate North America build their nests unaided by the males.

4. The Social Flycatchers apparently selected the acacia because the Derby Flycatchers were nesting there. As Sutton and I have indicated elsewhere (1942: 22), each of twelve *Myiozetetes* nests (including the one now being discussed) under observation during our 1941 expedition was built near the nest of some other bird, either a Derby Flycatcher, Rose-throated Cotinga (*Platypsaris aglaiae*), Alta Mira Oriole (*Icterus gularis*), or Boat-billed Flycatcher (*Megarynchus pitangua*). In each case observed, the *Myiozetetes* nest was started after the nest of the companion species was wholly or partly finished.

#### SUMMARY

The myrmecophytic bull's horn acacia, offering as an inducement its big thorns, sweetish fluid, and food bodies, attracted an ant population that in turn defended the shrub. This symbiosis between plant and insect did not prevent certain birds from nesting in the shrub. In the case discussed, two flycatcher species nested simultaneously in a twelve-foot acacia. These flycatchers were not observed to eat ants and the ants did not molest the birds nor their nests.

The smaller flycatcher (*Myiozetetes similis*) apparently chose to nest in the same shrub with the larger (*Pitangus sulphuratus*) because of the latter's ability to drive off larger enemies.

The interesting association of plant, ants, and birds attracted a wild-life photographer who, in order to secure good pictures, was obliged to erect a blind close by. The blind was chosen by a Hooded Oriole as the site of her nest.

## LITERATURE CITED

- BLANCHARD, BARBARA D.  
1941 The White-crowned Sparrows (*Zonotrichia leucophrys*) of the Pacific seaboard: environment and annual cycle. *Univ. Calif. Publ. Zool.*, 46, No. 1.
- CARRIKER, M. A., JR.  
1910 An annotated list of the birds of Costa Rica, including Cocos Island. *Annals Carnegie Mus.*, 6, No. 7.
- CHAPMAN, FRANK M.  
1928 The nesting habits of Wagler's Oropendola (*Zarhynchus wagleri*) on Barro Colorado, Island. *Bull. Amer. Mus. Nat. Hist.*, 58, art. 3.
- CLEARE, L. D., JR.  
1923 The Kiskadee. *Pitangus sulphuratus*. *Jour. Board of Agric. Brit. Guiana*, 16: 181-184.
- DEGROOT, DUDLEY S.  
1934 Field observations from Echo Lake, California. *Condor*, 36: 6-9.
- GILLESPIE, MABEL  
1927 Returns of a Crested Flycatcher. *Bull. Northeast. Bird-Banding Assoc.*, 3: 52-54.
- HERRICK, FRANCIS H.  
1911 Nests and nest-building in birds: part III. *Jour. Animal Behavior*, 1, No. 5.
- MOUSLEY, HENRY  
1931 A study of the home life of the Alder Flycatcher (*Empidonax trailli trailli*). *Auk*, 48: 547-552.
- SCHIMPER, A. F. W.  
1903 Plant geography upon a physiological basis. Translation by William R. Fisher. Clarendon Press, Oxford.
- SUTTON, GEORGE MIKSCH  
1928 The birds of Pymatuning Swamp and Conneaut Lake, Crawford County, Pennsylvania. *Annals Carnegie Mus.*, 18: 19-239.
- SUTTON, GEORGE MIKSCH, and OLIN SEWALL PETTINGILL, JR.  
1942 Birds of the Gomez Farias region, southwestern Tamaulipas. *Auk*, 59: 1-34.
- VAN ROSSEM, ADRIAAN  
1914 Notes on the Derby Flycatcher. *Condor*, 16: 11-13.

CARLETON COLLEGE, NORTHFIELD, MINNESOTA