THE AUK:

A QUARTERLY JOURNAL OF

ORNITHOLOGY.

VOL. XLVII. JULY, 1930. No. 3.

THE HABITS AND NESTING ACTIVITIES OF THE NORTHERN TODY FLYCATCHER IN PANAMA.

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Plate XI.

I SPENT the period from November, 1928 to June, 1929 on one of the plantations of the United Fruit Company near Almirante, in the province of Bocas del Toro, Panama. Although botanical investigations occupied the major portion of my time, I devoted most of my spare hours to the companionship of the birds which were so numerous about the precincts of the Research House and Laboratory. Flycatchers of several kinds were among the most abundant and characteristic birds in the vicinity of dwellings, and none more numerous than the Northern Tody Flycatcher (*Todirostrum cinereum finitimum* Bangs). The appearance of the completed nest of this wide spread species has been described by Cherrie,[1] and more briefly by Carriker,[2] Richmond,[3] and Stone,[4] but so far as I am aware the indirect manner of its construction has never received the attention it merits.

[1] Cherrie, George K. Notes on the Nesting Habits of Several Birds at San Jose, Costa Rica. Auk VII: 233–237, 1890.

[2] Carriker, M. A., Jr. Annotated List of the Birds of Costa Rica, including Cocos Island. Ann. Carnegie Museum, VI: 314–915, 1910.

[3] Richmond, Charles W. Notes on a Collection of Birds from Eastern Nicaragua and the Rio Frio, Costa Rica. Proc. U. S. Nat. Museum, XVI: 479–534, 1893.

[4] Stone, Witmer. Birds of the Panama Canal Zone with Special Reference to a Collection made by Lindsey L. Jewel. Proc. Acad. Nat. Sciences, Philadelphia, LXX: 239–280, 1918.

NEST OF TODY FLYCATCHER (TODIROSTRUM CINEREUM FINITIMUM).

1. AN EARLY STAGE IN CONSTRUCTION.
2. SAME NEST TWO DAYS LATER, SHOWING EXCAVATION OF THE PENDENT MASS TO FORM THE NESTING CHAMBER.
3. COMPLETED NEST.

The little Northern Tody Flycatcher is a bird of most bizarre appearance. With the exception of our Ruby-throated Hummingbird, it is smaller than any of our native birds of the Eastern States; the length is given by Mrs. Sturgis[1] as 3.60 inches. The upper parts are generally dark; the black of the forehead and crown extends to below the eye, the back and rump are olive green; the wings and tail are mostly black, but the yellow tips of the wing coverts form a distinct wing bar. The under parts, including the lower part of the cheeks, the chin and throat, are sulphur yellow. The head seems over-large for the small body and the bright yellow iris is accentuated by the jet black feathers among which it is set. The short, narrow tail is continually wagged from side to side as the bird hops about in the trees and bushes surrounding habitations and along the banks of rivers and lagoons. Its notes are several and varied. The birds of a pair often call and answer each other with a low, measured *tick tick tick*, and they also utter a high-pitched little trill which is very pleasant to hear. When angry they pursue an enemy while making a sharp, clicking sound by rapidly closing their broad bills. In catching their insect food they do not, like their larger relatives, perch in some exposed situation and make long swoops after the passing fly or moth, but rather snatch it up on the wing as they make short darts from limb to limb of the sheltering tree. Sometimes, too, they fly against a leaf on which an insect is resting and pluck it off, and often they climb about the boughs, picking insects from the leaves and bark more in the manner of a Warbler or a Vireo than a Flycatcher. They have a queer habit of hopping sideways along the branches for considerable distances, wagging their narrow tails from side to side as they go.

The broad, flat bill which so admirably adapts the Flycatcher to carry on the activity for which he is named hardly fits him to be a weaver, yet in the tropics several species build pendent nests which, in the comfort and security they afford their occupants, might well make an Oriole jealous. The method of their construction is perforce quite different. The sharp-billed Oriole would probably look upon the Tody Flycatcher, with his roundabout method of

[1] Sturgis, Bertha Bement. Field Book of Birds of the Panama Canal Zone. New York, 1928.

construction, as an indifferent worker, but if we are to judge by the finished product alone, he seems to be quite as competent as the skillful weaver to fashion a safe and comfortable retreat.

It was in the last week of February that I stumbled across a loose, irregular mass of brownish material hanging about five feet above the ground from one of the branches of the croton bush (*Codiaeum variegatum*) on the front lawn (Plate XI, fig. 1). In the tangled aggregation of material there was a liberal proportion of fibres pulled from the decaying leaf-sheaths of the banana plants which grew all about us, plant down, pieces of weeds, and dry and shrivelled bits of leaves, all inextricably entangled and bound together into a coherent whole by the liberal use of cobweb. There was no sign of a cavity, and I was at first quite puzzled as to the origin and significance of this strange conglomeration, not recognizing it as the beginning of a bird's nest until, a day or so later, I saw a Tody Flycatcher with a length of fibre in its bill perch on the limb where it was attached and then, crawling head downward over the side of the structure, entangle the fibre in the general mass.

The male was indistinguishable from his mate, but since I sometimes saw the two birds working on their nest at the same time, I know that he helped her with the work. The birds were very desultory at their task, bringing in a few bills-full of material, then wandering off to feed or rest for a considerable period, and if at any time I resolved to stand by and watch them build, I was more than likely to have spent an hour in vain. Still the mass continued to augment, until one day I saw one of the birds, whether the male or the female I could not tell, clinging to the side and spreading apart the fibres, until a small depression was formed. (Plate XI, fig. 2). The birds now continued to work into the mass from one side and spread apart the material until in the central portion, where it was thickest, it enclosed an irregular chamber, which was reached through a small aperture in the side. This simple operation in itself consumed several days. As the nest then stood it would have been a very unsatisfactory chamber in which to deposit eggs, for there was no proper floor, and the surrounding walls were loose and thin.

Now began the lining of the chamber, the most time-consuming portion of the building operation. First they carried in fine grass

and plant down, continuing this in their desultory manner for about four weeks, and lining the cavity all around. It was at this period that they pilfered the down which, in the face of great difficulties, a Hummingbird had collected for a nest in a nearby cashew tree. Finally the chamber was padded with downy feathers moulted by domestic chickens and, after I had impatiently remarked in my notebook that the nest was "practically completed two or three weeks ago," the female laid the first egg (Plate XI, fig. 3.).

Thirty-two days had elapsed from the time I first noticed the beginning of the nest. I should have accused these birds of undue procrastination, had not another pair which built in an avocado tree nearby spread their building operations over a slightly longer term. Compared with the number of days consumed by the average song-bird which builds an open nest, even where the female works alone, this certainly seems a long time. On the other hand there are records of even longer periods: the Bienteveo Tyrant (*Pitangus bolivianus*), as we learn from Hudson's 'Birds of La Plata,' sometimes consumes from five to six weeks in the construction of its bulky, untidy, dome-shaped nest, while the Red Oven-bird (*Furnarius rufus*) often begins its elaborate nest of mud in the autumn, and works on it during favorable weather throughout the winter preceding its occupancy. The Whistling Thorn-bird (*Phacellodomus sibilatrix*) has a similar habit.

The completed nest bore the marks of the indirect manner in which it was constructed. From its attachment to the limb to the dangling extremity it measured about a foot. Only a little over a third of this length was occupied by the nesting chamber itself. Above this was the gradually contracting stalk by which it was attached to the branch, while below hung a long, loose and apparently useless tail, both representing the unexcavated portions of the originally "solid" mass. It is the long, useless appendage hanging below the nesting chamber which at once distinguishes the nest of the Tody Flycatcher from the woven nests of Orioles, Oropendolas, Weaver-birds and Bush-Tits, and hints at the different mode of origin. Those birds which are true weavers do not, like the Tody Flycatcher, find it necessary to employ cobweb to bind their materials together. Richmond has remarked, not without

justice, that the nests of these birds are "ragged in appearance" and "resemble bunches of drift grass." Let us not, however, judge of their utility from their often untidy appearance. The long banana fibres which, where available, form the chief suspension of the nest, and the liberal use of cobweb in binding all of the materials together, make the structure strong and durable. The walls of the cozy nesting chamber are usually so thick that the interior remains dry even after hours of rain. The small aperture in the side is in most cases protected by a short, pent-roof projection from above, further adding to the protection enjoyed by the brooding bird. This, it is true, seems to be formed as a result of the birds always alighting below the aperture and moving upward in entering their nest during the period of construction, rather than in pursuance of any architectural design. Generally hung far out on a slender, projecting twig, one would think them inaccessible to all but winged enemies, but none-the-less, they are often despoiled of eggs or nestlings.

The birds employ a great variety of material in the construction of their nests, and different nests vary greatly in their composition according to what the locality affords. They seem always to be begun by entangling fine fibres about a slender support, and fastening them there with cobweb. Various bits of non-fibrous materials, such as small pieces of papery bark, withered flowers, plant down, fragments of weeds and the like are fastened into the mass with cobweb, long before the cavity is started, and serve to give it bulk. The lining is likewise composed of a great variety of materials. A nest in a saman tree in the pasture, which the birds were engaged in tearing apart when I found it, was lined with a great mass of the withered flowers of this leguminous tree, a few horse hairs, and other miscellaneous material. Carriker found nests in Costa Rica which were "made almost entirely of green moss, with some weed-fibre intermixed, and greatly resembled a bunch of moss hanging from a twig." None of the nests which I found, however, contained moss or other green material.

Although three is the more usual number for the species, the birds in the croton bush laid only two delicate, snow white eggs. I shall not soon forget my sensations when I first came face to face with the brooding bird. Warned by the watchful mate, it always

flew off at my approach in the day time, even if I came up to the nest from the rear, so one night I stealthily advanced with a flashlight. When the beam first fell upon the nest the bird was sleeping, its head, black to below the eyes, yellow on the cheeks and throat, framed in the narrow aperture. Presently with a startled shaking of the head, the eyelids parted and, to my great surprise, revealed an iris yellow on the sides and bottom, but blood-red above the pupil, giving the face a weird and somewhat demoniacal expression.

The pent roof over the aperture made it impossible to see the eggs inside, so it was only by carefully probing the interior with the little finger that I could determine when the eggs were laid, and when they hatched. Two weeks passed, and still I felt only the smooth surfaces of the eggs within the nest. Two, and three more days slipped by, and I began to fear that the eggs had addled, for twelve to fifteen days is the usual period of incubation of the various species of flycatchers which nest in the north. Finally, on the eighteenth day from the laying of the second egg, they both hatched. I might suspect some irregularity or error of observation, had I not followed the incubation in three other nests, and found that the period given is correct. In incubation, as in nest-building, the Tody Flycatcher will not be hurried.

The nestlings were but a few days old when some undetermined fate overtook them. The parents had now spent almost two months in their attempt to raise a family, and perhaps they at last began to realize that if they were ever to accomplish their purpose in life, a little more expedition would be in order. At any rate, three days after their bereavement, they had made a substantial start at a new nest among the blossoms of a hibiscus bush fifty feet away. The old nest was hardly injured; the aperture merely enlarged a trifle by whatever creature devoured the nestlings, and might readily have been repaired, but some prudence which we do not understand prompted them not to entrust a second brood to the scene of the disaster. Yet at bottom they were economical, for they tore away the material which composed the old nest and incorporated it in the new. I saw them make frequent trips between the two structures, pulling fibres from the old nest until its support gave way and the remnant fell to the ground.

For some reason, the new nesting site did not please them; perhaps the "yard boy" brushed against the nest and injured it while cutting the grass or trimming the hibiscus hedge, which it almost touched. For this reason or another, after they had worked upon it for twelve days and had made a good start at lining the nesting chamber, they began to tear it apart and to use its materials in the construction of a third nest in the cashew tree across the hedge. This was the highest of all the nests which I saw the pair attempt, and hung from an unsubstantial dead twig seven feet above the ground. The construction of this latest nest required only half the time of the first, and after sixteen days the first egg was laid. When I left Panama early in June they still brooded the two eggs, and I could only wish that, after three months of continuous effort, fortune would at last smile upon their endeavors.

All of the breeding records of this species which I have been able to find refer to the spring or early summer. In Nicaragua, Richmond found a nest with eggs on March 31. In Costa Rica, Carriker found nests with fresh eggs from April 11 to July 17, while Cherrie took a nest with eggs near San Jose on May 30. In the Panama Canal Zone, Stone gives the dates April 21, April 30, and June 23. My own records of fresh eggs fall between March 28, and the first weeks of June, when I left Almirante. Since the birds may consume a month or more in the construction of the nest, this period should be added to the earliest dates, given to obtain the actual commencement of the impulse to breed. The late records are probably of birds which have had their previous nests rifled; at least this is true of my own records. It is of considerable interest that in a uniform climate such as that of the Caribbean coast of Panama, where there is not even a pronounced dry season, so many species of birds should begin their nesting in the spring—just as the migrants are beginning to depart. The same impulse must determine both. The one unmistakable sign of spring which I discovered in Panama was the wooing and nesting of the birds.

In April and May the pendent nests of the species were to be found almost everywhere in the open. I remember several which hung from the telephone wires along the railroad, the birds apparently unmindful of the frequent passage of the thundering

banana trains. A number more were found attached to low branches which overhung the lagoon. One nest was precariously suspended from the petiole of a leaf of the rubber tree (*Hevea brasiliensis*) which grew beside our water tanks. Not counting replacements of rifled nests, nine were found in trees and bushes within about a hundred yards of the house, and I soon ceased to keep count of those which I encountered farther afield. Despite the apparent security of the eggs and young swinging in a closed basket at the end of a slender twig, the nests were robbed with surprising frequency. Although I selected five of the most favorably situated nests for close observation, in every case I was disappointed in my desire to follow a single family through the entire nesting period; either before or after the eggs hatched every one of these nests were robbed. It was never my good fortune to come upon the despoiler, but I hardly believe it could be other than a bird, and the Talamanca Jay (*Cyanocorax affinis zeledoni* Ridgway) falls under suspicion. Sometimes small flocks of these noisy Jays ventured into the trees or the banana groves close to the house, when the excited behavior of the nesting Thrushes and Tyrant-birds proclaimed them to be, like their relative the Blue Jay, nest robbers; yet I confess to a complete lack of evidence to incriminate them in any misdemeanor whatever.

When a nest was robbed the birds invariably tore it apart, even if it were not in the least injured, and used the materials in the construction of a second, nearby. The Cedar Waxwings observed by Gross[1] behaved in the same way when their nest was despoiled of its eggs, and doubtless similar cases will occur to anyone who has spent much time observing birds. It would be interesting to understand the mental processes underlying this behavior. Does the bird realize that an enemy has discovered the nesting site, and so is unwilling to entrust a second clutch of eggs to the same nest? Or is it merely instinctive with these birds not to lay a second time in a used nest, which may have become soiled or infested with parasites during the occupancy of the first brood, and in accordance with this instinct a new nest is built whether the first has sheltered nestlings or not? A grave objection to the second alternative is

[1] Gross, William A. A Cedar Waxwing Study in Northern Michigan. Bird-Lore, XXXI: 178–182, 1929.

that the materials of the old nest are incorporated into the new, and any parasites they might harbor would in this manner be carried over into the new structure. Consciousness that an enemy is aware of the location of the nest might also explain the behavior of certain birds in deserting a nest in which a Cowbird has deposited an egg, instead of taking the less troublesome alternative of casting out the undesirable egg, or at least covering it with a false bottom. At any event, in all cases where I was able to find the Tody Flycatcher's second nest, it was in the same "territory" as the one it was intended to replace; perhaps higher up in the same tree, or on the other side of it, or in a nearby tree; often better concealed than the first, sometimes not so well concealed. These birds seem particularly attached to their territory, and defend it valiantly against the intrusion of their own kind.

In early May I spent much time watching a nest which contained three newly-hatched nestlings. One of the parents, presumably the mother, brooded her infants during most of the day and of course at night. The father hopped about the boughs of the tree, searching for insects. Frequently he called to his mate in his high-pitched trill, and she answered with a similar trill from within the nest. Having made a capture he would approach the nest flitting from limb to limb in his usual unhurried manner, often stopping to wipe the insect he held against the bark, perhaps in an attempt to break off the wings. Meanwhile the expectant mother would lean far out of the nest, as though impatient of his delay. Finally he would fly up and, clinging beneath the aperture as a Woodpecker to the bark of a tree, pass in the billful to his brooding mate. After he flew off, by peering through the field glasses into the dimly-lighted interior, I could barely discern her bend down her head and place the insect in the mouth of one of the nestlings which she covered. At intervals she left the nest for short periods to seek food for herself, but on returning, before entering the chamber to continue her brooding, she paused a moment before the entrance and passed the moth she brought back to one of the waiting mouths within. Two and then one, the nestlings met the mysterious fate of so many others, but the mother continued to brood the last survivor during the sixth and final day of his life. With such unusually close attention, the parents brooding the

young by day at an age when Song Sparrows are almost ready to leave the nest, one wonders why the nestling mortality is so high.

Because of the persistent misfortunes to which I have alluded, I was unable to determine how long the young remain within the nest, and the details of parental care at various ages. A few days before my departure from Panama, I came across a nest which, though quite close to the house, had for a long while escaped my notice, and now contained two nearly fledged young. Their irides were brown, not yellow and red as in the adult birds. When alarmed by my intrusion, even at night, they uttered a little trilling chirp which resembled that of their parents, but was weaker. The adult birds clung beneath the aperture and passed in food to them. The interior of the nest was clean, but the nestlings appeared so crowded that it seemed that had a third been present, they must burst the chamber asunder. When they finally left the nest a few days later, and flew into the branches of a tamarind tree nearby, the parents protected them with energy. When a pair of Black-winged Palm Tanagers (*Thraupis palmarum atripennis* Todd) and some Scarlet-backed Passerini's Tanagers (*Ramphocoelus passerinii* Bonaparte), birds over twice the size of the Flycatchers, attempted to perch on its limbs, the parents darted at them, making a loud clacking sound with their broad bills, and drove the harmless intruders away. The outstanding characteristic of this little Flycatcher is his devotion to his mate, his home and his family.

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