A challenge to ornithologists is the

Three-Wattled Bellbird

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THE COTINGA family, of which the bellbird is a distinguished member, is one of the most remarkable groups of birds in the world. It includes some of the smallest, as well as some of the largest, of passerine birds. It exhibits almost the whole range of colors from dead black to pure, snowy white; some of its species are largely red, others intense blue, still others green and yellow, while the dullest are brown, gray or mottled. In some, the cheeks or even the whole head and neck are bare of feathers. Some have curious crests, bizarre wattles, or elongated tail feathers.

The voices of this avian family are no less varied than their plumage, ranging from the stentorian calls of the bellbirds to the habitual silence of the snowy cotingas, from the liquid melody of the white-winged becard to the queer grunts and dry, chaffy notes of the tityras. Some members of the family build bulky covered nests, while others entrust their eggs to slight hammocks barely large enough to hold them, and many more rear their progeny in holes that they find in trees. In some species, the male is a devoted husband and parent, whereas in others he forms no enduring nuptial attachments and never goes near the nest.

The three-wattled bellbird, member of a family whose habits are but slightly known to ornithologists, breeds in the highland forests of Nicaragua, Costa Rica and western Panama, and migrates to the coastal lowlands during the stormiest period of the year.

This remarkable family is confined to the Western Hemisphere, where it is best represented in forested regions of the tropics, although a single species, the rose-throated becard, reaches the southern boundary of the United States. Exceedingly little is known of the habits of the majority of its members, whose nests have never been found by naturalists. Thus, the cotingas hold forth a standing challenge to the young ornithologist eager to advance his science.

Its curious appendages, its arboreal habit and the mystery that surrounds the intimate details of its life make the three-wattled bellbird, *Procnias tricarunculata*, a typical representative of the cotinga family, if so heterogeneous an assemblage can be said to have a type. Even without his wattles, the male—uniform pure white on head, neck and chest, bright brown on all the rest of the body, wings and tail—is a bird of distinct and unforgettable appearance. Add to this striking attire three long, string-like, dark-colored, naked, fleshy appendages, one springing from the forehead and one from each side of the mouth, and you have a bird which can be confused with no other feathered creature on earth. About a foot in length, this boldly attired cotinga catches the eye even when perching at the very top of one of the great trees that it frequents.

The three-wattled bellbird breeds in the highland forests of Nicaragua, Costa Rica and western Panama. I found it abundant a mile and more above sea level on the northern or windward face of the Central Cordillera of Costa Rica, where the tall, massive trees of the primeval forest were burdened with an unbelievable profusion of air-plants, ranging from delicate mosses and ferns to bromeliads, aroids, orchids in almost endless array, colorful epiphytic heaths, gay-flowered shrubs, and even trees that perched high on greater trees. When a brilliant sun, shining in the bluest of skies, illuminated these stately forests and set aglow the varied colors of myriad blossoms, one might imagine himself in paradise. But through much of the year, the winds sweeping in from the Caribbean Sea over the great lowland forests of eastern Nicaragua and Costa Rica pile the storm clouds against this mountain barrier and obscure the sun for many days together. Then moisture drips from every leaf, and penetrates every chink and cranny in the walls of the rough mountain dwellings; the air becomes so chilly that, despite the flourishing vegetation, one expects to see icicles hanging from his eaves; and the gray mist seems at last to seep into one's very soul. In this high region of alternate delight and gloom dwell the bellbirds, in company with resplendent quetzals, blue-throated toucanets, prong-billed barbets, black-faced solitaires, slaty flower-piercers, and countless glittering hummingbirds that draw sustenance from the profuse blossoms.

Not in his own right, but merely because of his close affinity to certain South American birds with a more ringing voice, is this mountain dweller called a bellbird. There is no metallic timbre in his calls, which at best might be imagined to emanate from a wooden clapper. He has a very limited vocabulary, consisting, as far as I could discover, of only two fundamentally distinct notes. The first, loud and strong but dull and throaty, is such as might be produced by striking once a wooden bell devoid of resonance; the second is much sharper and

higher in pitch than the first loud "wooden bell" note.

These two notes are so dissimilar in character that, when I first heard them from a bird unseen in a mist-veiled tree-top, I wrongly surmised that the deeper note was the call of the male and the sharper one the answer of the female. The two notes together form a phrase that often sounded to me like *buckwheat*. The first is not always delivered with full intensity, but often in a more or less subdued form, as though the bird gave both hard and gentle strokes to his wooden clapper. A whole series of these notes is uttered while he keeps his extraordinarily large mouth wide open, revealing a cavernous black interior that attracts the attention of a watcher fifty yards away. Some of these series, delivered without closing the bill or even perceptibly moving the mandibles, might be expressed as *BUCK wheat; BUCK wheat BUCK; BUCK BUCK; BUCK buck BUCK; BUCK wheat BUCK wheat BUCK; BUCK buck BUCK buck buck buck*—and so on to include almost every possible combination of these notes. The greatest number of notes that I heard a bellbird deliver without closing his mouth was seven.

When I first arrived in the mountain home of the bellbird in early July, I often heard his far-carrying notes without ever succeeding in glimpsing the caller through the mist that much of the time shrouded the tree-tops. Then, after a long-continued rain storm in mid-July, I heard them no more until December, when a few of these unforgettable calls rang out through the mist. In January, I heard the bellbirds more often, but it was not until late February that their calling became frequent and sustained. From then until the following August the voice of the bellbird resounded daily through the mountain forests.

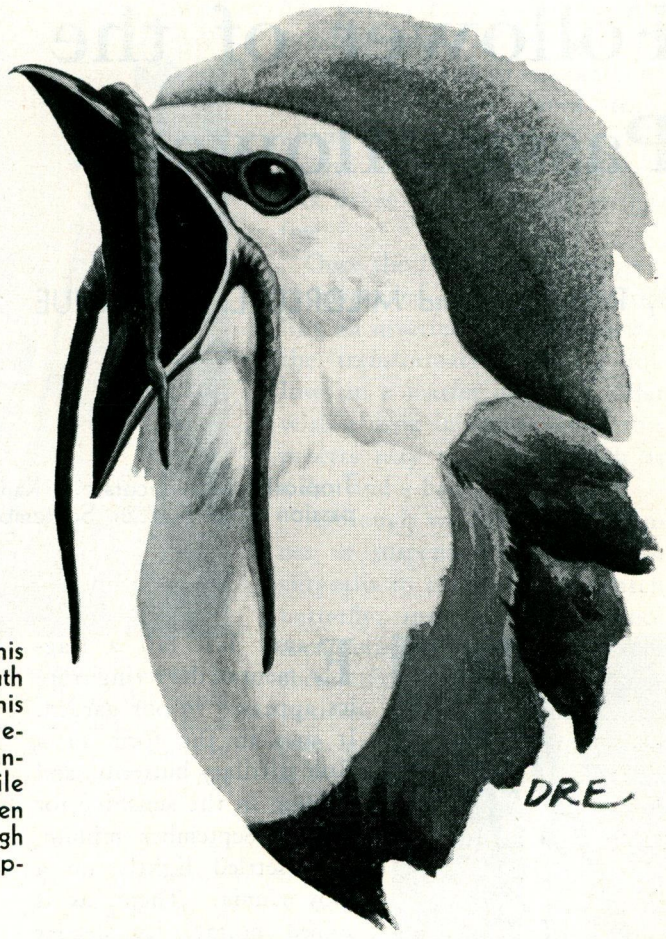
The female of the species is smaller than the male, olive-green above and yellow below, marked with contrasting streaks, and without the wattles of the male bird.

A favorite singing post was the topmost leafless branch of some towering tree, a hundred feet or more above the ground. On this exposed perch the performing male was to be found day after day for months together. As he delivered his powerful calls with widely opened mouth, he leaned far forward in what seemed a strained posture. At the end of a sequence of notes he often flew forward a foot or possibly less, only to execute a sudden about-face in the air, and return to his perch facing in the opposite direction. More rarely he flew to a neighboring branch, rested there a short while, then returned to his favorite perch. Often it looked as though he had bent so far forward to call that he lost his balance, and found this the simplest mode of regaining it; but, actually, this short flight appeared to be part of a simple display, which included spreading the brown tail and drawing in the white neck after alighting on the perch. This contracted pose was maintained for only a second or two.

At times the bellbird performed rather constantly from a single favorite perch, but at other times he alternated between several similar perches situated possibly fifty yards apart. Often he gave his head a sharp shake, as though one of the fleshy appendages that Nature had

inflicted upon him had fallen over an eye, or otherwise annoyed him. At intervals, he flew off to seek food, perhaps the big, hard, green fruits of the *Ira rosa*, a tall tree of the laurel family, which he plucked while perching. Soon he returned to the display perch, where he spent most of the day.

The purpose of these far-carrying calls, sent forth tirelessly from a fixed location, is undoubtedly to advertise the male's position to the females, so that at the proper time they may come and have their eggs fecundated. Probably, as with the blue cotingas and the pihas, the female then goes off to her solitary nest and rears her family with no assistance from a mate. She is considerably smaller than the male, without wattles, and far less conspicuously attired, being olive-green above and yellow below, and nearly everywhere marked with contrasting streaks. I saw little of the females and failed to find a nest, which seems never to have been described in print.



When the male opens his extraordinarily large mouth to deliver the notes of his limited vocabulary, an eye-catching and cavernous interior is revealed. While performing, the bird often shakes his head as though annoyed by the fleshy appendages.

Most of the bellbirds that I saw in greenish, streaked plumage were young males, as I judged by their calling and their budding wattles. In June, I watched some of these short-wattled youngsters who seemed to be practicing their first calls. They opened their mouths as widely as the adults and displayed the same black interior; but they failed in a ludicrous fashion to produce the same resounding notes with voices still weak and untrained. Sometimes a youngster alighted in the same tree-top with a long-wattled adult, who appeared not to resent the intrusion. One brown and white male perched close to a streaked young bird and called, as though demonstrating to him how it was done. I believe that the males take a full year, if not longer, to acquire their elegant adult attire.

One February, on my farm in El General, Costa Rica, I watched a male in streaked greenish plumage, with wattles less than half-grown, calling as loudly as mature birds, and displaying in the same fashion. In late April, I saw, higher in the mountains, another short-wattled male who was in transitional plumage, his head and neck impure white, his body dull brown with light-colored spots on his breast. He probably was hatched no later than the preceding spring.

In the stormiest period of the year, the bellbird wisely leaves its damp, chill mountain forests and seeks warmer and sunnier regions where fruiting trees abound. Although many birds of mountainous tropical regions move short distances up and down with the seasons, no other tropical species that I know makes such great changes in altitude. Its migrations are largely vertical, taking it no farther than the coastal lowlands within sight of the peaks where it was hatched. In the valley of El General, between two and three thousand feet above sea level and well below their breeding range, I have heard bellbirds in every month except November, but chiefly I have noticed them from January to March and from June to August. In the former period, they are probably moving upward to their breeding ground, whereas in the latter they seem to be returning to the lowlands.

The bellbirds travel not in flocks but singly, and I first become aware of their arrival in El General by hearing the voice of one resounding through a tract of forest from which they have long been absent, drawing attention to the newcomer perhaps half a mile away. Since the encircling lowlands have a far greater area than the mountains where the bellbirds breed, these visitors from cooler heights are at best thinly scattered through the former, and to meet one here is always a memorable occasion. They call freely while visiting lower regions; and, in late February and early March, a male, I believe always the same, proclaimed himself in the forest near my house for more than a fortnight. Although there is no reason to suppose that the females stay to face the highland storms that drive the males to warmer regions, I have never seen a female at lower altitudes. Undoubtedly this is because of their silence; were they to desist from sounding their wooden clappers, even the strikingly colored males rarely would be detected in the tops of the great trees of the lowland forests where they forage and rest.