NOTES ON THE BEHAVIOR OF THREE COTINGIDAE

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DURING a three-week visit to British Guiana in March 1960, three species of Cotingidae of different genera were briefly studied: the White Bellbird *(Procnias alba)*, the Greenheart Bird *(Lipaugus cineraceus)*, and the Calf or Capuchin Bird *(Perissocephalus tricolor)*. There has been little published on the behavior of these species. For British Guiana, Chubb (1921) draws on the works of Schomburgk (1848), Quelch (1890), Beebe (1910), and Brown (1876), and gives a description of some of the calls and the habitats. The Cotingidae are a family so diverse in appearance and size, that any similarities in their habits and social organization are of interest. Some similarities were found, although more problems were discovered than solved. But, in view of the scant knowledge of the family, unsolved problems seem worth recounting.

It will be helpful occasionally to compare the behavior of the Cotingidae studied in British Guiana with that of the Bearded Bellbird[1] *(Procnias averano)* at present being studied in Trinidad (B. Snow, unpublished). This species is highly sexually dimorphic, with the female cryptically colored. The male, a spectacular mainly black and white bird, devotes all his time to calling from a territory in the forest in which he also feeds. The call is very loud and far reaching and advertises his presence to the female and possible rivals. When the female is ready to mate, she visits the male in his calling territory. Copulation takes place on a special branch after a preliminary ritualized display by the male. There is no other contact between the sexes, the female undertaking all nesting activities by herself, usually at some distance from the males' calling territories. The adult males appear to be slightly sociable and prefer a calling territory within earshot of another male. The immature males are more sociable, and two or three will call within 16 meters of each other.

THE WHITE BELLBIRD

A male White Bellbird was first watched for three-quarters of an hour on 13 March calling on a steep hillside in the Kanaku Mountains

[1] I prefer this name to Black-winged Bellbird or Mossy-throated Bellbird, the former of which does not refer to the bird's most striking character, while the latter gives a misleading idea of the mass of black wattles that dangles from its throat.

about 60 meters above Nappi Creek. It was relocated on the same hillside two days later and watched for four and three-quarters hours throughout the middle of the day. On these two days it remained within approximately a quarter square mile of steep hillside forest, which contained high trees of 30 meters and more, but also had many gaps in the upper canopy due to the steep, rocky nature of the valley. The bird called for 78 per cent of the five and a half hours it was watched, using several horizontal, bare perches 15–20 meters up. The two perches from which it called most of the time were a horizontal, dead branch and a horizontal liana, both of which possessed a spring-

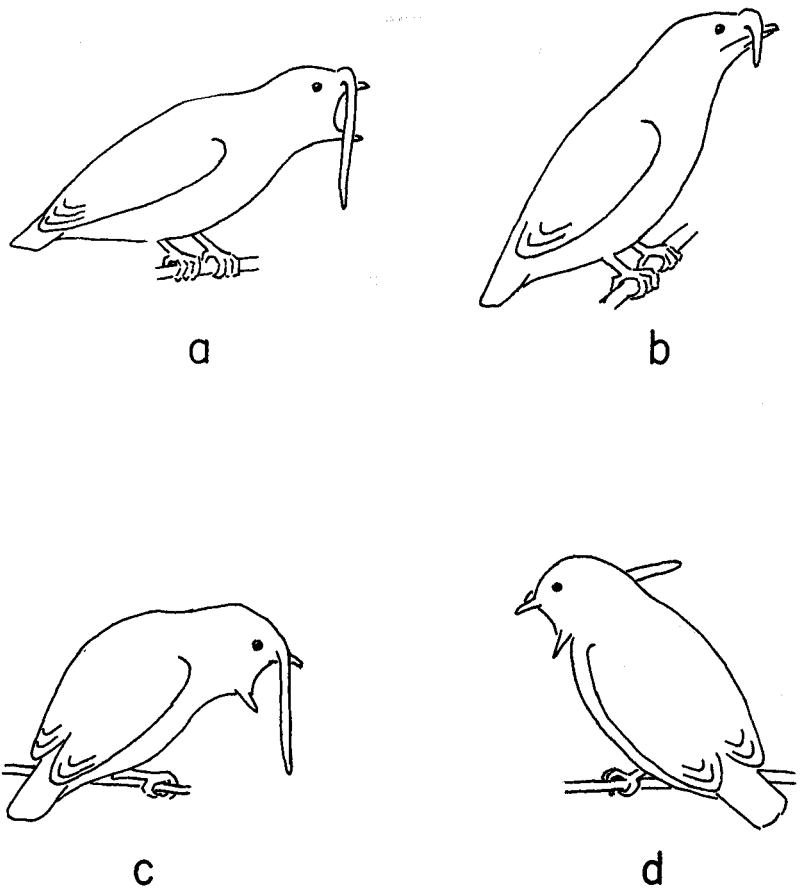

Figure 1. Postures of the White Bellbird: (a) during the *doi-ng* call; (b) with wattle contracted before flying off to feed; (c) and (d) when making the *ding-ding* call.

board quality possibly of importance in a display described later. When calling, the White Bellbird always faced downward into the valley, never up the hillside, which would doubtless have reduced its carrying power. In this it differs from the Bearded Bellbird, which frequently turns on its perch to call in the opposite direction.

The bird has two calls. The most usual is a dissyllabic *doi-ng doi-ng,* which lasts two to three seconds and is repeated four to six times a minute. This must be the *dor-ong* described by Brown (1876). It is a very musical and attractive sound, each *doi-ng* being a chord containing several notes. The second *doi-ng* is slightly shorter and higher pitched. Just before calling, the bird leans forward; then the throat is distended and the bill opened widely and held open while the two syllables of the call are uttered. During the calling the wattle hangs down to the level of the bird's breast (Figure 1a). Previously the wattle has been portrayed as sticking upward in a spike (*e.g.,* Chubb, 1921), but I saw no evidence of this. However, I was much surprised, after watching the bird with its long, pendulous wattle continuously for one and one-half hours, to see as it stretched and prepared for flight the wattle contract to a third of its former length (Figure 1b). Immediately afterward the bird flew out over the tree tops and down the hillside, doubtless to feed.

The second call is a sharp, staccato *ding-ding* lasting one second. It is usually interspersed among the *doi-ng* calls, although once five were made consecutively within two minutes. To make this call the bird under observation leant well forward so that the bill was pointing downward, inhaled air causing the throat to bulge, turned to the right to make the first *ding,* then with beak still wide open rotated its body rapidly through approximately 100° to make the second *ding* facing to the left (Figure 1c and 1d). While turning rapidly from right to left, the wattle flew out to an almost horizontal position. I watched the bird make over 40 of these calls, and each time it moved from right to left. In order that the wattle should not accidentally go into the wide-open gape as the bird swung round, it was essential for it to be hanging on the right of the beak before the call was started. Only three times during the two days when I was watching this individual was the wattle seen hanging to the left of the beak, and on each occasion, prior to making the *ding-ding* call, the bird leant forward and maneuvered it back to the right side. I regretted the lack of opportunity to find out whether there are "left-wattled" as well as "right-wattled" White Bellbirds.

Once the *ding-ding* call was accompanied by a more elaborate display movement. The call began as usual with a *ding* call directed to the

right, then while making the second *ding* the bird jumped with a flutter about two feet to the left, at the same time turning to face in the opposite direction. It then repeated the movement, again turning to the left so that it was in the same position as when it started. The dead, horizontal branch on which it did this display seemed to act as a springboard to assist it in the movements.

The jump to the left with the *ding-ding* shows some similarity to the precopulation display of the Bearded Bellbird. This species usually calls in a stationary position, but, as an immediate prelude to copulation, the male leaps with a loud *clonk* along the whippy, horizontal side branch of a sapling, lands beside the female, and then mounts her; this movement is also sometimes practiced when the female is not present. No other bellbirds were seen near the male White Bellbird, but it seems possible that the jump to the left with a *ding-ding* is a precopulatory movement that the bird was practicing. If this is so, the fact that the male always swings the same way when making the *ding-ding* call would give the female foreknowledge as to the side from which he was going to approach her. If the male White Bellbird, like the Bearded Bellbird, has no relationship with the female except that of copulation, a stereotyped, precopulatory movement may be necessary to enable the two birds, otherwise strangers to each other, to synchronize in mating.

Both adult and nestling Bearded Bellbirds feed exclusively on the fruits of various trees. This is probably the chief factor emancipating the male from all domestic duties. Judging from the large proportion of time the male White Bellbird was able to devote to calling, it seems probable that this species also feeds largely or entirely on fruit. Several

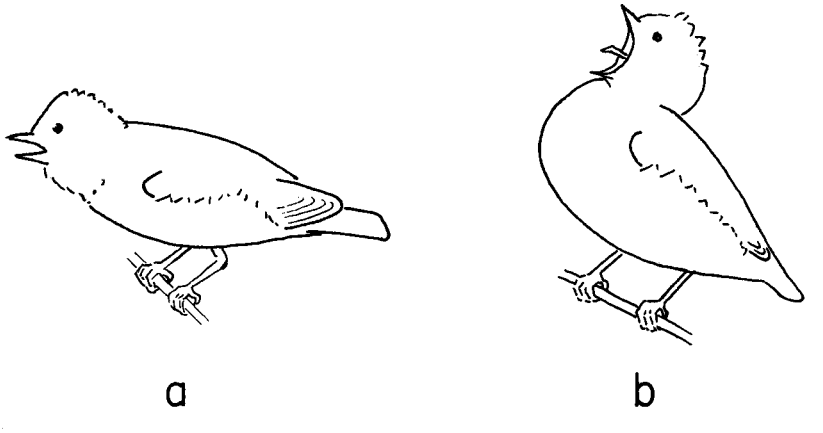

Figure 2. The calling postures of the Greenheart Bird: (a) during the preliminary *groo, groo* call; (b) when making the *pi, pi, y-o* call.

times it was seen regurgitating seeds, some of which were picked up and proved to be a species of Lauraceae, a family of trees providing much of the Bearded Bellbird's food.

THE GREENHEART BIRD

The Greenheart Bird or Pi-Pi-yo is a thrush-sized, gray bird. It is seldom seen, but its extremely loud, ringing call, *pi, pi, y-o,* makes it well known to all who have been in the Guiana forests.

The sexes are very similar. Chubb (1921) reported that the female differs from the male in having the outer aspects of the wing and the tips of the tail feathers tinged with rufous. However, this needs confirmation. It is possible that the rufous tinge to the wing and tail is just a juvenile character, as four of the five birds sexed as females in the Georgetown Museum lack it, and one of the four birds sexed as females in the British Museum also lacks it.

I watched the Greenheart Bird fairly intensively for a total of 23½ hours over a period of six days. The birds studied were near Wineperu on the Essequibo River, in a stretch of forest from which the Greenheart timber *(Ocotea rodiei)* of economic value, about 2–3 per cent of the dominants, had been cleared 15 years previously. Notes were also kept on five calling grounds in a forested area in the foothills of the Kanaku Mountains.

All the calling birds of which a good view was obtained lacked the chestnut markings, and it seems probable that it is only the males that hold territories in the calling grounds and give the *pi, pi, y-o* call. This call is extremely loud and audible through approximately 300–400 meters of forest. Out in the open there is no doubt that it would be audible a great deal further. Close at hand, the call seems to be more nearly described by *qui, qui, y-o.* While calling, the bird has the feathers of the head erected to form a slight crest, and the pale-gray flank feathers puffed out covering part of the wing. As a preliminary to the call, the bird leans forward, opens the bill slightly and at the same time utters two somewhat dovelike notes, *groo groo,* audible for about 100 meters (Figure 2a). The first note is slightly lower pitched than the second. From the forward position held in the *groo* call, the bird suddenly jerks its head back so that it almost rests on its scapulars. At the same time the beak is opened very wide, displaying an orange gape, and the first *qui* note is uttered (Figure 2b). With the beak still open, the bird gives another jerk back for the second *qui* and then relaxes forward and closes the bill with the *y-o* note. This final note has an indescribable ringing quality and carries further than the more-piercing *qui* notes.

When watching a bird call one morning against the early-morning light, it was evident that much air was expelled with the *qui, qui, y-o* but not with the *groo groo* notes, when probably air is inhaled. The quite violent and ritualized bodily movements involved in the call give the impression of being physically essential to the production of the call, but are probably really a visual display, as the bird occasionally makes another equally loud call without any movement.

The *qui, qui, y-o* lasts about two seconds and the preliminary *groo groo* also about two seconds. The number of calls per minute varies greatly, from one or two per minute, when the bird may also be occupied with preening, to eight per minute. On one occasion 12 per minute were witnessed. The bird was very excited, and this rapid calling was followed by a different call and behavior, described below, which possibly heralded the approach of a female.

One individual, A, watched for 16½ hours at the Wineperu calling ground, had a territory approximately 75 meters by 35 meters. It was seen in this territory on six successive days. Fortunately, this individual had the tip of the right, outer tail feather missing, so it was possible to check its identity. It was not seen calling outside its territory. The 16½ hours spent watching this individual covered the whole of a day from 0645 to 1645 and duplicated many of the hours. Seventy-seven per cent of this time was spent calling in the territory; the remainder of the time the bird was silent, and I usually lost sight of it. The silent periods recorded usually lasted for from 5 to 10 minutes, but a period of 23 minutes was once recorded.

Very occasionally, while calling, the bird would flutter up to a nearby leaf and take an insect. But judging from the short time taken to feed, fruit must be its main diet. Like the Bellbirds and Calfbirds, it was frequently seen regurgitating fruit seeds. Twice it was seen taking fruit, once from a melastomaceous tree of about 13 meters and from an unidentified tree of about 32 meters. Most of the fruit must have come from high up, as usually after a spell of calling, the bird would disappear into the upper canopy, where it would be silent and was presumably feeding.

There appears to be a strong social bond between neighboring birds. Thus the individual A had two neighbors, B and C, with which it synchronized its day so that all three birds, but more particularly A and B, would tend to have their silent periods and period of high- and low-tempo calling at the same time. When all three birds were calling at a fairly high tempo, such as six calls a minute, the calls were timed to follow each other and not overlap. A and B, timing their calls alternately, would reach a tempo of eight per minute. As the full call of

groo groo, qui, qui, y-o took approximately four seconds, careful timing was required, and it could only be accomplished by one bird starting its *groo groo* call when the other was terminating with its *y-o*. These bouts of alternate calling were made when the two or three neighbors were calling near each other, probably not more than 100 meters apart.

The bird usually calls from below the canopy, perching on fairly thin, horizontal branches 6 to 16 meters up. Occasionally, it will call from higher perches. It moves its perch rather frequently, calling from all parts of its territory with no apparent preference for any particular perch. When excited, A was seen on several occasions to fly down to perches 4 to 5 meters above the ground, where it hopped about from perch to perch while calling at a very high tempo. The Bearded Bellbird flies down to a lower perch when a female appears, and here it displays prior to mating. Although I saw no other bird when A flew to these low perches, it seems probable that one may have been present and visible to A.

Two birds with abnormal calls were heard at different calling grounds in the Kanakus. These birds were reheard at the same place on subsequent days and give further proof that each bird has a fixed area in the calling ground. One bird every fourth or fifth call gave a *qui, qui, y-ee,* the intervening calls being normal. The other bird always used an abnormal timing, so that after the first, unusually quick *qui,* there was a one-half second pause before the final *qui, y-o*. This bird frequently did the *groo groo* calls alone. The young male Bearded Bellbird takes many weeks to perfect its call, and the second bird may have been a young bird learning the call.

Another call made very occasionally by the calling birds holding territories was a loud, whistling *wee-oo* repeated several times. This call was usually made before or after a silence of five or more minutes. It was also made early in the morning and in the evening. In the Kanakus, where we camped in the middle of a calling ground, the *qui, qui, y-o* calling started around 0645 hours and continued until about 1715 hours in the evening. But each morning, sometimes as much as 20 minutes before the day's calling started, a few *wee-oo* calls would be heard, and the same would happen in the evening after the calling had finished for the day. There was no special body movement made with this call, although it was equally as loud as the *qui, qui, y-o* call. It seems likely that this is a preliminary contact call between neighbors who have temporarily lost contact through silence. From the following incident, it looks as if it may also be a contact call between the sexes. The individual A flew from the borders of its territory, where it had been calling, into the lower branches of a sapling in the center of the territory.

Here it called *qui, qui, y-o* at the rate of 12 per minute, evidently excited, moving from branch to branch, and frequently turning on the branch to call in the opposite direction. It suddenly stopped calling and hopped up the sapling, giving a low, whistling *queue queue,* probably not audible for more than 15 meters. At about 10 meters, it stopped and called *wee-oo,* which another bird, somewhere above, answered with a *wee* call. This calling and answering was repeated two or three times before A flew off and there was silence. It seems possible that the answering bird was a female, although unfortunately I never saw it.

It is probable that the Greenheart Bird's calling grounds are a type of lek, where each male owns quite a large territory from which it derives a proportion of its food. I gathered from residents in British Guiana, who frequently visit the forest, that they have not noticed any seasonal change in the amount of calling but have the impression that the bird calls throughout the year, and also that it calls in the same places over the years. A loud call, with effectiveness increased by numbers, and a fixed locality are probably both important features facilitating contact between the sexes. The extreme loudness of the Greenheart Bird's call has presumably evolved through intraspecific competition, as have the extravagant visual displays of other lek birds.

THE CALFBIRD

The Calf or Capuchin birds were watched for a total of nine and one-half hours. Seven and a half hours were concentrated into one day; the other two hours were in the early morning of the following two days. Even so short a time brought to light some very interesting and puzzling facts about these extraordinary birds.

The Calfbird is a fairly large bird, 340 mm. long. Its general color is chestnut brown with black upper tail coverts, tail and flight feathers. The under tail coverts are bright orange-brown and are important in display. The bird has bare, bluish-gray skin on the face. The sexes are similar. The far-carrying, *mooing* call, very like the lowing of a calf when heard in the distance, was described by Schomburgk (1848) and has been mentioned by many subsequent writers.

The piece of forest at the foot of the Kanuku Mountains in which a display area was found consisted mainly of trees not more than 25 meters high with a fair proportion of secondary growth due to felling. There was another display area, heard but not visited, about a quarter of a mile away from the one where I watched. The display took place on two adjoining trees that were mostly leafless, particularly the lower branches. The bareness of these lower branches, about 16–20 meters up,

was almost certainly due to the industry of the Calfbirds, as two different birds were seen to snap twigs off these display branches and drop them. Preparation of a place for displaying is seen in another member of the Cotingidae, the Cock of the Rock *(Rupicola rupicola)* (Guppy, 1958: 90–92), and has been found in some species of manakins (Pipridae), a closely related family.

Five birds, two couples and a single bird, commonly came to call and display at these display branches. Their identity on consecutive days was presumed from the similar positions they took up when displaying. The single bird, A, took up a central position, with one couple, B, four to five yards away on one side, and the other couple, C, four to five yards away on the other side. In these positions all five birds would give the *mooing* call, sometimes in unison and sometimes individually or in couples.

When two birds give the *moo* call together, they come to within a few inches of each other; then both face in the same direction, lean forward, cock their tails, and puff out their orange-brown under tail coverts. At the same time they open their beaks and utter a growling call, *grrr*, probably by the inhalation of air (Figure 3a). In unison the birds then puff up all the feathers of the upper part of their bodies and slowly assume an upright and then a leaning-back posture (Figure 3b); at the same time tails are fanned and depressed, so that tufts of the bright, orange-brown under tail coverts appear on either side of the black tail (Figure 3c). While the birds have been assuming this upright posture, the *grr* has changed to an *aaa;* then, while in this puffed-up, leaning-back position, the *moo* call is made. The bill is closed during the *moo,* and the air is probably blown out through the gape. The air appears to be stored in sacks at either side of the neck, which at the beginning of the call are distended and become dented as the call progresses. The *moo* is by far the loudest part of the call, and at a distance is frequently the only part of the call heard. From a position near the bird, the full sequence is most closely described by *grr-aaa-oooooo.*

Two other calls were heard. One of these, *grr-aaaa-aw,* is almost as loud as the *moo* call, and is in many ways similar: the *grr* starts with the bird leaning forward, and the *aaaa* is made with the beak open as the bird becomes more upright; but there the call ends with an *aw,* as the beak closes and the bird never reaches the leaning-back, puffed-up position of the *moo* call. I did not see this call performed in unison, and my impression was that it was made when the excitement was not sufficiently great to produce a *moo* call. The other call heard was a *wark,* repeated once every two seconds for up to 10 minutes at a time.

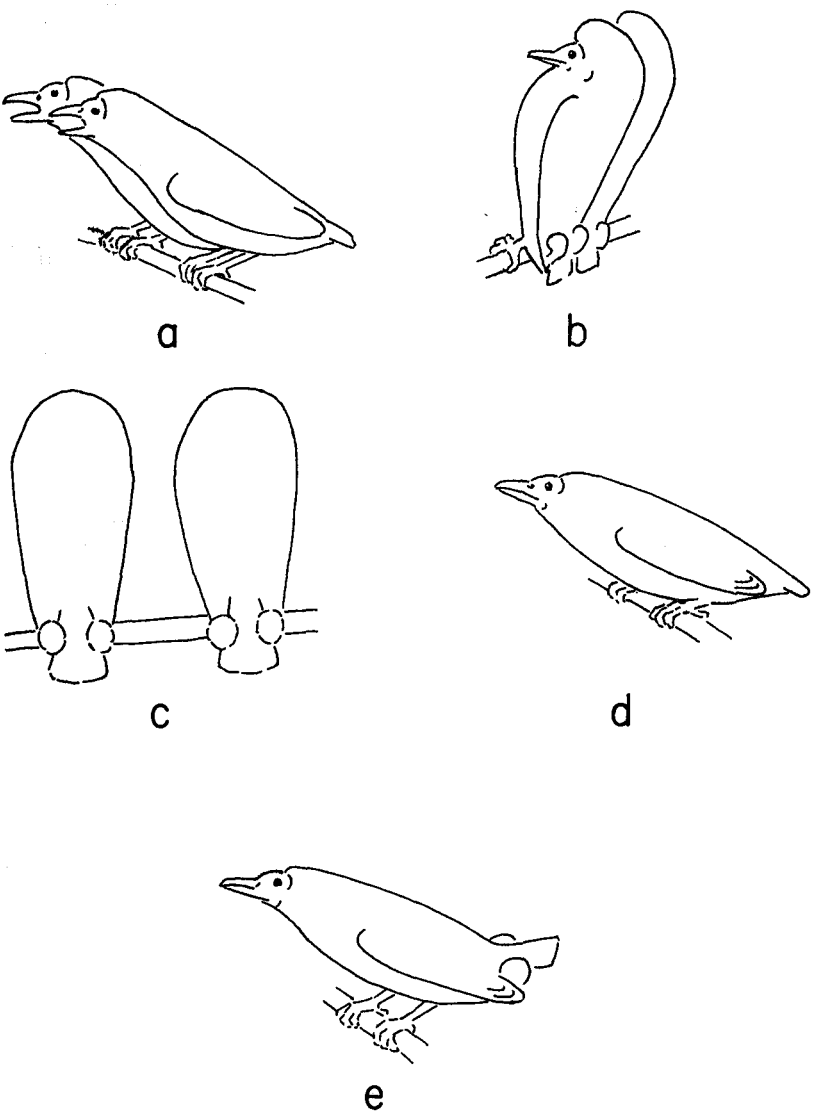

Figure 3. Display postures of the Calfbird: (a), (b), and (c) two birds making the *moo* call in unison; (d) and (e) postures assumed by single birds.

This call was not audible beyond a range of about 30 meters. The single bird A was seen making this call and also one individual from a couple; but the two birds of a couple were not seen to make it together. While making this call, the bird has its feathers flattened, including the orange under tail coverts.

The individual A frequently hopped about the display branches, landing in a pointed position (Figure 3d) and holding it for several seconds. This position shows striking similarities with the male Bearded Bellbird's display performed between two branches of the mating sapling, when it first espies a visiting female. A rather different version of the pointed position (Figure 3e), with the tail cocked up and the under tail coverts erected, was several times taken up by the bird of couple B and couple C, which was nearest to A. It looked like the position a female might adopt when inviting copulation, but unfortunately it was not possible to determine the sex of any of the birds.

Besides the five birds watched at the bare display branches, there were sometimes other birds calling nearby. They appeared to move about and not call from any one place. At the beginning of a bout of display, one bird calls, and immediately other birds begin to fly in to the display center, often stopping on the way to *moo*. They fly in singly just below or through the canopy, with a rapid, undulating flight during which the wings make an audible whirr.

The birds were present in the display area and calling for 74 per cent of the seven and one-half hour watch on 14 March. The longest period of silence was 38 minutes near midday. From 1450 to 1800 hours some birds were continually present and calling, and in the early morning there was also a concentrated period of display. Like other Cotingidae this species is probably able to spend so much of its time calling and displaying because of its fruit-eating habits. It frequently regurgitates the hard seeds of the fruits it eats. Fifteen of these were picked up from below the display branches; all but three were a species of *Aniba*, a tree belonging to the Lauraceae family, which provides so much of the food of the Bearded Bellbird.

The purpose and import of all these displays remain a mystery. The two most likely explanations are that displaying is either a communal activity to which paired birds come as a social stimulus, or it is a lek of males to which females resort in order to mate. If it is a lek and the displaying couples are males, then this shows some analogy to the Blue-backed Manakins *(Chiroxiphia pareola)*, in which two males cooperate for part of the display (Snow, 1956). It is unusual for the plumage of the sexes to be similar in a lek bird; but possibly it is a hole-nesting species as two other genera of Cotingidae *(Attila* and *Tityra)* are known

to be. If this is the case, there would not be the same necessity for the female to acquire a less-conspicuous plumage.

SUMMARY

1. Field notes are presented on the calls and behavior of the White Bellbird *(Procnias alba)*, the Greenheart Bird *(Lipaugus cineraceus)*, and the Calfbird *(Perissocephalus tricolor)*.

2. The calls of the male White Bellbird and some of the accompanying movements are described, including the position of the wattle. While under observation, the male called for 78 per cent of the time and stayed within a restricted area of forest.

3. The various calls of the Greenheart Bird are described. The observations suggested that the main call is made by the males, who occupy adjacent territories, forming a type of dispersed lek.

4. The communal display of the Calfbirds includes a loud, synchronized calling by couples perched side by side. The birds use special display branches from which they clear the twigs and leaves.

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