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# HOW THE MALE BIRD DISCOVERS THE NESTLINGS

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MOST BIRDS have highly developed vocal organs. The majority of the small birds of our woods and fields are probably capable of producing a greater variety of sounds than any mammal except man, and some of the more gifted avian mimics exceed even ourselves in the range and flexibility of their voices. By no means all feathered creatures are accomplished musicians, but all, songful and songless alike, give a variety of simpler, less musical sounds which ornithologists lump together as "call notes." The number of distinct sounds which the average bird-watcher can recognize, and record by means of imitative syllables or phrases like *peep* or *pe-dee,* is for the majority of species not great, rarely exceeding a dozen or two, and this, compared with even the most primitive of existing human languages, is a very small vocabulary. But these simple sounds are delivered with a considerable diversity of modulations and inflections which we can recognize but which, in the absence of a satisfactory system of notation, we cannot adequately record. It seems likely that these subtle variations in tone are meaningful to the birds themselves, who distinguish them far more readily than we do, just as they can recognize each other as individuals with a certainty rarely achieved by us.

These so-varied calls of birds serve to apprise their companions of their location, as greetings upon coming together after an interval of separation, as warnings of approaching danger, as threats to trespassers and rivals, as signals that food has been found – there is considerable difference in this respect from species to species. When we watch a pair of birds working together in building their nest, hatching their eggs, attending their young and outwitting their enemies, we can readily believe that without the ability to talk to each other this close cooperation would be impossible. It seems that they must possess distinct sounds or "words" to indicate the various objects and operations which enter into their daily activities. Such communication is, of course, the primary function of our language.

But a conclusion of such fundamental importance cannot be accepted without an adequate foundation of carefully controlled observations. Writers have often jumped to unwarranted conclusions about the powers of speech of animals, just as they have hastily assigned to them all sorts of miraculous capacities for conveying intelligence by means of telepathy or some mysterious "super-sense" unknown among ourselves. This matter of the modes of communication of animals of all sorts is not beyond the range of scientific investigation. Much has been done in this field in the past, with ants and bees no less than with birds and mammals, but much more remains to be learned.

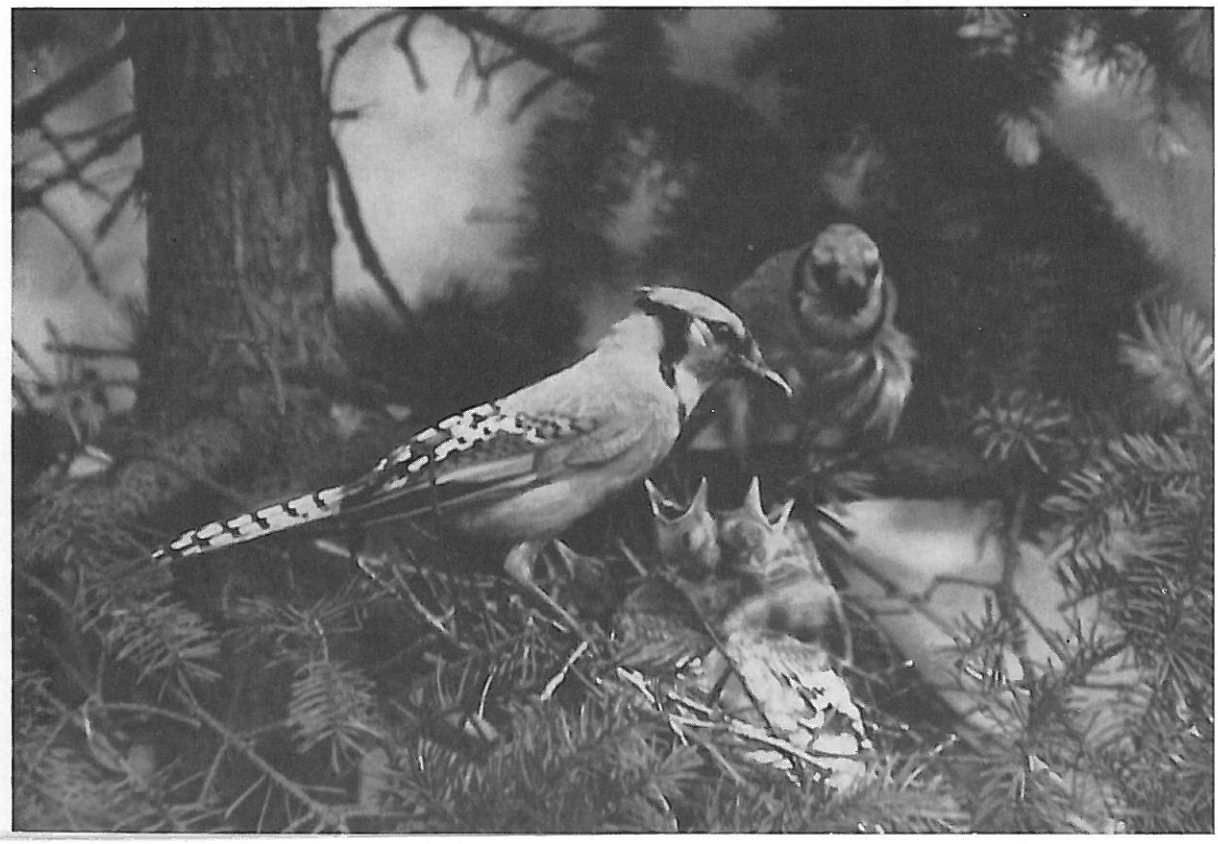
One might, for example, choose one particular event in the nesting operations of a pair of closely cooperating birds and by patient observation learn whether they have the means of telling each

other about it. Events of this character are the selection of the nest site, the laying or hatching of an egg, or the departure of a youngster from the nest. Of all these occurrences, hatching seems most suitable for a study of this kind, because the student can predict within narrow limits the hour when it will take place and plan to witness it, and it causes great changes in the routine of the parent birds. Nearly always one parent sits on the nest while the eggs hatch beneath it, while the other hunts or sings or rests somewhere in the vicinity. Does the bird in closest contact with the nest hasten to convey the exciting news to its mate, as a human parent would do in corresponding circumstances? If so, how is this information transmitted? If not, how does the other parent learn that there are now nestlings which require food as well as brooding and protection? Twenty years ago I was led by my studies of the nest-life of Central American birds to ask myself these questions, and many subsequent seasons were devoted to answering them.

It is obvious that such an investigation is not to be undertaken without close familiarity with the nesting habits of the species one decides to use, and even of the idiosyncracies of the particular pair of birds whose nest one watches. It is not so simple as finding a nest where the eggs are on the point of hatching, then sitting down to see what happens. First of all, one needs to know whether the male or the female, or both by turns, enter the nest to warm the eggs. And if, as with the majority of the song birds, the female alone incubates, it is essential to learn how the male spends his time during this period. Perhaps he never comes to the nest and so would not be likely to discover the nestlings unless his mate made some special effort to direct his attention to them. Or perhaps he has been in the habit of making frequent visits to inspect the nest throughout the period of incubation, and so would see his offspring soon after their hatching without any prompting by their mother.

It is well known that with some birds, as phalaropes and jacanas, the Kiwi of New Zealand, the Rhea and the tinamous of South America, the male takes charge of the eggs, and presumably also of the young, with no assistance from a mate. With hummingbirds, manakins, most ducks, and many cotingas and flycatchers, the male neither incubates nor attends the young. But perhaps in the majority of the families of birds the two sexes take turns at incubation,

***Both male and female Bluejays participate in incubation of the eggs and consequently the male is in the secret when they hatch. He shares, too, in the chore of bringing insects to the ever-gaping mouths.***



then share the task of nourishing, brooding and defending their progeny. Sometimes one sex, sometimes the other, assumes the brunt of these domestic duties. Thus among most woodpeckers, and some at least of the non-parasitic cuckoos, the male is in charge of the nest through the night and is in general the more devoted parent. But with a few exceptions, such as the Rose-breasted Grosbeak and some of the swallows and vireos, the male song bird (Oscinine) fails to incubate, although nearly always he faithfully brings food to the young. Since these are the birds which breed in greatest abundance about our houses, usually in open nests more favorable for watching than the holes used by woodpeckers, kingfishers and so many others of the "songless" families, our study of how the male discovers the nestlings will deal largely with birds of this great group and of the closely allied family of American flycatchers, whose domestic economy is in general quite similar.

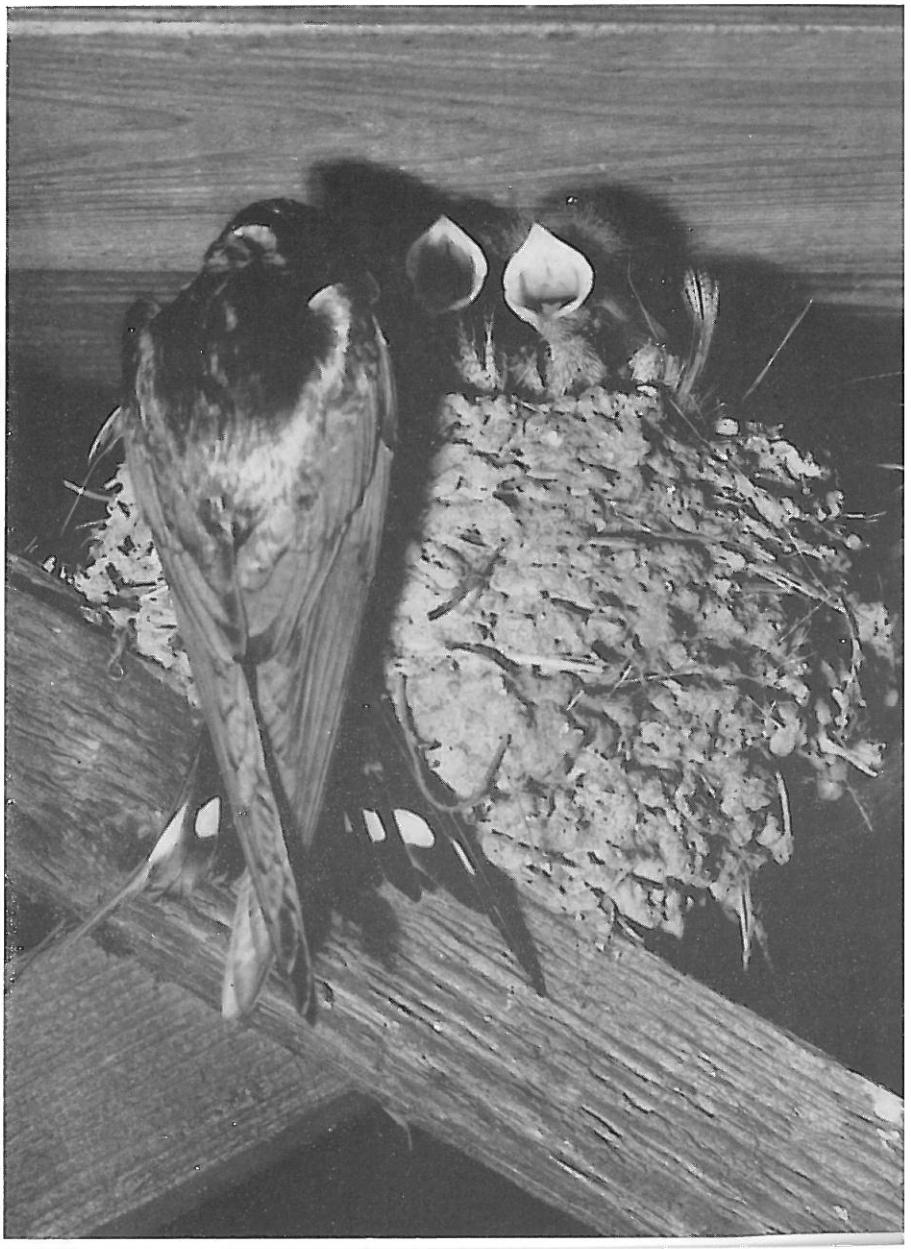
What contacts does the male bird maintain with the nest when he takes no part in warming the eggs? He may merely sing in neighboring trees or bushes, drive invaders from his territory, accompany his mate during her recesses from incubation, yet never closely approach the nest until after the young hatch. But often he has habits which bind him more closely to the eggs. Instead of flying off with his mate when she interrupts her sitting to forage, he may advance to the nest and guard it until she returns. This custom, as we should expect, is best developed among big, strong birds well able to drive away squirrels, small hawks and other less formidable predators. Among Central American birds it is of regular occurence among the big Brown Jays and the Boat-billed Flycatcher, one of the largest species in its multitudinous family. But I have seen it as an individual peculiarity among some tiny flycatchers who seemed incapable of chasing even the smallest predatory creature from the eggs they so faithfully guarded. In North America, a Catbird kept watch over the nest in a barberry hedge from a neighboring hawthorn tree. Here he regularly came to sing whenever his mate flew off to hunt for food, although when she returned to cover the three blue eggs he retired to chant from a more distant perch. With him, standing guard was more than an empty formality, for whenever I examined the nest he would buffet the back of my head while his mate pecked my intruding hand.

When the male bird instead of acting as sentinel accompanies his mate on her outings, he may escort her as she returns to her eggs, turning back at a point some yards or only a few inches distant from the nest. Among the small tropical tanagers known as euphonias, the male has the custom of flying close beside his mate as she darts into the narrow, round doorway of her roofed nest. The first time I witnessed this, it seemed to me that the blue-black and yellow male was racing his greenish mate in an effort to enter the nest before she took possession of it, but when again and again I saw the female win the spectacular race by little more than her own length, I was convinced that he made merely a formal gesture. Among the tody flycatchers, which build swinging nests with a round aperture in the side, the female's return to her eggs is the occasion of a similar "race" between her and her mate. Escorting the female, and even standing guard, may not be sufficient to give the male a view of the contents of the nest. In the first instance, he may stop short at a point too far away or, as with the euphonias and the tody flycatchers, pass too rapidly by; in the second, the sentinel's post may be too distant or low to allow a clear view of the eggs. But many male birds go from time to time to rest on the nest's rim and deliberately scrutinize its contents. Such visits of inspection, if frequent, may lead to the male's prompt discovery of the newly hatched nestlings with no intimation from his sitting mate.

Even better preparation for the discharge of paternal obligations is procured by those male birds which bring food to their incubating mates. In the majority of species in which such feedings occur, their number, perhaps two or three in a morning, is not sufficient to reduce appreciably the time the female must devote to foraging for herself and thereby increase the time she can spend warming her eggs. The importance of such *occasional* food-bringing consists in keeping the male in close contact with the nest and ensuring his prompt attention to the needs of the newly hatched babies. Occasional food-bringing has been reported for many species of finches, tanagers, wood warblers, titmice and other birds too

numerous to be listed here. Sometimes, however, as with goldfinches and some jays, the male bird brings enough food to satisfy his mate, or at least greatly to reduce the time she must spend hunting for herself. The classic example of such *sustaining* food-bringing is the hornbills of the Old World Tropics, among which at the beginning of incubation the female is immured in the nest cavity, which she never leaves until her young begin to acquire feathers, or even until they are ready to fly. The plug which the hornbills build of clay or remains of food to close off the doorway contains a slit just wide enough for the toiling male to pass in food to his sitting partner.

The most curious kind of food-bringing has received little attention from ornithologists. The male brings food to the nest, not for delivery to his sitting mate, but for his unhatched children, still tightly enclosed within the shells, perhaps only half-formed embryos which will not hatch for a week. With a morsel in his bill he bends low over the eggs, twitters or murmurs soft notes, behaving exactly like a parent coaxing sluggish nestlings to rise up and take their meal. When his earnest efforts to dispose of the morsel in this impossible manner prove unavailing, he carries it away or devours it himself. If the female happens to be sitting when her mate comes with food for the unhatched nestlings, she may incidentally receive it, or she may disdain his offering, as I have seen with some warblers and tanagers. The most persistent of all these impatient fathers that I have discovered was a certain red Pink-headed Warbler in the Guatemalan highlands,



***The female Barn Swallow probably performs most of the incubation, although the male is closely associated with all stages of the family's life and thus should soon be aware of the nestlings.***

who, leaving his mate to forage down the hillside, came again and again to offer billfuls of tiny insects to her unhatched eggs. It was quite obvious that this food was intended for the offspring, not for her, although a few times she received it while sitting. Other species in which I have seen such *anticipatory* food-bringing are the Band-tailed Tityra, Buff-rumped Warbler, Crimson-backed Tanager, Song Tanager and Ash-colored Wood Pewee. This behavior suggests that the male finds the time pass slowly while his mate incubates and is eager to begin feeding nestlings, which is apparently an agreeable occupation when food is abundant. One wonders whether this premature food-bringing is confined to older males, who have had experience of earlier broods and perhaps have a mental image of the babies they vainly try to feed. Although female birds anticipate the nestlings more rarely than the males, I have seen an Ash-colored Wood Pewee and an Orange-billed Sparrow present food to intact eggs. This difference in the behavior of the sexes seems to result from the female's more intimate contact with events at the nest and her closer conformity to an innate, cyclic pattern of activities.

Thus when I began seriously to study how the male discovers the nestlings, I was aware that with many pairs of birds he has habits which might lead rather promptly to this result, even if the incubating female failed to apprise him that they had hatched. Even when I was already familiar with the general pattern of behavior of a species chosen for study, I spent at least one morning watching during the period of incubation the particular nest at which I hoped to learn how the male makes this discovery. Except with a few particularly confiding birds, all my vigils were made while I sat well concealed in a little tent of brown cloth. By carefully feeling the shell, I could usually detect as a slight roughness the first minute fracture made by the rhythmically hammering bill of the imprisoned birdling, at least twelve hours before it cut and broke away the large end and escaped. Then I would begin the crucial watch in the gray dawn of the following day. Of course I could not see the eggs while the mother bird covered them, but her restless sitting often made it clear to me that they no longer lay passively beneath her; and soon she would reach down and pick up a piece of empty shell, to eat it or carry it away. This told me the time of hatching of the first egg with sufficient accuracy for my purposes. As for the father bird's discovery of this event, since I could not read his mind, I had to select some objective criterion. Usually his delivery of food to the new birdling was my first unequivocal intimation that he was aware of its emergence from the shell, but sometimes his close scrutiny of the interior of the nest left me without doubt that he knew what it contained.

My most careful studies were made at 20 nests of 15 species belonging to the families of American flycatchers, wrens, thrushes, vireos, wood warblers, tanagers and finches, all in the valley of El General in southern Costa Rica, and mostly about my house. Of the 20 male birds, 8 first brought food within an hour after I learned that the first egg hatched, 8 in one to 6 hours, 3 in 6 hours to 1½ days, and one between the sixth and tenth day after hatching. Those which fed their new babies most promptly were an Orange-billed Nightingale Thrush (9 minutes after hatching), a Neotropic House Wren (25 minutes), a Song Tanager (38 minutes), a Streaked Saltator (finch family – less than 40 minutes), a Yellow-bellied Elaenia (flycatcher family – 49 minutes), a Yellow-green Vireo (49 minutes), a Golden-masked Tanager (51 minutes) and a Buff-rumped Warbler (56 minutes). Usually the female parent brought food before her mate, sometimes long before. But the male House Wren fed the nestlings in the bird house 73 minutes before their mother brought food, and a male Buff-rumped Warbler more than 1½ hours before the female. At one Song Tanager's nest both parents brought their first offering together. The female Golden-masked Tanager's first feeding preceded that of her mate by only a minute; the female Nightingale-Thrush's by two minutes; while the female Yellow-bellied Elaenia first fed the nestling three minutes before her mate.

In most instances, the male's delay in bringing food for the nestlings was long enough to make me feel confident that his mate had not immediately, by some elusive process of thought-transference, apprised him that he had become a father. He had to discover their arrival by more commonplace means. Usually when he saw the babies

very soon after their hatching, this was because he had prepared himself by close attention to the nest during the period of incubation. From my preliminary watches, I could often predict whether the male at a certain nest would be prompt or tardy in discovering the nestlings. Most informative were the instances in which the male loitered in the vicinity, or accompanied his mate when she flew off for food, over a period of several hours before he took any notice of the nestlings. In such cases, if the female had been able to tell her partner that the babies were hatched, or to request his help in feeding them, I suppose that she would not have failed to do so. Often while sitting on her new nestlings she would utter notes which usually seemed to me quite like those she habitually voiced, but sometimes were decidedly different from any that I had noticed before the eggs hatched. Her mate was often close enough to hear these calls, but he never reacted to them in a fashion that made it clear that they conveyed specific information to him. Although some of my watches left puzzling questions unanswered, with none of these fifteen species of birds and a number of others that I watched for other purposes as the eggs hatched, could I convince myself that one parent had a special note to draw its mate's attention to the nestlings, or that it otherwise made an effort to inform its partner of their arrival.

Of course, when we recall that there are about 8,600 species of birds, a score of kinds is a very small sample of the whole. It may well be that with some of the bigger and supposedly more intelligent species, as crows, jays or cranes, one parent does indeed tell the other that the babies have hatched, or asks for its help in attending them. There are on record observations that make such communication seem likely, but I believe that it is exceptional among birds as a whole. The cooperation between a pair of nesting birds, so close that it rarely fails to arouse our wonder and admiration, results, then, not from their powers of communication or ability to talk to each other, but from the perfection of their innate patterns of behavior.

The adequacy of these inborn modes of conduct is attested by the fact that at most of the nests I studied the father began to bring food within a few hours after the first egg hatched. In normal weather during the nesting season at lower elevations in the Tropics where I made these studies, there was no real need for the male to help his mate feed the two or three nestlings which formed the brood, until they were considerably bigger and made greater demands for nourishment. Thus in every instance, save that of the singularly unobservant Chipsacheery Flycatcher who required more than six days to become aware of his offspring, the male bird began feeding with a wide margin of safety. At high altitudes and high latitudes, where there is often much cold, wet weather while the eggs are hatching, prompt feeding by the male, allowing the female to brood almost constantly instead of leaving the babies exposed while she gathers their nourishment, may spell the difference between the survival and the loss of the brood.

There is one further conclusion which I believe we may draw from our study. In regions where there is abundant food throughout the year and birds are not forced to wander afar in order to survive, a considerable proportion of them live in pairs at all seasons. Edmund Selous was of the opinion that birds always remain mated when external conditions permit. These constantly mated birds fly, forage and roost together, seem to find pleasure in each other's company and to be distressed when separated from their partner. But, so far as our study of the discovery of the nestlings shows, they have not attained that higher stage of spiritual development at which the prompt sharing of thoughts and experiences adds to the joys of companionship.

### Scientific Names of Species Mentioned, in the Order of their Occurrence

Rose-breasted Grosbeak – *Pheucticus ludovicianus*
Brown Jay – *Psilorhinus mexicanus*
Boat-billed Flycatcher – *Megarhynchus pitangua*
Catbird – *Dumetella carolinensis*
Pink-headed Warbler – *Ergaticus versicolor*
Band-tailed Tityra – *Tityra semifasciata*
Buff-rumped Warbler – *Basileuterus fulvicauda*
Crimson-backed Tanager – *Ramphocelus dimidiatus*
Song Tanager – *Ramphocelus passerinii costaricensis*
Ash-colored Wood Pewee – *Myiochanes cinereus*
Orange-billed Sparrow – *Arremon aurantiirostris*
Orange-billed Nightingale-Thrush – *Catharus aurantiirostris*
Neotropic House Wren – *Troglodytes musculus*
Streaked Saltator – *Saltator albicollis*
Yellow-bellied Elaenia – *Elaenia flavogaster*
Yellow-green Vireo – *Vireo flavoviridis*
Golden-masked Tanager – *Tangara nigro-cincta*
Chipsacheery Flycatcher – *Myiozetetes similis*