HELPERS AT THE NEST

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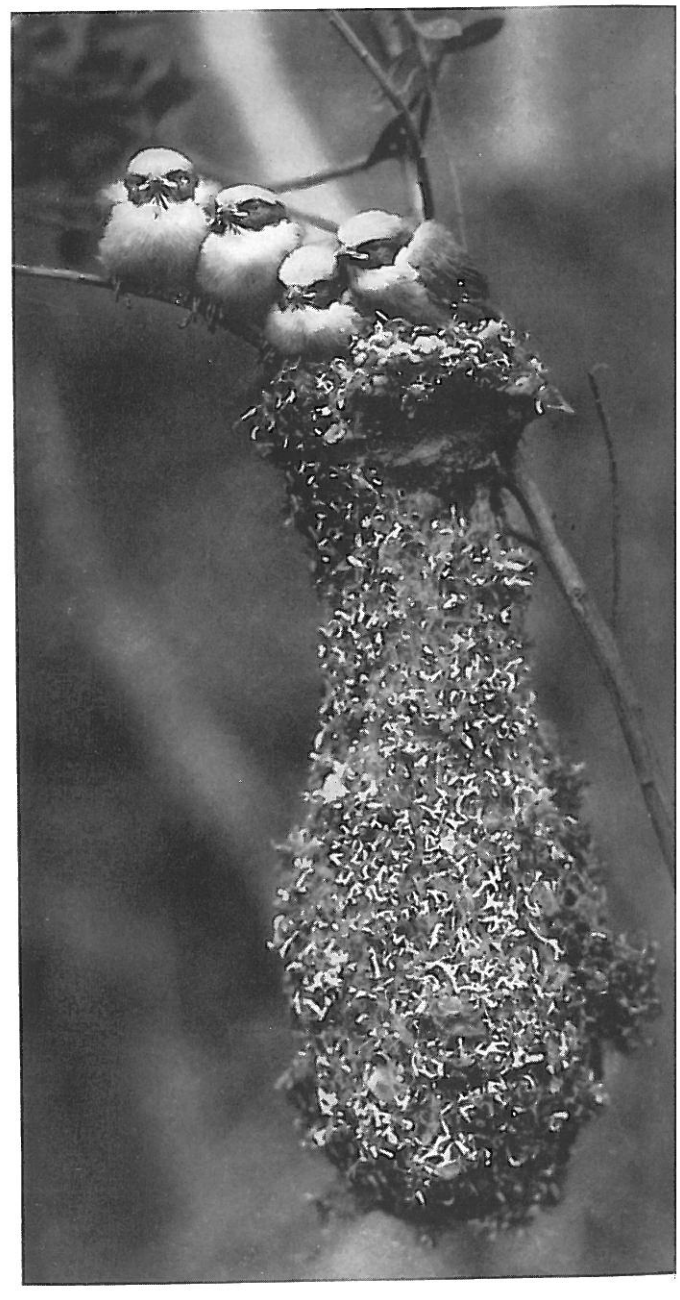
BETWEEN MY HOUSE in Costa Rica and the broad mountain stream that it faces lies a rocky pasture, shaded by orange, guava and other trees, in whose leafy crowns many birds build. Last May I found, high in a spreading copalchí tree in this pasture, a most puzzling nest. Three birds were bringing food to it! These were a pair of Golden-masked Tanagers, elegantly attired in blue, black, yellow and white, and a female White-browed Gnatcatcher, a smaller and plainer bird, whose sharp, slender bill contrasted with the short, thick bills of the tanagers.

Here was a mystery to be solved! How had this unusual situation come about? Who had built the nest, and whose were the nestlings it held? A close examination might have answered some of these questions, but the structure was too high to be reached by a ladder and too far out from the trunk to be approached by climbing. The best I could do was to watch from the ground. The size of the nest suggested that it had been built by the tanagers, and the outer covering of moss pointed to the same conclusion. The neater, downier cup of a pair of gnatcatchers would have been plastered over with bits of lichen and liverworts rather than thickly covered with green moss. When the occupants stretched up their necks to receive food, I never saw more than two heads, and the interior of their mouths was red, as in tanagers, rather than yellow, as with gnatcatchers. All of these facts led me to believe that the nest belonged to the Golden-masked Tanagers and the female gnatcatcher was an intruder. The failure of the male gnatcatcher, who sang blithely in the distance, to take any interest in it, strengthened this belief, for normally the male gnatcatcher is a faithful attendant of eggs and young.

The parent tanagers usually came to their nest

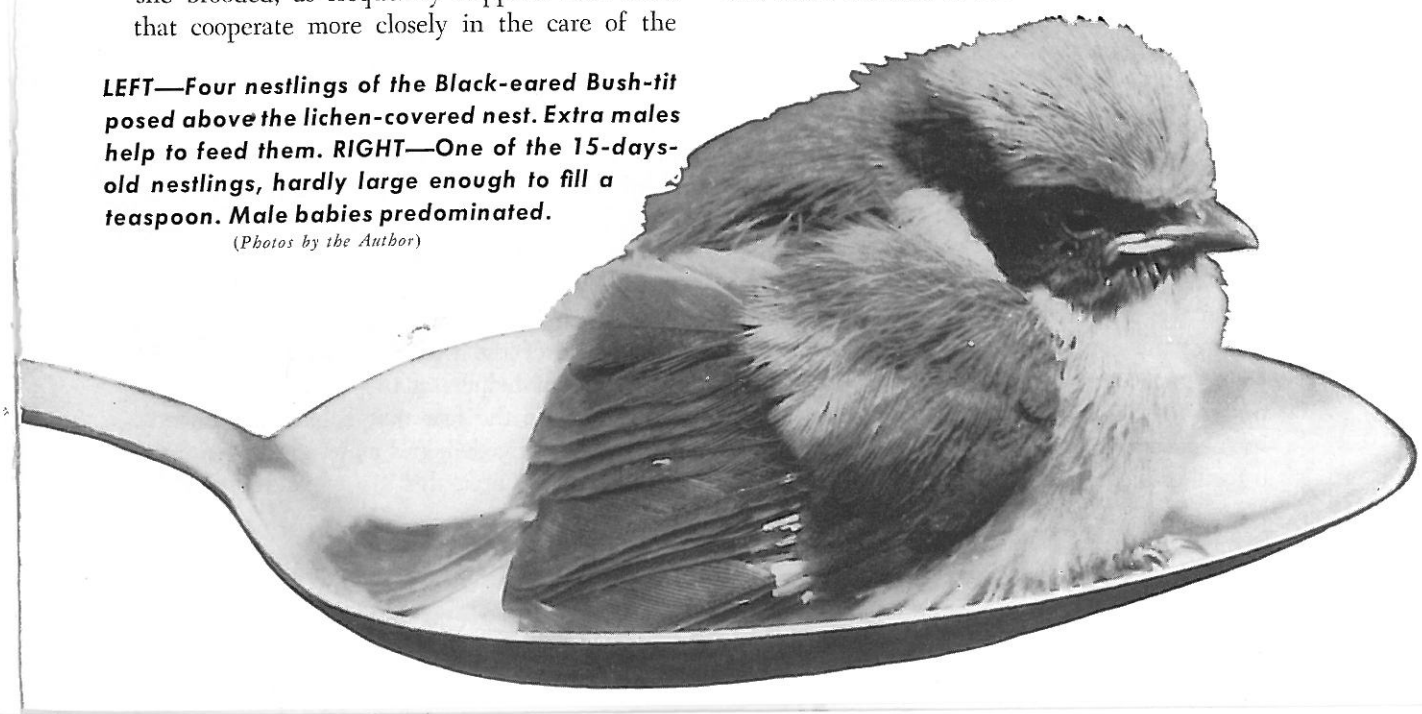


together, each bringing a billful of berries or fruit pulp. Then, after each in turn had delivered its contribution, they winged away in company, often voicing the rapid series of dry, ticking notes which is their only song. As the nestlings grew older their visits became very frequent, and the two together gave the youngsters from 17 to 22 billfuls in an hour. In contrast to the bulky portions brought by the parents, the female gnatcatcher came with tiny insects or other small morsels held daintily in her slender bill. Because she spent so much time flitting around the nest amidst the foliage, which screened her approach to it, I found it difficult to learn how many times she fed the nestlings, but at the beginning of my observations she seemed to do so about as often as either one of the parents. Although the food brought by the gnatcatcher weighed far less than that brought by the parents, it helped to vary the nestlings' diet.

When I first discovered the nestlings they were still unfeathered and required a good deal of brooding. This office was performed not only by their mother but also by the attendant gnatcatcher, who also spent much time resting on the nest's rim with her breast above the little ones.

Although the gnatcatcher was so solicitous of the young tanagers' welfare, it was plain that she was not on friendly terms with their parents. If she happened to be sitting when they flew up together with food, she was careful to hop from the nest before they reached it, never receiving from them a morsel to be passed to the nestlings she brooded, as frequently happens with birds that cooperate more closely in the care of the young. While the tanagers were at the nest she would flit around it in a belligerent attitude, her tail fanned out to display the white outer feathers that contrasted prettily with the dark central ones, her wings drooping, while she protested with her sharp, nasal *chaaa*. If, after feeding, the mother tanager settled down for a period of brooding, the gnatcatcher would continue to hop around her and complain. Sometimes she would pursue the parents as they flew back and forth between the nest tree and the neighboring woodland where they hunted food. As the days passed and the nestlings seemed to become too big for the little helper to brood them with comfort, she devoted less time to ministering to their needs and more to trying to keep the parents away from them. But most of the time the parents ignored their quarrelsome assistant, chasing her only when she darted close to them, and never pursuing her far.

A few days after I found this nest I discovered that the male gnatcatcher was building one of his own in the same tree, about three yards from that of the tanagers. He brought much cobweb, which with his long, black bill he carefully applied to the lichen-covered outer surface of the little cup. His mate, absorbed in the nestling tanagers, gave him no help and seemed indifferent to his effort to prepare for a family of gnatcatchers. He in turn ignored the neighboring nest which so engrossed her. But if the tanagers and the female gnatcatcher happened to be engaged in a lively chase as he passed by, he might join the commotion, which was of brief duration and never resulted in the loss of a feather.



LEFT—Four nestlings of the Black-eared Bush-tit posed above the lichen-covered nest. Extra males help to feed them. RIGHT—One of the 15-days-old nestlings, hardly large enough to fill a teaspoon. Male babies predominated.

(Photos by the Author)

He built in vain; after the two young tanagers grew feathers and flew away, his nest remained deserted, too. Although the female gnatcatcher attended the tanagers so long as they stayed in the nest, I doubt whether she followed them through the tree-tops with their parents, and she might then have been free to raise a family of her own.

In the same shady pasture I found, some years earlier, another nest of the pretty Golden-masked Tanager with a helper of a different sort. Instead of a bird of a distinct species, this time the assistant was a young Golden-masked Tanager, whose greenish plumage was variegated by the earliest flecks of the richer adult colors. Since the time was late June, this bird was probably an older brother or sister of the nestlings it attended, hatched in an earlier nest of the same season. Its relation to the nestlings' parents was far different from that of the gnatcatcher. In five morning hours the young assistant brought food 19 times, the two parents together 67 times, making 86 feedings for the two nestlings. Eighteen times in this period all three of the attendants arrived together, and 16 of these times the young bird fed the nestlings along with the adults, leaving only three times when it came alone with food. When the trio arrived together, either the helper or a parent might be the first to deliver its billful. In this instance, it was difficult to decide whether a precocious awakening of the parental instinct, or a social bond which led the young tanager to accompany its parents and to imitate them, was responsible for this early manifestation of parental behavior. Probably the youngster was determined by both of these motives to bring food to the nestlings.

At two other nests, one on my farm in Costa Rica and the other in Panamá, I have found young Golden-masked Tanagers in juvenal or transitional plumage helping the parents to attend nestlings. Both of these nests were late ones situated near early nests in which young had been reared, so that it is fairly certain that the helper was in each instance an older brother or sister of the nestlings it attended. The greenish young tanager who fed nestlings in a calabash tree in front of my house in 1946 amused me by its inconstant behavior. When I first discovered it feeding the nestlings, it brought them food, including banana from the neighboring bird table, about as often as either one of the parents. But after a few days the youngster's rate of feeding fell off sharply. It reminded me of a child who, eager to share in grown-up occupations, starts off with a burst of enthusiasm, but soon finds the adult tasks harder than they seem and grows weary of them.

Twice I have found groups of three adult Golden-masked Tanagers bringing food to the same nest. In each case all three of the attendants wore fully adult plumage, which is practically the same in the two sexes. They usually came in a little flock, fed the nestlings one by one, then winged away together. They all behaved so much alike that I could not tell which were the parents, or what relationship the helper bore to them.

ALTHOUGH I have found helpers at nests of Golden-masked Tanagers more frequently than at the nests of most other birds, I would not leave the impression that they are of regular occurrence. At only six of the sixty nests of this tanager that I have found did I notice that the parents were assisted by other individuals of their own or another species. The relatively high incidence of helpers at nests of Golden-masked Tanagers is without much doubt a result of the weakness of their defence of the breeding territory. Although they are by no means gregarious in the nesting season, their efforts to drive off intruders are at best slight and ineffectual. Birds of many kinds stoutly oppose the approach of others of the same species to their nests, and even chase their self-supporting offspring of earlier broods away from their later nests of the same season. Were it not for this exclusiveness, they would far more often receive voluntary assistance in their parental duties. But such assistance is not without its disadvantages; for the more bustle and movement there is about a nest, the more likely it is to draw the attention of some predator that will pillage it. Since as a rule the parents are well able to provide for their family without assistance, natural selection would in most parts of the world operate to reduce the frequency of helpers at the nest.

Yet despite the fact that helpers are in most instances not needed, and may even increase the hazards of the nest, this sort of voluntary assist-

ance is so in keeping with the character of birds that many examples of it have been recorded, and their number is constantly increasing as bird-watchers make more careful studies of familiar species and extend their observations to hitherto neglected parts of the earth. As we have already seen in our study of the Golden-masked Tanager, the helper may be of the same species as the parents it assists, or of a different species, perhaps even of a family of quite distinct habits and diet. The conspecific helpers may be scarcely more than fledglings who only a few weeks before became self-supporting; they may be yearling birds who will not themselves breed until two years or more of age; or they may be mature individuals which for some reason cannot find mates, or have perhaps lost their own nests or young. Let us briefly consider each of these classes of helpers.

Each year bird watchers stumble upon unexpected instances of birds giving food to young of other species, or even brooding them. The number of such cases which occur among the birds of the world in a single year must be great, although naturally an exceedingly small proportion of them fall to the attention of people who will record their discovery in print. Since such interspecific associations arise chiefly from chance propinquity, almost any combination of species may occur, the chief limitations being size and mode of feeding. We should hardly expect to find a bird as big as a goose or a stork feeding tiny nestling hummingbirds, nor a young pigeon, which receives a special food in a special manner, to be nourished by a bird that feeds its nestlings with solid particles brought in the bill.

One of the strangest cases that have come to my attention is that of a pair of Mountain Chickadees which were found by an ornithologist in California assiduously feeding a nestful of Williamson Sapsuckers. Apparently the chickadees and sapsuckers had taken possession of neighboring cavities in the same rotting pine tree; the weak partition between the two chambers had broken down; and the chickadees, who had not yet laid, finding themselves face to face with the young sapsuckers were stimulated to feed them. In this case the helpers and the nestlings they attended belonged to two different zoological orders. But in the great majority of recorded instances the assistants and the parents they aid belong to the same order, usually the Passeriformes or sparrow-like birds, although often to widely separated families. A Phoebe fed nestling Tree Swallows. A European Nuthatch carried food to Starlings in a neighboring nest, and also removed the droppings of the Starling chicks. An Oregon Junco fed nestling Bewick Wrens. A House Wren brought caterpillars to both the male and female of a pair of Grosbeaks while they sat brooding their own young. Some of this food was eaten by the Grosbeaks and some passed on to the nestlings beneath them; and later the wren fed the young Grosbeaks directly. Afterward this same energetic wren attended a family of English Sparrows. One Catbird mothered orphaned Cardinals, and another fed a half-grown Flicker that was dislodged from the nest and separated from its parents in a storm. Black and White Warblers have been found giving

Nest of the Groove-billed Ani with eight eggs laid by two females. Two or more pairs sometimes build a nest together, laying their eggs in a common heap and all parents incubating.

A nestling Banded Cactus Wren of the mountains of Guatemala is well cared for by a helper or two in addition to the parents. Later it will sleep with the attendants in the nest.

food to nestling Worm-eating Warblers and a fledgling Ovenbird.

My notes contain many other curious observations of this sort, made by bird-watchers in many countries; but these should suffice to show what odd combinations may develop. The helper is often a male bird who, finding little to do while his mate hatches out her eggs, attends the babies in some neighboring nest. This was the way with a male Scarlet Tanager who brought food to young Chipping Sparrows while his mate incubated; with a Song Sparrow who fed Robins; with a Carolina Wren who gave insects to nestling Crested Flycatchers. At times the intrusion of the uninvited assistant is resented by the nestlings' parents, who may be greatly perturbed by the stranger's visits, but in other cases the gifts of food seem to be accepted as a matter of course. After their own nestlings make greater demands for food, these male helpers usually confine their attention to their own families.

When the helpers are of the same species as the parents they assist, they are of more regular occurrence, for such associations usually spring from the innate character of the species rather than the chance propinquity of nests or such improbable accidents as the collapse of a partition separating two nest cavities. In birds that are strongly territorial, like so many thrushes and finches, conspecific helpers rarely occur; but where defense of the nesting area is weak or lacking, this sort of helpfulness frequently arises. Swallows, which are at all seasons rather gregarious and often nest in crowded colonies, present conditions unusually favorable for the occurrence of helpers, which have been found in numerous species in this cosmopolitan family. Juvenile helpers have been recorded for the European House Martin, the Purple Martin and the Barn Swallow. In the Violet-green Swallow, Tree Swallow and Cliff Swallow, three or more adults sometimes feed the young in a single nest. A number of House Martins may join in the construction of one clay nest, and young Barn Swallows not only help their parents to nourish younger brothers and sisters, but may even assist in building a later nest.

Another family in which helpers are often found is the Corvidae. Three adults were seen feeding the young in a single nest of the American Crow, and the same happened at a nest of the Florida Jay. The related Arizona Jays are said to help to build and defend their neighbors' nests. In the big, crested White-throated Magpie Jays of Central America, the incubating female is fed not only by her mate but by other grown birds whose relationship to her is uncertain. At one nest that I watched in Guatemala, the female was kept so well supplied by at least two attendants that when at long intervals she took a recess from her eggs she devoted her time almost wholly to preening and stretching her limbs, finding it unnecessary to supplement the food they brought her. In the White-tipped

Brown Jay, too, the sitting female is given morsels by her mate and sometimes by helpers as well, but at the nests I studied in Guatemala the attendants failed to bring enough to satisfy her hunger and from time to time she went off to forage for herself, leaving her mate standing guard over the eggs. These Brown Jays were particularly favorable for study, as the bills of many were so variously marked with black and yellow that I could recognize them individually. After the eggs hatched, the unmated birds helped the parents to feed and defend the nestlings. Each of the five nests that I watched had at least

A young White-tipped Brown Jay from the Caribbean lowlands of Central America should be a robust baby, for as many as seven adults may feed two or three young in a single nest.

one attendant in addition to the parents. At one nest there were five assistants, making seven grown birds who devoted their time to stuffing the three nestling jays. I believe that Brown Jays, like so many other birds, fail to breed in the year following that in which they hatch, and possibly allow several years to pass before they mate; in these intervening seasons they help older birds, probably often their own parents, to rear their families.

The helpfulness of members of the crow family is not confined to the nest. Charles Darwin long ago wrote of Indian Crows who fed blind comrades. Recently, when snow and ice covered the ground, a Northern Raven in the National Zoological Park in Washington passed food through the bars of its cage to a free Black Vulture, which took the offerings from the captive's bill.

Another family in which helpers are frequent is the titmice. In her revealing book on *Birds as Individuals,* Miss Howard told how in England a male Great Tit fed the fledglings of a widowed female. Another pair adopted orphaned fledglings, and a youngster placed food within reach of a brother with a broken leg. In the Long-tailed Titmouse, whose beautifully felted oval nests are among the marvels of European ornithology, helpers at the nest have been repeatedly recorded. In the Bush-tits of the Pacific coast of the United States, extra adults sometimes help the mated pair with their nesting activities. While studying the Black-eared Bush-tits in the Guatemalan highlands, I found that the black-faced males were far more numerous than the gray-cheeked females. Those which perforce remained bachelors did not pass the breeding season in idleness, but attached themselves to the mated pairs and shared their labors. Sometimes they helped to build the exquisite, downy, pear-shaped pouch, richly encrusted with foliaceous lichens. After the young hatched, the bachelors joined the parents in bringing minute insects to them, and more rarely took a turn at brooding. At one nest at least three males, in addition to the parents, were in attendance, making five adults who labored to satisfy the hunger of the four tiny nestlings. By night four of the grown birds — three males and the mother — slept above the four nestlings in the downy pouch, which gave welcome protection from the incredibly penetrating nocturnal chill of those high tropical mountains. At each of my two other nests of the Black-eared Bush-tits there was a single male helper, who fed the nestlings and slept with them and their parents.