SOME ASPECTS OF CENTRAL AMERICAN BIRD-LIFE

II. PLUMAGE, REPRODUCTION AND SONG

By Dr. ALEXANDER F. SKUTCH

SAN JOSÉ, COSTA RICA

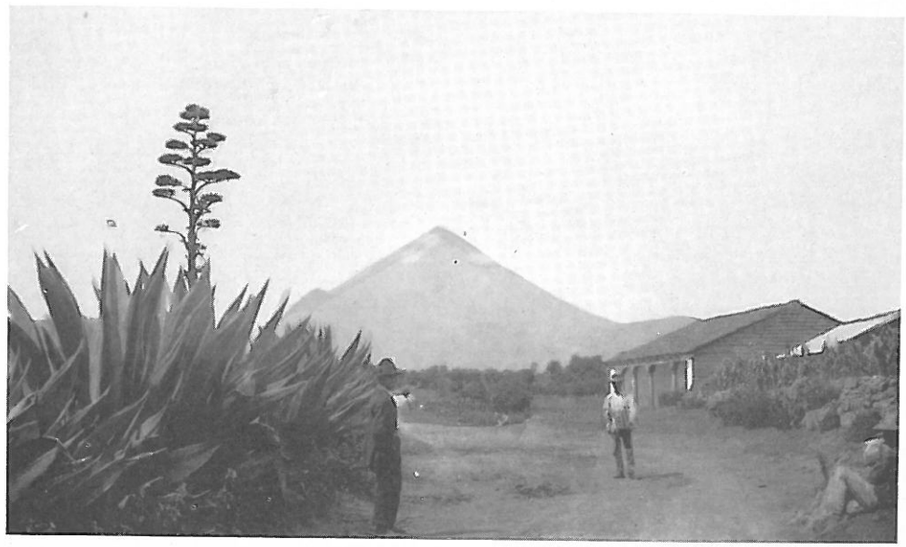
IV

Seasonal changes in the coloration of the same individual bird are a phenomenon in the bird-life of the North Temperate Zone so familiar that we are apt to look upon it as a characteristic of birds in general. I had already devoted some years to the study of Central American birds before it dawned upon me that I did not know one single instance of seasonal change in coloration among the resident species. Since then, keeping this problem especially before me during the course of seven years, I have convinced myself that a seasonal change of coloration does occur only in a single species of finch, the far-ranging blue-black grassquit (*Volatinia jacarini*). The plumage of the males among these little birds of grassy places, shining blue-black during most of the year, is clouded with brown during its closing months—yet even then a few individuals in full breeding plumage will be seen. I at one time considered these brownish males to be young individuals moulting into the adult plumage; but in certain districts, in December, they form far too great a proportion of the entire male population for this view to be tenable. Careful and continued watching of many species in the field has failed to bring to light another convincing example of seasonal change in attire among the inland birds of Central America, although a comparison of specimens collected at various seasons might reveal changes too slight to be noticed in the free, living birds.

The semi-annual change in array seems to be a phenomenon somehow linked with the habit of migration. Not that all migratory birds, even those brightly colored, exhibit it, or all non-migratory birds fail to manifest it—this is far from being true. Yet many facts, some of them concerning the most familiar birds, are so suggestive of a relationship—by no means a simple and direct one—between migration and seasonal plumage-change, that students of birds can not afford to disregard them. Is it merely a matter of chance that the brilliant red male cardinal, a non-migratory species, wears the same plumage amid winter's snow and summer's verdure, while the bright indigo bunting, cardinal's neighbor during the summer months, is far more plainly attired while in his winter home far away? The critical reader will object that the painted bunting, certainly no less splendid in his parti-colored array than his close relation, the indigo, is clad in the same colors the year around, in spite of his migrations. But the painted bunting performs shorter migrations; and some may linger over the winter in southern Florida: facts which suggest that the migratory urge is weaker in this species than in the indigo bunting. Turning to a different family, is it merely a matter of chance that the migratory summer tanager wears the same bright red plumage in his winter home in Central America and his summer home in southern United States; while the scarlet tanager, which performs a much longer annual journey, changes the intensely brilliant cloak of scarlet and black that

he wears in northern United States for a far less colorful dress during his sojourn in South America? Is it a purely fortuitous coincidence that the bobolink, the greatest traveler in the oriole family (Icteridæ), undergoes the most complete seasonal changes in coloration to be found in that great family, most of whose members are non-migratory? These examples and a number of others that might be cited suggest the possibility of a quantitative relationship between extent of migration and annual change in coloration; but at the same time their diverse character serves to warn the student that this problem is by no means a simple one, and that almost any generalization he may dare to arrive at must be followed by a list of exceptions.

The seasonal changes of coloration of migratory birds can not, in most cases, be explained by the necessity of diverse color-patterns to make the same individual inconspicuous in the different environments of its winter and summer homes. In the first place, birds as a rule seek the same type of habitat in their wintering as in their breeding range, those which live in the forest in the North seeking forest in the South, those which breed in grassland passing the winter in grassland, and those which prefer low, tangled thickets frequenting such vegetation the year about. The red summer tanager is neither more nor less conspicuous among the foliage of a Costa Rican forest composed of a hundred species of trees than in a northern forest of half a dozen kinds; and his enemies are no more numerous in his winter home. Secondly, diurnal, arboreal birds, in my experience, depend little if at all for their personal safety upon "protective coloration," their ability to escape detection; rather they stake their lives upon their alertness and fleetness. At the nest, on the contrary, the parent's ability to avoid detection may mean the difference between life and death, not for the mobile parent, but for the immobile occupants of the nest. How many a nest, which otherwise would most probably have been



VOLCÁN SANTA MARÍA (ABOUT 12,400 FEET)
PHOTOGRAPHED FROM THE PLATEAU NEAR QUEZALTENANGO, GUATEMALA

overlooked, has been revealed to me by the parent bird's abrupt departure!

Closely allied to the questions we have been discussing is that of the differences in coloration of the male and female of the same species. In eastern North America, so many of our brilliant male birds have soberly colored mates that we come to consider this as the natural order of things among feathered beings. But the situation is quite different in Central America. Among the highly migratory wood warblers of temperate North America, the male, if at all gaily attired, has a mate of duller plumage. But among the non-migratory warblers of Central America, many of which remain paired through the year, the sexes are alike in plumage more often than not. This is true of such typical genera as *Myioborus, Basileuterus* and *Ergaticus,* species of which are among the most beautifully attired of warblers. Again, among the highly migratory orioles (*Icterus*), a striking difference in coloration of male and female is the rule; but among the non-migratory Central American orioles, no less brilliant in their splendid array of gold and black than their migratory cousins, the sexes are alike or only slightly different in coloration. Among the Central American finches, it is noteworthy that none of the numerous species which I have listed as remaining mated through the year exhibits sexual differences in coloration; while those which aggregate into large flocks after the close of the nesting season (chiefly the seed-eaters, grassquits and goldfinches) show pronounced sexual differences in plumage. The same holds true of the tanagers. In the genera *Thraupis, Tangara, Calospiza* and *Calliste,* containing some of the most lovely and gem-like of Central American birds, those species best known to me commonly fly two by two at all seasons, except when accompanied by young dependent upon them for support; and male and female are exactly or essentially alike in plumage. On the other hand, in such genera of beautiful birds as *Euphonia, Chlorophonia* and *Ramphocelus,* which form conspicuous flocks (certain species of *Ramphocelus* being polygamous by excess of females), sexual differences in coloration are most conspicuous. Among the typical honeycreepers, *Cyanerpes* and *Dacnis* travel in flocks and the sexes are very different in appearance; *Cæreba* never flocks, possibly remains paired, and the sexes are identical.

Thus among migratory song-birds, the male, if brighter than his mate during the breeding season, frequently, but by no means invariably, assumes a plumage more like hers after its close. On the other hand, among the non-migratory song-birds of tropical America, especially those which live in pairs through the year, there is a strong tendency for the female to wear a dress quite as bright as the male's; and both retain their colorful attire at all seasons. If we seek a common causative agent which may unify things seemingly so diverse as migration, seasonal changes in plumage, sexual differences in plumage, and the habit of remaining paired through the year, it seems likely that this agent may be found in the internal secretions of the organs of reproduction. We know, on the one hand, that these exert a strong influence upon the migratory urge, and on the other, that they are responsible for the sexual differences in plumage.

Intimately linked with the subjects of sexual and seasonal diversities in plumage in the same species is that of the age at which the young bird acquires the coloration of the adult. Among the species of temperate North America which exhibit pronounced sexual, and frequently seasonal, differences in coloration, the young males as a rule pass their first winter in a dress closely similar to that of their

BIRDS OF LOWLAND RAIN-FOREST IN PANAMÁ

Left: FEMALE RED-HEADED MANAKIN (*Pipra mentalis*) ON NEST. *Right:* FEMALE SLATY ANT-SHRIKE (*Thamnophilus punctatus*) ON NEST.

mother, and acquire the bright nuptial dress at the outset of their first nesting season, by means of the prenuptial moult. But in many kinds of Central American birds, of which the sexes are alike, I have observed that the young, decidedly different from their parents at the time of quitting the nest, promptly change into the brighter plumage of the adults, by means of the postjuvenal moult. Without the retarding influence of winter, or of migration, the youngsters acquire the bright adult dress far earlier than their cousins of "temperate" regions. In quite a number of species of Central American finches, warblers, tanagers, mockingbirds, wrens, etc., a few months after the close of the breeding season, young and old, males and females, are alike, or at least confusingly similar, in appearance.

In the species of which male and female are distinct in plumage, the young males, at first resembling their mothers, may assume the colors of their fathers at their first (postjuvenal) moult. Or, less frequently, they may wear a dull or intermediate plumage for a year or more, even breeding in it, as occurs among Central American birds in the yellow-crowned euphonia, the Costa Rican chlorophonia, some of the more deeply colored thrushes of the genus *Turdus* and certain manakins. The situation is exactly paralleled in such northern birds as the orchard oriole and the purple finch.

V

It has long been known to students of birds that the nests of tropical species commonly contain fewer eggs than those of the most closely related kinds of higher latitudes. Of the thousand nests of hundreds of species of Central American birds into which I have peeped, not one has held more than five eggs, excepting only those of the anis, which build com-

SUBTROPICAL RAIN-FOREST IN COSTA RICA

HEADWATERS OF RÍO SARAPIQUÍ (5,600 FEET). IN THE HAUNTS OF THE BELL-BIRD, QUETZAL, SOLITAIRE, TOUCANET AND BARBET.

munal nests that cradle the offspring of several closely coöperating pairs. Two is the number of eggs most commonly found in the nests of Central American birds, including a great number of finches, tanagers, honeycreepers, flycatchers, manakins, antbirds, hummingbirds, doves and others too numerous to mention. Sets of three are by no means rare, of four less common, and of five distinctly uncommon. I have found so many only rarely, in the nests of cactus wrens, swallows, a kingfisher and a few others. A single egg forms the full set in the nests of certain pigeons of the genus *Columba*.

The fact that a certain bird lays smaller sets of eggs than another is not proof that it raises fewer offspring during the course of a year; it may compensate its smaller sets by a greater number of broods. It is important to learn whether Central American birds actually produce fewer offspring than the feathered kind farther to the north, or whether a longer breeding season, made possible by a tropical climate, offsets the smaller size of individual broods.

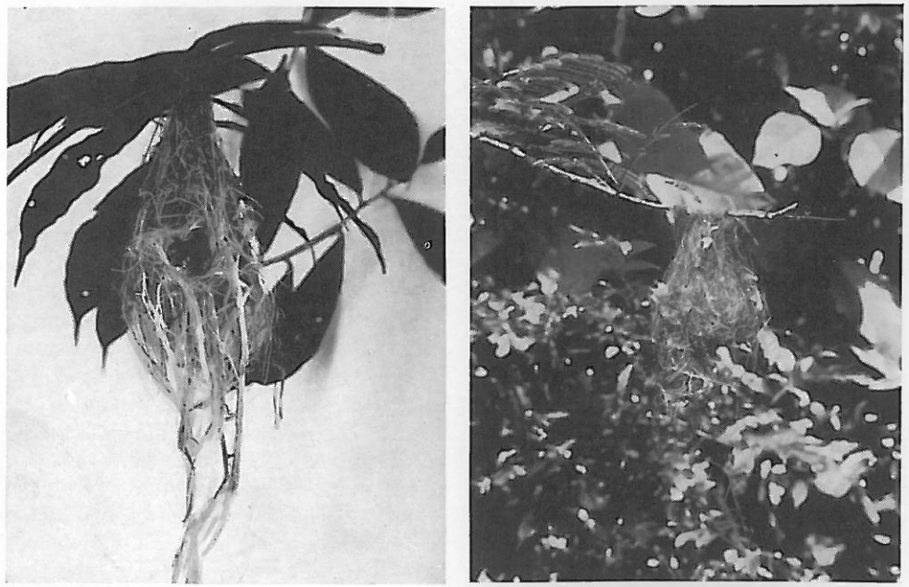
A few exceptional species, including Rieffer's hummingbird (*Amazilia tzacatl*), the ruddy ground dove (*Columbigallina rufipennis*) and the slaty antshrike (*Thamnophilus punctatus*), nest, in the Caribbean lowlands, *as species*, throughout the year. It is not known over how long a period the reproductive activities of a single individual may extend; but it is almost inconceivable that she should breed continuously. Each of these species lays regularly only two eggs in a set; of the three, the reproductive cycle of the antbird is slightly shorter than the others; if we set it at forty days, and assume that a pair breed continuously without a rest through the twelve months, they could raise at best nine broods, or eighteen fledglings, in the course of a year. Yet even admitting this highly improbable result, the antbirds could not equal the record of the English robin, which may lay eight eggs in a set, and is said to produce a maximum number of twenty in a single summer! The highest fecundity among Central American birds actually known to me by direct observation is that of a pair of house wrens (*Troglodytes musculus*), which between December and June laid four sets of four eggs each, in a gourd which I put up for them in southern Costa Rica, and successfully raised at least one fledgling in each brood.

There is good evidence from a number of sources that Central American birds lay fewer eggs in the course of a year than those farther to the north. Thus kingfishers raise only a single annual brood in Central America, as in temperate North America; but the tropical species lay sets only about half as large as those of the northern belted kingfisher. Many kinds of tropical birds which raise a single annual brood lay only two or three eggs in a set. Although, as we have seen, a few species breed throughout the year, and in the lowlands nests of one species or another are to be found in each of the twelve months, the breeding of the birds as a whole is a distinctly seasonal activity; and the great majority of them raise their families during the quarter-year between the vernal equinox and the June solstice. In the highlands, above five thousand feet, the concentration of nests within this period of three months is even more pronounced than in the lowlands. In the mountains of Guatemala, between eight and nine thousand feet above sea-level, I found that nearly all the birds (hummingbirds and honeycreepers excepted) nested in the brief period of most favorable weather between the last frost, at the beginning of April, and the advent of the rainy season in the middle of May. Most species raised only a single brood, no larger—sometimes

smaller—than that of the most closely related birds of the lowlands where the breeding season is longer, and notably smaller than the families of birds of higher latitudes.

But not only is the potential number of offspring, produced each year by a pair of Central American birds, small in comparison with that of northern species; the actual number of offspring is smaller still. In the high mountains of Guatemala, 55 per cent. of the nests which I had under observation produced at least one living fledgling; on a great banana plantation in the lowlands of the same country, 43 per cent. of my nests terminated happily; in a region of southern Costa Rica where somewhat less than half the forest remained standing, the percentage of successful nestings was reduced to 33; in heavy lowland forest in the Canal Zone, only 14 per cent. of my nests—one out of seven—escaped premature destruction. This astounding mortality of nests in the lowland forests I attribute chiefly to snakes; but there are many other predators. The big Swainson's toucans are insatiable nest-robbers; the graceful swallow-tailed kites pluck many an egg and nestling from exposed nests in the tree-tops; and I suspect that monkeys, violently swaying the boughs as they career wildly through the heights of the forest, must shake not a few eggs from frail and shallow nests such as are built by a number of the woodland birds—in addition to those devoured by the carnivorous Cebus or white-faced monkey.

Because of the tremendous loss of nests, I know few endeavors more discouraging than that of trying to obtain complete life-histories of the birds of the lowland forest. Happy the bird-watcher who can discover a pair of these forest-dwellers



NESTS OF CENTRAL AMERICAN FLYCATCHERS

Left: COZY NEST OF THE BENT-BILLED FLYCATCHER (*Oncostoma cinereigulare*). *Right:* RETORT-SHAPED NEST OF THE GRAY-HEADED FLYCATCHER (*Rhynchocyclus cinereiceps*). IT IS MADE OF FINE BLACK FIBERS AND ENTERED BY FLYING VERTICALLY UPWARD INTO THE END OF THE DOWNWARDLY POINTING TUBE AT THE LEFT.

CONTRASTS OF VEGETATION IN GUATEMALA

Left: CACTI AND THORNY SCRUB ON THE PLAINS OF ZACAPA (500 FEET). THE HOME OF THE MAGPIE-JAY, TURQUOISE-BROWED MOTMOT, WHITE-LORED GNATCATCHER AND LICHTENSTEIN'S ORIOLE *Right:* FOREST OF CYPRESS WITH UNDERGROWTH OF BAMBOO (9,500 FEET). THE HAUNT OF THE GOLDEN-CROWNED KINGLET, BROWN CREEPER, MEXICAN TROGON, GUATEMALAN ANTPITTA AND GUAN.

who have come into a neighboring clearing to build their nest, for here their chances of success are somewhat greater—a fact of which the birds themselves seem to be aware.

Of late years, I have derived one most consoling thought from the many nests I have seen meet disaster. If the birds have such great difficulty in reproducing their kind, yet their number remains substantially constant from year to year, it follows that the adults must lead lives longer, and doubtless happier, than in regions where they succeed in raising large families, yet fail to become more numerous. My whole experience with Central American birds strengthens this deduction that their lives are, for birds, long and tranquil. Although I have upon countless occasions returned to a nest only to find that it had been emptied of its contents during the twenty-four hours since my previous visit, rarely indeed have I found evidence that either of the parents shared the unhappy fate of their offspring. In most cases where I devoted particular attention to the pair, I soon after found them hopefully preparing to nest once more. Although I have all too often had the disturbing experience of seeing a serpent devour nestlings or eggs, never once have I known a snake to catch an adult wild bird. Stories of snakes "charming" birds are admitted by most competent naturalists to be pure fable.

Central American hawks, although numerous in species, are for the most part rare in point of individuals. Many of these birds of prey seldom if ever devour smaller feathered creatures; and some, such as the guaco or laughing hawk (*Herpetotheres cachinnans*) are among

ALPINE MEADOW IN THE HIGHLANDS OF GUATEMALA

SCATTERED PINE TREES AND COPSES OF JUNIPER ON THE HIGH PLATEAU OF THE SIERRA CUCHUMATANES (10,600 FEET). HERE LIVE THE RAVEN, GUATEMALAN FLICKER, BLUE-CRESTED JAY, GUATEMALAN JUNCO, MEADOWLARK AND FLOWER-PIERCER

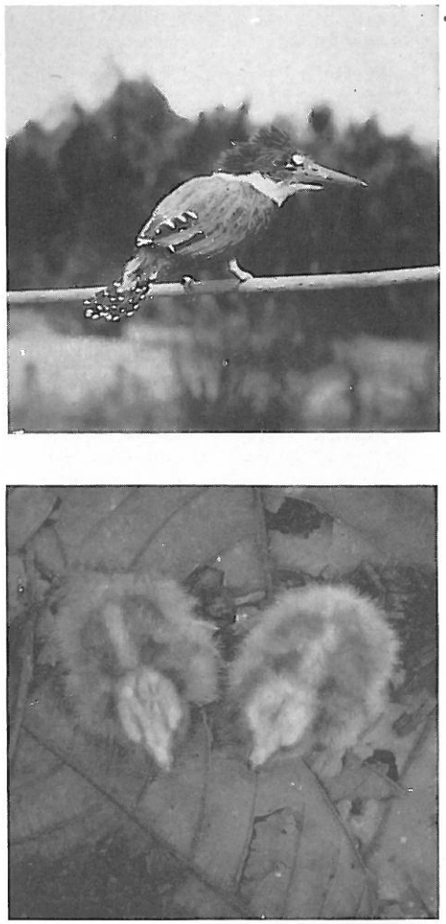
the very best friends the birds have, for they subsist almost entirely upon snakes, and so rid the smaller birds of the most relentless destructors of their nests. During the last six months, passed entirely in the field of southern Costa Rica, I have seen just one bird fall prey to a hawk: a swallow snatched in the fading light of evening from a vast migratory cloud of its kind. This single capture of a small bird by a hawk in the course of half a year about represents the average of my experience over a decade. The Central American hawk, apparently most destructive of bird-life, is one of the smallest, the swift, fierce-hearted, little white-throated bat falcon (*Falco albigularis*), which I have known on reliable evidence to carry off a blue-throated toucanet almost as big as itself, and which captures many smaller birds as well as large insects—but I have never known it to eat one of the bats for which it is named.

Bird-protection in the Central American countries is indeed in a lamentable state of neglect; and in the more populated districts, what with bird-trappers, small boys with sling-shots and larger ones with firearms, the feathered folk lead a precarious existence. But it should be remembered that the great Central American isthmus is chiefly wild, sparsely inhabited territory; it is in such country that I have preferred to live, and of such that I write. Here, with an abundance of food the year about; with a temperature never long below the freezing point, even on the highest peaks; with few feathered enemies, and their swiftness and alertness to prevent their falling into the clutches of other sorts; with perfect familiarity with the territory in which they reside the year round, and with its dangers; the tropical birds, having attained maturity, live far more securely than those of lands nearer the poles, and need produce fewer offspring each year

in order to maintain their population at its normal level.

The conditions of life of birds of higher latitudes are quite distinct. Each year they are faced with two alternative courses of action, both fraught with immense danger: they must either remain in the north during the cold months, or migrate southward. If they follow the former course, they may succumb to the combined effects of low temperature and insufficient nourishment; and many fall victims to predators whose hunger is sharpened by scarcity of food. The dangers which beset migrating birds, the storms which sometimes destroy them in vast numbers, the perils of a too early return in spring, the risk of impinging fatally upon some high obstruction while flying blindly through the darkness, are too well known to need description here. But one point in which migrating birds are at a disadvantage, as compared with the birds resident in the region through which the former are passing, has never, to my knowledge, been adequately stressed: The resident knows every source of danger peculiar to its district, and is perfectly familiar with the covers that afford the best security; the transient wanderer is unfamiliar with local conditions, and therefore more likely to meet disaster. It is easy to understand the urgent necessity of birds of the far north to raise large families during the brief summer months, to repair the losses their kind has suffered during the past winter.

Finally, the resident birds of Central America have time to build nests of a size, complexity and degree of comfort such as no migratory bird of high latitudes could afford to undertake. Many tropical birds are content with simple, easily constructed nests; simplicity of design seems to be the rule of architecture among finches, tanagers, antbirds and manakins. But other kinds, less readily satisfied, construct large or complex edifices for the accommodation of their young. One thinks of the great, elaborately designed and furnished castles of sticks built by the little spine-tails (*Synallaxis*) no bigger than wrens; of the commodious, often memorably beautiful pendent nests made by some of the tropical flycatchers, a family second to none in the diversity and complexity of its architecture; of the



WIDE-RANGING BIRDS

OF THE TROPICAL AMERICAN LOWLANDS. *Upper:* FLEDGLING RINGED KINGFISHER (*Megaceryle torquata*) *Lower:* NEWLY HATCHED CUYÉOS OR PARAQUES (*Nyctidromus albicollis*), RELATIVES OF THE WHIP-POOR-WILL AND THE NIGHTHAWK

long, swinging pouches skilfully and laboriously woven of fibrous materials by oropéndolas, caciques and many of the orioles. Nothing at all comparable to these various complex structures is to be found among the unsettled avian population of eastern North America; these birds could ill afford to devote a month to completing their nests, as tropical birds not infrequently do. In Argentina, in the South Temperate Zone, we do indeed find nests of great size and complexity, built by members of the ovenbird family (spine-tails and their relatives) and well described in W. H. Hudson's "Birds of La Plata." But these spine-tails are, I believe, resident where they breed; and Hudson states that some of them devote the winter to erecting, in a leisurely fashion, their impressive castles of sticks.

VI

One difference which certain people profess to find between tropical birds and those of northern lands is that the former are deficient in song. I here denounce, as the grossest and most libelous calumny, statements to this effect which for centuries have appeared in the writings of northern authors. Woodpeckers, kingfishers, hawks and owls do not produce lilting melodies in Canada or in Europe, why should the tropical representatives of these families be expected to do so? These and other groups of birds whose vocal organs are too poorly developed for song—toucans, parrots, motmots, barbets and a host of others—are so much more abundant in tropical than in temperate regions that they are likely to be considered, by superficial observers, as the typically "tropical" birds—whence follows the false conclusion that the bright birds of low latitudes are incapable of song. In justice to these songless groups of birds, it should be borne in mind that

RUFOUS-BREASTED SPINETAIL (*SYNALLAXIS ERYTHROTHORAX*)
ABOUT TO ENTER ITS CASTLE OF STICKS. THE BIRD IS SEEN IN THE RIGHT CENTER OF THE PHOTOGRAPH; THE DOORWAY IS THE ROUND OPENING IN FRONT OF ITS BILL

a number of them, including certain tinamous, trogons, motmots, antbirds and cotingas, utter notes of great, sometimes exquisite, beauty, although their vocal organs lack sufficient range and flexibility for the creation of complex song.

The true song-birds (oscines), although they form a relatively less important constituent among the teeming bird population of tropical lands than in the less varied avifauna of temperate countries, are represented in Central America by a larger number of species than is to be found in the vastly greater area of temperate North America. Thus one of the smaller Central American countries, Costa Rica, with an area of only 18,000 square miles, is the home of forty-three resident species of finches, twenty-two species of wrens, twelve species of thrushes, four kinds of orioles of the genus *Icterus*. One need only come to Central America with senses alert and mind free from prejudice to be convinced that, taken all in all, its birds are at least not inferior as songsters to the northern representatives of the same families.

But it is necessary to time one's visit at the proper season. A few kinds of birds, notable among them the wrens, sing more or less in all months; but the great majority are most tuneful during the breeding season, that quarter of the year occupied by the sun's northward swing from the Equator to the Tropic of Cancer. Some of the finest songsters, including the thrushes of the genus *Turdus*, are songful exclusively during their breeding season. A traveler arriving in Central America in December, at the beginning of the dry season—when the sky is full of sunshine and the meadows and clearings of bright blossoms, when nature is in general in her most attractive mood, but when scarcely any bird sings—might easily conclude that tropical birds are deficient in song. No doubt the prevailing silence of the birds, at certain seasons when earth and air and sky seem most to invite song, has been responsible, no less than the great abundance of species belonging to the songless "lower" families, for the growth of the old error that a parsimonious nature, having richly endowed tropical birds with color, withheld from them the gift of melody. It is as though a stranger, arriving in Costa Rica for the first time now in June, when two months of rain, following a severe dry season, have covered hill and vale with exuberant verdure, but when blossoming is near its lowest ebb, should conclude that this land of a thousand kinds of orchids is deficient in bright flowers!

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