

LIFE-HISTORY OF THE BLACK-CHINNED JACAMAR

BY ALEXANDER F. SKUTCH

Plates 7, 8

AT Birichiche beside the Uluá River in Honduras was a grove of stately cohune palms, with tall, massive, columnar trunks and spreading crowns of gigantic pinnate fronds. Tall as they stood, they were overshadowed by some noble silk-cotton trees and a few other giants of the forest. Scattered among the palms grew many wild fig trees, most of which had probably started life on the trunks of palms long since vanished. Here was a numerous troupe of Black Howling Monkeys, which enjoyed the protection of the owner of the banana plantation in which the grove stood. Their voices reverberated through the still air at dawn, and answered the echoes raised by the passing trains. Their grove stood between the railroad and the river, with extensive plantations of bananas on the other two sides; they never descended to the ground, and so had remained here and multiplied since the retreat of their ancestors had been cut off by the felling of the forest more than twenty-five years before, isolated as effectively as though they were on an island in the sea.

Here, among the many interesting birds which frequented the grove, I saw one cloudy afternoon a slender, graceful creature, scarcely larger than a Starling, with a long and very sharp black bill which it held with a saucy upward tilt. I watched it make long, graceful evolutions in the air, tracing beautiful loops and figures-of-eight, as it snatched up insects on the wing, usually returning to the same perch after each sally, to sit there quietly and await its next catch. Since the bird was of a kind entirely new to me, I took out my notebook and tried to write a description as it perched there, to look up its name later when I returned to my books. But I had undertaken a task more difficult than I at first supposed. The dark, metallic plumage was so wonderfully variable, in the dim light which filtered through the clouds and the palm fronds, that I could not decide what color it was. I wrote 'green' as the color of the bird's crown, but in a moment it turned its head and I was obliged to substitute 'blue'; and after I had described the broad band across the breast as blue, the bird shifted its position and the band appeared green. The wing feathers I first described as dusky, but when next I glimpsed them in a more favorable light, they also appeared green. Finally I gave up in despair and wrote: "Plumage wonderfully iridescent."

When next I encountered a Black-chinned Jacamar (*Galbula melanogenia*), three months later, it was on the open, bushy flood-plain of the Tela River. The light was good, and there could be no doubt that the bird's principal

color was bright metallic green; but over the feathers of its back and wings flickered the reflections of gold and burnished copper and bronze. The throat of the male was pure white, and it was necessary to look sharply through the binoculars to discern the small black feathers which are responsible for the descriptive portion of the bird's name. A broad green band across the breast separated the white of the throat from the chestnut of the belly. The outer tail feathers were of the same shade of chestnut, and when the tail was spread in flight they contrasted prettily with the green central quills which covered them in repose. Elsewhere the bird was green. The female differed from her mate in minor details only, principally in the color of the throat, which was faintly tinged with buff instead of pure white.

In Central America few birds are more attractive than the Black-chinned Jacamars. They possess all the physical characteristics which win so much admiration for the hummingbirds,—metallic brilliancy of plumage, richness and variety of color, delicacy of form, grace and dash of movement,—yet they are several times as large as hummingbirds without any detriment to their delicacy and grace. Hence they may be seen to better advantage, and are more companionable because they are nearer to our own scale of dimensions. In their family life, the mutual affection of the mated pair stands in very pleasing contrast to the unnatural aloofness of the male hummingbird. In voice the jacamars are hardly less attractive than in appearance. Their most usual call I can describe only as a squeak, but it is by no means an unpleasant sound, rather an appealing, endearing squeak. It reminds one of the squeaks uttered by some beloved toy of childhood when we squeezed it, and makes us want to caress the little gem-like bird, if only we could lay a hand upon the airy creature with the bright brown eyes and rapier bill. When two mated birds are together, this simple squeak undergoes a number of surprising modifications. In one of the most characteristic of these, the notes are at first uttered slowly, at well-separated intervals, but gradually they come faster, and finally again slower and with a higher pitch. Possibly we may represent the refrain in this way:

be—be-be-be-be be, be, be, be-be-be-be—be—be.

Both sexes also utter a high-pitched and very rapid trill, which at its best is almost silver-toned, but at other times is duller and reminds one of the rattle of a small kingfisher delivered at high speed. This trill is ordinarily voiced with the bill wide open and the lower mandible rapidly vibrating; but even with the bill closed on an insect they are able to utter a somewhat lower and less clear trill. The male sometimes sings a pretty song beginning with his little squeals, which become more animated and more melodious as the lay proceeds, and finally merge into rapid trills and high-pitched whistles. Although for pure, elemental sound no utterance of the jacamar

can compare in quality with the calls of the tinamous, or those of the Blue-throated Motmot (*Aspatha gularis*), its song is one of the longest, most varied in phrasing and most pleasing of any I have ever heard from a bird which is not an oscine or true song-bird. While the puff-birds are usually placed close to the jacamars in modern systems of classification, they are among the most nearly voiceless of Central American birds; and their extremely limited range of utterance and habitual taciturnity contrast with the great vocal flexibility and customary loquacity of the jacamar as strongly as their short, thick bills and heavy, ungraceful bodies contrast with the jacamar's long, slender bill and lithe, dainty form.

Although the slender, finely pointed bills of the jacamars seem poorly adapted to catching insects on the wing, they secure their food almost exclusively in this manner. But marvelous as is their skill in snatching small insects from the air with such narrow mandibles, it is exceeded by certain hummingbirds, notably the Jacobin (*Florisuga mellivora*), with even finer bills. The jacamars dart from their perch with a loud whirr of wings and seize the insect with a resounding snap as the bill closes upon it,—but this *clack* is loudest when they chance to miss the intended prey and the mandibles strike against each other. They are very expert in catching minute insects, for great precision of movement is needed to seize them in such a slender bill; but they usually prefer larger game. Large, brilliant-winged butterflies and great, filmy-pinioned dragonflies are their favorite food. One witnesses a beautiful if somewhat cruel display when one of these brilliant birds overtakes a great blue Morpho, or a magnificent yellow-and-black swallow-tail butterfly, returns to its perch with the hapless creature fluttering in its bill, and beats it against the branch until the gorgeous wings, vibrating rapidly until the last, fall away one by one and go twirling slowly to the ground, while the bird swallows the wingless body. All of the jacamar's prey, except soft-bodied flies, is beaten long and loudly against the perch before it is swallowed. Most observers agree that birds rarely catch the larger and more brilliantly colored butterflies, and this has been my own experience. I do not think it would be an exaggeration to say that I have seen more large butterflies eaten by jacamars and motmots than by all other kinds of birds taken together.

No one who admires Charles Kingsley's 'At Last' could forbear to quote a fine passage which touches upon this very point. He describes his first meeting with a jacamar in the forests of Trinidad: "Or are our eyes, accustomed to the blaze outside, unable to expand rapidly enough, and so liable to mistake for darkness air really full of light reflected downward, again and again, at every angle, from the glossy surfaces of a million leaves? At least we may be excused; for a bat has made the same mistake, and flits past us at noonday. And there is another—No; as it turns, a blaze of

metallic azure off the upper side of the wings proves this to be no bat, but a Morpho, a moth [!] as big as a bat. And what was that second larger flash of golden green, which dashed at the moth, and back to yonder branch not ten feet off? A Jacamar [*Galbula*]*—kingfisher, as they miscall her here, sitting fearless of man, with the moth in her long beak. Her throat is snowy white, her underparts rich red brown. Her breast, and all her upper plumage and long tail, glitter with golden green. There is light enough in this darkness, it seems."*

Since my first meeting with the Black-chinned Jacamar beside the Ulua River, six years ago, I have encountered the bird at scattered points, in the regions of Central America which drain into the Caribbean Sea or the Gulf of Mexico, from southeastern Costa Rica to the northern lowlands of the Department of El Quiché in Guatemala, and from sea level up to an altitude of about 2500 feet in the mountains. The range of the species is much more extensive than this, and stretches from southern Mexico to western Ecuador. These jacamars live chiefly in the heavier second-growth of the humid lowlands, and among such tangled vegetation are more easily heard than seen, although they are not particularly timid or fearful of man. Frequently they forage above streams which flow through tangled thickets, or along a trail that leads through the riotous growth which has taken possession of an abandoned plantation, where the clear space above the waterway or the pathway allows them more freedom in their aerial pursuits. They live also in forest that has been thinned by cutting trees for lumber, an operation which increases the amount of light that penetrates to the ground and augments the bushy undergrowth; but I have never seen them beneath the dark shade of the tall, primeval woodland. The two nests which I found were excavated in precipitous hillsides, rather bare of vegetation, amid the second-growth which they prefer. In Honduras and Guatemala their breeding season extends at least from March to June.

On the afternoon of April 22, 1932, while sliding and slipping down a steep hillside sparsely covered with small trees, vines and bushes at the base of the Sierra de Merendón on the boundary between Guatemala and Honduras, I frightened up a pair of jacamars. On searching the area whence they arose, I found a small depression, about an inch deep and freshly dug, which seemed to be the beginning of a nesting burrow. It was situated beneath the roots of a small tuft of grass on a steep, nearly bare portion of the slope. On returning to the same spot on the following afternoon, I found, just below this, a new excavation which had been begun within the last twenty-four hours and was already nine inches long. I wanted to watch the pair of jacamars at work, but could find on the precipitous slope no spot suitable to set up my umbrella blind, and was obliged to dig out a little shelf, broad enough to hold my camp stool, a few feet from their

burrow. When everything had been arranged and I settled down to watch them from concealment, I found that the birds would not continue to work with the blind so near, so I had to dig out another niche for myself farther down the hillside. Here I had better success and watched them at work for two days.

The two jacamars approached the burrow together, but the buff-throated female was clearly the leader in the undertaking. As she entered the tunnel, she kicked the earth backward with her feet, throwing out jets which continued after she had disappeared, but became shorter and shorter until finally they failed to reach the entrance, and followed the digger inward. She followed exactly the same method of removing the loosened earth that kingfishers and motmots use. When, after a few minutes in the earth, she emerged tail first, her mate caught a large, filmy-winged dragonfly and began to beat it against the limb on which he habitually perched. It slipped from his grasp, but he darted after it and easily overtook it. When it was sufficiently lifeless, he gave it to the female, who had been waiting expectantly close beside him while he completed the process of quieting the victim. Then she entered again, while the male remained on a dead limb in front of the burrow, the whole time uttering little squeals which sounded very far away. When she came out after two minutes of work the male flew to the entrance, but merely thrust his head into the tunnel and left at once. So two hours passed, the female alone digging in the burrow, while the male waited near the entrance, squealing and sometimes trilling, as though to encourage her in her labors. Often he perched on one of the fronds of a large fern which grew beside the burrow, and I noticed that his chestnut belly was of nearly the same color as the scales which covered the heavy 'fiddlestick' of a newly expanding frond. When the female emerged from her labors, her mate often caught a dragonfly or a large butterfly from which he removed the lovely wings, a small beetle with splendid metallic green shards, or some other morsel with which he rewarded her. Often he flew to the burrow, but came back again without having worked. At each visit he went in a little farther, until finally only the tip of his tail remained visible from the outside, and at length he began to scratch in the entrance. Once he actually flew backward as he emerged from the burrow.

The male seemed to be gradually warming up to the point of entering the excavation to help with the digging. By the middle of the morning he actually did so, but at first for only the fraction of a minute at a time. Still his enthusiasm for the work was increasing, and before noon he regularly alternated with his mate, remaining at his task from two to four minutes at a stretch. Once he flew away while his mate was at work. While he was gone she emerged from the burrow and perched in front of it to await him. On returning, he alighted beside her and began to bow.

He turned rapidly from side to side on his perch, bobbed his head up, down and sideways, pumped his tail back and forth, while he uttered low, squealing notes. During the whole performance the female trilled sweetly. On another occasion I saw the two perch side by side, spread their tails fanwise, revealing the chestnut outer feathers, and bow up and down to each other, very much in the manner of Flickers.

That afternoon was excessively warm, and my clothes became soaked with perspiration as I sat in the blind. Yet rarely have I seen birds work at their nest as continuously, as long or as energetically as the jacamars. Perhaps they had lost a first nest elsewhere and were therefore in a particular hurry to finish this, for others of their kind were already feeding their young. The male now took an almost equal share with his mate, and fully atoned for the slight excess of work he permitted her to do by continuing to feed her. Indeed, he kept her so well supplied with insects that she rarely caught one for herself. Once, when she had just started to enter the tunnel, he caught a small green beetle and called her back before she had passed beyond sight. After knocking it several times against the fern stipe he billed it to her. While the male was inside, his mate sometimes trilled, just as he did while she was at work. They had already begun to enlarge the nesting chamber, which gave them room to turn around, and were coming out head foremost now. Sometimes the male paused a moment in the entrance as he emerged, and made a most attractive picture with his black bill, green head, white throat and green breast-band framed in the round opening in the rust-colored earth. I am afraid it was all lost on his mate, who was in such a hurry to continue with the digging that she could hardly wait until he came forth, and dashed to the entrance even before he had cleared it. Sometimes she went in while he was still there.

The needle-like bills of the jacamars seemed better fitted for the weaving of some wonderful fabric like an oriole's or a cacique's nest than for the coarse work of delving in the earth. It is hard to explain the jacamars' possession of such bills on any utilitarian principle, for they seem as little adapted to their mode of feeding by catching insects on the wing as to the digging of their burrows, and yet the birds do both very well. One would expect birds of their habits to be equipped with broad, heavy, flat bills, like the motmots which they resemble in so many of their customs. Perhaps we are inclined to be too utilitarian in our search for adaptations, and should rely more upon esthetic principles. The long, slender bill certainly fits to perfection the jacamars' style of beauty, and it would be as difficult to picture them with the motmot's coarse and heavy rostrum as to imagine a tern with a pelican's pouched bill. They used their bills chiefly for loosening the soil and pushed it out of the burrow with their feet. Sometimes they emerged bearing a lump in the bill, and once the female while digging

found a grub or something of the kind, which she carried out and ate. Their bills became dusted with earth, but their glittering plumage remained remarkably fresh and clean during the course of their labors.

On the third day after their burrow had been started, I found the pair of jacamars at work when I arrived at a quarter after eight in the morning. They labored, with short intermissions, throughout the day; and when I was obliged to leave them in order to visit some other nests, at half-past four in the afternoon, they were still digging, but their burrow appeared to be nearly finished. It went straight into the earth without turning and widened into the nesting chamber at the rear. From the entrance to the back of the chamber its total length was sixteen and a half inches. The tunnel was only two inches in diameter and too narrow to admit my hand. Unfortunately for me, the birds had encountered a root at the end of the burrow and were obliged to enlarge their nesting chamber downward, with the result that the floor was just far enough below the level of the tunnel to make it impossible to see the eggs from the front. I did not dare to open the burrow until the birds had begun to incubate, which was about two weeks after their excavations had been completed. Then I dug into the hillside a horizontal shaft, which began on a level with the entrance, several inches away from it, and struck in obliquely until it touched the side of the nesting chamber. I found the soil very soft and friable, so the birds had not had a very laborious task of excavation. When my shaft had become wide enough to admit my hand, I drew forth four small, pure-white eggs which were nearly round and appeared quite fresh, for the shells were somewhat translucent and the yolks shone through. Incubation could hardly have been in progress more than two or three days. They measured: 22.2 x 19.1, 22.2 x 19.1, 22.2 x 19.4 and 23 x 19.8 millimeters. After taking their measurements, I returned them to their berth on the bare floor of the chamber, for the birds had brought in no softer lining. Then I closed the shaft with a stone and packed the earth in its entrance.

Although I could not see the eggs from the entrance of the burrow because they rested too low, I soon discovered that if I approached stealthily I could peep in and see the greater part of the bird who warmed them. There at the back, it sat, facing me, the sharp bill jauntily upturned and covered with earth on the end, the white throat gleaming like freshly fallen snow in the glare of the flashlight, the deep brown eyes sparkling in the beam, the green cheeks and breast returning iridescent scintillations here and there, as the light happened to strike them. The bird stared into the beam motionless and unblinkingly, and remained so until I extinguished the light and stole away.

I returned after the stars began to shine and again found the bird with the pure white throat in the burrow. It was always the same when I looked in.

"Poor little overworked husband," I exclaimed to myself, "you not only provide for your mate while she digs the burrow, take an almost equal share in the labor yourself, but must sit on the eggs most of the day and all of the night." I had already found that male woodpeckers, anis and Ringed Kingfishers incubate at night, and here was another bird to add to the list. The game was becoming exciting. I might have continued to believe that the male warmed the eggs during the night, had I not spent many hours in front of the nest in the blind, watching for the birds to enter and leave. I soon noticed that the female was less easily frightened from the burrow than her mate by the vibrations of the earth when someone walked heavily near it, and since I had found with other species that the bird whose attachment to the nest is the stronger usually occupies it during the hours of darkness, this observation made me question the correctness of my first conclusion that the male incubated at night. After I had seen the female disappear into the burrow I stole up and peeped in, only to behold again the white-throated male. Then the truth dawned upon me; in the artificial light her throat, which by daylight was distinctly buffy, appeared as white as his. The next time, I came with a more powerful flashlight, and thought I could detect a slight tinge of buff on the female's throat as she sat in the burrow; but even in the beam of a three-cell battery the difference between her and her mate was not convincing. The pitfalls for the unwary are innumerable. There was no way to solve the problem except to watch from the blind the goings and comings of the birds. This was not easy, because sometimes a bird would approach the burrow from a point outside of my limited range of vision, and enter it so rapidly that I was unable to distinguish its sex; at other times it would dart forth and fly away without allowing me a good look at its throat.

The jacamars arranged their turns on the nest in much the same manner as the Amazon and the Green Kingfishers (*Chloroceryle amazona* and *C. americana isthmica*), especially the latter. The female, I afterward made quite sure, incubated every night. Her mate arrived before sunrise in the morning, alighted on his customary perch before the burrow and called. She answered in a lower voice from within the nest and came to the entrance, where sometimes she paused a moment with her head framed in the aperture, then flew swiftly away. The male added another insect or two to his hastily snatched breakfast and then entered the burrow. His early entry into the nest gave him perhaps fifteen or at most twenty minutes in which there was sufficient light to catch his morning meal. He was very regular in his time of going on the nest. On three successive mornings he went into the burrow at 5.24, 5.24 and 5.37 o'clock. I think he was late on the third morning because it was dark and overcast and he had difficulty in finishing his breakfast any sooner. His mate had become impatient and left the eggs six minutes before his arrival.

At some time between seven and half-past seven o'clock the female, having made a good breakfast, returned to relieve her mate. She called him forth from the burrow just as he had called her, and entered as soon as he departed. Once she went in with a fly held in her bill. After the male had flown down the bushy hillside he called in his trill, and she answered in low, rapid squeaks from the burrow. Two or two and a half hours later the male returned for his second turn on the nest. Thus they alternated throughout the day. The male had a long session of three hours or more in the late afternoon. Once the female appeared at a quarter after five and called to him, but it was so unusually early for her to relieve him that he remained in the burrow until she went in. On another day she was much later; the male waited on the eggs until twenty minutes after six, and came forth at length holding a lump of clay in his bill, possibly as a symbol of his hunger. He called for his mate before he flew off. She entered twenty minutes later, in the gathering dusk. Usually she delayed until after sunset before she went into the burrow for the night. This arrangement gave her mate scant time for his evening meal and, just as he had begun the day with a hasty breakfast, he was obliged to end it with a light supper.

During the course of incubation a great quantity of the hard parts of insects, conspicuous among which were glittering particles of the armor of a metallic green beetle, were regurgitated by the birds as they sat, and these accumulated on the floor of the nesting chamber. For a small bird, the eggs required a long period of incubation. They did not hatch until eighteen days after I had first seen them, and doubtless they had been incubated for a day or two before that. But other burrow-nesters also take long to hatch their eggs. The Amazon Kingfisher must incubate for twenty-two days, and the Blue-throated Motmot (*Aspatha gularis*) for twenty-one or twenty-two, while even the Rough-winged Swallow must warm her eggs for sixteen days before they hatch.

The nestlings bore a copious natal down, long, soft and white, over most of their body. The long white down on the chin and throat, hanging over the chest, gave them the appearance of being prematurely bearded and aged. Their skin was pink; their eyes covered by the closed lids, were no more than black protuberances. Both the outer and the inner toes were directed forward, although the corresponding toes of older nestlings and of the adults are turned backward. Their oval heel-pads were already prominent and considerably broader than the tarsus, but unlike the narrower pads on the heels of young kingfishers and woodpeckers, they were nearly smooth. These little cushions of callous skin are found on the heels of many nestlings who pass their infancy standing erect in a nest without any soft lining,—whether in a burrow with an earthen bottom, a hole in a tree with a wooden floor, or a cavity in a termites' nest littered with chips of the hard black

substance of the termitarium,—and prevent the abrasion of the heel joint as the little birds move about on the hard, uncarpeted floor of their nursery. The newly hatched jacamars' lower mandibles projected slightly beyond the upper, as do those of young kingfishers. They could already stand erect and peep very softly. While I held them in my hands both of their parents arrived with small insects in their bills and perched not far distant, uttering complaining squeals, but they neither darted at me nor attempted to lure me away; yet they were very much attached to their young, and two days later the mother allowed me to touch her while she brooded them in the burrow.

The parents were tardy about removing the empty egg-shells, and left them in the burrow for several days. Both joined in feeding the nestlings with winged insects of many kinds, and when the little birds were four days old they were served dragonflies whose slender bodies were as long as themselves. These were of course delivered to them after the wings had been removed. I watched the male as he perched on a dead twig in front of my blind, catching insects for his nestlings, while the female brooded them. He was constantly turning his head from side to side, alert to pounce upon any sizable insect which came within his range. Smaller insects, such as might have appealed to a swallow or a flycatcher, were entirely disdained, although they might pass within a few inches of his perch. He deemed nothing smaller than a house-fly worthy of his attention, and he considered even insects of this size too trifling to take into the burrow for his young, but swallowed them at once himself. He made long, swift sallies after passing dragonflies and butterflies; when he caught them he returned to his favorite perch and knocked off the wings before he carried them into the nest. He was not without spirit and drove a Lesson's Motmot, much larger than himself, away from the vicinity of the burrow.

When the nestlings were six days old their eyes began to open and the pin-feathers started to push out, most of them terminated, like the seed of a dandelion, by the star-like tufts of down. The upper mandible of the black bill was already longer than the lower. The feet were yellow and the first and fourth toes, which at hatching were turned somewhat forward, already pointed backward. They huddled together in the center of the nesting chamber, facing outward and standing erect on the full foot, like young kingfishers. While they waited for their parents to bring them food, they uttered, in a little, far-away voice, the characteristic song of the adults:

be—be-be-be-be, be, be, be, be,-be-be—be.

The development of their voices was very different from that of true song-birds, which do not sing until some time after they have left the nest, and in many cases probably not until the following spring. But the jacamars,

when they were eight days old and their eyes fully open, already uttered a pleasing little trill which was a very good imitation of that of their parents. When I pulled them from the burrow they emerged with their pin-feathers, particularly those of the head and neck, all standing on end, so that they bristled like porcupines and it was hardly possible to find their eyes in the pincushions which were their heads. As I held them in my hand they gradually laid back their feathers and assumed their normal appearance.

When, at the age of twelve days, the nestlings' feathers began to protrude from their horny sheaths, I could see that two would have pure white throats and two buffy throats; there were two brothers and two sisters in the family. They were bright, sprightly youngsters, constantly turning the head from side to side, opening and closing the bill and moving their wings. About this time (it was then approaching the middle of June) the heavy rains began, their burrow became damp and muddy and their feet and bills were soon caked with mud. As they preened their sprouting feathers with their mud-tipped bills, the natal down adhered to them and remained sticking there. To add to their troubles, small ants invaded their nest, probably attracted by the maggots which bred in the filth on the floor, for jacamar parents take no more sanitary precautions than kingfishers, motmots and trogons. Nevertheless, the feathers of the little birds remained fresh and clean, because they stood erect and did not permit them to touch the soiled, muddy floor of their nursery.

One morning, upon visiting the nest, I found all four nestlings lying on the hillside in front of it, unable to fly and quite helpless, although they were fully feathered. I replaced them in the burrow, after I had cleaned it out and removed the ants which had driven them forth. The two males eventually died from their exposure, but their sisters survived and left the nest at the age of twenty days, when they could fly very well.

While these jacamars were incubating their eggs, I found the burrow of another pair, tunneled into a steep, bare slope in a little amphitheater in a precipitous hillside covered with dense second-growth. The burrow was only thirteen inches long, and with my flashlight I could easily see the four blind nestlings, that stood pressed close together in the middle of their nursery. As I sat on the hillside, twenty-five feet away, to watch their parents bring them food, I heard their constantly reiterated little cries emerging from the earth. Soon both parents brought them butterflies from which the wings had been removed. The male was much less cautious than the female, and after fidgeting around for a few minutes delivered his burden, while she delayed nearly a half-hour before she would approach the burrow. As I noticed also on later occasions, she was characteristically more cautious than he.

These parents had better fortune than the other pair and brought all

four of their young forth from the nest, early in May before the rains began. There were three males and one female in the family, and when they were fledged each bore a close resemblance to its parent of the same sex. They were truly gems from out of the earth, the more precious because no man could set a price on them. No diamond or emerald or other stone was ever more scintillating and iridescent than they. Neither words nor photographs can do justice to the fire and sparkle of the deep-green plumage of their backs and wings, over which played in wondrous fashion reflections of bronze and gold and burnished copper. It seemed to show to better advantage in the shadow of the thicket than in full sunlight, as though it depended upon no external source of light for its brilliance. But one need hardly marvel at their loveliness, for loveliness was their daily fare. Beneath the branch where their parents perched to prepare their food, I picked up the broad wings of a Morpho butterfly. Wonderful as was the play of blue and azure on their satiny expanse, it paled before the leaping flame of the birds' green coats. They had transmuted the butterflies' loveliness into a higher, more animated, more sentient beauty. But why must beauty ever be nourished at the expense of beauty, why must one destroy in order to create?

Regretfully I watched the parent jacamars lead their family away into the depths of the thicket. In voice, in mannerisms, in appearance, there were never more winsome nestlings.

DESCRIPTION OF PLATES

PLATE 7

Left: Site of nesting burrow of the Black-chinned Jacamar. Foothills of the Sierra de Merendón, Department of Izabal, Guatemala, May 6, 1932.

Upper right: Nestling Black-chinned Jacamar, two days old.

Lower right: Nestling thirteen days old, with the feathers just beginning to escape their sheaths.

PLATE 8

Above: Fledgling Black-chinned Jacamars, ready to leave their burrow.

Lower left: A female nestling, seventeen days old.

Lower right: A seventeen-day-old nestling, placed on its back, to show the heel pads.

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