

A NESTING OF THE PLUMBEOUS KITE IN ECUADOR

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I passed most of the months of August and September, 1939, in the vicinity of Puyo, a military post situated on the small river of the same name—a tributary of the Pastaza—in the Province of Napo-Pastaza, Ecuador. Here, at an altitude of about 3000 feet, the eastern foothills of the Andes, so high and rugged just a little nearer the backbone of the range, had dwindled away to a succession of low, rounded, forest-clad hills that continued as far as the eye could reach toward the vast Amazonian plain in the east. The excessive wetness of the climate was attested by the exuberance of the epiphytic growths that burdened the trees in the surrounding forest and by the swampy character of pastures even on steep hillsides. The forest, pressing close about the narrow clearings, stretched on and on for long distances. The fauna and flora were composed predominantly of lowland species; yet among both birds and plants I encountered highland forms whose presence at so low an elevation was a surprise and was apparently to be accounted for by the excessive humidity.

To my great disappointment, the breeding season of the great majority of species seemed to have ended before my arrival on August 9. I had hoped to study the nesting habits of some of the typically Amazonian species; but since so few of these were to be found breeding at the time of my visit, the discovery, on August 25, of a nest of the far-ranging Plumbeous Kite (*Ictinia plumbea*) assumed an importance it might not otherwise have had; and for nearly a month the kite family claimed a fair share of my attention.

The kites' nest was situated about ninety feet above the ground, far out on a horizontal branch at the top of a tall, slender, leafless tree growing beside a brooklet at the edge of a small clearing that bordered the Río Puyo. This elevated position made the structure quite inaccessible to man; but fortunately the back of a high, sharp ridge, rising between the rivulet and the river into which it fell, afforded an excellent view not only of the nest but also of its occupant. The bulky, shallow saucer of coarse sticks, so conspicuous amid the naked boughs, held a single small nestling, covered with white down. I could see the nestling clearly as it tumbled around in its lofty eyrie.

By September 12, the nestling was well covered with feathers and seemed almost ready to fly. It now stood upright on the nest, often upon the rim, moved about a good deal, devoted much time to preening its plumage, and at intervals spread its wings and flapped them vigorously, but without rising into the air, evidently because it kept a firm hold on the nest with its toes.

In plumage it was somewhat different from the parents. Its forehead and brows were whitish; the top of its head and hind neck were finely and closely streaked with gray on a light gray ground. Its back, rump and wings were dark gray, with a dark rufous area on the primaries, corresponding to that of the parents. There were prominent white tips on the longer remiges and less conspicuous white tips on the greater coverts. The tail was black with white bars on the outer feathers. The orbital region was black, all the under plumage so light a gray as to be nearly white and the breast faintly tinged with buff. The feet, like those of the parents, were bright orange.

It was after the nestling reached this stage of development that I devoted most time to the kite family. Between September 12 and 17, I spent twenty-two hours watching the nest, in all sorts of weather. When it rained, I found shelter beneath a big hut of palm-thatch and split bamboo, which, perched high above the ground upon massive

palm trunks, stood on the back of the ridge between the rivulet and the Río Puyo and commanded an excellent view of the nest.

FOOD AND MANNER OF HUNTING

The kites' nest was attended by both parents, which were too much alike in appearance to be distinguished. While watching it I learned much about their way of obtaining food. Because some of the peculiarities in their mode of attending the nestling resulted from a manner of hunting unusual among hawks, let us consider this first.

These Plumbeous Kites subsisted largely if not exclusively upon insects. I never saw them eat anything else. During all the hours that I spent watching them, I found no evidence that they shared the Swallow-tailed Kite's (*Elanoides forficatus*) habit of pulling young birds from tree-top nests. This might have been merely because so few other birds were nesting at this season. Although nearly all insectivorous birds seize their prey with their bills, kites—both the Plumbeous and the Swallow-tailed—follow the hawks' usual method of grasping it in their feet. Even insects so small that a little flycatcher would snatch them up in the bill are captured by the kites with their feet. This gives the hunting kite a most peculiar appearance. One watches the big bird soaring about overhead, striking out with one foot and then the other; and since its prey is mostly invisible at so great a height, one is at first greatly puzzled to account for this apparently purposeless behavior. The bird appears to be boxing with phantoms!

The kites caught most of their insect food while soaring effortlessly on widely spread wings on ascending currents of air in sunny weather. After making a capture, the kite would bend its head beneath its body, stretch one foot forward, and transfer the prey to its bill. When the insect was of good size, the birds appeared to tear it between the feet and the bill and eat it piecemeal, all the while continuing to soar about on set wings. The Swallow-tailed Kite captures and devours a large share of its food in similar fashion.

When atmospheric conditions were not favorable for soaring, the Plumbeous Kites caught a certain number of insects which their keen eyes detected while they perched motionless on an exposed branch high in a tree. Suddenly a kite would break its long period of immobility, flap its wings vigorously if the insect happened to be flying above it or dart swiftly downward with pinions half-folded if it was below, and easily overtake its victim by seizing it with a deft movement of one foot. The prey was then carried to a convenient perch, where the kite dismembered it between feet and bill and ate it at its leisure, with little, dainty mouthfuls. Even when flycatching from a perch, the kites caught most of their insects in the air. More rarely, while perching, they espied insects crawling over the nearby foliage which were of sufficient size to tempt them and darted down to snatch them up, more in the manner of a cotinga than of a flycatcher. At times they missed their intended prey, flew back to the perch, and darted down upon it a second time. But so far as I saw in the vicinity of this nest, the kites caught far less food when they were obliged to dart upon their victims from a stationary lookout than while favorable atmospheric currents permitted them to soar. Doubtless, too, flying insects were more numerous during those hours when the air was warm and ascending currents encouraged soaring.

Atmospheric conditions also determined how food was brought to the nest for the young bird. Since the great bulk of the food was caught while the parents soared, it was transferred to the bill at a distance from the nest and carried to the nest-tree in the bill, one insect at a time. Once I saw a parent transfer the insect from foot to bill as it glided down toward the nest; but usually, unless caught from the nest-tree or some neighboring lookout, the prey was transferred to the bill while the kite was still out of sight. One

unusually large insect was, however, borne to the nest-tree in both feet. It seemed that the kites experienced difficulty in carrying heavy insects in their weak bills and preferred to employ their talons for this purpose.

Even when brought to the nest-tree in the feet, the insect was usually taken into the bill before it was actually carried to the nest. One exception to this rule was witnessed when the parent alighted on a branch near the nest with a particularly big insect grasped in a foot. It moved to transfer this to its mouth; but after merely touching it with its bill, the bird straightened up and hopped to the nest still holding it in a foot. Once I saw a parent pull the wings from an insect while resting on a neighboring bough, then take it to the nest. Sometimes, when the day was cloudy or rainy and the parents, unable to soar, appeared to be hungry, they might consume a portion of one of the few insects they caught, then take the remainder to the nestling. Usually, however, the insect was taken whole to the nest, unless, indeed, the wings had been pulled off while the parent soared out of sight. After reaching the nest, the parent would rest upon the rim, and holding the insect beneath a foot—or possibly both feet if it were very big—tear off small bits with its beak and place them one by one in the mouth of the nestling. The young kite was never clamorous at mealtime, but waited quietly until it was served. So far as could be determined, the nestling's food consisted wholly of insects; but I recognized definitely only a large dragonfly. A number of the larger insects appeared to be beetles.

On September 16, for the first time, I saw a parent deliver a whole insect to the nestling, who, holding it beneath a foot, tore off pieces for itself, just as the adults did when they ate on a perch. The following day the insects were sometimes fed to the nestling bit by bit, sometimes delivered entire. Once, while the young kite was busy with the insect it had received some minutes earlier, the parent merely laid the latest one beside it in the nest. If the youngster had wandered along the branch beyond the nest, it would return to receive its meal in the eyrie. Once it was given a whole insect while it perched outside the nest, but it carried this back to the eyrie to dismember and eat it. The young kite was now almost ready to fly away.

RATE OF FEEDING

There was an amazing variability in the parent kites' rate of bringing food to the nest from hour to hour and from day to day. Most birds which nourish their young with insects or fruits carried in the bill rather than regurgitated, bring food to the nest with fairly uniform frequency. But with the kites, long periods during which little or no food was brought alternated with intervals of—for a hawk—amazingly frequent feeding. The rate of bringing insects to the nest appeared to be determined largely by atmospheric conditions. It is well known that the state of the weather affects the success of all insectivorous birds in finding food, especially of those that forage in the air. But it was surprising to find that the success in hunting of these big kites was influenced to a marked degree by atmospheric variations so slight that they would have hardly changed the rate of gathering food of a small flycatcher or a warbler.

The dependence of the kites upon the weather can best be illustrated by the analysis of the records made at the nest from day to day. As an indication of whether or not atmospheric conditions were favorable for soaring flight, I had not only the testimony of the kites themselves, but also that of the locally abundant Yellow-headed Vultures (*Cathartes urubitinga*). The weather in the Ecuadorian Oriente, unlike that of many tropical regions where rain falls at definite seasons and often at more or less definite hours of the day, is wholly unpredictable. It is quite as likely to rain in the early morn-

ing as in the afternoon. Hence I was able to watch the kites in different kinds of weather and to record great variations in the amount of food brought during the same hours of different days.

On September 12, I began to watch the nest at 8:00 a.m. and continued until noon. The early morning was cloudy; but about the middle of the morning the sun appeared through the clouds, and air currents became favorable for soaring. Between 8 and 9 the nestling received no food; but between 9 and noon the parents brought it eleven insects, six of these between 10 and 11. That afternoon, while the sun shone, the nestling was fed five times between 3:10 and 6:20.

On September 13, when I watched from 6:10 a.m. to 12:00 noon, the weather differed. The first half of the morning was darkly overcast, while during the second half rain fell almost continuously, at times quite heavily. All morning there was no sunshine; and no bird of any kind was seen soaring. During six hours, the nestling received only four insects; and before being taken to the nest, two of these were eaten in part by the parent, who must have been hungry. This parent, which I believe was the female, herself had no more than portions of these two insects between 6:39 a.m., when she began to guard the nest, and noon, when I departed in the rain; and it is not likely that she found much to eat before 6:39. After this hour, the second parent did not appear, but the one thought to be the female remained continuously in sight, guarding the nest. Both of the insects which she caught after 6:39 were captured by darting down from the perch to the foliage below, and both were shared with the nestling. The second of these she ate in part as soon as it was caught, then held the remainder during twenty minutes of immobility before she took it to the nestling.

On September 16 I arrived in sight of the nest at 8:15 a.m. The sun was then breaking through the clouds after a rainy night and darkly overcast early morning. The air was sultry, and there was a light breeze, which soon died away. During the remainder of the morning there were intervals favorable for soaring, alternating with brief showers during which the Yellow-headed Vultures and other soaring birds vanished from the air. During the four hours from 8:15 to 12:15, the nestling received eight insects, brought during the periods of more favorable atmospheric conditions.

On the following day, September 17, I watched the nest from dawn, at 5:45 a.m., until 11:00 a.m. For about an hour after the rising sun had dissipated the early morning ground mist, the sky was clear with bright sunshine. But by eight o'clock the gathering clouds obscured the sun, and the sky was soon completely overcast. By eleven o'clock, however, the gradually thinning ceiling of clouds permitted the passage of enough direct sunlight to cast a faint shadow, and soaring birds appeared overhead. During the bright hour following 6:25, when the nestling received its first morsel of breakfast, one of the parents brought it twelve insects, on as many visits to the nest. Seven of these insects were brought during the eleven minutes from 6:51 to 7:02. During most of the next two hours (7:02 to 9:25) the sky was overcast, and the same parent brought food only once more. Meanwhile the other parent, probably the female, rested continuously in the top of the nest-tree and brought the nestling only a single insect, which she darted down to catch as it flew beneath her high perch. From 9:25 to 11:00, the young kite received eleven additional insects, making a total of twenty-five during the first five hours of the morning. With the single exception already mentioned, all of these were caught out of my sight.

During 22 hours of watching, the hourly rate of feeding, for single hours, varied from 0 to 12. For three-hour periods, the rate of feeding varied from 0 to 14. The average rate on different days, as determined during watches of from 4 to 7 hours' duration,

ranged from 0.7 to 5.0 feedings per hour. During the whole 22 hours of watching, the nestling was fed 53 times, or an average of 2.4 times per hour. For a hawk, this seems to be unusually rapid food-bringing. I once watched the nest of a Laughing Hawk (*Herpetotheres cachimans*) containing a single downy nestling. One parent kept almost constant guard, while the other brought a snake every morning and evening, just two a day, which formed the food not only of the nestling but also of the guardian parent. For insectivorous birds these kites showed an unexpectedly great hour-to-hour variation in the rate of feeding the nestling.

It is instructive to compare them with a pair of Northern Yellow-bellied Elaenias (*Elaenia flavogaster subpagana*) which I watched not long ago. These little flycatchers feed largely upon insects which, like the kites, they catch in the air. Also like the kites, both parents attend the nestling, and at this particular nest they hatched only a single one. From the morning the nestling hatched until the afternoon when it left the nest under a drenching rain, I devoted 22 hours to watching it, at all times of the day, and in all kinds of weather. The rate of feeding this Elaenia nestling, for single hours, ranged from 4 to 20 times per hour. The average hourly rate, computed for periods of from 4 to 8 hours, ranged from 6.0 to 14.8, increasing with the age of the nestling. Extremes of weather made less difference in the success in hunting of these small flycatchers than of the great soaring kites.

GUARDING THE NESTLING

When I began to make long-continued watches at the kite's nest, the young bird was already well feathered and no longer required brooding by day. Yet much of the time it was guarded by one of the parents, who rested in the top of the nest-tree, usually on the topmost bough. Whether the guardian was always the same, I could not tell with certainty, for I could not distinguish the parents by their appearance; but I suspect that it was always the same individual who guarded. On the evening of September 12, the parent who had been guarding the nest for nearly three hours went to brood the nestling for the night; this makes it probable that the guardian was the female. Her ability to rest motionless in the tree-top was remarkable. On a dark and rainy morning, September 13, she was present continuously from 6:39 until noon, nearly 5½ hours. During this period she varied her monotonous watching only by making a few brief sallies to capture passing insects, and by sitting in the nest for about forty minutes, during which the rain fell hard; but the nestling, instead of sheltering itself, stood beside her in the downpour.

The nestling was guarded chiefly in the early morning, the late afternoon, and during bad weather. In the late morning, when conditions were favorable for insect-catching, the nestling was seldom watched over, at least after it was older. But then the parents were coming frequently with food or else were soaring about in sight of the nest. While one parent guarded, the other, if it was not bringing food, remained continuously out of sight. On the bad morning of September 13, the second parent (the male?) did not appear at all during almost six hours.

One afternoon the guardian of the nest drove away a big, white-breasted toucan which flew past the nest-tree. On another occasion, while the supposed female guarded, the male, coming with food, found a Yellow-headed Vulture soaring about near the nest and drove it out of sight, then returned to give the nestling the insect that he bore in his bill. It was interesting to observe that the vulture, soaring with set wings, easily kept ahead of the kite, who was flapping hard.

All through the day, the feathered nestling kite stood up in the nest. But after sunset it settled down, and I could no longer see it from the ground. On the evening of Sep-

tember 12, it went to rest at 6:05, although the female did not come to brood it until fifteen minutes later. On the morning of September 17, the brooding parent flew from the nest in the gray half-light at 5:53, but the nestling did not stand up and become visible until 6:10. But during the day, the nestling, after it had grown older, would not submit to brooding even in the rain.

THE NESTLING'S DEPARTURE

By September 17, the young kite, who could already hold its food beneath a foot and tear it apart, began to make brief sallies from the nest, walking out along the supporting branch, then hopping back. The first excursion that I witnessed took it only about a foot beyond the rim, but this was soon followed by a longer journey. Often it flapped its wings vigorously, but always kept hold of the nest or the supporting branch. By September 20, however, the young kite was making short flights between the boughs of the nest-tree. Sometimes it directed its course outward from the tree as though to fly away, but after taking one or two flaps it circled around and returned to the sheltering boughs. While the young bird engaged in these exercises, a parent stood guard on the topmost branch, remaining there for nearly an hour. When the adults brought food, sometimes they fed the nestling piecemeal, as when it was younger, sometimes they delivered the insect whole for the youngster to break up for itself. Once, while the young kite, standing on a branch, was engaged in feeding itself with an insect that it had received entire from one of the parents, and doing very well, the other parent arrived with a big, lacy-winged insect. It first took the food to the empty nest, then flew across and alighted beside the fledgling, who alternately plucked bits from the insect beneath its own foot and received those placed in its mouth by the parent.

The next morning, September 21, the young kite continued to move about among the branches of the nest-tree and to be fed there by the parents. I last saw it there at noon, when a parent was feeding it an insect, piecemeal. When I returned at 5:20 p.m., the fledgling had left; but a parent was resting on the topmost branch of the tree. It lingered in the same spot, resting and preening, for the next hour, and flew away just at sundown. The nest-tree remained deserted for the night.

Since I did not know the age of the nestling kite when it was first found as a downy chick on August 25, I cannot tell how old it was when it left the nest. But it could hardly have been less than four days old when first seen, which would make its period in the nest at least one month.

INCIDENTAL OBSERVATIONS

While I watched these kites, the only notes I ever heard from them were thin, high-pitched, weak monosyllables, sometimes repeated twice or thrice and uttered usually when they came together at the nest-tree after a period of separation. The eyes of both adults were bright yellow, not red, as in Sutton's (1944) painting of a more northern race of this species. Otherwise these Plumbeous Kites in the Ecuadorian Oriente rather closely resembled the Mexican bird portrayed by Sutton.

Nearly three years after I watched these Ecuadorian Plumbeous Kites, I met the first and only member of the species that I have seen during thirteen years in Central America. On February 15, 1942, while riding along a grassy road in the basin of El General in southern Costa Rica, I saw a kite resting in a small roadside tree. I dismounted from my horse and moved about below the bird, while it perched motionless, looking down at me and giving no evidence of fear. Finally, by dint of considerable waving of arms and clapping of hands, I caused it to take wing, for I wished to see it in flight as well as at rest. Carriker (1910:444) includes this kite in his key to the Costa Rican hawks,

but fails to give it a place in his numbered list of the birds of the country. Griscom (1932:163) states: "This pretty little kite is chiefly migratory in Central America, although a few individuals winter in the Caribbean lowlands; from late March to the middle of May flocks containing as many as fifty birds have been noted occasionally drifting northward, and I have frequently seen such myself in Nicaragua and Panamá."

SUMMARY

A nest of the Plumbeous Kite containing a single downy nestling was found near Puyo in the Oriente of Ecuador on August 25, 1939. The young bird was fed by both parents, largely if not exclusively upon insects. The adult kites caught most of these insects while soaring. At times an adult left its perch to overtake an insect that flew by; more rarely it snatched some small creature from the foliage, darting past without alighting. The kites invariably seized their prey in their feet, but transferred it to the bill before reaching the nest. At first the parent tore the insect between its feet and bill and passed small pieces to the nestling; but after the young kite was feathered, it received whole insects and broke them up itself. The rate of feeding the nestling was amazingly variable and was determined largely by atmospheric conditions. Food was brought most frequently while the sun shone, under conditions of ascending currents that favored effortless soaring; in cloudy or rainy weather, when soaring birds were "grounded," the nestling received scarcely any food. During 22 hours of watching, the rate of feeding, for single hours, varied from 0 to 12 times. For three-hour periods, the rate varied from 0 to 14. The average rate on different days, as determined by watches of from 4 to 7 hours' duration, ranged from 0.7 to 5 feedings per hour. Even after it was feathered and no longer brooded by day, the nestling was guarded much of the time by one of the parents.

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