



## ON THE BIOLOGY OF THE AMERICAN FINFOOT IN SOUTHERN MEXICO

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Photographs by the author

Along the tropical streams and rivers on three continents dwell relatively uncommon birds called sun-grebes or finfoots — three species, one on each continent. Comprising a distinct family (Heliornithidae), these three species appear to be most closely related, on morphological grounds, to rails. Superficially similar to rails, the finfoots have grebe-like bills, lobed toes, and short legs placed far back on the body. Extremely secretive and inconspicuously marked, they live along the margins of tropical streams and rivers, seeking a variety of food, including insects, crustaceans, frogs, and molluscs. The females are usually slightly smaller and bear somewhat more vivid markings than the males; unlike the grebes, both sexes have a well-developed tail.

The bills and feet are different in all three species. The large African Finfoot (*Podica senegalensis*) is over two feet long, has bright red feet and bill, and ranges from south of the Sahara to South Africa. The Asian Finfoot (*Heliopais personata*), the medium-sized, has green legs and a yellow bill and inhabits Sumatra, Malaysia, Thailand, Burma, and eastern India. The American Finfoot (*Heliornis fulica*), the smallest, has conspicuously banded black and yellow feet and a red bill. It ranges from southern Mexico to northeastern Argentina and is the subject of this paper. For simplicity I shall refer to this bird as the finfoot or *Heliornis*.

The literature contains almost nothing of the natural history of the American Finfoot. By making periodic observations of this secretive bird for several years, I finally discovered its nest in April 1969 (Alvarez del Toro, 1970).

### *Habitat*

In southern Mexico, the finfoot lives along arroyos and slowly flowing rivers with wooded margins and on the edges of lakes, in the lowlands, apparently no more than 100 meters above sea level. Generally considered rare, it is relatively common in remote places in Chiapas — around Jaurez, the Lacandona region, and the fresh water swamps of the coastal estuaries (Figure 1).

The American Finfoot prefers dwelling in still water — in deep, slow-moving streams, quiet bends of bigger rivers, and along the edges of ponds.



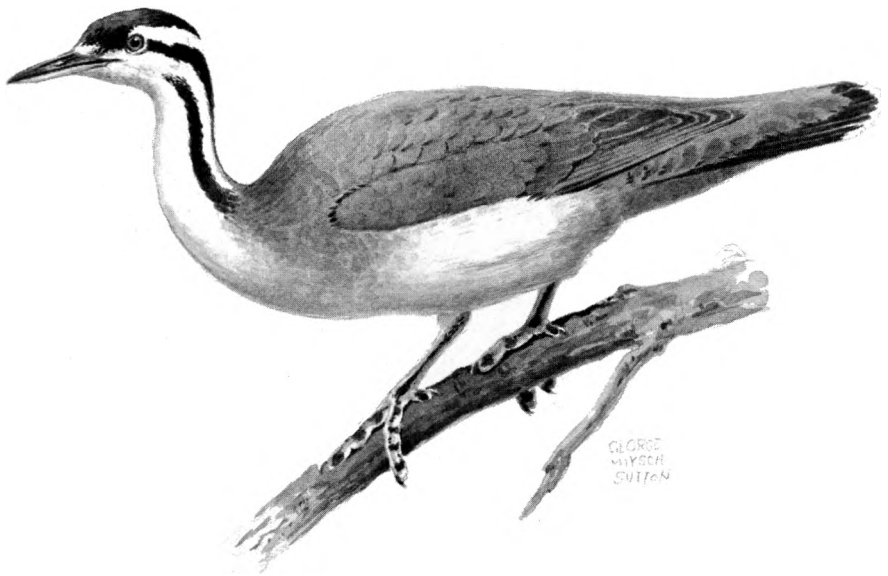
Figure 1. A small stream in southern Chiapas, Mexico, showing the typical habitat of the American Finfoot and the site of this study.

### *General Activity*

The finfoot becomes active at daybreak, moving along the bank and feeding. Its diet, chiefly of aquatic insects and their larvae, may also include small fish, tadpoles, and some wild seeds. Sometimes, it catches dragonflies. From about 09:00 until 16:00 hours, the finfoot spends much of its time resting, either floating in a shaded watery glade or, more frequently, perched less than a meter above the surface of the water. When perched, the bird preens and, occasionally, drops to the water to capture an insect floating by. From 16:00 until dusk, it resumes active feeding on the water. At dark, it climbs with pronounced difficulty, fluttering its wings, into the lianas or branches that hang low over the stream. Very rarely does it fly to a perch.

The finfoot sleeps, hidden in dense vegetation, never on an exposed branch. If something frightens it during the night, it drops, without hesitation, into the water. At such times, crocodiles and caimans constitute a real danger. Using a flashlight, I searched for finfoots at night, and because I flushed one from the same perch on several occasions, I suspect that an individual bird roosts in the same site night after night.

These secretive birds always swim near the bank and very rarely venture into the middle of the stream except when passing from one bank to another. When escaping from danger, real or potential, the finfoot almost always swims. Very occasionally, one flies just above the water for a short stretch, and just once I saw one dive. This bird came up under floating debris and overhanging vegetation and floated with little more than its bill above the surface of the water. The heavy growth of plants along the water's edge affords a protective cover into which the finfoots often climb to hide.



American Finfoot, *Heliornis fulica*.  
Illustration by George Miksch Sutton.

*Territoriality*

The male finfoot maintains a territory, which includes about 200 meters along the bank of a stream, and appears to remain on it the year round. Once in a while, territorial birds advertise their property right with a call. If a bird on his territory sights a trespassing finfoot, he calls several times and hurriedly approaches the intruder, which generally flees, stopping only when he reaches the boundary of his own territory. Then, each rival male performs an elaborate agonistic display, usually swimming in circles counter to the direction of the opponent's circles so that the two males come face to face at each turn. While swimming in these circles, each bird extends his neck forward parallel to the water, half raises his wings, and skims the water with his bill. The two birds circumscribe smaller and smaller circles until finally their bodies nearly touch. At this point, they fight, striking each other with their bills, jumping from the water, and flapping their wings until one bird breaks off and flees.

The encounter may last five or six minutes. Sometimes, only the territorial male circles for a time and then moves away; and sometimes, the agonistic circling may occur within the territory of one of the males instead of on their common boundary. The intruder, chased by his rival to the boundary, invariably flees. The victor swims back into his own area, frequently uttering a characteristic call, which the defeated male answers from a safe distance.

Since the two sexes appear identical for most of the year, I could not determine whether the male alone defends the territory. Nor could I determine this even after the birds had recently paired, when the female still wore the duller plumage so like that of the male. Later, during nest-building and incubation, both sexes are antagonistic toward other finfoots.

When swimming along the bank, the male, from time to time, emits a call — a short, sonorous “laugh” — that I can best describe phonetically as *eeyooo, eeyooo, eeyoo-eeyaaa, eeyaaa*, rather similar to the calls of some grebes.

*Courtship*

For most of the year the finfoots are solitary birds, living all alone; but, in late February, when the male emits his advertisement call more frequently and a female joins him, they swim along the territorial boundaries together. After pair-formation the male calls less frequently.

Their courtship display resembles the antagonistic display between males in that the male and female swim in counter circles with necks fully outstretched and held parallel to the water, and with wings partially raised in swan-like fashion. Both birds give a soft *cluck* sound. Describing ever smaller circles, the swimming birds eventually touch one another, at which point the male mounts and copulates. Postcopulatory display involves wing-flapping and body-shaking. The pair then swims off together.

About mid-March, the bill of the female changes from dull red to scarlet; the eyelids turn red; and the cheeks and the sides of the neck acquire a patch of golden brown feathers. The golden brown feathers are molted when the nesting season is over.

*Nesting*

On 15 April 1969, on the lands of the Rancho Alejandria, Municipio de Jaurez, Chiapas, I discovered a nearly completed nest of a finfoot — a thick platform, almost flat but with a slight hollow just deep enough to keep the



Figure 2. A pair of finfoots construct a platform of twigs in a tangle of vegetation overhanging the water. This shallow cup contains a single egg; there will be a second.

eggs from rolling out. The nest platform, about 90 centimeters above the surface of the river, rested on lianas and branches that lay directly on the water. The nest was made of sticks and lined with dead leaves. The platform, 22 cm across and seven cm deep, looked bulky and unstable, but held up well against the wind and the movements of the birds (Figure 2). I constructed an observation blind some five meters away.

The nest contained one egg when I discovered it. The following day, the female was on it when I checked at 07:00. Two hours later, she departed and there were two eggs in the nest. They were oblong in shape, pale cinnamon in color with a sprinkling of numerous, irregular, reddish-brown spots; and measured 30 x 20 millimeters and 29 x 20 mm. Soon after the female left, the male appeared, holding a leaf in his bill. He climbed into the nest, added the leaf to the lining, and then sat on the eggs (Figure 3).

The two sexes cooperated in nest construction and incubation. From the beginning of incubation, the female came to the nest at about 16:00 every day and stayed on the eggs all night and during the early morning hours. When the male appeared about 09:00, the female left to feed and did not return to resume incubation until the late afternoon. The hours of attentiveness changed gradually during the incubation period until, at eight days, the female stayed on the nest until 10:00 and did not return until dusk at 18:30.

Each bird, while on the nest, spent some time rearranging the leaves and sticks in the nest, rotated the eggs periodically, and changed position. The male, during his attentive period, often dropped down to the water to capture an insect or grab a floating leaf, and then climbed back into the nest and added the leaf to the lining. He also left the nest for short periods, swimming about in the immediate vicinity or perching on a branch overhanging the water and preening. When one bird was attentive, the other periodically visited the nest and usually added a leaf or a twig to the lining. During these visits, both birds often uttered a low *cluck*. Occasionally, they came to the nest with a short flight over the water; then they climbed slowly up the lianas that hung into the water. When leaving the nest, they simply dropped into the river like balls of cotton without producing a splash or noise.

If another bird approached the nest while the finfoot was taking a short rest period, he returned immediately. If the other bird came too close, the finfoot chased it a short distance. While I watched the nest, I saw various species of birds in the area. The finfoot's response varied not only with the proximity of the intruder, but also with the particular species. It returned leisurely to the nest when the Squirrel Cuckoo (*Piaya cayana*), Striped Cuckoo (*Tapera naevia*), Groove-billed Ani (*Crotophaga sulcirostris*), Golden-fronted Woodpecker (*Centurus aurifrons*), and Clay-colored Robin (*Turdus grayi*) appeared nearby. A pair of Green Herons (*Butorides virescens*) that nested about six meters away and often perched only one meter from the incubating finfoots never seemed to alarm them. On the other hand, if White-tipped Brown Jays (*Psilorhinus mexicanus*) or Melodious Blackbirds (*Dives dives*) appeared in nearby trees or approached the nest, the finfoot was restless. If the finfoot was off the nest, it hastily returned and threatened the intruders with plumage erect and bill open.

### *Hatching*

On the afternoon of 26 April, the male incubated as usual. Seeing me, he showed a definite reluctance to leave the nest and, furthermore, kept his bill open as if threatening. As I approached the nest, he dropped into the river and swam to the opposite bank where he hid in the thicket that hung over the water. This behavior was quite unlike any I had encountered earlier when he, upon leaving, had moved either up or downstream and disappeared around a bend.

Puzzled by the male's behavior, I glanced at the nest and found, to my dismay, only empty eggshells. I picked up a shell and was surprised to note that it showed all the signs of normal hatching; but I could not find the chicks.



Figure 3. The male on the nest. Both sexes incubate, the male during most of the day, the female from late afternoon until the following morning.

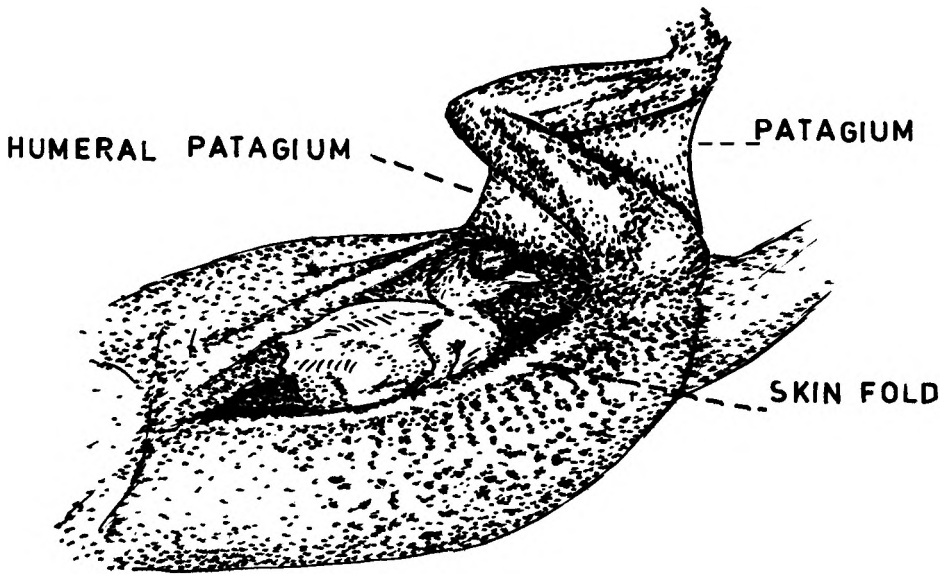
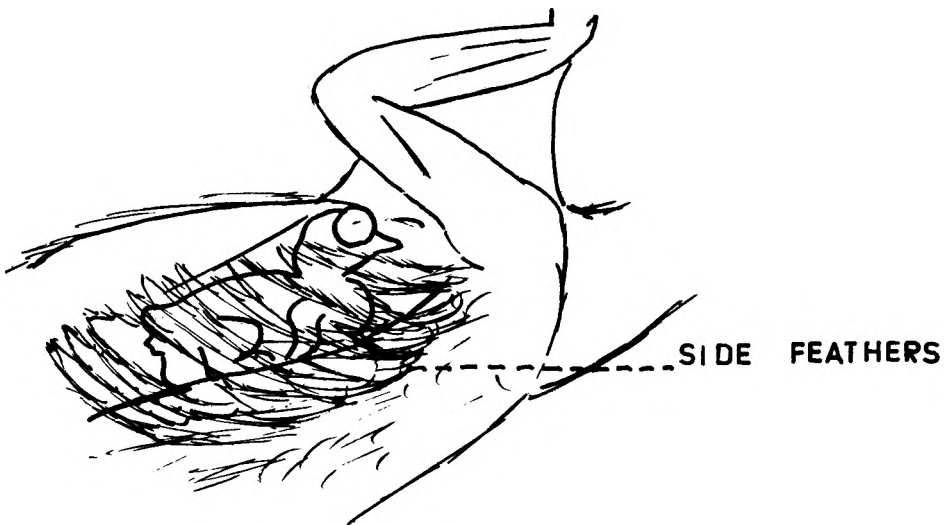


Figure 4 (*above*). A sketch, drawn from a specimen, shows the location of the shallow brood pocket and the position of the chick in the fold against the side of the male's body beneath the wing. Illustrations drawn by the author.

Figure 5 (*below*). The feathers of the side project upward, enclosing the chick in the pocket so that only the head protrudes. These feathers play an important role in providing warmth as well as helping to keep the chick securely in the pocket.



Although the incubation period was short, I believed, because of the eggshells, that the hatching had been normal and that the chicks were hidden somewhere.

I moved away from the nest to hide and wait. Soon the male swam back and very cautiously climbed up the vines and into the nest. If the chicks were hiding, he gave no calls to bring them to him and I still saw no sign of them. In a little while, I again moved closer, and the finfoot once more dropped to the water and headed for the opposite shore. When I drew back a second time, the bird again returned to the nest.

Intrigued and confused by the bird's behavior, I withdrew again and engaged a man with a little fishing boat to help me. As he approached the nest in his boat, I waited upstream. The bird jumped off the nest and, by lucky chance, swam upstream toward me, coming to land some 20 meters beyond me. Then, seeing me so close, he flew. As I watched the bird in flight through binoculars, I saw two tiny heads sticking out from the plumage of the sides under the wings. The finfoot had his chicks with him.

Subsequently, I collected the male and discovered that he had a special mechanism for carrying the young (Figures 4 and 5). On either side, beneath the wing, a pleat of skin forms a slight depression or cavity into which the young fit — one under each wing. Numerous side feathers, which enclose the body of the chick, add to the effectiveness of this "pocket." Muscular control probably holds the chick against the body, offering it warmth as well as concealment (Figure 6). In this depression the chicks are perfectly secure even when the male swims or flies. The female has no skin pleats under her wings and probably does not care for the chicks, at least in the early period following hatching.

The chick, at hatching, is very undeveloped (Figure 7) — almost naked with pale pink skin. It measures 50 mm from bill tip to vent. Its eyes are large with tightly joined lids; its bill is short and soft with an egg-tooth. Its feet are plump and poorly formed. Its plumage consists only of short, sparse down in the capital, spinal, humeral, ventral, femoral, and caudal feather tracts. The down on the head, submalar area, and ventral neck is whitish; on the remaining feather tracts, it is dark gray. The spinal feather tract divides into two branches with a wide apterium the length of the back. I noted only vestiges of primary and secondary wing feathers.

Considering the helplessness and undeveloped state of the chicks at hatching, I believe that the male probably puts them immediately into the pockets beneath his wings — in some unknown manner — and keeps them there for a number of days — until they attain a degree of plumage and muscular development that allows them to accompany the parent under their own power with relative safety. While carrying the young, the male reaches beneath the wing to feed them and remove the droppings.

Except when disturbed, the male remained on the nest during the first day of hatching. On the second day, he left the nest site, taking the young with him.

The finfoot's short incubation period accounts for this unusual habit of transporting and caring for the young. I found the nest with the single egg on the afternoon of 15 April. The following morning, after the female left the nest at 09:00, I noted two eggs. If the female laid the second egg shortly after she arrived at the nest on the afternoon of 15 April, then incubation lasted 11 days. If, on the other hand, she laid the second egg early





Figure 6 (*above*). The newly hatched chick, supported in the shallow pocket formed by a fold of skin and feathers of the side beneath the wing.

Figure 7 (*below*). The newly hatched chick is helpless, unable to see or to use its poorly formed legs. Only sparse, short down covers parts of the body.



on the morning of 16 April, the birds incubated for only 10.5 days, perhaps as little as 10 days and eight hours.

After hearing of my discovery of the finfoot's unique method of carrying its young, Dr. Alexander Wetmore kindly sent me a copy of several pages from a publication, in which the author (Wied, 1833) told of a male finfoot carrying his young in the manner described above. I believe that my observations are the first to confirm Wied's statements made over 100 years ago.

We have much more to learn about the biology of this tropical bird. So many questions arise: For instance, how long does the adult normally stay with the chicks on the nest? How does he put the chicks into the pockets? How long does he carry them with him? And what part does the female play during the hatching and post-hatching phase of the breeding cycle?

### *Summary*

I observed the American Finfoot (*Heliornis fulica*) in southern Mexico over a period of two years. This species inhabits sluggish streams and rivers with densely vegetated margins and the edges of lakes. It lives solitarily, and each male appears to maintain his territory throughout the year, defending it with a circling display on the water. Courtship occurs toward the end of February. After pairing, the female assists in defending the territory. Both members of the pair construct the nest, a platform of sticks lined with leaves, in a tangle of dense vegetation over water. The female lays two eggs, and both sexes share the incubation which lasts from 10.5 to 11 days. The female is attentive from late afternoon until mid-morning the following day; the male incubates during the day.

The chicks are naked and helpless when hatched. The male places each chick under a wing in a "pocket," formed by a pleat of skin and feathers. In the nest that I observed, the male left the nest with the chicks in the pockets the day after hatching, but he probably kept the young in the pockets and fed them there until they had gained some independence.

My observations are the first to confirm the statements, made by Wied in 1833, concerning the carrying of young by the finfoot.

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# THE LIVING BIRD



*Albert Earl Kilbert*

**TENTH ANNUAL..... 1971**  
*Cornell Laboratory of Ornithology*

## COVER PAINTING OF THE SOUTHERN HELMETED CURASSOW

ALBERT EARL GILBERT

I made the cover painting of the Southern Helmeted Curassow (*Crax unicornis*) for the forthcoming book "Curassows and Related Birds" by Jean Delacour and Dean Amadon. While working on the color plates for this book I was fortunate enough to see all the genera and most of the species of the Curassow family in life, either in the wild or in captivity. Over the course of two expeditions, I came to know many of these somber toned, yet beautiful, birds as they lived in the volcanic mountain forests, steaming lowland jungles, or dry savannas. Throughout tropical America, they inhabit the fascinating worlds of bromeliads, orchids, lianas, and neblina — wild and remote places only now threatened by the intrusion of man.

The Southern Helmeted Curassow from the mountains of Bolivia eluded me. It is extremely rare, known only from scattered field observations and a very few museum specimens. However, my acquaintance with its close relative, the Northern Helmeted Curassow (*Crax pauxi*) in Venezuela, together with study specimens enabled me to paint a fairly accurate picture of this secretive bird. I have based many of the following remarks on the conclusions of Delacour and Amadon.

The turkey-sized curassows and the smaller guans and chachalacas comprise the family Cracidae, gallinaceous birds found mainly in the forested regions of neotropical America. The 13 curassows fall into four groups: (1) the perhaps primitive little Nocturnal or Russet Curassow (*Nothocrax urumutum*); (2) the Razor-billed Curassow (*Mitu mitu*) and two allied species in which the red bill is laterally compressed or otherwise modified; (3) the two Helmeted Curassows which have a large, hard casque; and (4) the seven "typical" curassows which often have soft, fleshy knobs or wattles and a recurved crest of stiffened feathers.

Some authorities regard the Northern Helmeted Curassow from Venezuela and Colombia and the Southern Helmeted Curassow from Bolivia as subspecies of the same species even though their ranges are separated by a gap of some 1,200 miles. Delacour and Amadon tentatively regard the two as distinct species having an interrupted, and in part relict, distribution down the Andes: ". . . though it is difficult to believe they would not interbreed freely, were their ranges to meet."

The two curassows are very similar in every respect except for the shape of the casque and the feathering of the head. Aside from the great gap in range, the principal character favoring specific separation is the feathering of the head. In the Northern Helmeted Curassow, the feathering is dense and plush with a matt appearance; in the Southern Helmeted Curassow, the crown feathers curl forward with a glossy appearance. The shape of the casque varies geographically in all forms, but the variation is not clinal. A rare rufous phase that occurs in the female *Crax pauxi* is as yet unknown in *Crax unicornis*.

In 1969, John S. Weske and John W. Terborgh (*Auk*, 88:233–238, 1971) discovered a new form of helmeted curassow in a locality in Peru, about 850 miles north of the type locality of *unicornis* in Bolivia and even more distant from the range of *pauxi* to the north. This was significant. Would the new form bridge the differences between the northern and southern forms and show them to be, indeed, subspecies? Evidently not. Weske and Terborgh concluded that the new form was a race of the Southern Helmeted Curassow and named it *Crax unicornis koepckeae*.

Both species inhabit the dense epiphytic vegetation in humid cloud forests where they are most difficult to observe. Charles Cordier found the Southern Helmeted Curassow in Bolivia between 1,500 and 3,600 feet, inhabiting forests of heavy rainfall in a rugged terrain cut by steep valleys (*Animal Kingdom*, 74 (2): 9–11, 1971). Though the bird no doubt eats tender leaves and buds, its favorite food is the nuts of the almond tree after they have fallen to the ground.

Probably, like other curassows, the Southern Helmeted Curassow travels in pairs or in small family groups and roosts in trees at night. It weighs about eight pounds; its nest, eggs, and downy young are unknown except perhaps by the Indians who, according to Cordier, fashion, among other things, cigarette lighters from its casque.

The distribution of the helmeted curassows along the Andean chain was almost certainly more continuous in the past. The reasons for this diminution are unknown. Hunting by natives, who in some regions valued the helmets as well as the flesh, is a possibility.