

Foraging behavior of the Double-toothed Kite in association with white-faced monkeys.—A few cases of birds foraging in association with troops of monkeys are known from the literature (see K. Stott, Jr., *Auk*, 64: 130, 1947, for references; and Stott and C. J. Selsor, *Condor*, 63: 508, 1961). In these instances the birds were presumably feeding on insects disturbed by the moving troop.

On 16 August 1965, on Barro Colorado, Canal Zone, Panama, I observed that foraging Double-toothed Kites (*Harpagus bidentatus*) may also actively associate with bands of the white-faced monkey (*Cebus capucinus*). My first observations were of a band of about 10 *Cebus* accompanied by two adult kites. About one-half hour later, at another location, I saw a smaller troop of *Cebus* accompanied by one adult kite. In both of these cases, I observed the kites for at least 10 minutes, using 8× binoculars. On 19 August, I saw an immature kite which was accompanying about 8 or 10 *Cebus*. I followed the kite and monkeys for about 200 yards.

The kites showed a definite tendency to maintain a particular relationship to the moving troop. The perches which they used most frequently were below the monkeys and near the center of the troop. The birds sat quietly on exposed limbs or lianas in the open space between the forest canopy and subcanopy (25 to 30 feet high), peering around as the monkeys moved overhead. Much of the time, the birds appeared to be looking upwards. They often perched for one to two minutes, but from time to time they suddenly left their perches, sometimes disappearing momentarily and then reappearing and flying to another post nearby, or moving ahead with the troop to a position nearer the center or the van.

On one occasion, I was able to watch a kite closely during a sally. A large, green insect (probably a cicada [Cicadidae] or katydid [Tettigoniidae]) suddenly flew from the foliage onto which a monkey had just scrambled. The kite almost immediately left its perch and flew swiftly and directly after the insect. I was unable to witness the actual capture, but within seconds the kite reappeared with a green insect in one foot. It landed on the same perch, held the insect beneath its foot on the branch, and tore it apart with its bill, swallowing each piece. The kite then flew off in the direction of the monkeys, which had moved away.

Edwin O. Willis (pers. comm.) also has seen the Double-toothed Kite in the vicinity of a band of *Cebus* on several occasions on Barro Colorado. He recently informed me (*in litt.*) that he had observed *H. bidentatus* moving under a large troop of squirrel monkeys (*Saimiri* sp.) as they worked the canopy and mid-levels of a swampy forest at Caruarí, Amazonas, Brazil (on the Rio Juruá), in March, 1966. Following behind both the squirrel monkeys and the kite was a smaller band of *Cebus* sp. Willis' observations indicate that the behavior is not just a local phenomenon.

On Barro Colorado, *Harpagus* is evidently only an irregular attendant of troops of *Cebus*. Willis reports having watched kites foraging alone, and on 16 August, I observed a pair around the edge of the tower clearing when no monkeys were in the area. Also, on 20 August, I watched a troop of *Cebus* for about 45 minutes without seeing a kite.

It is reported that this kite feeds mainly on insects and lizards (see for example, R. M. Laughlin, *Condor*, 54: 137-139, 1952; A. F. Skutch, *Condor*, 67: 241-245, 1965). However, aside from Laughlin's account (*op. cit.*: 137) of an individual securing a lizard by hopping up a slanting branch after it, little has been published about the foraging behavior of the Double-toothed Kite. My observations suggest that the birds may obtain much of their food by sitting quietly on exposed perches and

sallying after large flying insects which are spotted. However, I was not able to determine whether the kites capture the insects in the air or after they land.

A. L. Rand (*Fieldiana: Zoology*, 36: 20-24, 1954) reviewed situations in which birds take advantage of "beaters" which flush prey, and included references to such behavior among other diurnal birds of prey.

I express appreciation to my wife, Violet, who accompanied me on Barro Colorado and aided me in making observations. I also thank Edwin Willis, who suggested this note and allowed me to use his observations, and Dean Amadon and Jeff Swinebroad for their criticisms of the manuscript.—JON S. GREENLAW, *Department of Biological Sciences, Douglass College, New Brunswick, New Jersey.*

Breeding behavior of the Roadrunner, *Geococcyx californianus*.—A. L. Rand (*Auk*, 58: 57-59, 1941) described the courtship behavior of the Roadrunner as consisting of five acts, in a sequence as follows: the posing of the male with food, the invitation of the female, copulation, the passing of the food item from the male to the female, and the circling of the female by the male. Rand concluded (p. 59): "The act of copulation . . . is the only part of the ceremony which is peculiar to it. All the other components of the ceremony are also used under other circumstances, for other purposes." In observing the courtship of captive Roadrunners I have noted a display which Rand apparently did not observe, and which, as far as I know, does not occur elsewhere in the behavioral repertoire of the species.

From 1964 to 1967, hand-reared Roadrunners were kept in 3 × 6 m outdoor pens at Duke University. The courtship and nesting of two pairs were observed. Within a sex, no differences in behavior were apparent.

The territorial song of the males was like that of the wild Roadrunners, as described by G. M. Sutton (pp. 39-40 in A. C. Bent, *U. S. Natl. Mus., Bull.* 176, 1940). Confrontations of the two males, at a fence separating them, included a crouching, threat posture, with the wings being extended slightly and the tail being cocked almost vertically; this, also, is similar to the behavior I have observed of wild Roadrunners in southeastern Arizona.

In the courtship ceremony of the captive birds, a piece of beef kidney or a live mouse or baby rat served as the food item to be offered. A mouse given to one of the males often seemed to act instantly as an aphrodisiac. First the male stunned or killed the mouse by holding it in its mouth and slamming it against the pavement. Bearing this food, the male went to the female, usually approaching from the rear. Sometimes the female begged, like a Roadrunner chick, fluttering her wings and uttering a buzzy, squeaking call.

The male then performed a display which seems not to have been described before. His crest feathers were raised and the colored areas of skin posterior to his eyes were maximally exposed. He wagged his cocked tail from side to side, while rapidly stepping or patting his feet in place. A rapid, vocal *kuk-kuk-kuk-kuk* accompanied this. After a short period of wagging and stepping he made a deep bow in which the tip of his bill nearly touched the floor. With this bow, the tail-wagging ceased and the tail was lowered until it was horizontal, with the feathers partly spread. A low, almost growling, *coo* was made during the bow. Tail-wagging and bowing occurred alternately, two or three times if the female was not moving away. Mounting was attempted by combined hopping and wing-flapping.

After copulation, the food item was given to the female. The female was then circled by the male, as described by Rand, but this was interrupted by a halting in which both birds raised their heads and cocked their tails simultaneously, and flicked their tails from side to side, in a manner characteristic of startled Roadrunners.