

ROADRUNNER PREDATION ON PASSERINE BIRDS

DALE A. ZIMMERMAN

Department of Biological Sciences
Western New Mexico University
Silver City, New Mexico 88061

Roadrunners (*Geococcyx californianus*) winter in small numbers at least to elevations of 6000 ft in southwestern New Mexico. Although the winters are sunny, there are long cold periods which effectively eliminate insect and arachnid activity for many weeks at a time, and lizards only rarely are in evidence between late November and March around Silver City where the following observations were made. After watching Roadrunners there during the past 11 years I believe that they can survive by regularly feeding on small birds and perhaps at times on fruits. (A specimen killed on 21 January 1969 had been feeding extensively on fruits and seeds of a local cactus, *Opuntia engelmannii*.)

The literature contains a few references to this species killing birds, and in places there exists a long-standing prejudice against Roadrunners because of their quail-killing propensity. I believe the latter to be exaggerated, for, despite numerous broods of Gambel's Quail (*Lophortyx gambelii*) about our property each year, we have yet to see a Roadrunner attempt to capture the downy young. That they occasionally do so, however, is suggested by the prompt release of threat displays and even vigorous pursuits by adult quail when a Roadrunner approaches their young. Scrub Jays (*Aphelocoma coerulescens*), Mockingbirds (*Mimus polyglottos*), Curve-billed Thrashers (*Toxostoma curvirostre*), and Brown Towhees (*Pipilo fuscus*) often voice alarm calls when detecting a Roadrunner. They may so respond at any time but react with increased intensity during the breeding season.

There are several references to captive Roadrunners eating birds, and to wild ones capturing wounded, trapped, or fledgling passerines (e.g., Sutton in Bent, U.S. Natl. Mus., Bull. 176:45, 1940), but there appear to be few observations of wild Roadrunners frequently and successfully hunting full-grown, healthy, wild birds.

On 11 February 1961, as my wife and I watched a group of juncos feeding on our lawn, a Roadrunner raced into the flock from a place of concealment 10 ft distant and captured with its bill an adult Junco *oreganus mearnsi*. The junco had been banded by us and was a regular visitor to the feeding station; it seemed to be in perfect physical condition. The Roadrunner seized it across the carpal area of one wing as it attempted flight. A quick vertical snap by the captor abruptly ended its life, and it was carried beyond our view. We were impressed both by the speed of the Roadrunner and by the apparent inability of the junco to take flight in time to avoid capture, although it faced the direction of the attack across 10 ft of bare lawn. The other juncos also were surprised and flew only as the Roadrunner was in their midst. The incident occurred when the air temperature was 70°F, and when insects were in evidence throughout the neighborhood. The entire performance reflected efficiency and suggested practice in the art of bird hunting.

Although we later saw Roadrunners carrying what appeared to be freshly killed birds (one of them a

House Finch, *Carpodacus mexicanus*), and several times saw them stalking and attempting to catch passerines, it was not until 1969 that we witnessed another "kill." On the afternoon of 6 June we watched an adult Roadrunner cross the lawn and pause beneath a large, spreading alligator juniper (*Juniperus deppeana*) tree. It seemed intent on some immature but full-sized House Sparrows (*Passer domesticus*) feeding on the ground nearby. After a few minutes it jumped to a low branch and thence to a point midway up the 30-ft tree where it squatted with its tarsi essentially horizontal, its tail vertical, and its neck unstretched. In this seemingly relaxed position it remained motionless except for frequent, short, lateral movements of the head as it watched the sparrows. About 15 min later several of these flew into the thinly-foliaged juniper, some alighting within 5 and 6 ft of the Roadrunner which they either overlooked or ignored. Suddenly the Roadrunner lunged horizontally capturing one of them with its bill. It dropped to the ground with the motionless sparrow firmly held by the neck, walked a few steps to a gravelled path, dropped the bird, and began inefficiently plucking it, making no attempt to secure the carcass with its feet. It awkwardly removed a few feathers at a time, including most of the remiges and perhaps half of the rectrices, often raising the sparrow and dropping it again. Sometimes it merely struck the sparrow or, when pulling, failed to dislodge any feathers. The Roadrunner worked thus for over 15 min, then maneuvered the still largely feathered sparrow into its mouth head first, tried twice to swallow it, and succeeded the third time. It stood gaping for a moment with the conspicuous bulge in its throat displacing the feather tracts so as to reveal the cervical aperture, then it bounded upward to near its original perch in the tree and remained for several minutes before leaving the area. On the preceding day we saw a Roadrunner make several unsuccessful attempts to capture House Sparrows drinking at a nearby pool. At the same place on 28 June 1969, while investigating a bird's distress call, we discovered a Roadrunner with a limp House Sparrow in its bill. The plucking operation was repeated in the same manner and at the same site. After swallowing the sparrow the Roadrunner drank from the pool, then moved into the shade where it vigorously wiped its bill on a rock, dislodging some adhering sparrow feathers. Following this it crouched on its tarsi, fluffed out its feathers and rested for several minutes before walking away.

The following afternoon, I saw a Roadrunner ascend into the juniper tree and settle down as before. House Sparrows were feeding close by and eventually some alighted near enough in the tree to tempt the Roadrunner to lunge twice unsuccessfully. On the third attempt, following a 6-ft leap, it caught a sparrow across the upper body. The victim uttered one brief cry and fluttered its wings feebly as the Roadrunner sharply jerked it up and down and dropped with it to the ground. I could not witness the plucking operation. On two subsequent occasions I found remains of sparrow "kills" which I attributed to a Roadrunner.

The incidents described above took place in and near the same tree where we watched a full-sized immature Roadrunner fail in attempts to catch sparrows on 8 September 1968. All observations were made when air temperatures were 80–93°F, and indicate that Roadrunner predation on birds is not confined to times of year when reptiles and invertebrates

are scarce. Lizards of the genera *Urosaurus*, *Sceloporus*, *Cnemidophorus*, and *Phrynosoma* were plentiful throughout the area where the sparrow hunting took place. We have seen lizards moving about both before and after the Roadrunner's captures. It would

seem that House Sparrows and other small passerines are at times easier to capture than are the nimble lizards we customarily think of as Roadrunner food.

Accepted for publication 29 December 1969.

AMERICAN KESTREL, *FALCO SPARVERIUS*, EXHIBITS RELIC NEST BUILDING BEHAVIOR

GERALD L. RICHARDS

Biology Department
Wisconsin State University
Whitewater, Wisconsin 53190

It is generally accepted that members of the genus *Falco* do not build nests as such, but may occupy the old nests of other species, or merely make a shallow scrape in the debris of a ledge or on the ground. This is generally true for American Kestrels (*Falco sparverius*) with the exception that kestrels frequently lay their eggs in hollows excavated by woodpeckers. Bent (U.S. Natl. Mus., Bull. 167, 1937) states that kestrels habitually use their chosen cavity as they find it. They add little if any nesting material, and lay their eggs either on the bare floor or on whatever the previous occupant has left behind.

In the course of breeding experiments with the American Kestrel under confinement, several female kestrels exhibited what appeared to be nest building behavior. During the last week of March 1969 a captive female kestrel laid four eggs in a modified natural log cavity. After the last egg had been laid and the female began to incubate, it was noticed that the nest materials had been rearranged. The scrape had been deepened, forming a well shaped cup about two inches deep; wood chips forming the litter at the bottom of the cavity were placed horizontally and tangentially around the eggs, giving the appearance of

a well ordered nest. At this point I removed all the chips lining the cup and placed them with a few others in a pile six inches away from the eggs. By the following day all the chips had been placed back into the cup by the hawk, and nearly all were again aligned with their long axis to the horizontal.

Later when two other female kestrels were laying eggs, wood chips about $1 \times \frac{1}{8}$ inch were placed in their nest boxes to see if they followed the same pattern. During egg laying no manipulation of the chips occurred, but, as soon as incubation started, the birds arranged the chips to form a well ordered cup.

The fact that kestrels lay pigmented eggs, while most cavity nesters lay white eggs, has led to the notion that kestrels may have only recently evolved to the habit of nesting in hollows, and that during the past they used open nests of some type. The evidence that kestrels have considerable skill in manipulating nesting material, as indicated by this study, tends to support the idea that kestrels may have at one time built their own nests, or at least remodeled the stick nests of other species. It should also be noted that kestrels have sometimes utilized the old nests of magpies, and that the European Kestrel, *Falco tinnunculus*, a close relative of the American Kestrel, often lays in the open nests of rooks.

This study was supported by grants from Wisconsin State University, Whitewater, from funds provided by the Board of Regents and the National Science Foundation. Thanks go to Dean Amadon for suggestions.

Accepted for publication 19 January 1970.

TEMPERATURE MEASUREMENTS AT THE NEST OF THE DESERT LARK (*AMMOMANES DESERTI DESERTI*)

YOSEF ORR

Kibbutz Mashabei-Sade
P.O. Ramat-Negev
Israel

The Desert Lark (*Ammomanes deserti deserti*) is a small, sparrow-sized bird which occurs in desert areas of North Africa, Arabia, and east to India (Meinertzhagen, Birds of Arabia. Oliver and Boyd, Edinburgh, 1954). It is mainly a seed-eater, but it also includes insects in its diet. It nests on the ground, usually in early spring, but occupied nests may be found as late as the end of May.

The nest is interesting because its orientation and structure seem helpful in avoiding high mid-day temperature extremes in the nest, and also appear adjusted to take advantage of early morning sun and late afternoon wind to provide favorable incubation conditions while the female is absent for foraging. Microclimatic measurements were made in two nests in order to obtain information about temperature conditions in the nest as compared with ground surface and air temperature. The two nests were located in the Central Negev of Israel near Avdat ($30^\circ 47' N$,

$34^\circ 46' E$). This is close to the northern distribution limit of the Desert Lark.

All four nests observed in this area were facing north and were shaded against the mid-day sun by a bush (1 nest) or an overhanging stone (3 nests). Nest number one (see fig. 1) was situated on a rather steep north-facing rocky slope in a shallow depression under an overhanging stone. It was lined with the long and hairy seeds of *Geranium* sp. to a thickness of 1–2 cm. The inner diameter of the cup-shaped nest was about 10 cm, and its depth, 5.5 cm. The overhanging stone acted as a "roof," leaving the east, north, and west sides open to free air-flow. A semi-circle of small stones—a pebble glacis—was built on the open sides of the nest, forming a wall up to 4 cm high, enclosing the nest to its full height.

Nest number two was situated on a more gentle north-facing slope. The area was covered by smaller stones and the vegetation coverage was denser than near nest number one. The nest was built in a depression on the northern side of an *Artemisia* bush about 30 cm high. The encircling wall of pebbles and the lining were similar to those of the first nest, but the wall encircled the nest on all sides, and there was no overhanging stone. Two more nests under overhanging stones had the same general characteristics as nest number one.