

FROM FIELD AND STUDY

Unusual Feeding Behavior of the Fulmar.—A Fulmar (*Fulmaris glacialis*) was recently encountered by the author while skin diving in the kelp beds about 200 yards off the private beach of Dos Pueblos Ranch in Santa Barbara County, California. On this occasion, the weather was foggy, with visibility of perhaps 150 yards. The water was relatively calm and estimated to be 60° F., with clarity adequate to see the ocean floor below at about twenty feet.

When first noted, the actions of the bird suggested that it was suffering from hunger or disease; however, observations during the following thirty minutes indicated it to be vigorous, although no flight was observed. Subsequent to the initial encounter, the Fulmar followed, within three to six feet, all my swimming movements.

Because the Fulmar was assumed to be hungry, a small sea urchin was retrieved from the ocean floor, broken open, and the eggs thrown approximately four feet to the bird. By the time the Fulmar had swum to the eggs, the mass was three to six inches beneath the surface of the water. Immediately inverting, the bird plunged its beak beneath the food, then raised the beak so that the eggs settled in the depression on the top of the beak just distal to the tube nose. The Fulmar then returned to a sitting position on the surface of the water with the eggs hanging over the top of the beak. A shake of the head was sufficient to dislodge the food, and before it could reach the water, it was grasped and ingested. I repeated this experiment ten to twelve times utilizing one large and three small sea urchins. In each case the same behavior was observed. Visibility of the water and proximity of the Fulmar allowed clear observation of the entire procedure.

On one occasion one half of a sea urchin shell containing eggs was held at arm's length at the surface of the water. At this time, the food was taken with the tip of the bill, or pecked, as one would normally expect.

Observation of this phenomenon impressed me with the seemingly inherent difficulty of withdrawing the beak from the water without the food being dislodged by the considerable drag forces present. The food was never lost upon withdrawal, and yet the slight indentation distal to the nares seems hardly adequate to hold the food in place.

Fisher (The Fulmar, 1952:451-452) states, without specific reference to the investigator, that the Fulmar cannot inhale through the nostrils because of a one-way valve located within the nose. I made dissections of the entire narial cavity of one Fulmar which, although fixed, was also slightly desiccated. (This Fulmar was kindly donated by Dr. Larry Z. McFarland, Department of Anatomy, University of California, Davis.) These dissections revealed a membranous structure within the tube nose. This structure, however, closed off only about 50 per cent of the air passage. Other valve-like membranes were not observed. If inhalation is possible through the tube nose, a slight suction could be applied to the food in order to retain it on the beak during its withdrawal from the water.

The observations here reported then suggest that while retrieving the sea urchin eggs used in this experiment, the bird may have applied suction at the nares upon this food and thereby held it on the beak as it was lifted from the water. Previous reports of this unusual feeding behavior by the Fulmar have not been found in the literature.

I wish gratefully to acknowledge the critical discussion of this report by Dr. Loye Miller.—J. NORMAN GRIM, *Department of Zoology, University of California, Davis, March 10, 1962.*

Early Nesting of the Costa Hummingbird in Southern California.—On the morning of February 3, 1962, a group of four persons including this writer discovered the nest of a Costa Hummingbird (*Calypte costae*) in a narrow canyon about one and one-half miles southeast of the Anza-Borrego State Park campground in northeastern San Diego County, California. It was located two feet above the ground in a small bush. The female was seen flying to the nest, which held two nestlings in the pinfeather stage of development. A short time later nearby I saw a male Costa Hummingbird courting a female with its characteristic high diving. These observations lead me to suspect that in southern California the nesting period of this species in 1962 may have been earlier than usual.

Bent (Bull. U.S. Nat. Mus. 176:371) recorded March 11 as the earliest egg-laying date for Costa Hummingbirds in California based on 100 records. The usual egg-laying period extends from May 12 to June 10. In Baja California the earliest record for eggs is February 24 based on 14 accounts. Hann

(The Biology of Birds, 1953:76) reports that the incubation period of North American hummingbirds is 15 to 17 days. The nestling period is 20 to 23 days and pinfeathers appear on the sixth day. If these data are used, it can be calculated that the female we observed laid between January 8 and 13.

The dominant plants in the area included creosote bush (*Larrea tridentata*), brittle bush (*Encelia farinosa*), and ocotillo (*Fouquieria splendens*). Several plant species were in bloom including the large yellow-flowered century plant (*Agave* sp.). At least one ocotillo was commencing to flower. In 1961-62 precipitation in southern California was greater than normal and several times that of the preceding year. It is conceivable that an early luxuriant plant growth may have been partly responsible for early nesting because of the flowering of some species and, perhaps even more, because of the concomitant large initial insect population.—GERALD J. BAKUS, *Department of Biology, San Fernando Valley State College, Northridge, California, March 14, 1962.*

Prairie Falcon Displays Accipitrine and Circinine Hunting Methods.—The stoop of the falcon as a method of catching prey is well known and it seems to be commonly accepted that this is the nearly universal method employed by the larger North American falcons and indeed the large falcons in general. The stoop may be to strike or merely to grasp the prey, but usually it is done from a vantage point from above. Bond (*Condor*, 38, 1936:72-76) in his discussion of hunting and eating habits of falcons, notes some of the usual and normal methods of the stoop and its variations. The literature, however, indicates that many raptors, upon finding a successful method of obtaining prey, which may or may not depart from the normally observed and employed manner, resort regularly to this method, usually with a characteristic pattern. This has been noted by Sick (*Auk*, 78, 1961:646-648), Cade (*Univ. Calif. Publ. Zool.*, 36, 1961:217), and Jennings (*Falconry News and Notes*, 1(5), 1954:15-19) for the Peregrine and by Farb (*Audubon Mag.*, 60, 1959:124-129) for the Cooper Hawk. The following observations corroborate a departure from the usual falconine stooping method and indicate utilization of methods usually associated with other groups of hawks, namely the behavior of bird and marsh hawks.

On January 30, 1960, a few miles west of Salt Lake City, Utah, a female Prairie Falcon (*Falco mexicanus*) was seen perched on a telephone pole. An effort was made to trap the bird for banding. Just before the bird was about to strike the bait, which was a pigeon with trap attached, a low-flying, Rough-legged Hawk (*Buteo lagopus*) appeared on the scene, possibly attracted by the actions of the falcon. The falcon immediately left the pigeon to pursue the Rough-legged Hawk. After the falcon stooped several times at the buteo, the hawks parted company going in different directions. The falcon soon returned to the vicinity of the lure and alighted on a nearby telephone pole. After sitting for several minutes, it took off at a height of about 100 feet in the direction of a flock of Starlings (*Sturnus vulgaris*) milling in the air about three-fourths of a mile away. After flying at this height for about 200 yards, she dropped very low, barely missing the tops of the sage brush and fences. She proceeded, with great speed, passing under several small trees along a fence row. Upon emerging, she was directly beneath the flock of Starlings. At this point, she made a nearly eighty degree turn upward into the flock, grabbing with both feet but failing to capture a bird. She returned to the pole at a relatively high elevation of about 200 feet and alighted. The same tactics were employed again, this time in another direction, seeking prey which we could not discern. The falcon was lost to our vision owing to the haze, but it returned in about five minutes, again at a relatively high elevation. This time she had a Starling clutched in her foot.

The falcon's actions had a very practiced appearance which suggested that these tactics had been utilized with success and expediency at various times and were, therefore, not just accidental. This concealed, low, "hedge-hopping" type of flight is very characteristic of accipiters (see Farb, *op. cit.*, for the Cooper Hawk). Another noteworthy item in this connection is that falcons are assumed to obtain their prey in the early morning or late evening except during the nesting season; however, this falcon was actively foraging about 11:30 a.m.

On December 27, 1961, at Coyote Springs, Wyoming, another female Prairie Falcon was observed, this time employing a harrier-type hunting method. The bird was seen flying with a slow, languid flight, low over the scant, snow-covered ground and even laboriously hovering momentarily at various times above clumps of small desert brush. The bird dropped to the ground several times while harrying near clumps of brush, apparently seeking some small rodent or bird, but each time it arose un-