

PREDATION ON BATS BY HAWKS AND OWLS

BY MARY W. LOONEY

**M**ANY A SO-CALLED "bat cave" has very few bats; but Vickery Bat Cave, in western Major County, Oklahoma, truly deserves the name. The cave is inhabited from mid-April to mid-October by Mexican Free-tailed Bats (*Tadarida brasiliensis*). Counts made at dusk at the cave's mouth indicate that from 700,000 to 800,000 bats inhabit the cave in spring and early summer, and that as many as 1,400,000 live there in August and early September. The increase is due not only to the crop of young reared in the cave, but also to the arrival of migrants that stop briefly on their way southward.

The cave's roughly rectangular mouth, which measures about 40 by 40 feet, opens into a narrow canyon that deepens rapidly and curves slightly before widening out some 3000 feet away. In early dusk the bats start to leave the cave in a stream about 2 feet deep and 10 feet wide that moves rapidly down the narrow



MOUTH OF VICKERY BAT CAVE

*Photo taken in the fall of 1971 by Craig Rudolph.*

canyon to the point where it widens. Here the bats spiral upward, attaining heights so great that they can no longer be seen with an 8-power binocular, before they disperse. The stream of bats continues to flow for at least half an hour and sometimes—in late summer—for an hour and a half.

Birds of prey evidently become aware of regular bat-flights of this sort. Stager (1941, *Condor*, 43: 137-39) observed Peregrines (*Falco peregrinus*) swooping and screaming near the entrance to a cave in south-central Texas in late afternoon "as if . . . calling the bats to come out." Perry and Rogers (1964, *Southwest. Nat.*, 9: 205) observed two Great Horned Owls (*Bubo virginianus*) that regularly hunted bats at Conner's Cave in Major County, Oklahoma. Near Vickery Bat Cave I repeatedly saw Red-tailed Hawks (*Buteo jamaicensis*) in the evening perching motionless on posts and treetops near the cave mouth just before the exodus of bats started. Marsh Hawks (*Circus hudsonius*) also flew in just before dusk, but they did not perch on the treetops as a rule. On twelve occasions in 1969 I watched the bat-flight—on 26 April (small flight), 17 and 31 May, 21 June, 4 and 5 July, 9, 16, and 17 August, 21 and 22 September, and 5 October (small flight). On eleven of these twelve occasions I saw at least one hawk (one to four Red-tails; one to three Marsh Hawks) attempt to catch a bat. In addition, on 31 May and 4 July, I saw a hawk that I could not identify. The persistence of all these hawks was puzzling: in spite of their repeated efforts to make a capture, not once did I see them succeed.

Barn Owls (*Tyto alba*), on the other hand, often caught bats. Their hunting procedure differed strikingly from that of the hawks. Red-tails invariably soared well above the flying bats for a time, then dropped rapidly, meeting the bats head-on, and grabbing for one. Apparently bewildered by the profusion of prey, they shot through the moving column in a matter of seconds, and the bats avoided them simply by banking or side-slipping. At the end of the dive, close to the ground, each hawk was obliged to follow the canyon a short way before shooting upward and regaining enough altitude for another stoop. On the evening of 5 July I followed one Red-tail for some time with my binocular. The bird made seven passes before giving up. By this time it was so dark that I could hardly see the bats.

Marsh Hawks were no more successful than the Red-tails. These harriers usually flew back and forth over the canyon, keeping close to the ground. Never did they soar above the flying bats or plunge into and follow the narrow stretch of canyon. They approached from the front or side, made a swift pass at the top of the bat stream, and circled briefly, sometimes trying again. They were far less persistent than the Red-tails. Often, after an unsuccessful pass, they left.

Two Barn Owls that probably spent the day between ledges under the outer overhang of the cave-mouth, and that might have had a nest there, used a wholly different technique. Usually they did not appear until dusk—i.e., until

the bat-flight was in full swing. Then, dropping from a ledge only ten feet or so above the bats, and moving swiftly along with them, they often made a capture. Each owl appeared to select one particular bat before starting the chase, and the bats were caught with unerring precision. More than two Barn Owls may have captured bats regularly at the cave's mouth, but I never saw more than two at one time. On the evening of 21 September I witnessed the capture of seven bats by one or more Barn Owls within a 45-minute period.

Only on 16 August did I see what I believed to be a Great Horned Owl. The large bird—whatever its species—made one attempt and caught a bat. It attacked from a ledge, in the manner of the Barn Owls.

One should not conclude, from what I have reported above, that hawks cannot capture bats. The common names of at least two falconiform birds—the Bat-eating Hawk (*Machaeerhamphus alcinus*) of the Old World and the White-throated or Bat Falcon (*Falco albigularis*) of Mexico, Central America, and South America—connote ability to capture bats. The Peregrines observed in Texas by Stager (*loc. cit.*) were highly successful in catching bats not only in the evening but also in the morning when "the incoming column was not as compact as the outgoing stream and was descending at a much greater speed." George M. Sutton informs me that the stomach of a Peregrine collected by him at nightfall near Linares, Nuevo León, Mexico, on 2 March 1941 contained two Free-tailed Bats. Macy and Macy (1939, *J. Mammal.*, 20: 252) witnessed the capture of a bat by a Red-tailed Hawk during the morning return-flight in south-central Kansas. Twente (1954, *Wilson Bull.*, 66: 135-36) watched two Sparrow Hawks (*Falco sparverius*) and a hawk that he tentatively identified as a Rough-leg (*Buteo lagopus*) capture bats released during homing experiments with bats in south-central Kansas. Sutton (1951, *Mexican birds*, p. 63) found a living Free-tailed Bat in the talons of a Sparrow Hawk that he collected at dusk near Monterrey, Nuevo León, Mexico, on 4 February 1938.

The technique used by the bat-catching Peregrines observed by Stager (*loc. cit.*) was quite different from that of the Red-tailed Hawks observed by me. Stager's Peregrines took bats from a 15-foot-diameter column that rose from a cave mouth at an angle of 45 degrees for about 50 feet, then levelled off. The falcons, "darting from above, or on the flank of the column . . . cut into the on-rushing mass of bats with talons set, and they seldom emerged on the opposite side without their prey held fast."

As for the technique used by Barn Owls, Twente (*loc. cit.*) made a surprising discovery. At a cave in Woods County, Oklahoma, he watched an owl that flew into a column of bats head-on from above, stalled with head up, feet down, and wings spread wide, catching a bat that struck it in the chest. Twente assumed that the bats were not using their echo-location apparatus while flying in such a dense mass. One owl that he watched made four successful captures of this sort.

Hawks and owls—indeed all predators—prey heavily on forms of life that are both acceptable as food and readily obtainable. Perry and Rogers (*loc. cit.*) ascertained that in pellets gathered by them “from 50 ft. outside to 50 ft. inside” a cave in Major County, Oklahoma on 30 July, 13 August, and 15 September 1963, “bats remains predominated.” The fact that Taylor (1964, *J. Mammal.*, 45: 300) found bat remains in only one of 119 Barn Owl pellets gathered by him at caves in southwestern Oklahoma probably indicated not that bats were scarce, difficult to catch, or unpalatable, but that other forms of life were more easily obtainable.

3433 N. W. 26th STREET, OKLAHOMA CITY, OKLAHOMA 73107, 15 AUGUST 1971.

## PREDATION BY HAWKS ON BATS AT VICKERY BAT CAVE

BY WARREN D. HARDEN

ON 16 AUGUST 1971 my wife Mary Ann, my mother Merle L. Harden, and I visited Vickery Bat Cave in Major County, Oklahoma, to watch the evening bat-flight. Arriving at about 19:00, we put to flight a molting adult Red-tailed Hawk (*Buteo jamaicensis*) that was perched in a tree just above the cave mouth. The hawk flew across the narrow ravine below the cave, disappearing over a ridge to the southwest.

On investigating the area, I decided that a narrow, heavily eroded ledge directly above the cave mouth would hardly serve as a perch for any large avian predator such as a Great Horned Owl (*Bubo virginianus*)—a species known to feed extensively on bats (Taylor, 1964, *J. Mammal.*, 45: 300). I saw no owls and found no owl pellets about the cave mouth. I did not go into the cave.

The bat-flight began at sundown (20:00). The bats were all dark brown except for one pure white individual that we noted soon after the flight started. I believe the bats were all of one species—the Mexican Free-tail (*Tadarida brasiliensis*)—but other species might, so far as I know, have been present.

When, at about 20:05, the vanguard of the bat-flight had reached a point well above the horizon south of us, two Swainson's Hawks (*Buteo swainsoni*) appeared over the hill to the northwest. The leading hawk was screaming, as if excited at sight of the bats. It glided into the side of the bat-flight and, without changing speed or course, snatched a bat in its talons and retraced its flight northwestward. The second hawk, using the same tactics, easily caught a bat and followed the first hawk over the hill.

At about 20:07 one of the Swainson's returned, caught a bat on its first attempt, and flew back northwestward. At about 20:10 both Swainson's returned. This time one hawk missed on its first attempt, but quickly turned and caught a bat with another try. The second hawk also caught a bat, which it transferred to its bill midair. Suddenly, changing course slightly, it caught another bat in its talons. Carrying the two bats—one in its bill, the other in its claws—it fol-

lowed the first hawk over the hill northwestward. At about 20:15 one of the Swainson's returned to make a last catch.

Meanwhile, the molting Red-tail reappeared from the southwest. Using the same technique as that of the Swainson's Hawks, it made five attempts to catch a bat. Every attempt was unsuccessful. After its last attempt it flew off eastward.

Also while we were watching, a Sparrow Hawk (*Falco sparverius*) appeared south of the ravine where the mainstream of the bat-flight was well above ground. The hawk captured a bat using the Swainson's technique and, while hovering, transferred its prey momentarily to its bill (perhaps killing it thus), and flew swiftly eastward with the bat in its talons.

When, at 21:30, it had become so dark that we could not see the bats at all clearly, we left. At that time bats were still flying from the cave.

Certain points about our observations should be stressed. Every hawk that we observed used the same capture technique. The two Swainson's Hawks and the Sparrow Hawk were successful in capturing bats; the Red-tailed Hawk was entirely unsuccessful. Not once did we see a hawk stoop *through* the bat-flight. Nowhere in the area did we see a Marsh Hawk (*Circus hudsonius*). We saw no owl either before or after dark.

1609 ROSEMONT DRIVE, NORMAN, OKLAHOMA 73069, 1 FEBRUARY 1972.

## THE WESTERN LIMITS OF THE PILEATED WOODPECKER'S RANGE IN OKLAHOMA

BY LOUIS E. MCGEE AND FRANCES NEELD

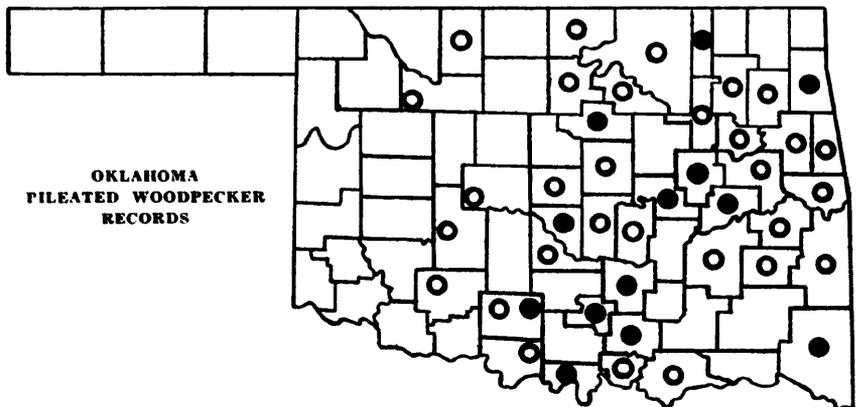
**I**N THE SOUTHERN half of the United States the Pileated Woodpecker (*Dryocopus pileatus*) is chiefly an eastern bird; it is locally common southward to the Gulf of Mexico. In the western United States, on the other hand, it is merely "casual" as far south as "southeastern Utah (Bluff), northern Arizona (Kaibab Plateau), and southwestern New Mexico" (1957, AOU Check-list, p. 315). Its range in Oklahoma very nearly coincides with that of the "Eastern Forest" (see map of "Forest Regions of the United States," 1948, U. S. Dept. Agric., Forest Service), the westernmost records for it being from southwestern Major County (one seen 6 April 1955 among cottonwoods along the North Canadian River near Chester by J. L. Steele, Jr.) and from Comanche County, where J. H. Gaut collected a female specimen (U. S. National Museum 195,664) on Mount Scott in the Wichita Mountains in February 1902, and where Gaut saw "a few . . . along Medicine Creek" (Nice, 1931, *Birds of Oklahoma*, p. 112) between 11 March and 28 May 1904 (Nice, *op. cit.*, p. 43).

So far as we know, the Pileated Woodpecker has not been seen in Comanche County since Gaut's day, this despite continued efforts of the Lawton-Fort Sill Bird Club to find it during the past four years. There are, however, two recent

records for Caddo County (one seen 6 December 1956 in a wooded canyon near Hinton by C. A. Ely; female specimen found dead 2 miles north of Fort Cobb Reservoir on 16 January 1965 by H. B. Lyman), three vague, not wholly satisfactory early records and one valid recent record for Canadian County (one seen by G. B. Wint on 1 May 1954 along the North Canadian River near El Reno), and two recent records for the Salt Plains National Wildlife Refuge in Alfalfa County (one seen 28 April 1946 by S. H. Low; one seen 8 December 1956 by L. L. Byfield). The species has not been reported from Dewey, Blaine, and Cotton counties.

Data filed at the University of Oklahoma Bird Range make clear that the known western limits of the Pileated Woodpecker's *breeding* range in Oklahoma today are in Payne, Cleveland, and Stephens counties: in Payne County a pair nested in a "highline pole" along the Cimarron River just west of Ripley in the spring of 1967 (*vide* Zella Moorman); in Cleveland County one or two pairs have nested regularly, and fairly successfully, during the past 20 years in the vicinity of Norman (D. F. Parmelee, R. L. Hosner, J. Janovy Jr., G. W. Dickson, G. M. Sutton); in the northeastern corner of Stephens County, about 1 May 1966, W. M. Brewer and C. Brewer saw a bird at a nest about 20 feet up in a partly dead blackjack oak about 2 miles west of the Garvin County line and 1 mile south of State Highway 29. In Jefferson County, in March 1970, R. W. Wilson and L. Ball found two "nest holes" about 20 feet up in a big cottonwood stub near Ringling; while these holes were not quite proof of breeding, they certainly indicated that the woodpecker was well established in the area.

Members of the Stephens County Audubon Society have ascertained what the present day western limits of the Pileated Woodpecker's range are in that



*Species is known to have bred in every county having a solid black spot; a circle indicates at least one sight record for the county; positioning of westernmost circles is accurate, of all other symbols approximate.*

county. They have observed the species regularly and rather widely in the northeastern quarter of the county during the past five years. In the vicinity of Lake Fuqua, the county's most recent large impoundment, they failed to find it in 1968 and 1969, but on 31 October 1970 Frances Neeld, William Fox, John Craythorne and his wife Moryne sighted two birds there. Dorothy Paul has observed the species repeatedly among big trees along a creek that feeds a "conservation pond" on the Ringer Ranch near the village of Velma in the east-central part of the county. On a Breeding Bird Survey made on 16 June 1967, the Pauls and their son Stephen saw one along the "Loco Route" (Loco is one of the oldest settlements in the county) near Comanche Lake. On the 1968 Christmas Count (28 December) one was seen by Frances Neeld *et al.* at Clear Creek Lake (1969, Audubon Field Notes, 23: 346). The westernmost, as well as the most frequent, sightings in the county have been in tall trees just west of Lake Humphreys, an impoundment slightly west of Clear Creek Lake and 6 miles south of the Grady County line. About 1 November 1971 someone shot a male Pileated Woodpecker in the Clear Creek Lake area—6 miles east, 2½ miles south of Marlow. The specimen is now in the Tyler Collection at Cameron College in Lawton, Oklahoma.

Along Beaver Creek near the town of Corum, in the extreme southwestern corner of Stephens County, Frances Neeld and several other members of the Stephens County Audubon Society failed to find the Pileated Woodpecker on 17 January or 9 May 1970. In this area there are large trees of the sort in which one might expect to find the bird. Part of this watershed will be inundated when the Waurika Reservoir is completed in the mid-1980's. As the reservoir fills, the surrounding woodland should be observed carefully, for the combination of big trees and water should provide an attractive habitat for the big woodpecker.

1703 N. 43rd ST., LAWTON, OKLAHOMA 73501; 1304 ELM ST., DUNCAN, OKLAHOMA 73533, 17 MAY 1971.

### GENERAL NOTE

**Aggressive behavior of Starling at Yellow-shafted Flicker nest-site.**—On 25 April 1971, in a small patch of woods just north of the Harold S. Cooksey residence at 909 Morningside Drive, in Norman, Cleveland County, central Oklahoma, Mr. Cooksey and I witnessed an encounter between a female Yellow-shafted Flicker (*Colaptes auratus*) and a Starling (*Sturnus vulgaris*). At a newly excavated hole about 2½ inches in diameter and 30 feet up in a cottonwood, a female flicker came and went so frequently that we felt sure she was nesting—or preparing to nest—there. Each time she went into the hole she stayed for 30 seconds or so, then left the tree. Since we heard no sound of excavating, we assumed that the nest cavity had been finished.

On returning to the cottonwood after a brief walk through the woods, we saw the flicker go into the hole. She had been inside only a short time when a Starling flew directly to the hole and also went in. Within about 15 seconds we heard the muffled clucking of the flicker. Almost immediately

she emerged, clucking loudly. Gripping her tail with its bill, and hanging on with the tenacity of a bulldog, was the Starling.

The two birds flew about 20 feet, the flicker clucking loudly all the while, before the Starling let go, returned to the cavity, and went in. Presently the flicker also returned, but when she started to enter the hole she immediately backed out. Clinging to the bark close to the hole, she looked in; but whenever she started to enter, she backed out. We could not see the Starling, of course, but from the behavior of the flicker we judged that the two birds were exchanging blows. We remained at the scene for about 15 minutes. The Starling did not come out—nor did the flicker leave during this period.

The tree would have been difficult to climb, so we made no attempt to ascertain what was in the cavity. The entrance hole was on the south side of the branch. Not far above it, on the north side of the branch, was another hole—which neither bird tried to enter, so far as we could see. At no time did we see a male flicker.

Much has been published about the theft of woodpecker nest-holes by Starlings. Howell (1943, *Auk*, 60: 90-91) discussed Starling-flicker competition as he observed it during a five-year period in Maryland. Sutton (1967, *Oklahoma birds*, p. 467) stated that in central Oklahoma Starlings steal many nest-holes of flickers and Red-bellied Woodpeckers (*Centurus carolinus*); in the spring of 1957 Sutton (*op. cit.*, p. 305) shot 17 Starlings, one by one, in an attempt to help Red-bellied Woodpeckers keep their nest, but the Starlings won out. On 23 April 1959 he rescued a flicker that a Starling had pinned to the ground and was pecking savagely; on 4 July 1964, after he had shot a total of 37 Starlings, one by one, within a radius of about 15 yards of a flicker nest, he witnessed the fledging of the flicker brood (*op. cit.*, p. 467). Prescott (1971, *Wilson Bull.*, 83: 195-96) recently reported a puzzling relationship between Starlings that had a nest in a nest-box and flickers that were nesting in a dead elm about 75 feet away. The Starlings continued to carry food not only to their own "noisy" young, but to the flicker nest-hole as well. On one occasion Prescott saw one of the Starlings enter the flicker nest just after chasing the female flicker "from her perch on the nest-hole edge"; on another occasion he saw the male flicker "fly out of the nest-hole to frighten away a Starling." When the flicker nest-hole became empty (presumably after the successful fledging of the flicker brood), Starlings nested there, but Prescott had no way of knowing that these were the very same Starlings that had fed their own young and also carried food to the flicker nest-hole.—Steve K. Sherrod, P.O. Box 282, Springville, Utah 84663, 20 July 1971.

**FROM THE EDITORS:** The editors wish to thank Craig Rudolph for the excellent photograph illustrating the "lead" paper in this issue, Jeffrey H. Black and his wife Judith for their assistance in obtaining this photograph, and Bryan Ellis for his help with the map illustrating the Pileated Woodpecker paper.

**THE BULLETIN**, the official scientific organ of the Oklahoma Ornithological Society, is published quarterly, in March, June, September, and December, at Norman, Oklahoma. Subscription is by membership in the OOS, \$4.00 single or \$6.00 family per year. Treasurer, Mr. and Mrs. Walter Doane, 9912 Mahler Place, Oklahoma City, Oklahoma 73120; Editor, Sophia C. Mery, 345 S. E. Boston Ave., Bartlesville, Oklahoma 74003.