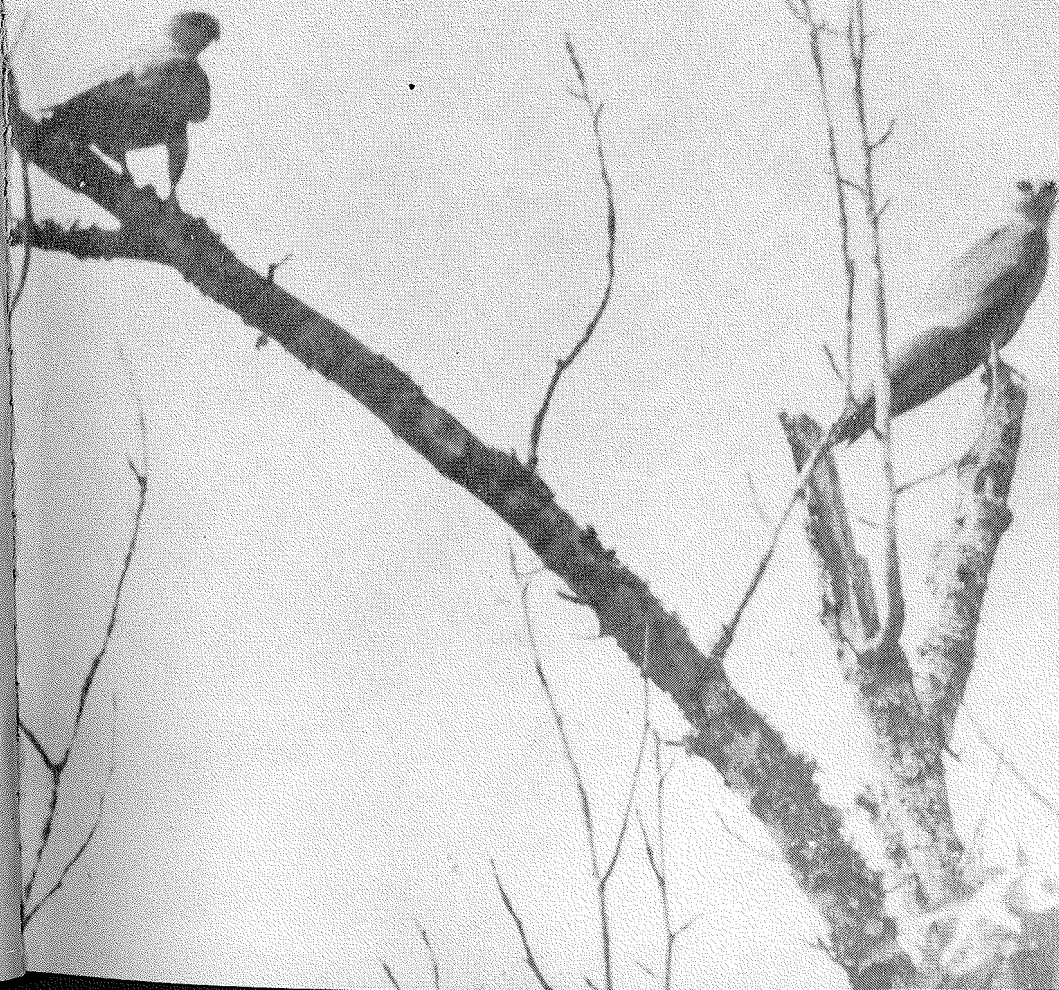


THE MISSISSIPPI KITE

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Front Cover: A pair of Mississippi Kites.

Frontispiece: Female worm-eating warbler feeding four young in nest, 7 miles north of Bovina, Mississippi, in Warren County, May 30, 1972.

Utilization of Artificial Nesting Structures by Hooded
Mergansers in Mississippi

by

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The Mississippi Game and Fish Commission began a wood duck nest box program in 1968. Initially nest boxes were erected on Grenada Waterfowl Refuge in Calhoun County and Pearl River Waterfowl Refuge in Madison County. In 1969 the project was expanded to include other areas around the State. Among these areas was Lowndes County and it was here that Commission personnel first recorded a hooded merganser nest in an artificial wood duck nest box.

In 1969 there was a total of 6 nest boxes in Lowndes County. During the same time period, one hooded merganser nest was recorded on the Pearl River Waterfowl Area. Other areas where hooded merganser have been found nesting in boxes include Sardis Management Area, Holmes County near Cruger, Mississippi, Bucatunna Management Area, and Montgomery County.

The most remarkable area for hooded merganser nesting thus far has been on an old river run of the Big Black in Montgomery County. This particular area is located a few miles outside of Kilmichael, Mississippi and has the distinction of being primarily an old tupelo gum slough. In 1970 there was a total of 15 boxes available for ducks. One hooded merganser nest was recorded in 1970 with 13 eggs, 10 of which hatched. An additional 15 boxes were added to the area for the 1971 nesting season and 6 hooded merganser nests were recorded for a total of 76 eggs and a 100% hatching success.

The 1972 nesting season has begun and an amazing thing has happened with the 30 boxes in Montgomery County. There are, as of March 16th, 19 hooded merganser nest starts for a total of 224 eggs. One merganser hen was found to be incubating and was not disturbed so an egg count was not made. The remaining 11 nest boxes are all occupied by nesting wood ducks. Of the 19 hooded merganser nests, seven of them also

contain from one to four wood duck eggs. Another interesting aspect of this particular unit of boxes is the fact that both fox squirrels and gray squirrels are nesting in several of the boxes in which both mergansers and woodies are laying eggs. Four boxes were found to have young squirrels in them (eyes not yet open).

Box competition appears to be fierce in Montgomery County and at this time we do not know whether we are going to raise wood ducks, hooded mergansers, or squirrels, but nevertheless, all three are wildlife and offer both naturalists and hunters many many hours of pleasure.

Table 1. Hooded merganser nests in Lowndes County.

Year	Nest Starts	Success-ful Nests	Eggs in Success-ful Nests	Number Hatched
1969	6	5	61	61
1970	10	3*	42	34

* Seven nests were destroyed by flooding.

Table 2. Hooded merganser nests in Pearl River Waterfowl Refuge.

1969	1	1	8	8
1970	2	2	23	22

Table 3. Hooded merganser nests in Montgomery County.

1970	1	1	13	10
1971	6	6	76	76

The Winter Roosts and Food Habits of Marsh Hawks
in East Central Mississippi

by

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The Marsh Hawk (Circus cyaneus), a winter resident in the southern half of the United States, often roosts in large numbers in favorable habitat. Weller, Adams, and Rose (1955) reported 80-90 birds at a roost in Missouri. Littlefield (1970) observed up to 66 at a roost in Texas, and Brimley (1935) reported as many as 75 Marsh Hawks concentrated in a small area in North Carolina. Gandy (1970) reported a communal roost of "close to two hundred birds", perhaps the largest Marsh Hawk roost ever discovered, in Lowndes County (B. E. Gandy, pers. comm.), east central Mississippi. We became aware of this large roost in March of 1971 as a result of its proximity to the newly constructed Golden Triangle Regional Airport. During March we made several trips to the roost to survey the site and collect pellets for food habit studies. The following is a summary of our findings.

The Roosts

Trips to the roost site were generally made in late afternoon so that we might observe birds coming to the area for the night. Evidence at the site indicated that a large number of Marsh Hawks had been using the roost during the winter of 1970-1971, but the largest number of birds ever observed was 23. It is possible that by the middle of March the majority of Marsh Hawks using the area had started their northward migration, though Gandy and Turcotte (1970) report spring records for the species in Mississippi as late as April 23. It is also possible, and perhaps probable, that construction at the airport disturbed the birds enough to make them abandon the area (the roost was located precisely at the north end of the north-south runway).

Most of the individual roosts were within a 1.1 acre quadrangle that was sharply defined by vegetation patterns and that sloped about two degrees to the north. The predominant vegetation in the roost area was broomsedge (Andropogon virginicus) and silver beard grass (Andropogon saccharoides). At the edge of the roost area the Andropogon species diminished abruptly and sericea lespedeza (Lespedeza cuneata) increased. Beyond the site, open grassland extends for approximately a mile to the north, three-fourths mile to the south, and one-fourth mile to the east and west. These boundaries are defined by second growth trees grown up at fence lines. Beyond these limits and within a radius of five miles, the countryside is about 80 percent pastureland and 20 percent second growth bottomland forest.

Individual roosts were characteristically elliptical, 15-18 inches long and 9-12 inches wide. The grasses in the roosts were neatly clipped off 2-3 inches above the ground. Most roosts contained from one to six pellets and were also marked with white fecal matter around the periphery. Three one-tenth acre circular plots were arbitrarily selected within the roost area and each roost within the plots was marked. The number of roosts per plot was 26, 36, and 45. The roosts were more concentrated on higher ground and in the center of the roost area. Some roosts were as close together as 15 inches and occasionally two roosts would appear connected by a "runway". Judging from the density of roosts in the circular plots, it seems likely that the quadrangle contained in excess of 300 individual roosts.

Food Habits

On March 5, 130 Marsh Hawk pellets were collected from approximately 45 roosts in the quadrangle. There had been over 2 inches of rain in the area since March 1, the ground was soggy, and there was evidence of numerous disintegrated pellets. The pellets collected were wet, but appeared to be of recent origin. The pellets were dried for four days at 175 F and were numbered consecutively and put in individual containers. After dissection, prey items were identified with the aid of a reference series of skins and skeletons of local birds and mammals. Reference specimens and the dissected Marsh Hawk pellets are being kept in the bird and mammal collections of the Mississippi State University Department of Zoology.

Six species of mammals, seven species of birds, and one grasshopper were identified from the pellets (Table 1). Some of the pellets also contained pieces of grass. The number of individuals of prey species in a pellet was estimated from the multiple occurrence of some bones or, in the case of mammals, incisors. Molars and incisors were the most reliable indicators for mammal species. Feathers were the most common clue for bird identification, a task which was greatly facilitated by the fact that feathers were almost entirely from the head region of the prey species. Skeletal elements and the horny covering of fringillid tongues were also used for identification.

The cotton rat (*Sigmodon hispidus*) was the most important prey species, accounting for 40.8 percent of the individual prey animals found in the pellets. The house mouse (*Mus musculus*) was also common prey (22.6 percent), and was followed in abundance by the harvest mouse (7.2 percent) and the Eastern Meadowlark (5.3 percent). We found mammals in 93.8 percent and birds in 24.6 percent of the pellets. Table 2 indicates the cumulative results of the pellet analysis as summarized by 20 pellet samples. The relative frequency of cotton rats and house mice in the pellets was established in the first sample and fluctuated little in subsequent 20 pellet samples or in the cumulative sample. Over half of the number of prey species identified were present in the first 20 pellets examined.

Discussion

The winter roosts of Marsh Hawks in Georgia have been described (Stoddard, 1931) as "beaten down" spots in a broomsedge field. Gurr (1968) describes the roosts of the Australasian Harrier (*Circus approximans*) as being "trampled vegetation". Our observation that the grasses in the Mississippi roosts were actually cut short may be the result of our closer scrutiny of the roosts rather than actual differences from the roosts described by these authors. The occurrence of grass in some of the pellets may be a result of the clearing or maintenance of the closely cropped roost sites.

We have found no description of the size of individual roosts of the Marsh Hawk, though the largest of the roosts we observed was much less than the "square yard" of the Australasian Harrier (Gurr, 1968). Stoddard (1931) states that

Table 1. Analysis of 130 Marsh Hawk pellets collected in Lowndes County, Mississippi.

Prey Species In 130 Pellets	Pellets Containing Prey Remains		Individuals Found in Pellets	
	%	N	%	N
Cotton Rat (<u>Sigmodon hispidus</u>)	61.5	80	40.8	85
House Mouse (<u>Mus musculus</u>)	29.2	38	22.6	47
Harvest Mouse (<u>Reithrodontomys humulis</u>)	10.7	14	7.2	15
Shrews (<u>Cryptotis</u> , <u>Blarina</u>)	7.7	10	4.7	10
Rice Rat (<u>Oryzomys palustris</u>)	5.4	7	3.8	8
Rabbit (<u>Sylvilagus sp.</u>)	1.5	2	1.0	2
Unknown Mammals	5.4	7	3.4	7
Total Pellets Containing Mammals	93.8	122		
Total Mammals Found in Pellets			83.5	174
Eastern Meadowlark (<u>Sturnella magna</u>)	9.2	12	5.3	11
Cardinal (<u>Richmondia cardinalis</u>)	6.2	8	3.8	8
Song Sparrow (<u>Melospiza melodia</u>)	1.5	2	1.0	2
Slate-colored Junco (<u>Junco hyemalis</u>)	1.5	2	1.0	2
Loggerhead Shrike (<u>Lanius ludovicianus</u>)	.8	1	.5	1
Field Sparrow (<u>Spizella pusilla</u>)	.8	1	.5	1
Starling (<u>Sturnus vulgaris</u>)	.8	1	.5	1
Unknown Birds	5.4	7	3.4	7
Total Pellets Containing Birds	24.6	32		
Total Birds Found in Pellets			16.0	33
Grasshopper	.8	1	.5	1
TOTAL PELLETS		130		
TOTAL INDIVIDUALS				208

Table 2. Occurrence of prey in Marsh Hawk pellets in relation to the number of pellets examined.

PREY SPECIES	CUMULATIVE NUMBER OF PELLETS EXAMINED													
	20		40		60		80		100		120		130	
	%*	N**	%	N	%	N	%	N	%	N	%	N	%	N
THE MISSISSIPPI KITE														
Cotton Rat	42.9	12	47.2	25	42.0	37	46.5	53	45.0	65	44.9	80	40.8	85
House Mouse	25.0	7	20.8	11	22.7	20	21.1	24	19.9	29	20.1	38	22.6	47
Harvest Mouse	3.6	1	5.7	3	6.8	6	6.1	7	6.8	10	7.9	15	7.2	15
Shrews (sp.)	7.1	2	5.7	3	3.4	3	3.5	4	4.1	6	4.8	9	4.7	10
Rice Rat	7.1	2	7.5	4	8.0	7	6.1	7	4.8	7	4.2	8	3.8	8
Rabbit (sp.)	0.0	0	0.0	0	0.0	0	0.0	0	1.4	2	1.1	2	1.0	2
Unknown Mammals	7.1	2	3.8	2	3.4	3	3.5	4	3.4	5	2.6	5	3.4	7
Eastern Meadowlark	3.6	1	3.8	2	8.0	7	6.1	7	6.2	9	5.3	10	5.3	11
Cardinal	0.0	0	1.9	1	1.1	1	2.6	3	3.4	5	4.8	8	3.8	8
Song Sparrow	0.0	0	0.0	0	1.1	1	1.8	2	1.4	2	1.1	2	1.0	2
Slate-colored Junco	0.0	0	0.0	0	0.0	0	0.0	0	1.4	2	1.1	2	1.0	2
Loggerhead Shrike	0.0	0	1.9	1	1.1	1	.9	1	.7	1	.5	1	.5	1
Eastern Field Sparrow	0.0	0	0.0	0	0.0	0	0.0	0	.7	1	.5	1	.5	1
Starling	3.6	1	1.9	1	1.1	1	.9	1	.7	1	.5	1	.5	1
Unknown Birds	0.0	0	0.0	0	1.1	1	.9	1	.7	1	3.2	6	3.4	7
Grasshopper	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	.5	1	.5	1
TOTAL		28		53		88		114		146		189		208

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* % of total individuals found in pellets

** Number of individuals found in pellets

Marsh Hawks return to the same individual roost night after night. This suggests that the number of roosts may be a valid estimate of the number of hawks using the roost site. Though no concentrations of Marsh Hawks have been reported that are of the magnitude of 200 to 300 birds, Gurr (1968) has reported a winter roost of more than 150 Australasian Harriers in New Zealand, and Meinertzhagen (1956) reported a roost of well over 200 Montague's and Marsh Harriers (Circus pygargus and C. aeruginosus) in Kenya.

The high proportion of rodents in the diet of Marsh Hawks wintering in Mississippi is expected. Similar high proportions of rodents have been found by workers in Pennsylvania (Randall, 1940), Missouri (Weller, Adams, and Rose, 1955), and Michigan (Craighead and Craighead, 1956), though these investigators found voles (Microtus spp.) to be the most important food item. Stoddard (1931) found cotton rats to be the most abundant prey species in Marsh Hawk pellets from Georgia. Schnell (1968) considered the Marsh Hawk the most important avian predator of cotton rats in a study in Georgia. The geographic differences in prey indicated by these studies are a function of the distribution of the prey species, and probably indicate little or no difference in the foraging behavior of the hawks, since Microtus and Sigmodon are to a degree ecological equivalents (Svihla, 1929).

The percentage of birds in the diet of Marsh Hawks in Mississippi is higher than reported by other workers, and may reflect the large concentrations of birds known to winter in this area. Our discovery that most of the feathers in the pellets were from the head region of the prey is perhaps explained by the observation of Errington and Breckenridge (1936) that "Prey animals of the usual small sizes ... are dispatched and eaten more or less easily, the heads often being pulled off and swallowed soon after capture."

Summary

A communal roost of the Marsh Hawk in a 1.1 acre broom-sedge-silverbeard grass field in east central Mississippi is estimated to have had in excess of 300 individual roosts in the winter of 1970-1971. The roosts were characteristically elliptical, 15-18 inches long and 9-12 inches wide. The grasses in the individual roosts were cropped 2-3 inches

above the ground. Analysis of 130 pellets collected at the roost site indicates that the cotton rat was the single most important prey species, accounting for 40.8 percent of the individual prey found in the pellets. Mammals accounted for 83.5 percent and birds for 16.0 percent of all prey individuals found in the pellets.

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A Scissor-tailed Flycatcher Record

By W. H. Turcotte

On May 27, 1972 I observed a scissor-tailed flycatcher (Muscivora forficata) in a newly planted field beside Highway 49 opposite the Piney Woods School pasture fence, Rankin County. This bird was first seen perched on a wire about 1:30 P.M. by John W. Turcotte who made the sighting and reported it to me by telephone when he arrived home in Jackson. I drove to the site about 5:30 P.M. with my wife and observed the bird closely with binoculars for at least thirty minutes. It was first noticed when it flew from a small tree and alighted on a clod in the field where it remained, perching on clods as it moved about catching insects on the ground. The bird was in beautiful plumage with a full tail and bright salmon-orange markings.

Previously reported sight records for this species in literature are by M. G. Vaiden, Bolivar County, May 11, 1952; May 9, 1962 by Mrs. Amy Tolman, Clermont Harbor, Hancock County, and October 7, 1962 by Sammie Danna, Jr., Bolivar County. Mrs. Ethel Floyd photographed a scissor-tailed flycatcher on May 10, 1960 at Clermont Harbor, Hancock County.

Nesting Records of the Worm-eating Warbler in Mississippi

By W. H. Turcotte

Introduction:

The worm-eating warbler, Helmitheros vermivorus, is a fairly common spring and fall transient in Mississippi. Collection and sight records at the Mississippi Museum of Natural Science and records in the literature show that spring migration occurs largely in April with extreme dates of occurrence from March 31 (Haberyan, 1962) to May 5. Fall migration records at the Museum and in literature occur from July 31 to October 6 (Burleigh, 1945, p. 110). The breeding range in Mississippi is poorly defined although it has been known to breed locally in Mississippi, Louisiana and Alabama. No breeding records other than sight records of adults feeding young out of the nest have been reported previously. Two nests, found in a ravine in Warren County in May, 1972, are described and one nest photographed with adult female feeding young (Frontispiece) establishes the first known nesting record for Mississippi.

Observations:

On May 20, 1972, while entering a ravine beside a small intermittent stream at Clear Creek in the loessial hills north of Bovina, Mississippi, I saw a small bird flit by and alight on a sapling at the point of a beech bluff. The accompanying party of Jackson Audubon Chapter members watched as the worm-eating warbler flew to a nest site on the face of the bluff and entered the nest through an opening in dead fronds at the base of a Christmas fern, (Polystichum acrostichoides). After the bird flew away, inspection showed the nest with basal structure of dried and skeletonized leaves completed. On May 25 the nest was examined again with minimum disturbance and the lining had been added.

On this second visit I was accompanied by John H. Phares and Wendell A. Neal. Since the nest contained no eggs, I photographed the nest habitat (Figure 1).

I carried a tape recorder and previously recorded warbler songs intending to call up the Swainson's warbler. Farther up the ravine, near a site where the Swainson's had



Figure 1. Nest habitat of worm-eating warbler on a beech bluff, Bovina Area, Warren County. Location of first nest shown by arrow.



nested twice before, I played the tape which included parts of the worm-eating warbler song. A male worm-eating warbler responded to the recorder playback. John Phares, using binoculars, noted he was carrying food and singing with food in mouth. We watched this bird for several minutes before he flew over the point of a ridge bordering the creek bed. As we walked around the point of this ridge I noticed a similarity of habitat to the first nest site and decided to climb the slope. In doing so I discovered a second nest about midway up the beech bluff with the female brooding.

The site of this second nest was on the north slope of the ravine below the terminus of the ridge top on the west side and covered by large beech trees, (Fagus grandifolia), several yellow poplar, (Liriodendron tulipifera), southern magnolia, (Magnolia grandiflora), and a few cucumber trees, (Magnolia acuminata), along the basal slope and stream bottom (Figure 2). Ground cover about the nest consisted of small cane, (Arundinaria gigantea), small sprouts and saplings, poison ivy, (Rhus radicans), dead limbs and a thick carpet of dead leaves, mostly beech (Figure 3.)

Opposite Page

Figure 2. Habitat of worm-eating warbler with nest containing young, Bovina Area, Warren County. Nest location shown by arrow.

Figure 3. Ground cover at worm-eating warbler nest containing young, Bovina Area, Warren County.

The female remained on the nest while I took photographs from within 5 feet to 16 inches before she flitted down the slope feigning injury. The nest contained four tiny young, naked except for fuzzy, gray down and barely able to extend their necks. A slight touch on the nest triggered feeding response. I examined this nest and later dismantled it. The basal structure was made entirely of compacted, decayed beech leaves arranged clockwise in spiral fashion concealed from above by dead beech twigs, overhanging dead beech leaves and poison ivy. The lining, which also contained some fine dried grass, was composed of the dead reddish brown to blackish terminal rachis and pinnae of the maidenhair fern (Adiantum pedatum). The nest was built in a horizontal plane against the slope supported by dead leaves and other debris in its small niche.

Several minutes after our disturbance ceased, the parent birds returned. Apparently the male went to the nest, fed the young and left. The female more reluctantly returned to the nest and remained on it.

On May 29 and 30, 1972 I returned to try and obtain better photographs since the first ones were under-exposed. The four young and both adults at the second nest were photographed. Both parents brought food consisting of green and brown leaf larvae but only the female braved my presence about 8 feet away. She returned and fed the young at least four times. The male returned to the nest habitat with food but would not approach nearer than five or six feet from the nest, moving about to favorite perches and finally eating the food. The female came more directly to the nest while the male dallied at more distant perches. Both parents made frequent "chip" calls while approaching the nest site. The four young responded to the female's presence when she alighted on dead twigs leaning over the nest by extending open mouths in her direction. Nest cleaning by the female followed each feeding and she remained at the nest long enough to await this chore. She usually flew to or from the nest to a landing on a dead twig or sapling sprout to pause momentarily before feeding young or taking flight to forage for more food.

The first nest of the worm-eating warbler found on May 20 was collected on May 30 and deposited in the Mississippi

Museum of Natural Science. This nest was lined with coarse reddish-brown flower or fruit pedicels of red maple (Acer rubrum) in groups of three arising from a common base. The nest lining contained minute egg shell fragments, indicating this nesting was interrupted by predation.

Occurrence records of the worm-eating warbler in Mississippi during the breeding season are few in number. I have observed and reported two sight records of fledgling young out of the nest from this same area. On May 25, 1963 I saw an adult feeding a fledgling just out of the nest in this same ravine and on May 25, 1968 recorded adults feeding a flying juvenile on the opposite side of the same ravine (MOS Newsletter, Vol. 8, No. 3:15-16 and ibid. Vol. 13, No. 3). Since 1963 I have searched for nests in this area and have on numerous occasions found singing males and feeding birds but no nests. R. M. Freeman recorded in unpublished field notes, WPA Plant and Animal Survey Project, finding two adults feeding three flying young near Woodville, Mississippi, Wilkinson County on August 1, 1939. Freeman also recorded two flying young being fed by an adult on July 14, 1939 near Indian Springs, Jones County. B. A. Bloodsworth recorded another observation of both adults feeding flying young in Wilkinson County on August 2, 1939.

Discussion:

After periodic searching for a nest of the worm-eating warbler during eight seasons without success it is now obvious why the nest is difficult to find. The breeding habitat in the area described above is mature deciduous trees, mostly beech with scattered magnolias along steep slopes strewn with dead leaves, forest debris, and understory of small shrubs, saplings and occasional small stands of cane. Ground cover is rather sparse and consists of poison ivy, Christmas fern, maidenhair fern and small sprouts. The leaf litter around the nest site may be piled in drifts so as to suppress other growths. Overhanging litter and vegetation provides concealment from view above the nest. The slopes where the two nests were located were greater than 45 degrees from horizontal and both nests were about two-thirds the distance up the slope. Both nests were on the north exposure of the slope and bordering an intermittent small stream in a deep ravine heavy with dense understory vegetation except along the bordering bluffs.

The song is a simple trill much like the chipping sparrow, which for me is difficult to hear except at close range. The birds feed in the leafy middle or upper canopy and are difficult to keep in view or course their flight movements. My experience indicates the best way to find the nest is to locate a breeding territory by a singing male and watch for adults carrying food or nest material looking upward from the base of beech-magnolia bluffs, this being the easier way to observe movement of the birds to or from a nest.

Scientific names of plants mentioned in the text are after Radford, A. E., Ahles, H. E., and Bell, C. Ritchie, Manual of the Vascular Flora of the Carolinas, 1964. Thanks are due B. E. Gandy for assistance in duplicating museum records.

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