

his way inside. He emerged immediately, returning to attack RM. Within a minute, however, he climbed to attack the nest hole a final time. The female struck so forcefully that breast feathers floated downward. IM, however, forced his way into the hole in spite of her defense and on this occasion, after nearly a minute of cackles and sounds of scuffling, the female emerged. Her mate had meanwhile flown to another tree. She flew at him as if in an attack and he left on a long flight through the pines. The female then preened her disordered plumage. The intruder remained in the hole and was still looking out from the entrance when I left.

When I came by the nest at 06:25 the following morning, RM was clinging to the outside of the nest cavity preening in the quick ineffective manner characteristic of displacement activity (Kilham, unpubl. data) while drumming at a rate of three bursts a minute. He had not behaved this way on previous mornings. At 06:30 he flew away. He returned in 13 min to perch nearly motionless for 20 min above the hole before entering at 07:15. At 07:25 his mate flew in to a dead pine nearby. RM tapped inside the hole (Kilham, Condor 61:377, 1959), then flew to her. There was an exchange of low *woicks* as she moved out on a limb, took a crosswise position, and copulation followed. Two days later, I witnessed a second copulation. After each of these, the female entered the nest and it seemed likely that egg-laying and incubation had begun. I left the island at this time and hence made no further observations.

The conflicts described above are unusual in that a resident pair of birds, especially if close to a nest, generally have a strong psychological advantage. An intruder, therefore, has little chance of success. In the present episode, however, IM fought both the resident male and female and succeeded, after evicting the female, in occupying the nest hole temporarily. A possible explanation is that the intruder

was an unmated male who had lost his mate, a situation which, as I have noted among other hole-nesting birds, can lead to unusual behavior. The first observations involved a pair of nesting Casqued Hornbills (*Bycanistes subcylindricus*). Here, an unmated female repeatedly attacked the nesting female, walled inside her nest, and when the full-grown young one emerged, she attacked and injured it severely [Kilham, Smithsonian Misc. Collect. 131(9): 1-45, 1956]. In a second set of observations (Kilham, Wilson Bull. 81:169, 1969), an unmated male Hairy Woodpecker (*Dendrocopos villosus*) made intrusions into the territory of a mated pair. The attacks of the intruder became increasingly successful and finally led to the defeat of the resident male. A feature common to both Casqued Hornbill and Hairy Woodpecker, as well as Pileated Woodpeckers, is a strong pair bond. An individual, therefore, that has lost its mate after the start of the breeding season may find outlet for thwarted drives in unusual agonistic behavior. Such behavior, however, need not involve loss of a mate. It may be precipitated by other obstacles to nesting, such as failure to find an adequate nest site, as I have described for Yellow-shafted Flickers (*Colaptes auratus*) in captivity (Kilham, Wilson Bull. 71:323, 1959) and for Yellow-bellied Sapsuckers (*Sphyrapicus varius*) in the field as well as in captivity (Kilham, Auk 79:31, 1962).

A further observation might be added in regard to the Pileated Woodpeckers. When I first found the nest of 15 March, I noted the fairly fresh remains (wing feathers, bones, and bill) of a Pileated Woodpecker about 5 m from the base of the nest tree. It is conceivable that IM had been the one to actually start the nest hole, but had given it up when his mate was killed by a hawk or other predator. If such events did occur, it might be that IM still had a sense of possession at the time of his attack.

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VIRGINIA RAIL AND CAPE MAY WARBLER IN CHIAPAS, MÉXICO

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During a recent visit to the Mexican state of Chiapas, I obtained new information on the distribution of two bird species: the Virginia Rail (*Rallus limicola*) and Cape May Warbler (*Dendroica tigrina*). On 2 May 1972, while observing birds near the reservoir in the central highlands town of San Cristóbal de Las Casas (elevation 2090 m), Dennis E. Breedlove and I heard and saw at least seven Virginia Rails in a small patch of California bulrush (*Scirpus californicus*). The birds were calling loudly and frequently, and four times I saw one bird chase another out into a cleared area and back into the sedges. Venturing into the marsh, I collected a single adult female (CAS 68571) which, upon dissection, appeared to be in postbreeding condition. The ovary measured 15 × 9 mm and the largest ovum, 3 mm in diameter. The presence of several rather large corpora lutea suggested that eggs had been laid recently. The oviduct was

enlarged and appeared to be in a regressive state. The slight amount of fat exhibited by the specimen indicated, especially at this late date, a resident rather than a migrant status.

Measurements (mm) of the specimen are as follows: wing (chord), 98.0; tail, 40.9; exposed culmen, 36.0; tarsus, 32.8; and middle toe without claw, 32.0. Although these measurements fall within the extremes given for *R. l. limicola* by Ridgway and Friedmann (Bull. U.S. Natl. Mus. 50, pt. IX:92, 1941), all are well below the averages, and the lengths of the culmen and middle toe exactly match the low extremes. In plumage the underparts of the Chiapas bird are paler (grayer, less reddish) than any California specimen in our collection; this difference, however, might be the result of foxing. Even if these size and color differences are shown to be consistent within the Chiapas population, I doubt that they will prove to be of such a magnitude to warrant subspecific recognition.

During the early evening of the same day, we visited two other *Scirpus* marshes in the vicinity of San Cristóbal de Las Casas. At one marsh we noted one adult and two juvenile Virginia Rails. One juvenile was about half grown and completely covered with black down. The bill and body of the second were similar in size and shape to those of the nearby

adult, but the body, except for some white bars on the flanks, appeared mostly blackish at a distance; I could not ascertain whether the black portion of the plumage consisted of down or contour feathers. The bill of this bird was dark with a light tip and base. At the second marsh we noted two adults, and Breedlove believes that he saw a black chick accompanying one of the adults.

The marshes in this large valley are quite extensive and provide a variety of habitats. I observed pure expanses of bulrush, saw grass, cattails, and short grass, and in one location noted an area of short grass dotted with small bushes. The two *Scirpus* marshes into which I ventured were disconcertingly quaking.

The North American race of the Virginia Rail (*R. l. limicola*) winters south to Guatemala but is not known to breed south of the Distrito Federal, México (Friedmann et al., Pacific Coast Avifauna no. 29:84, 1950). Additional races breed in South America north to Colombia. M. Alvarez del Toro (Las aves de Chiapas. Gobierno del estado de Chiapas. Tuxtla Gutierrez. 1971. p. 57) states that in Chiapas this species occurs only as a winter resident (Sep.-Feb.) and is restricted to the northern part of the state. The present records thus extend the known breeding

range of the nominate race some 725 km to the southeast.

On 25 April 1972 in a residential yard in San Cristóbal de Las Casas, I noted a Cape May Warbler feeding 1.8 to 2.4 m up among the outer branches of an apple tree (*Malus pumila*) that measured about 4.3 m tall and 10 cm dbh. Moving more like a vireo than a warbler, the bird picked carefully at the bases of leaves and on the undersides of small branches. I immediately collected the bird (CAS 68567), which proved to be a female (ovary 4×3 mm, ova minute) with a fully ossified skull and an extreme amount of fat that invaded even the body cavity. The plumage was rather worn and faded, but new feathers were appearing on the crown, throat, and breast. Alvarez del Toro (op. cit.) makes no mention of this species in Chiapas, and Miller et al. (Pacific Coast Avifauna no. 33:248, 1957) record it for only Yucatán and Quintana Roo. Thus the present specimen appears to be the first for México outside the Yucatán Peninsula.

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COOLING RATES AND DEVELOPMENT OF HOMEOTHERMY IN THE BROWN-HEADED COWBIRD (*MOLOTHRUS ATER ATER*)

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Heart rate, body temperature, oxygen consumption, and carbon dioxide output in newly hatched passerines are similar to poikilotherms; but by the time of fledging, these birds are homeothermic (Dawson and Evans 1957, 1960; Kendeigh 1939; Odum 1942). Ectothermy apparently serves to conserve energy necessary for the rapid growth of these altricial birds. In the 10-day period between hatching and fledging, the average weight of young Brown-headed Cowbirds (*Molothrus ater ater*) increases from 2.5 g to 33 g (Friedman 1929). Because growth is so rapid and the nestling period short, one might expect homeothermy to develop faster in the cowbird than in other passerines. The intent of this investigation was to measure cooling rates of *M. ater ater* in the field and to follow from hatching to fledging the development of independent homeothermy.

METHODS

Between 2 May and 8 May 1972, 13 Brown-headed Cowbird eggs were located in 6 Song Sparrow (*Melospiza melodia melodia*) nests and in 1 Cardinal (*Cardinalis cardinalis cardinalis*) nest in Union Cemetery approximately 0.5 mile N of the Ohio State University, Columbus, Ohio. After hatching, cloacal body temperatures of the nestling cowbirds were measured, using a Model 46TUC Yellow Springs

telethermometer. Young cowbirds were removed from the nest and their cooling rates determined in the shade, sheltered from the breeze, and exposed to ambient temperatures ranging from approximately 15–21°C. Initial readings were taken within 2 or 3 min after flushing the host parent from the nest and body temperatures were recorded until reading 1 or 2°C above ambient or until 30 min had elapsed. All birds appeared to recover when replaced in the nest; however, heavy rainstorms and cold ambient temperature apparently caused the death of five nestlings throughout the study. Day 1 is considered the day of hatching. Day 1 through Day 3 data are the average of readings from five nestlings; Day 4 through Day 9 data are the average of three nestlings; and Day 10 data include two nestlings.

RESULTS AND DISCUSSION

As shown in figure 1, nestling Brown-headed Cowbirds show a decrease in cooling rate (change in mean $T_B - T_A$ divided by time) from Day 1 to Day 10. From Day 1 to Day 3, birds cool rapidly to near ambient temperatures. Day 4 shows the beginning of temperature regulation and from Day 4 to Day 10, cooling rates decreased from 0.47°C to 0°C/min. Day 8 and Day 9 nestlings cool slowly (0.11°C/min and 0.09°C/min, respectively) and Day 10 fledglings appear to be completely homeothermic, maintaining an average body temperature of 37.4°C. Adult *M. ater ater* were found to have a mean resting body temperature of 40.8°C (average of five adult cowbirds) which compares with the mean resting body temperature of 39.2°C in *M. ater obscurus*, the southwestern Cowbird (Lustick 1970). Full tolerance to low ambient temperatures is probably not reached in young birds until the autumn molt (Kendeigh 1939).

Similar conclusions concerning development have been reported in nestling Vesper Sparrows (*Pooecetes gramineus gramineus*) (Dawson and Evans 1960)