

sonal observations of Baptista, Leopold, and DeBell, and I wish to thank J. Davis, O. P. Pearson, and F. A. Pitelka for their comments on the manuscript.

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Accepted for publication 1 July 1970.

UNUSUAL PREDATORY ACTIVITIES OF MEXICAN JAYS AND BROWN-HEADED COWBIRDS UNDER CONDITIONS OF DEEP SNOW IN SOUTHEASTERN ARIZONA

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Snows of any depth and duration are unusual in the Chiricahua Mountains at the elevation of the Southwestern Research Station (5400 ft). Usually the snow covers the surface for only a day or two, after which large patches melt off, allowing ground-feeding winter birds access to foraging areas. On 14 December 1967 an area-wide storm struck southeastern Arizona and southwestern New Mexico. By 17 December 31 inches of snow covered the ground. It remained for a full week before the first patches of earth were exposed. Many local birds were obviously hungry and the Mexican Jays (*Aphelocoma ultramarina*) became especially aggressive at our feeding stations.

During this time one of these jays was seen to swoop down on a small bird and kill it by pecking. The prey appeared to be a sparrow but could not be retrieved because of the deep snow. On the same day two male Brown-headed Cowbirds (*Molothrus ater*) were seen attacking a junco (*Junco* sp.) on the snow. A female cowbird standing in the snow about a foot away watched the attack. Both males were pecking at the junco, which was struggling in the snow. The attackers were disturbed by the author and the junco flew off, but fell into the snow about 50 ft away, obviously hurt or weakened. Feathers were strewn about the area of attack. Tufts of feathers, perhaps also of juncos, gave evidence of three other attacks, probably by jays. The evidence is circumstantial but there were no mammal tracks about, or predatory birds. The cowbirds were not seen again, but a flock of 13 jays remained in the area through the winter. A. C. Bent (U.S. Natl. Mus., Bull. 191, 1946, and Bull. 211, 1958) does not mention predatory activities by this species of jay or by the Brown-headed Cowbird.

Accepted for publication 15 June 1970.

ROOSTING HABITS OF WHITE-BREASTED NUTHATCHES

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The following observations bring out three peculiarities in the roosting habits of White-breasted Nuthatches (*Sitta carolinensis*): (1) a close interchange with Downy Woodpeckers (*Dendrocopos pubescens*) in use of roost holes, many of which were probably excavated by the woodpeckers originally; (2) the regular removal of feces from its roost hole by *S. carolinensis* at dawn, and (3) a reversal of dominance at roost holes in the spring when the female takes over the hole occupied by the male. These situations have been noted in Lyme, New Hampshire, between 1963 and 1970, among wild as well as among several pairs of hand-raised individuals in an aviary.

A first roost hole noted was 30 cm from the top of a paper birch stub 3 m tall and 12 cm in diameter. Between 16 and 31 December 1964 a Downy Woodpecker flew from this hole on nine early winter mornings, but on 25 January and on 3 February 1965 the woodpecker had left and a male White-breasted Nuthatch emerged at dawn. Nuthatches do not always,

however, roost in cavities in stubs. At 15:50 on 5 January 1967 a male White-breasted Nuthatch gave a sudden burst of *aan* notes, then swooped into a curl of bark partially loosened and hanging down from a high, dead maple limb. Three days later he returned to roost in the same place, again at 15:50. The lowest roost hole encountered was in a small hemlock stub less than 2 m above the ground. Here a male White-breasted Nuthatch made a sudden swoop down into the hole at 16:30 on 18 February 1967. When I knocked on the stub, he did not come out.

A male (MB), coming to a swamp where flooding by beavers had resulted in numbers of stubs, used three of them, all of yellow birch, at different times. The first stub was one in which a Downy Woodpecker had roosted for a week previously. On 2 February 1969 MB emerged from it at 06:55 with a gob of feces in his bill. He emerged in similar fashion a week later at 06:57. In the following winter MB was roosting in an adjacent yellow birch stub. Here the hole, instead of being round, was elliptical and about twice the size needed for the bird to emerge. On 21, 25, and 26 December 1969 MB flew from it at 07:20, 07:25, and 07:30, respectively, having a gob of feces in his bill on each occasion. He usually deposited the feces on the bark of the first tree to which he came. On 22 and 27 February 1970 MB flew from a hole 7 m up in a third well-rotted

stub at 07:05 and 07:00, respectively. On the latter date he made a long flight across the open swamp, dropping the feces in mid-air about 16 m from his roosting place.

I waited by the hole on 2 March to watch him emerge again. When he failed to do so, I rapped on the stub and, to my surprise, a female Downy Woodpecker flew out. Thus, in three of five roosting stubs, there was an interchange between the White-breasted Nuthatch and Downy Woodpecker. These trees, however, were the only ones which, from the size of hole and the degree of preservation of the dead stub, one might have considered suitable for the woodpeckers. On the first two occasions the nuthatch appeared to have taken the hole of the Downy Woodpecker, and on the last the reverse was the case. As the Downy Woodpecker excavates roost holes and White-breasted Nuthatches do not, the woodpeckers may have possessive feelings towards some of the holes. Woodpeckers in general, however, like holes that fit the width of their bodies. A peculiarity of White-breasted Nuthatches in roost as well as in nest holes (Kilham, Auk 85:477, 1968), is that they prefer entrances double or even triple the size of their bodies. Possibly this is due to their ability to move, mouse-like, over surfaces in any direction. Given this maneuverability, they may be able to squeeze out of a roost hole (to imagine a case) past the inreaching paw of some predator, such as a raccoon (*Procyon lotor*), and thus escape. A woodpecker with a stronger bill would defend a hole if it were just the size of his head and body. This type of defense, however, would be nullified if the hole had been taken over by a nuthatch and enlarged.

Of my hand-raised nuthatches, Pair A attempted to nest in the same nest box in two successive years. Male A used this as his roost hole in intermediate seasons, invariably appearing with feces in his bill when the aviary lights were turned on at 05:30. Sometimes, after depositing the first bit of feces, he reentered to find a second one and brought that out

also. Roost hole sanitation thus appears to be a fixed habit comparable to nest sanitation. Among other hole-roosting species, woodpeckers frequently defecate shortly after emerging and hence do not foul their roost holes. Why White-breasted Nuthatches should do so is not obvious. One can readily surmise the survival value of nest sanitation, for the fecal pollution would soon become overwhelming. The value of cleaning roost holes is less apparent. Two reasons, however, are conceivable. Keeping roost holes clean may reduce odors such as might attract a predator in the night, and nuthatches may use cavities in trees first as roost holes and later as nest holes (as was the case in the aviary). So far I have not encountered any description of this habit of roost hole sanitation for *S. carolinensis* or any other species of nuthatch. I have kept numbers of hand-raised Red-breasted Nuthatches (*S. canadensis*) in the aviary without observing this habit, and Löhr (pers. comm.) states it is not done by the European Nuthatch (*S. europaea*). Löhr (Z. Tierpsychol. 15:191, 1958), however, does state that the latter species roosts under bark occasionally as well as in nest boxes, and prefers a wide entrance to its roost hole.

A third feature of roosting nuthatches in the aviary was the reversal of dominance which took place over some weeks in mid-winter. The male roosted in both of two years in what became the subsequent nest box, but the female started to take it over from him in February. This dominance of the female was associated only with the near vicinity of either the roost or nest hole. Although my observations on this female dominance in regard to a roost hole was limited to hand-raised White-breasted Nuthatches, Tyler (Wilson Bull. 28:18, 1916), who had opportunity to watch a male coming to a roost hole all winter, has described the dispossession of this male by a female on 16 of April 1914. It would thus appear that my aviary experience is also observable under natural conditions.

Accepted for publication 13 July 1970.

THE 1966-67 SNOWY OWL INCURSION IN SOUTHEASTERN WASHINGTON AND THE PACIFIC NORTHWEST

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During the winter of 1966-67 the Pacific Northwest experienced an influx of Snowy Owls (*Nyctea scandiaca*) of unusual magnitude. In the past the presence of this conspicuous and unwary bird during the upland game and waterfowl hunting seasons has resulted in many specimens being killed or wounded by irresponsible persons (Gross 1947). I made an attempt to prevent such needless destruction and to stimulate public interest in wildlife conservation by popular articles and appeals in news media. Reports of Snowy Owls were solicited and authenticated by personal observation whenever possible. A total of 86 reports representing 104 sightings were received during the period November 1966-April 1967. These reports concerned owls wintering in southeastern

Washington near the confluence of the Columbia, Snake, and Yakima Rivers (fig. 1). My evaluation of the reports indicates that these observations represent 20-27 individual birds.

The first Snowy Owl was reported in early November, and the majority evidently arrived during the last week of November and the first week of December. About half of the birds established hunting territories and remained until early spring, ranging over 3-5 km², either singly or in small groups. Concentrations of five to seven birds were twice noted sharing common areas in the gently rolling dryland wheat fields, old fields, and irrigated farmland of this region. From late December until April, 13 to 16 owls were present; the remainder evidently continued southward, as subsequent sightings in California (Harris and Yocom 1968) and several Oregon newspaper accounts indicate. At least three of the local owls were shot by unknown persons. The last reported sighting of an owl was on 1 April 1967; departure (presumably northward) dates of three individuals seen daily at widely separated points for periods of two to three months were 22, 25, and 29 March.

Previous incursions into Washington State, as summarized by Jewett et al. (1953), occurred during the winters of 1889-90, 1896-97, 1908-09, 1916-17 (an outstanding year), and 1917-18. Three of these dates coincided with "principal heavy invasions" into southern Canada and the United States reported by Bent

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