

Alternatively, the correlations may be a result of one species vocalizing as soon as it hears another species vocalizing. In our study, vocalizations were not arranged in any specific order with respect to species but this hypothesis needs further study.

At any rate, our data support the possibility that similar proximal factors mold the epigenetic systems of birds of a given community causing congruence and convergence in many behaviors. This could form a coevolved complex of behaviors, behaviors which were associated with each other and with the environment.

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Possible courtship behavior by Snowy Owls in winter.—Sutton (Mem. Carnegie Mus. 12:3–267, 1932), Watson (Ibis 99:419–462, 1957), Taylor (Living Bird 12:137–154, 1973) and others have described the breeding behavior of Snowy Owls (*Nyctea scandiaca*). Courtship consists of vocalizations, and ground and aerial displays used principally by males. Behavior resembling some elements of these displays has been reported on the wintering grounds. Mitchell (Can. Field-Nat. 61:68–69, 1947) described an owl with white plumage (male?) and another with very heavy markings (female?), that were seen perched together in a field in mid-March. The birds took flight at dusk, rose to a considerable height, and flew northwards side by side. Weir (Ont. Field Biol. 27:3–17, 1973) observed a small white owl (male) and a larger, darkly-barred owl (female) standing on the ground 1 m apart, swaying and bobbing their heads at each other, on 5 March. These actions were occasionally interrupted by short, joint flights, and the birds remained together for at least 5 h. Such reports may have led to the claim that Snowy Owls may arrive on the breeding grounds already mated (e.g., Karalus and Eckert, *The Owls of North America*, Doubleday, New York, New York, 1973). Except for these two brief observations, the nature and frequency of courtship outside the breeding season is unknown. This note describes several cases of possible courtship observed during a study of this species near Calgary, Alberta, and suggests the significance of such behavior.

Observations were made with 20–40× telescopes and recorded on a cassette recorder. The owls were observed at a distance of 50–200 m from a parked automobile. Sexes were identified by plumage characteristics and size (Witherby et al., *The Handbook of British Birds*, Vol. 2, H. F. and G. Witherby, London, England, 1938; Portenko, *Die Schnee-Eule*, Neue Brehm-Bucherei, No. 454, A. Ziemsen Verlag, Wittenberg, 1972; Josephson, *J. Field Ornith.* 51:149–160, 1980). Adult males are almost immaculately white. Adult females were distinguished from immature males by their larger size and by the absence of the mottled coverts characteristic of immature birds. The heavy barring and conspicuously mottled coverts of immature females permit their recognition. We have verified the validity of these plumage characters on over 50 specimens whose sex and age were confirmed by internal dissection and molt pattern (Lein, unpubl.).

Observations.—On 9 February 1978, an adult male was perched on an 8 m high utility pole, hooting at a female on a similar perch 400 m away. The male had been observed in the area for 2 days, and the female had been resident since mid-January. From 16:26–16:30, the

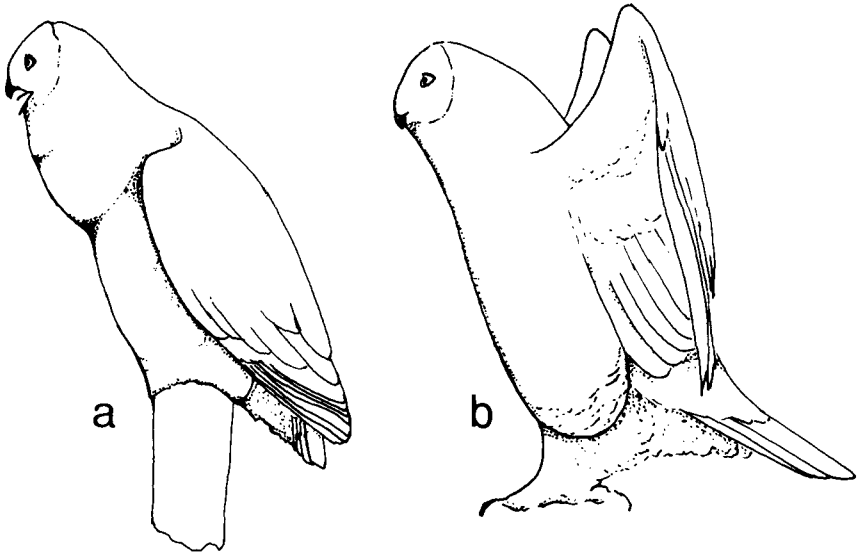


FIG. 1. Postures of male Snowy Owls during possible courtship activity: (a) hooting posture; (b) "ground display." Drawings made from photographs and field sketches.

male gave low volume hoots while facing the female. Each hoot consisted of two notes, resembling *whoo-whoo*; calls were separated by a 10–15-sec interval. The male's tail was held below the plane of the body and his wings were not extended (Fig. 1a). There was no observable reaction by the female. At 16:31 the male flew out of sight, away from the female, and was not seen in the area again.

On 25 February 1978, an adult male and two females were observed from 14:00–16:45. (Neither female was the bird involved in the previous observation; both were territorial residents.) The male was perched on a 25 m high steel powerline tower. One female (A) was on a similar perch 800 m from the male and the other (B) was perched 1600 m from the male on a 12 m high utility pole. From 14:00–14:51 the male watched both birds. At 14:52 the male hooted very softly. The posture and calls were identical to those described above. The bird hooted until 15:00, turning its head towards female A between calls. Shortly afterward, female A flew away, and the male's hooting was interrupted by a bout of preening. At 16:05 he flew about 400 m and landed on another powerline tower, still about 1600 m from female B. The flight did not resemble the undulating courtship flight described by Taylor (1973, fig. 7), but the wing-beats were more pronounced than in normal flight. After perching the male actively preened, looked around and shifted on the perch. Following several hooting calls at 16:41, he performed a display (Fig. 1b) that resembled Taylor's (1973, fig. 9) "ground display" in body posture and wing position. Males on the breeding grounds typically perform this courtship display with a lemming in their possession; we were unable to see whether the male we observed had a prey item in his feet. He continued hooting while displaying and slowly turned 90° to face the female, then turned back to face his original direction. After about 15 sec he flew directly toward the female. The male was lost from sight, but the female remained on the perch. There was no indication of aggressive behavior between these birds.

Discussion.—Some Snowy Owls are territorial in winter (Keith, *Can. Field-Nat.* 78:17–24, 1964; Boxall, M.Sc. thesis, Univ. Calgary, Calgary, Alberta, 1980), and one might suggest that the behavior patterns described in our observations represent territorial behavior. However, several lines of evidence argue against this explanation. First, in 5 years of study we have observed that males wintering in the Calgary region rarely defend territories but that many females do (Boxall 1980). Most males that we observed stayed in an area for only 1 or 2 days and then disappeared. Evans (*Am. Birds* 34:748–749, 1980) has noted a similar sexual difference in territorial behavior.

Second, in our observations the males appeared to be directing vocal and visual displays specifically toward females. The distances between the males and females in our observations may seem extreme for courtship interactions, but breeding males have been observed to display to females over 500 m away (Taylor 1973).

Third, in 29 obvious territorial interactions between wintering Snowy Owls we did not observe behavior patterns similar to those described in this note. Four of these interactions were between males and females.

We did not note vocalizations by owls during territorial interactions although Evans (1980) has. Snowy Owls have been described as relatively silent on the winter range (e.g., Witherby et al. 1938), and hooting by males has previously been reported only on the breeding grounds (e.g., Sutton 1932, Taylor 1973). Such hooting is very loud, being audible at distances of 2 miles (3.2 km) (Sutton 1932). Taylor (1973) mentions two forms of hooting: territorial hooting or song, in which the male lifted its tail while vocalizing, and quieter threat hooting, in which the bird maintained an upright posture and did not lift its tail. The hooting we describe was not loud (barely audible 400 m away), and the bird was upright with its tail lowered (Fig. 1a).

The posture of the male in the second observation (Fig. 1b) is very similar to that of males presenting prey while courting females (Taylor 1973), although we could not ascertain whether our male had a prey item. Also, we recorded the male hooting while displaying, whereas Taylor described males as being silent during such displays.

We suggest that our observations were of incipient courtship behavior. We observed no reactions by females to the males and therefore, the behavior may be non-functional. However, there is some evidence that some Snowy Owls may move north in pairs. We have observed a male and a female perched together (within 10 m) on over a dozen occasions in late February or March. This type of close association was not seen earlier in the winter. One of us (PCB), Weir (1973) and G. A. Webber (pers. comm.) have observed pairs of owls flying north at high altitudes in March, and Fyfe (*Blue Jay* 17:114, 1959) described a concentration of pairs of owls in Saskatchewan from 30 March–1 April 1959.

These observations suggest that some owls may arrive on the arctic breeding grounds already mated. The breeding cycle of Snowy Owls is quite long relative to the short arctic summer (Parmelee, *Beaver* 303:30–41, 1972). Therefore, pairing during late winter may allow owls to compress their breeding cycle, and to increase reproductive success allowing more time to raise young from large clutches of 11–13 eggs (Watson 1957). Only more detailed studies of the owls on their winter range, and of owls arriving on the breeding grounds, can confirm this hypothesis.

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