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OBSERVATIONS OF A RADIO-TAGGED GOLDEN EAGLE TERMINATING FALL MIGRATION

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On 26 November 1974 a Golden Eagle (*Aquila chrysaetos*) was trapped at Cedar Grove, Wisconsin, 60 km north of Milwaukee, and a 2 g radio transmitter was affixed to the ventral side of an outer rectrix feather (Cochran 1975). The eagle was banded with a U.S. Fish and Wildlife Service leg band, released and tracked throughout each day until 7 December. After 7 December the bird was tracked for all or part of eight additional d until 2 January.

Haugh (1972:21) notes that Golden Eagles at Hawk Mountain, Pennsylvania, reached maximum numbers about 20 September–23 November. Observations at Hawk Ridge, Minnesota (Hofslund 1966:82, Table 2) show Golden Eagles passing in September, October, and November but not in December. The data suggest that Golden Eagles migrate conventionally in fall (i.e., move south toward a wintering area). Bent (1937:314), on the other hand, asserts that the fall migration of Golden Eagles resembles a wandering rather than a migratory movement. Our observations are consistent with both views with wandering limited to a wintering phase after conventional migration ends.

From release at 0600 H on 26 November until 29 November the eagle covered a total of 215 km at an average rate of 43 km/d (rates are based on distance between roost sites). On 27 November the eagle shifted course from southerly to westerly (Fig. 1). After 29 November, and during 29 days of intermittent observation, the eagle's rate of movement slowed to an average of 3 km/d. We believe a shift from a migratory to a wintering phase occurred between 27 and 29 November when course and average daily rate of travel changed.

Activity during the wintering phase consisted of 1) flying from a roost to carrion and back to the same roost, 2) some hunting ($\bar{x}$ = 1.7 kill attempts/d), and 3) flights to search for carrion when carcasses became depauperate of food (2, 8, and 12 December). No other eagles were observed throughout the study, probably due to a low density in northern Illinois (see Millsap and Vana 1984). Only the American Crow (*Corvus brachyrynchos*) was observed competing with the eagle for carrion; the crows always left when the eagle approached. Our observations of the Golden Eagle suggest exploitation of carrion to offset low prey abundance or hunting success; further, there was little competition for carrion. Utilization and preference for live prey by breeding Golden Eagles has been documented (Brown and Watson 1964; O'Gara 1982; Tigner and Larson 1982; Nette et al. 1984). Greater abundance of food during the nesting season would permit a different pattern of food preference.

During winter wandering, 11 kill attempts were recorded in 19 d of close observation (1.7 kill attempts/d). The Golden Eagle has been reported to have a 20% success rate of prey capture (Collopy 1983). The radio tagged eagle attacked and injured a Ring-necked Pheasant (*Phasianus colchicus*), but our presence aborted the attack and permitted the pheasant to escape. Interference with the natural outcome of kill attempts was not our only problem in observing the eagle's hunting of live prey. In some instances we tracked the eagle to an area where it had perched, possibly on prey, but flushed the bird before we were able to identify the location accurately enough to look for prey remains. In other instances the eagle took flight again before we were close enough to determine if small prey had been captured or eaten.

Our observations of the Golden Eagle and those for the Bald Eagle (*Haliaeetus leucocephalus*) indicate that both species rely heavily on carrion as a winter food but employ different search strategies (Hansen et al. 1984; Stalmaster and Gessaman 1984; Fischer 1985). Golden Eagles may wander over large areas in search of carrion, whereas Bald Eagles achieve the same end with much less movement. In the case reported here, inter- and intraspecific competition was virtually absent, and an average of 4% of each 24-hr day was spent flying. Longer flights ended when carrion was located. In contrast Bald Eagles are reported to spend only 1% of their time in flight (Stalmaster and Gessaman 1984) and face considerable competition for carrion (Hansen et al. 1984; Fischer 1985).

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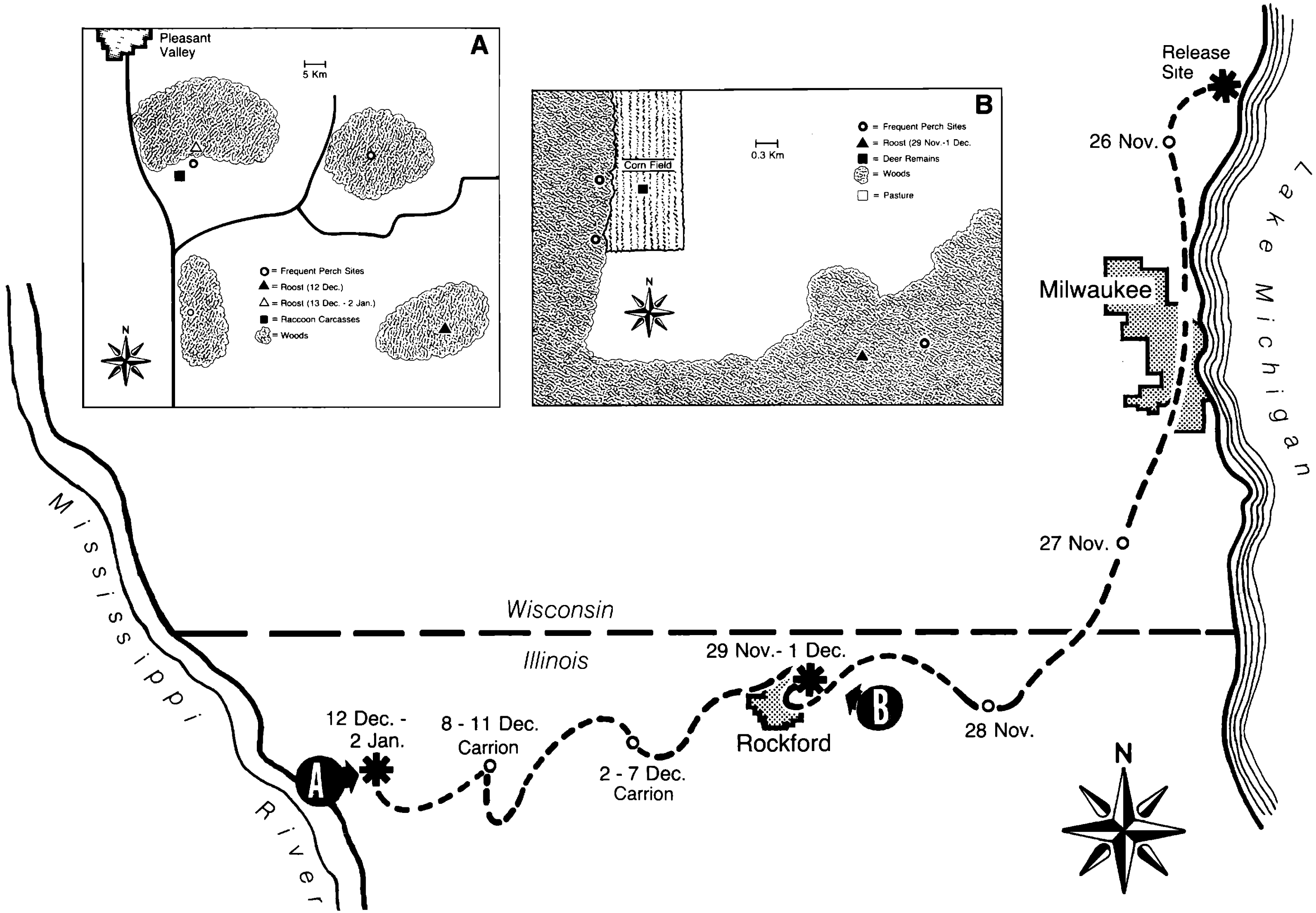

Figure 1. Migratory and winter movements of a Golden Eagle radio-tracked from Wisconsin to northwestern Illinois 26 November 1974–2 January 1975. Dashed line indicates general route taken by the eagle and closely approximates the actual route determined by visual observation and radio fixes. Dates indicate the roost locations used by the bird during the period of study. A) Detail of Golden Eagle activity associated with Raccoon (*Procyon lotor*) carrion. B) Detail of Golden Eagle activity associated with remains of a White-tailed Deer (*Odocoileus virginianus*). Alternate perch sites associated with A and B were used by the eagle during daytime flights to the carrion.

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FERTILITY AND HATCHABILITY OF FALCON EGGS AFTER INSEMINATION WITH FROZEN PEREGRINE FALCON SEMEN

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A procedure for freezing and post-thaw treatment of semen from the Peregrine Falcon (*Falco peregrinus*) was recently reported by Parks et al. (1986). During the spring of 1986, a project was undertaken to test fertility of Peregrine Falcon semen which had been frozen by this procedure and stored in liquid nitrogen for at least one year.

Four female Prairie Falcons (*F. mexicanus*) imprinted on humans and with histories of laying eggs in captivity were acquired from falconers and captive breeders in the United States. Prairie Falcons were used because of their availability and because of reasonable expectations for good fertility (Hardaswick and Smith 1981). Birds were housed in individual breeding chambers at the Ithaca, New York, facility of the Peregrine Fund, Inc. (see Weaver and Cade 1983 for description). Chambers were modified with low perches and nest ledges to enhance interaction between the birds and individuals working with them and to facilitate subsequent artificial insemination. At the onset of the breeding season, individuals working with imprinted falcons engaged in vocalizations, food transfers and other courtship rituals necessary to induce females to lay. Two female American Kestrels (*F. sparverius*) were housed in 1.82 × 1.22 × 2.44 m (L × W × H) chambers equipped with a food port and nest box. Kestrels were not imprinted on humans so that interaction with a male was considered important to initiate courtship behavior and laying by females. Therefore, male kestrels were maintained in adjacent chambers. A window with vertical barring was placed in the common wall which permitted courtship between the male and female but prohibited copulation.

Straws of frozen semen were thawed in a water bath at 4°C and dialyzed to remove glycerol using a stepwise procedure (Parks et al. 1986). Preparation of semen for artificial insemination required approximately 1.5 hr post-thaw. Single inseminations (80 μl) of semen originally diluted 1:3 (v/v) were made within 4–10 hr after oviposition. Thawed, dialyzed semen was maintained at 0–4°C until the oviduct was everted for insemination. Semen was then transferred to an insemination syringe and deposited in the oviduct (Weaver 1983).

After several eggs had been laid following inseminations with frozen-thawed semen two female Prairie Falcons were inseminated with fresh semen to 1) provide a measure of female fertility with fresh semen, and 2) ensure production of young for a separate project. Fresh semen was obtained from a Peregrine Falcon and a Peregrine Fal-