

EXTRA BIRDS AND HELPERS AT THE NESTS OF RICHARDSON'S MERLIN¹

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Cooperative breeding in birds is a widespread phenomenon, yet its occurrence in raptors is much less common in comparison with other taxa (Skutch 1961, Rowley 1976). In only two species do breeding groups occur regularly. In the Galapagos Hawk (*Buteo galapagoensis*), these groups are composed of several males and one female and appear to be polyandrous (Faaborg et al. 1980); in the Harris' Hawk (*Parabuteo unicinctus*), groups are dominated by males and may include extra females, but only the alpha male copulates with the breeding female (Bednarz 1985, Dawson and Mannan 1985). In addition, extra birds have been recorded at the nests of the Mississippi Kite (*Ictinia mississippiensis*; Parker and Ports 1982), Red Kite (*Milvus milvus*; Davies and Davis 1973), Bald Eagle (*Haliaeetus leucocephalus*; Sherrod et al. 1976, Fraser et al. 1983), Bateleur Eagle (*Terathopius ecaudatus*; Brown 1952, 1953), Red-tailed Hawk (*B. jamaicensis*; Wiley 1975, Santana et al. 1986), and American Kestrel (*Falco sparverius*; Wegner 1976). These and other studies have shown that raptor helpers can be of either sex, with the majority of cases involving adults. We report here the first evidence of helping at the nest in Richardson's Merlins (*F. columbarius richardsonii*), as well as document the regular occurrence of extra birds on Merlin breeding territories.

The most consistent observations (total ca. 600 min) were made at a nest in the city of Saskatoon, Saskatchewan, where an expanding Merlin population has existed since about 1971 (Oliphant and Haug 1985). The nest, originally made by a Black-billed Magpie (*Pica pica*), was discovered on 14 May 1985 approximately 13 m high in a maple (*Acer* spp.) tree. Our attention was initially drawn to the site by the vocal activity of the Merlins. Based on this, and the plumage/size differences of the birds (Temple 1972, Feldsine and Oliphant 1985), it was apparent that three birds were in attendance: an unbanded adult male, an unbanded female, and a yearling male. The latter had been banded as a nestling, and later recaptured on 5 November 1984 when it had been weighed, measured, and marked with a colored plastic leg jess (Warkentin 1986). We are almost certain that the recipients of the help were not the parents of the helper. He was fledged from a nest located 2.6 km from the 1985 site, and both his parents in 1984 were banded. Neither of the adults he helped in 1985 were banded. Relatedness, however, is not essential for helping to be favored by natural selection (Reyer 1980).

Repeated visits to the site showed that the yearling remained with the pair until the end of June, when he left the area following the failure of the nesting attempt. The adults displayed no aggression towards him at any time. His interaction with them during this period is illustrated by the following observations: on the morning of 14 May, the adult male was seen returning from hunting carrying

a House Sparrow (*Passer domesticus*). The yearling flew to the perched male and the sparrow was transferred to him in the same way as usual heterosexual food transfers. The yearling then flew to a nearby tree, where he cached the kill. Several minutes later, the adult male retrieved the sparrow, ate approximately half of it, and then flew to the perched yearling where the food was again transferred. This time the yearling flew to the nest, gave the half sparrow to the female and left. A similar food transfer between the males was observed the following day. However, on this occasion, the yearling ate the entire kill provided by the adult. The yearling was not seen killing his own food, despite the fact that he would accompany the adult male on hunting forays.

The yearling was also seen defending the nest area against potential nest predators. For example, during the morning of 14 June, he vigorously attacked two American Crows (*Corvus brachyrhynchos*), and later a Black-billed Magpie that had approached the vicinity of the nest. Both incidents occurred while the adult male was absent and the female was at the nest.

Other more casual observations made in Saskatoon from 1975 to 1984 suggest that the above behavior may not be a unique incident. We have noted extra Merlins on at least 22 other occasions throughout the breeding season at 14 out of 103 nesting attempts. All but one have involved birds in brown plumage, and at least 15 of these (71%) were identified as males by their size and vocalizations. The interaction of these birds with the resident pairs varied. The extra bird was supplanted from a perch on only two occasions. No other negative reactions by resident birds have been noted. Extra birds have given the *Copulation Chutter* (Feldsine and Oliphant 1985) on five occasions. When used by adult males, this call generally indicates a desire to copulate (Feldsine and Oliphant 1985). On two of these instances, the resident female then solicited to the extra male by bowing deeply and fanning her tail, but no copulation ensued. On one other occasion, the resident female copulated with the extra male. In addition to the 1985 observations above, extra birds have been seen bringing prey into breeding territories on three occasions, of which two involved food transfers to the females. An extra bird has also previously been seen accompanying the resident adult male on a hunting foray.

At first, we interpreted these observations solely as an unavoidable consequence of the high Merlin nesting density within the city of Saskatoon (Oliphant and Haug 1985). However, the constancy of extra bird sightings, their tolerance by resident pairs, and their observed participation in copulation, prey delivery, and nest defense suggests that the behavior could be more regular in occurrence.

Nest defense and food provisioning are two helper roles that have been described in other raptors (de Vries 1973, Mader 1975, 1979, Wiley 1975, Wegner 1976, Faaborg et al. 1980, Parker and Ports 1982, Santana et al. 1986). Their potential contribution to elevated breeding success and survivorship of the recipients is self evident. In return, a male helper can benefit from helping by being related to the brood helped, either directly by copulating with the female (de Vries 1973, Faaborg et al. 1980), or indirectly by helping his own parents (Woolfenden 1975). He could also benefit by learning and practicing behavior that he

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may subsequently use (Brown 1978), or by channelling food energy towards himself as in the 1985 example (see also Verbeek and Butler 1981). Whereas few Merlin helpers have been seen copulating with resident females, they could potentially fertilize eggs. At least some yearling males are known to be able to breed successfully (Temple 1972), and 2 out of 18 successful Saskatoon pairs in 1985 had yearlings as the only male present. In addition to the options of regular breeding or helping, some yearlings apparently do neither. The factors underlying these alternatives are unclear, although we do not believe that lack of nesting habitat is important. The Saskatoon population is still expanding and much apparently suitable habitat remains vacant.

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