



MERLIN CHASING SHOREBIRDS  
by John Schmitt

## MERLINS AND THE BEHAVIOR OF WINTERING SHOREBIRDS

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Falcons are commonly reported to associate with high concentrations of prey (Glue 1968; Roderick et al. 1968; Scott 1968). Wintering shorebirds, because of their concentrations near intertidal feeding areas, may be particularly vulnerable to such predation. Shorebirds, especially juveniles, experience high mortality rates (Martin-Lof 1961; Boyd 1962; Holmes 1966; Soikkelli 1970; Goss-Custard 1980) and a substantial proportion of which may be due to predation by raptors — particularly the Merlin (*Falco columbarius*) (Page and Whitacre 1975; Kus et al. 1984; Townshend 1984). Goss-Custard (1980) hypothesized a protective response by shorebirds to avian predators. Others found that there are advantages for some small shorebirds to associate with flocks when under attack (Goss-Custard 1980; Meyers 1982). Page and Whitacre (1975:82) found that "small shorebirds in flocks had less chance of being eaten by the Merlin than did shorebirds which occurred singly". Here I report information that shows an additional mechanism for avoiding predation when in a flock.

I studied the hunting behavior of Merlins on mixed shorebird flocks consisting of Dunlin (*Calidris alpina*), Least Sandpiper (*Calidris minutilla*), and Western Sandpiper (*Calidris mauri*) during November through January of 1975 and 1976 at northern Humboldt Bay, California. Humboldt Bay is a particularly good place to observe raptor attacks on shorebirds because incoming tides force shorebirds to abandon their feeding grounds on expansive mudflats and to congregate in compact groups of several thousand at the edge of the bay or in protected impoundments.

At high tide ( $\pm \frac{1}{2}$  h) falcons, including Merlin, Peregrine Falcon (*Falco peregrinus*), and Prairie Falcon (*Falco mexicanus*), arrived and hunted roosting shorebirds daily during the study period. Smaller shorebirds, primarily Dunlin, Least Sandpiper, and Western Sandpiper, flew and congregated into tightly knit flocks of several hundred to several thousand upon the approach of any falcon. Larger shorebirds, American Avocet (*Recurvirostra americana*), Marbled Godwit (*Limosa fedoa*), and Willet (*Catoptrophorus semipalmatus*), showed no response to Merlins and only flew when the larger Peregrine or Prairie Falcon arrived.

Merlins always positioned themselves high over the water's surface (30-60m) while shorebird flocks wheeled back and forth in synchrony over the surface below. Upon attack, the flock shape changed from spherical to teardrop. Merlins attacked by diving almost vertically at the flock and chasing trailing individuals; if unsuccessful in singling out a member, the falcon regained the original pitch above the flock and repeated the attack. Flocks often turned sharply while the Merlin maneuvered for position above. Under careful observation it appeared that the status of flock members positioned along the flock's periphery changed rapidly (within seconds) between "leaders" and "trailers" depending on the direction the flock turned. Since Merlins always attacked the trailing edge of the escaping flock's tear-drop or fusiform shape, shorebirds positioned in the flock interior were at an advantage because they were rarely trailers during attacks.

I observed individual shorebirds singled out on 10 different occasions. Two of the shorebirds successfully outflew the Merlin and rejoined the flock. Three were captured in mid-air. Three of the other 5 shorebirds were knocked into the water by Merlins and the last 2 were pursued so closely that they dove directly into the water. Each shorebird that was stranded in water submerged as the Merlin swooped down. This was a successful short term solution but given enough time the Merlin captured them (2 of 5 captured).

Four of the 5 water-bound shorebirds were 'assisted' by the flock from which they had been separated. In each case, the flock flew low directly over the stranded shorebird. The Merlin, as a result, always rose directly above the approaching flock. In 3 cases the stranded shorebird, within the first few passes by the flock, left the water and rejoined the flock as it passed overhead. One of the stranded shorebirds appeared to have a broken wing and could not rejoin the flock even though the flock flew over it many times. The other shorebird was captured before a flock flew over it.

Others have recorded shorebirds diving into water in an attempt to escape raptors. John Schmitt (pers. comm.) observed 3 additional instances at Humboldt Bay where shorebirds flew into water

when pursued by Merlins and I observed 9 other occasions where shorebirds flew into water when chased by Peregrine Falcons. I also observed a male Northern Harrier (*Circus cyaneus*) single out a small shorebird from a flock and cause it to fly into water. As with the Merlin, the flock returned and the shorebird rejoined it. I hypothesize that these birds are attempting to escape from raptors by purposely flying at full speed into cover. Neotropical birds, for example, have been observed to fly at high speed directly into tree foliage when closely pursued by the Orange-breasted Falcon (*Falco dieroleucus*) (Boyce 1980).

Both the individual and flock benefit when the raptor slows down to pick up the stranded bird. The flock is not in danger because of the Merlin's changed behavior (i.e., hovering). This allows the fast flying flock to return with no risk and recover the stranded member, and escape before the falcon can regain pursuit speed. The Merlin does not immediately pursue the escaping flock because it continues searching for the water-bound bird it believes still remains in the water below.

Shorebirds may experience reduced mortality by being associated with a flock for 3 immediate reasons. First, the probability of being the target of an attack is reduced when other targets are immediately available; second, the tightly whirling flock makes it difficult for Merlins to select an individual for attack; and finally, observations of small shorebird flocking behavior suggest that flocks will return over the location of a waterbound bird and allow the shorebird an opportunity to rejoin the flock and avoid capture.

A less obvious reason for reduced mortality, by being associated with a flock, is the position maintained by the individual within the flock while under attack. Kus et al. (1984) reported, at Bodega Bay, that juvenile Dunlins were over-represented in Merlin kills compared to the population at large and suggest that inexperience in maintaining coordinated synchrony with the rest of the flock may increase their risk. It is possible that shorebirds located in the flock's center are experienced adults

and those toward the periphery are inexperienced juveniles.

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