

SOME OBSERVATIONS ON THE DISPERSAL OF FLEDGLING PURPLE MARTINS FROM THE NESTING SITE

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Among birds, solitary nesters, or those that nest in cavities within colonies, need not be able to recognize their own young before they leave the nest providing that:

- (1) the parent birds have the capacity to learn to recognize the nesting site itself.
- (2) they learn to recognize their own young after they become mobile, that is to say, after they leave the nest.

There is evidence that individual pairs of Purple Martins (*Progne subis*) are virtually infallible in their ability to recognize their own nesting compartment but unable to recognize their own young in the nest.

Site recognition experiments were performed in the following manner: differences in breast color of females were noted and, based on this, nesting territories of several individual birds established. Such markers as missing tail and wing feathers were also useful in identification, and one male was identified by the fact that he was partially bald. The house (gourds suspended from crossbeams at the top of a metal pole) was rotated so that a given compartment faced in different directions at different times. These maneuvers created only temporary confusion; usually within an hour each pair reclaimed its own "property." The outcome was the same if the experiment was performed before eggs were deposited, during incubation, or while the young were in the nest. Clearly martins possess the ability to recognize, and develop a strong attachment to, a specific site within a colony, and this attachment seems to function as the "homing" device rather than any ability to recognize the offspring as individuals.

On several occasions I have interchanged young among nests without any evidence that regular patterns of parental care were disrupted. However, placing of young of disparate ages in the same nest frequently results in starvation of the less advanced individuals. If a young bird should die in the nest, it is usually removed by one of the parents. I once observed a female bird transport a dead 10-day old chick 125 feet from the nest before dropping it. If chicks placed with broods of more advanced age subsequently perish, they are routinely removed from the nest. The removal response seems to be elicited by the fact that the chick is dead and not because it is the offspring of another pair, since I have no record of live chicks being ejected from nests.

If the introduced fledgling is approximately the same age as its foster siblings, its chances of survival are about as good as any in the group. If a brood numbers no more than four, and one is replaced by an introduced chick of the proper age, its survival is assured.

Inability to recognize one's own young could pose hazards when the young are ready to leave the nest. The most obvious of these is loss of contact between parent and offspring before the period of paternal care should normally end. It thus seems reasonable to assume that martins learn to recognize their own young at some time during development, perhaps before they leave the nest. However, certain behavioral patterns of parents and other adult members of the colony toward young as they leave the nest suggests that recognition of young by parents at this time is not well developed.

The parents cease feeding the young in the nest when they are about 26 to 28 days of age. At least one of the parents, however, remains in the vicinity of the nest. Eventually one of the young birds ventures out of the nest and attempts to cling to the sides of the nesting chamber. It is immediately mobbed by adult members of the colony and flies away, apparently in attempts to avoid them. Harassment continues until the fledgling either perches on some object near (but not in) the colony, or flies approximately 200 yards from the colony. Among the entourage pursuing the young bird is one of the parents, usually the female. The parent does not appear to participate in the mobbing.

but stays close to the fledgling while it is flying and after it has perched. Eventually, after repeated short flights, during which it is mobbed by adults, the young bird finds its way to a treetop some distance from the colony. Here it remains unless escorted elsewhere by its parents. This procedure is repeated until all members of the brood are brought together in a group well isolated from the colony. The young then remain with the parents until they become independent, a period lasting about three more weeks.

Three significant facts emerge from the foregoing observations:

- (1) under natural conditions, the young emerge from the nest one at a time.
- (2) the parents attend the newly emerged young closely within the "mobbing range" of the colony.
- (3) after the young bird is beyond the "mobbing range" of the colony, it is left in a treetop, or some similar open site, while the parents attend to the emergence of the remaining young. The young bird remains stationary until encouraged to move by the presence of its parents.

Such behavior suggests that the parents key on an emergent young bird and never lose sight of it until it is established in an isolated site where it is not likely to be disturbed. Thus there is a transition from a fixed site within the colony to "mobile" sites beyond the effective range of interference from other colony members. It is likely that the process of recognition between parents and offspring begins in such sites, for it is not long before the young begin to make flights on their own and they are frequently fed on the wing. I have seen parent and offspring approach each other for transfer of food from a distance of at least 700 feet.

What of the mobbing behavior? At first consideration assault upon the young by adults would seem to be inadapive in the extreme. However, it undoubtedly serves a vital function in insuring maximum survival of young at a crucial period in their life history. In the first place mobbing amounts to little more than harassment. No bodily injury seems to result from such attacks. If martins do not recognize their own young, but respond only to a familiar site filled with pleading mouths, the presence of free-flying young about a colony calling for food might have a disruptive influence on the orderly process of recognizing one's own site and caring for the young that occupy it. Although site recognition in martins is highly developed, it is not perfectly expressed in terms of feeding one's own young. Occasionally a bird will offer food at a site other than its own. The presence of free-flying young about the colony soliciting all adults as they come and go could lead to confusion over territoriality and might lead to breakdown in the feeding system, to the detriment of the remaining nestbound broods.

Thus mobbing could be a device for driving the young away from the colony into isolation, where recognition cues, perhaps mutually adopted, could develop between parent and offspring. Once these bonds were established, orderly development could proceed until the young are fully independent.

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