

CORRESPONDENCE.

Editor of 'The Auk':

I believe that no student of bird behavior can afford to overlook Dr. Herbert Friedmann's interesting paper on 'The Instinctive Emotions of Birds,' but its author would, I am sure, be the last man to claim that it said the last work on the subject. On reading it shortly after its publication I felt that, in spite of its penetration and its general soundness, it raised some questions that needed discussion. I was particularly glad, therefore, to see Mr. Swarth's letter in the July 'Auk' on the significance of what is known as 'injury-feigning' among birds, and I am moved to continue the discussion, if I may, using some observations and arguments that I have already communicated to Dr. Friedmann. I agree with Mr. Swarth that the evidence seems to show that this type of behavior has a definite purpose and a survival value and that, however it may have arisen in the first place, it is not now a matter of a struggle between two emotions. Let me take the case of the Killdeer first, a case with which I am personally familiar.

When the Killdeer flutters away from an intruder in an apparently helpless condition, that is not the end of the affair. She (or he, for both sexes react in this way) returns again and again as long as the intruder remains in the neighborhood of her charges, with what certainly appears to be the purpose—though the unconscious purpose—of decoying him away. The return is not to the nest or young, but *towards the intruder*, wherever he may be, so long as he remains in what the bird appears to regard as the danger zone. If she were terror-stricken, surely she would keep away from the enemy, once she got off, and would simply seek a chance to sneak back to her charges.

Moreover, the behavior, as I have seen it, has a rather definite pattern. The bird lies on her belly with both wings fluttering and turned front edge down, sometimes rolling over somewhat to one side and fluttering only one wing. When both wings are fluttered, the bird looks at a distance as if it were lying helpless on its back. This is partly because of the angle at which the wings are held and partly because the upper tail-coverts are raised and fluffed out, showing a great deal of whitish about the base of the tail strongly suggestive of the white of the bird's belly. All this is accompanied by a rolling chatter of short low-pitched notes which are not, I think, used on other occasions. When I first saw this performance to good advantage, I was completely fooled for a time and really thought the bird was on its back. It would obviously be of use to the bird thus to deceive its enemies, whereas actually to turn over on its back would make a get-away difficult.

Mr. Swarth raises some other questions that are worth considering. First, as to the kinds of birds that practice this so-called injury feigning. He mentions Doves and Plovers as within his own experience. He says he cannot recall having seen any Grouse or Quail practice it. The behavior of the Ruffed Grouse in the presence of an intruder is, however, sometimes interpreted as injury-feigning. Forbush so describes it in his 'Birds of Massachusetts,' and Brewster in 'Birds of the Umbagog Region' speaks of this species as fluttering away before a dog instead of bustling up to it as it usually does to a man, and this certainly suggests acting the cripple. I judge that the Doves that Mr. Swarth has seen feigning injury are ground-nesting species, and this suggests the inquiry whether this habit is not confined to ground-nesting birds. So far as my information goes, this is the case.

And this is perhaps what might be expected. This reaction, I should suppose, would be of value only as a protection against prowling mammals. A bird of prey

attacking from above would have too great an advantage over a slow-moving bird on the ground to encourage the development of such a habit. Moreover, birds nesting in trees are usually well hidden from passing Hawks, which, so far as I know, never make a practice of nest-hunting; while the real nest-hunting birds, such as the Crows and the Jays, confine their attentions to the eggs and young and would never be beguiled into chasing a full-grown bird, however crippled it might appear to be. Again, of the tree-haunting mammals, the squirrels have no interest in full-grown birds as prey, and the weasels and martens are hardly equipped for chasing birds in the branches. Similarly, the snakes that prey upon the eggs and helpless young would not be beguiled into following adult birds.

Thus the conditions would seem to indicate a confinement of the injury-feigning reaction to ground-nesting birds—if, as we are supposing, the habit has been developed because of its usefulness to the birds. If, on the other hand, it is a mere matter of conflicting emotions, why should it not be shared by the tree-nesting species, which are just as devoted to their eggs and young and are equally subject to the emotion of fear?

Mr. Swarth notes that Gulls, Terns, Frigate-Birds, and Boobies do not practice injury-feigning. There may be more than one reason for this, but it would seem that a sufficient one would be the fact that these birds nest near together in colonies, where no bird could toll off an intruder without invading the nest-territories of others of the species—which would never be permitted by the neighbors!

Other ground-nesting birds not mentioned by Mr. Swarth that practice injury-feigning are certain Ducks, the Woodcock, the Whip-poor-will, the Nighthawk, and some species of Passerine birds. Of the last, without attempting an exhaustive search of the literature, I find the habit attributed to the following in Forbush's 'Birds of Massachusetts': Prairie Horned Lark, Black and White Warbler, Oven-bird, Louisiana Water-Thrush, Red-eyed Towhee, Savannah Sparrow, Grasshopper Sparrow, and Vesper Sparrow.

I have no pertinent notes of my own on any of these except the Black Duck. I have seen Black Ducks with broods of young flap off over the surface of the water with the very evident design (on the part of Nature) of decoying possible enemies out of the way. On one such occasion the mother bird led me a quarter of a mile up the river before she left me and returned to her brood of eleven quarter-grown ducklings. Toward the end of the performance she flew in the air short distances, then tumbled in again each time and flapped quacking over the surface as if she had decided after all to continue the ruse a little longer. I do not see how this could be a case of emotional conflict.

It will be seen that none of the ground-nesting birds that I have instanced nest in thick cover, such as high grass, reeds, cat-tails, or underbrush. And this is to be expected, because the ruse could not be worked to advantage where the bird cannot be easily seen and followed. Here, therefore, we have another restriction on the development of this habit.

In the case of the Ducks it may be found that some species that do not nest on the ground but that lead their broods off into the open water practice injury-feigning, but of this I have as yet no information. Among the Passerines, Herriek in his 'Home Life of Wild Birds' (pages 131, 132) cites a case of it in the Chestnut-sided Warbler, a bird that nests not on the ground but near it; and it may be found that the habit is extended to other species not actually nesting on the ground, though Herriek's case is the only one I have yet come across.

May we not now make a few tentative generalizations to the following effect?

1. The behavior commonly known as injury-feigning is a response that has been perpetuated in certain species of birds because of its usefulness to the species by decoying predators away from nest and young.

2. It is to be expected from ground-nesting birds that do not nest in colonies nor in thick cover, and in some cases from birds nesting near the ground in situations subject to attack by roving mammals and at the same time affording opportunity for the use of the ruse.

3. It is not to be expected from tree-nesting birds nor from colonial nesters nor from birds that nest in thick cover.

As to how the habit arose, it may be that Dr. Friedmann's suggestion of a conflict between fear and devotion to offspring is the answer, but that this reaction would not be perpetuated by natural selection unless it proved to be of real use to the species.

Of course, all I have said is only tentative. I do not pretend to have made a really thorough study of the subject, and it is clear, I think, that both Dr. Friedmann and Mr. Swarth have given only their personal impressions. I am sure they will both agree with me that more evidence and further discussion are desirable.

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P. S.—Since sending you this letter I have read a copy of it to the Nuttall Ornithological Club and have had my attention called to a few exceptions to the 'tentative generalizations' set forth above. I do not think they invalidate these generalizations, which after all were not formulated as invariable rules, but they do go to show that much more investigation is needed if we are to get to the bottom of this interesting subject.

The most important of these exceptions are three tree-nesting birds that practice injury-feigning on occasion. These are the Mourning Dove and the Long-eared and Great Horned Owls. Though in the case of these three species the ruse is not practiced invariably, it is not clear why it should exist at all. Perhaps there are ancestral reasons for its development among them. In the case of the Owls, it is hard to see why their very efficient weapons of offense and defense should not be adequate protection for the young, except against other Owls. Perhaps the well-known rapacity of such species as the Great Horned Owl, which has been known to prey upon smaller Owls from the Barred Owl down, is responsible for the injury-feigning habit in the Long-eared Owl and possibly even in its own species. It is conceivable, too, that the Mourning Dove may have acquired the habit as a protection against Owls. It is interesting to note that in all these three species the bird drops to the ground to practice its maneuvers, and of course they would be much more effective there than among the branches.

If some species of tree-nesting Owls practice injury-feigning at times, one would expect the habit to be universal with the ground-nesting members of the family, but such is not the case. The Short-eared Owl sometimes practices it, but, as I judge from the literature, more generally does not. The fact that the nest is sometimes placed in rather thick cover and is sometimes in the open may have some bearing on this variance of habit.

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