

"IS THE POOR BIRD DEMENTED?"
ANOTHER CASE OF "SHADOW BOXING."

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WE have a triple interest in adding another to the growing number of authenticated reports of birds' fighting their own images reflected from mirrors.

First. Thanks to the situation in which both bird and observers found themselves, we are able to present the record with unusual fullness of detail.

Second. Owing partly to recognition of the favorable opportunity for studying the case, and partly to the feeling that more effort to interpret such performances than seems to have been made, might be profitable, the observations had, in part, this end in view. A serious attempt has been made to correlate the observed activities and their almost certain motivation, in this instance, with the general structure (especially as to the brain) of birds, and with the accepted views of avian-evolution. This portion of the study has proved too elaborate and extensive to be included in this paper. It is expected to be published elsewhere. Only the concluding summary of the study is here presented. This takes the form of our answer to the question used as the main title to this paper: "No, the poor bird is not *de*-mented. It was never *mented* to meet such a situation as it found itself in here." This answer has its justification in the structure of the bird, more than anything else in the fact that the cerebral cortex (the chief seat of legislation, judgment, and guidance of action, in vertebrate animals) is exceedingly poorly developed relatively to the other parts of the brain, in the whole Avian Class.

Third. We desire to utilize the case for emphasizing the unique value of birds in a comparative study of man's status as a member of the great vertebrate division of the animal world. According to the customary view birds are so strikingly an off-side branch of the main vertebrate stem that they are of quite secondary importance for interpreting men and mammals generally, especially when the most specialized, most definitive activities are concerned.

We would point out that this extreme off-sideness of the class makes it specially useful in some respects for comparative studies as indicated. This is so from the fact that although birds and men are so extremely different in almost everything pertaining to their ordinary lives they are nevertheless both uncompromisingly true to type as vertebrates.

Subjected to thorough analysis these truths are found to contain items that seem genuinely contributory to the interpretation of human life and conduct.

But this part of the study would also be out of place in this paper. It is virtually inseparable from that listed as second, and hence must go with that in publication.

* * *

During the week previous to May 1, 1932, we had noticed Towhees (*Pipilo fuscus petulans*) on the window ledge of our adjoining studies eating seeds scattered from the cage of a captive Finch, and more seeds were placed on the ledge especially for them. We were rewarded by an increased frequency in their visits. On several occasions the birds entered the room looking for food, and once one alighted on a chair a few feet from its occupant. Interest became more acute when one of the birds began to fight with its reflection in the window-panes. On May 1 we placed a small mirror in the window to see whether or not the bird would fight its image in it. The fight continued here as there. This simple experiment led to others and to the attempt to trap and mark the Towhees coming to the window. We thought that the fighting bore some relation to the reproductive cycle and to the defense of territory, and by marking the birds we could more readily find their nests.

The trapping soon revealed that at least four birds, members of three pairs, visited the windows from time to time, but only three, two males and one female, visited habitually. Only one of the birds ever fought its reflection in the window-pane. We were able to recognize this bird at sight by an aluminum band on one leg, by its dark color, and by the worn feathers on the top of its head. We found out later that the bird had been trapped and banded on February 28, 1931, by E. S. Sumner, Sr., near the Life Sciences Building of the University of California. The other birds were

marked with colored celluloid bands and with paint so that they were easily recognizable. This individual probably was a male, for its mate had well developed brood patches during the nesting season. We found that only one member of a pair develops brood patches, and it is likely that this is the female.

The windows of our rooms in the Life Sciences Building face the south and are about twenty feet from the ground. Each is five feet wide. In front of each is a ledge a foot in depth. The window is composed of a stationary central section and two lateral casements. The window-pane forms a mirror which is most effective when it bears a film of dust and when the room behind is dark.

The Towhee, standing on the ledge, would face the window and assume a threatening attitude by lowering its head, fluffing out its feathers, and drooping its wings. It would then leap up at the window, striking it with its feet, or with the feet and the beak at a height of about ten inches. It would then fall back and immediately leap up to strike again. Sometimes it varied the procedure by continuing up the pane, clawing at its image as it rose.

The vigor and duration of the attacks varied. On some occasions the bird would be content with assuming a threatening attitude or with making two or three perfunctory blows at the pane with its feet, but at other times it would strike the pane a resounding blow with its beak at every leap and these leaps were repeated as fast as the bird could make them for periods as long as fifteen minutes. It was during these most vigorous attacks that it sometimes would continue to rise and claw at the image after striking the first blow. At the end of the most vigorous bouts the bird would be patently tired out.

That the bird was attempting to fight its image was apparent to anyone who watched the bird for any length of time. Yet the act puzzled some people when they saw it for the first time. One person came to inform us that a bird was locked out of its cage and attempting to get back into it. Another came to remonstrate from thinking we had taken its offspring which it was attempting to reach through the window. It was a visitor to one of the rooms when the bird was performing that gave us a title: "Is the poor bird demented?"

But it was the image the bird was interested in for it would

fight its reflection in mirrors or it would fight the central section of the window when the open casements offered easy access to the room.

Although the bird fought its reflection in the mirrors it appeared to prefer the dimmer image in the window-pane. The probable reason was that the mirrors used were too small to suit the Towhee's preferences as to the style of fighting. The leap upward would carry the bird over the mirror. Indeed, on several occasions the bird overshot the mirror and entered the room. After several similar attempts the bird transferred his attacks to the window pane.

An image of some sort was necessary or the bird would not fight. On one occasion the bird's access to the central section was blocked off. The lateral casement at which the bird had been fighting was shoved out at right angles to its usual position. Here it did not form a mirror for the amount of light falling on each side of the pane was the same. When the Towhee arrived it approached the pane, the while assuming a belligerent attitude. It made two or three half-hearted blows at the pane and then stood peering into it as if attempting to find its rival. Then it came around to the other side and immediately faced the pane, again with a threatening attitude. It stood peering again, but soon relaxed, turned away to eat and then moved over to the next room to fight the window there. It appeared that the bird sought an image first on one side of the pane and then the other, but finding none gave up the attempt.

The bird apparently never displayed any curiosity concerning the image. All it appeared to need was an image which would seem to fight back in a satisfactory manner. However, the bird's reaction to the image was not purely automatic. It sometimes gave the impression that it regarded the activity at the window as exercise for often it would interrupt its fighting to eat a few seeds and then return to the attack, or when more busily engaged in eating would step to the window long enough to deal it several blows and then return to eat. Also the Towhee was seen to leave the lawn where it was gathering insects for its young, fly up to the nearest window, fight the image, and then return to the task of gathering food. In the latter instance, the Towhee was not

stimulated by the sight of its image before it left the lawn, nor was it attracted by food on the window ledge for it was fed only at one window on the other side of the building. It appeared that the Towhee knew there always was a rival in the windows and would fly up to fight it from time to time.

After May 1 the bird fought the window every day until July 4. Its last visit for the summer was July 14, but it appeared again on September 23 and fought occasionally for some weeks. The amount of fighting was not constant during this period. Beginning April 28 the bird increased its fighting activity until May 15. During this period it confined its efforts to the windows of our rooms. By May 20 the attacks had fallen off a great deal and the bird had expanded the zone of its operations to include the west-facing windows of the main room of the Museum. By May 25 the attacks had nearly ceased, but after this date they increased again at our windows until on June 24 they were about as vigorous as ever. Subsequently they dwindled again to cease finally after July 14. On September 23, and for a few days subsequent to it more attacks occurred.

An explanation of the variation in the amount of activity was easy to discover. During the first period of increasing activity the fighting bird always accompanied its mate to the window. Their appearance at the window ledge was always heralded by a medley of mewing and squeaking notes from the oak tree outside the window. While the female fed busily the male would fight the window. The birds would usually fly into the oak tree where the female would sometimes preen awhile, but in a short time the female would fly to the west and disappear among the trees bordering Strawberry Creek. The male always closely accompanied the female. In a short time the male would return to the window to fight. The actions of the pair, and the presence of brood patches on the female, led to the belief that the female was incubating, but it appeared that the male was taking little if any part in the incubation other than guarding the female. Unfortunately we could not find the nest during the time available for searching for it.

After May 20 when the attacks had fallen off and when they had begun to be made on the west-facing windows, we found that the Towhees were now foraging on the lawn for insects and were mak-

ing frequent trips down to the bay trees growing beside the creek next to the grove of eucalyptus trees west of the building. The reason for the diminution was obvious. The birds were now carrying food to their young and the male did not find much time to fight.

Although we searched for the nest several times it was not found until May 31. At this time it contained only one full-fledged young nearly ready to leave the nest. This was what we had expected to find for we had thought that the period between May 1 and 15 was the incubation period and the subsequent time was the time the young were in the nest. Several days later the young one had left the nest and was not seen again.

On June 4 the birds came to the window together. Their visits and the attacks of the male at the window were similar to those which occurred during their first period of activity. On June 24 the female was captured again and the brood patches were again large and fresh appearing. This fact, together with the actions of the birds indicated that they were attempting to raise a second brood. But no nest was found. After June 24 the attacks again fell off.

The male of another pair came to the window from time to time but never fought its reflection. Its mate never came to the window to our knowledge, but once met her mate in the oak tree after he had been captured and banded. This Towhee always went toward the south after leaving the window. On May 29 this pair of Towhees was noticed foraging for insects on the lawn near the creek south from the window. Going to the place toward which they had been flying we found a nest containing three small young, apparently only a few days old.

Both the male and the female fed the young, but the male was never found brooding them. On June 28, several weeks after the young had left the nest, the male was seen feeding pieces from a crust of bread to a begging young bird. The female was not in evidence at this time.

Another male was caught twice at the window, but was not seen at any other time. Its territory probably was not close. That it was an intruder was shown by the fact that the other Towhees drove it away after both its visits.

That the Towhees tended to remain within definite territories was apparent. We could always find the birds whose nests had been found within a short distance of their nests. Our windows were equidistant from the two nests and were used by both pairs although only one pair used them at a time. That they resented the presence of other Towhees on their territories was shown by the fights which occurred when members of both pairs came near the window at once, or when a strange Towhee visited the window. The Towhee which fought its reflection was most belligerent. On several occasions he chased Hutton's Vireos and Bush-Tits that happened to come close to the nest.

The image fighting is, then, partially explained by the habits of the birds. Our observations indicate that Brown Towhees maintain definite territories in which they allow no other Towhees, that the females do all the work of incubating, during which time the male bird drives off enemies and intruders, but both males and females feed the young. It is likely that Brown Towhees, in this vicinity at least, attempt to raise two broods a season. Our pugnacious bird was perhaps one which had more belligerency than most and his great expenditure of energy at our windows was in defense of his territory against a bird which would not be driven away. The image fighting in the fall is probably likewise linked with defense of territory, for Towhees apparently hold their territory throughout the year. In this respect it is significant that hostile activities between Towhees have been noted in the late summer (Dawson, 'Birds of California,' Vol. 1, p. 407).

Being interested from previous observations and reflections in the quantitative aspect of animal activity and seeing here an exceptional chance to get data of this sort, we proceeded to take notes. With a record sheet close at hand, we could without serious interference with other employment jot down the time of arrival and of departure of the bird on his successive visits. We could also count now and then the whacks against the glass in a unit of time.

Without pretense of great accuracy such a record might be significant—especially in case the performance should be kept up for a considerable period. But some of the lacks of accuracy should be noted: Since routine work did not bring us to our rooms every day, never in the morning until about eight o'clock, and usually

did not keep both of us there much later than mid-afternoon, it is certain that many visits were not recorded.

Ordinarily the time of arrival was noted but unless the visit lasted at least a full minute the time of departure was not recorded.

Again, although the repetition of the thrusts was quite regular, especially if the bird was in real earnest, there was too much deviation from regularity to make calculation on the basis of a few counts anything more than approximations.

But despite their rough-and-ready character the data are certainly significant, especially in view of the conditions under which, and the duration of which, as previously described, the performance went on.

This record began on May 2. The last visit recorded was on July 11. How near the 70 days thus involved coincides with the breeding period of the bird the account given above duly considers.

To print this part of the record in full would seem a useless expenditure of time and energy for both writers and readers. A general summary and analysis will suffice.

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| Total number of visits, May 2 to July 11 | 116 |
| Greatest number of visits on any one day, May 16 . . | 15 |
| Longest single period of a visit, May 4 | 15 min. |
| Number of visits lasting one minute or more | 55 |
| Greatest number of thrusts counted in one minute . . | 53 |
| Least number of thrusts counted in one minute | 12 |
| Total number of visit-minutes recorded | 221 (3 hr. 41 m.) |

The average thrusts per minute, taking 53 as the highest and 12 as the lowest, gives 32.5. This makes a total of 7182 thrusts for the 221 recorded minutes. How many visits and thrusts should be added for the time of our absence from the rooms (many full days and some of every morning and every afternoon) there is nothing in this record on which to base an estimate.

But besides the activity at one window only, where surely much went on in our absence, three other windows were victimized sufficiently to give them considerable of the smudging that this one received. To specify 10,000 as the number of thrusts against all the windows by this one bird in 70 days is certainly to specify less than the actual number. How many he has made since, we have no other clue to than the fact that at the present writing (Oct. 2,

1933) six windows of the building are extensively marked by his operations.

Nor will it do to pass lightly over the character of the action. Almost every whack was delivered with about all the energy that could be put into it for the short distance between the foot-hold on the window ledge and the point struck on the glass. Both wings and legs-and-feet seemed to be always utilized in both making the dash and in striking the window. The actual hit against the glass was made as already stated, by feet and beak practically simultaneously. This was clearly registered in the smudging of the glass. The feet marks were confined to a zone the upper edge of which was about five inches above the window ledge. About two inches higher up came the lower edge of the zone of markings by the beak. The beak markings, much more distinct than the feet markings, sometimes contained what appeared to be bits of blood. These latter were particularly in evidence after visits in which the thrusts were specially vigorous—furious one might say. Such marks were particularly noticed on the day, May 4, when the visit lasted fifteen minutes. The time was near noon and the day particularly warm, the sunshine making it really hot at the south window where the performance was going on. The bird's fatigue was manifested particularly by his open beak as he rested a few seconds between thrusts. The thrusts during this one visit were estimated with considerable accuracy to be about 700.

It is desirable to consider briefly what is known about this same performance by other birds.

The species here concerned has quite a history in this respect although we know only one publication on the subject.¹ But this author narrates that he had seen "at least three different cases since 1911" at a cottage in Ojai, California, and other cases at his garage in Pasadena. Furthermore, he refers at some length to the experiences of an acquaintance with a case that would seem to have been as persistent as this of ours. And word-of-mouth reports of other cases by other persons have come to us. Thus in a meeting of the Cooper Ornithological Club at which our case was reported, a member gave her observations of a case that was particularly

¹ D. R. Dickey. The shadow-boxing of *Pipilo*. 'The Condor' Vol. XVIII., No. 3, May-June, 1916, pp. 93-99.

interesting in that it was, like ours, definitely connected with the nesting of the bird.

Nor is the performance by any means restricted to the Towhee. Mr. Dickey, for instance, mentions that two cases of it have been observed in the California Linnet, and one in the Western Mockingbird (*Mimus p. leucopterus*). From our notes the Robin (*Turdus migratorius*) and Cardinal (*Richmondena cardinalis*) are mentioned as species in which the phenomenon has been observed. A case reported by C. B. Moffat in 'The Irish Naturalist,' for 1903, of a Blackbird (*Turdus merula*) thudding against a window all forenoon, day after day, "as monotonously as clockwork," makes specially interesting reading because of what our Towhee has familiarized us with. This report of Moffat's is the more instructive from the fact that a Chaffinch (*Fringilla coelebs*) also comes into the picture. "So all through the spring of 1899," we read, "we had two battles going on. And in the third spring, the spring of 1900, it was exactly the same, the "crazy Blackbird"—as he was called—fighting himself at one side of the house, and an equally infatuated Chaffinch doing the same thing at the other."

Nor is there any doubt that many of the cursory reports that appear in the newspapers or are made verbally, from personal observations have a basis of fact.

The supposition that the case we here report comes under the head of "defence of territory" the first part of this record furnishes evidence that seems conclusive. But for the benefit of readers not familiar with the subject, a few words may be said on the idea of "territory" in the bird world.

Anybody who has observed at all attentively the nesting habits of common wild birds, knows that with a few notable exceptions the nest of each pair is situated at some distance from that of any other pair and that while the breeding operations are going on the parents have a foraging ground in the vicinity of the nest, for their own food and that of their young.

It is, of course, to be expected that special students of birds would learn more about these phenomena than common observation could. Out of these specialized studies has come the idea of bird territories. Publications of the English ornithologist Howard¹

¹ H. Elliot Howard (a) 'Territory in Bird Life,' 1920. (b) 'An Introduction to the Study of Bird Behavior,' 1929.

seem to have been among the first and most important to put the idea on a solid basis. So the conception is now taken as a secure and highly useful generalization by most, if not all, competent students of birds in the state of nature.

A rather imposing list of publications dealing, directly or indirectly, with the subject has been drawn up by T. T. McCabe of the Museum Vertebrate Zoology of the University of California. While this cannot be published here, mention of it will indicate the standing of the idea.

It may be incidentally added that in the extensive studies by one of us (Ritter) on the California Woodpecker, hardly any aspect of the life of this species comes out more strikingly than does that of its home and home area, or territory.

We quote briefly from Howard. After a few general remarks on his proposal to "use the word 'territory' in connection with the sexual life of birds," we read: "There cannot be territories without boundaries of some description; there cannot well be boundaries without disputes arising as to those boundaries; nor, one would imagine, can there be disputes without consciousness as a factor entering into the situation; and so on, until by a simple mental process we conceive of a state in bird life analogous to that which we know to be customary among ourselves. Now, although the term 'breeding territory,' when applied to the sexual life of birds, is not altogether a happy one, it is difficult to know how otherwise to give expression to the facts." And farther along: "Success in the attainment of reproduction is rightly considered to be the goal towards which many processes in nature are tending." (2 (a) p. 1).

With modification for recognizing that the concept of territory should not be quite so rigidly restricted to the sexual life of birds as here indicated, this definition should meet the requirements of any interpretative discussion of bird activities that might be undertaken. It is now certain that several species of resident birds here in California keep, and defend to some extent, their territories throughout the year and for several years.

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