

ON THE FUNCTIONS OF WING-FLASHING IN MOCKINGBIRDS

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IN recent years, several notes in this journal have called attention to the distinctive wing-flashing of the Mockingbird (*Mimus polyglottos*), in which the wings are opened upward at about 45° in a series of jerking movements, then closed. In this display, large white wing patches are exposed. The function of this behavior remains unknown; but, since the display is most frequently seen being performed by birds that are foraging on the ground, it has been suggested (Gander, 1931; Allen, 1947) that exposure of the contrastingly patterned wings facilitates food-getting by startling the more active insect types and illuminating the more sluggish types in dark areas on the ground. This interpretation has been questioned, however, by Sutton (1946) and Halle (1948), who noted that wing-flashing also occurs in the Calandria Mockingbird (*Mimus saturninus*), and by Haverschmidt's (1953) and Whitaker's (1957) observations on *M. gilvus*, species which lack white patches in the wings.

An understanding of the functional significance of this behavior will be achieved only when we have more complete information on the behavioral contexts in which it appears. Therefore, the following notes on its use in agonistic situations may be of some value.

OBSERVATIONS

On April 17, 1960, we watched a pair of Mockingbirds mob a Screech Owl (*Otus asio*) that was perched in an oak tree on the campus of the University of Texas, Austin. Observations began at 3:40 p.m., when our attention was attracted by the familiar "predator call" of the Mockingbirds, a rasping *chew* sound introduced with an accented note and having a sharply descending inflection. Nasal *chew* notes of constant pitch were also being given. In the oak tree, the Mockingbirds were moving excitedly around the owl at distances from one to three feet, with the body plumage compressed, the tail widely fanned, and the folded wings held slightly out from the body, apparently in readiness for flight. The fanned tail was repeatedly flicked upward, and calling was almost continuous. Occasionally one of the birds made a rapid pass at the owl. Periodically one or the other Mockingbird gave a typical wing-flash; and, in a ten-minute period, we recorded 16 wing-flashes. Significantly perhaps, most wing-flashes were given when the birds were backing away from the owl and none was given by a bird about to attack. Some wing-flashes seemed to be directed to the owl, others were perhaps given to the other Mockingbird, and some seemed to be undirected. As in Mockingbirds displaying while foraging, the wing-flashes of the mob-



Mockingbird wing-flashing between attacks on a dummy Screech Owl.

bing birds varied in intensity; in some the wings were only partly opened, while at the other extreme they were all but fully spread. The mobbing continued for an hour as we watched; but, since the owl soon shifted to a new position high in the tree, we were unable to follow closely the activities of the Mockingbirds.

On April 20, 1960, we were able to elicit mobbing attacks on a dummy Screech Owl and to photograph the display (Front.). In three tests, each lasting 15 minutes, the dummy was placed within the territories of three pairs of birds. In the first test, eight wing-flashes were noted as the birds mobbed the owl, which was placed on a traffic sign six feet above the ground; in the second, response was weak and intermittent, and only three wing-flashes were recorded. In the third test, with the dummy on the ground, one bird, probably the male of the pair, gave a total of 105 wing-flashes, and its mate gave four. The male (?) wing-flashed many times on the ground between flying attacks on the dummy and also wing-flashed on a wire 8 feet above the dummy and in a nearby bush. On the ground, wing-flashes were given at distances varying from a few inches to several feet from the dummy. Many were given as the Mockingbirds faced the back and sides of the owl, and some were given as they faced away from the dummy. We wish to emphasize the fact that the wing movements of these birds were identical with those of birds wing-flashing while foraging.

Mr. Thomas R. Hellier has kindly supplied notes on the behavior of a Mockingbird near Ottawa, Kansas, in the summer of 1956. On three occasions in a 15- to 20-minute period, he saw a Mockingbird fly from a tree to the ground and wing-flash several times in succession as it walked toward a domestic cat that was resting on the ground at the base of the tree. The bird approached the cat from behind and from the side and flew up to the tree as the cat became alert and turned to face it. Apparently wing-flashing may be used as Mockingbirds are reacting to a variety of predators, for Hicks (1955) reports wing-flashing by a bird attacking a blacksnake.

Mockingbirds also wing-flash in agonistic encounters with individuals of their own species at territorial boundaries and within such boundaries. And they may be induced to display by setting out a dummy Mockingbird within their territories. In May, 1956, Selander performed several experiments of this type in connection with a demonstration of territoriality for an ornithology class. The following excerpts from his notes are typical. Sex determinations were based on relative body size, males being larger than females.

May 1.—A male dummy in horizontal posture was placed on a lawn chair within the territory of a pair of Mockingbirds attending recently-fledged young. One bird gave loud *chew* notes, then both birds came to the chair with the "heavy" flight characteristic of birds defending territory. One (the male?) gave wing-flash display, fanning the tail at the same time; he then flew at the dummy, striking it with bill and feet. Both birds

wing-flashed several times, then the male (?) again attacked. At this point the episode was interrupted and the dummy removed.

May 4.—A wingless dummy in resting posture on a T-post was set out within the territory of a pair of Mockingbirds that was feeding a young fledgling. Both birds approached the dummy and wing-flashed several times. One bird flew to a perch above the dummy and gave a low-intensity wing-flash. The other then flew to the ground and wing-flashed strongly several times. Meanwhile, the first bird returned to the T-post and wing-flashed once. It then flew up and away but turned back and made a passing attack on the dummy, following which it flew to the ground, where both birds wing-flashed many times, perhaps directing their displays to each other. To this point, both birds had been silent, but now one, probably the female, began to give *chew* notes. The male (?) soon began calling and made another attack on the dummy, hitting it with bill and claws. Then he rejoined the female (?) on the ground and the two birds displayed strongly several times as they faced one another. This episode ended as both Mockingbirds flew away.

May 6.—A dummy with wings wired in wing-flash position was set out on the ground. The male (?) came to the dummy and displayed before it, walked around in back, and struck it six times from behind. Meanwhile, the female (?) came to the edge of bushes 10 feet away and wing-flashed. Later, when the male (?) had left the dummy, the female (?) came to the ground, calling repeatedly, gave a weak display, walked around the dummy giving increasingly more intense versions of the display, and finally gave a full display before walking away.

DISCUSSION

Whatever the biological significance of wing-flashing in Mockingbirds may be, the behavior appears early in development and is almost undoubtedly innate, for we have seen it in nestlings and it has previously been observed in young fledglings (Allen, 1947; Sutton, 1946).

The fact that the wing-flashing occurs while Mockingbirds are mobbing an owl, are reacting agonistically to dummy Mockingbirds placed in their territories, or are disputing territory with live Mockingbirds at territorial boundaries and elsewhere is open to several interpretations. If we assume that wing-flashing is not a typical social display—that is, that it has no function in communication among members of the species—but, rather, functions only in foraging, its occurrence in agonistic contexts could be attributed to “displacement” (Tinbergen, 1952), as suggested by Brackbill (1951). And since mobbing or fighting Mockingbirds clearly show ambivalence of tendencies to attack and to flee, it is perhaps not surprising to find irrelevant or “displacement” activities appearing. In owl-mobbing behavior, which does not differ greatly if at all from the behavior of birds reacting to Mockingbird dummies, the folded wings are held out slightly from the body in preparation for flight, and chance movements of the bird or flight-intention flicks of the wings may result in “transitional actions” (Lind, 1959) leading to “displacement” wing-flashing.

A second hypothesis is that wing-flashing is genuine agonistic display

servicing a threat function. If this is the case, the apparent mutual display of paired Mockingbirds confronted with a dummy might be interpreted as redirected aggressive behavior. Following this line of argument, the fact that Mockingbirds commonly wing-flash while foraging, sometimes in the apparent absence of other Mockingbirds, could be explained if the display also serves as a method of territorial advertisement, calling attention to the presence and position of the territory owner when it is not actively standing guard or patrolling its territory.

All evidence considered, we are inclined to think that Sutton's suggestion (1946) that wing-flashing is primarily a "gesture indicating wariness, suspicion, [and] distrust" is more nearly correct than any other. We suggest that wing-flashing in the Mockingbird represents a highly ritualized flight-intention movement of the wings, which, evolving originally as a social signal or wariness, has acquired a secondary function in food-getting. It is possible that it may also function to intimidate other birds in addition to indicating an apprehensive "mood." This theory would account for its frequent use by birds that are mobbing an owl or are reacting to the presence of a live or dummy Mockingbird in their territory. We further suggest as a working hypothesis that the Mockingbird's use of the display while foraging may be individually conditioned. Perhaps when first foraging on the ground, the young Mockingbird is apprehensive and gives the display; insects are flushed as a result, and in time the bird comes to associate wing-flashing with foraging, reinforcement being provided by the capture and eating of insects.

The hypothesis that we are advocating, and which is actually an extension of that proposed by Sutton, has the advantage of accounting for the appearance of the display in such different contexts as foraging and mobbing. It also eliminates the necessity of invoking "displacement" as a causal factor, which is perhaps desirable considering the difficulties involved in distinguishing between "displacement activity" and nondisplacement behavior (Hinde, 1959:593).

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NEW LIFE MEMBER



Paul A. Schwartz, of Caracas, Venezuela, a new Life Member of the Wilson Ornithological Society, has been an active member of the Society since 1952. A mechanical engineer by profession, Mr. Schwartz is a contributor to the serious literature of ornithology. He has published a life history of the Rusty-breasted Ant Pitta (*Grallari-cula ferrugineipectus*), and some two dozen of his excellent color photographs of birds may be seen in Gilliard's "Living Birds of the World." Some of his extensive field notes on South American birds were used for text material in that book also.

In addition to life history studies and photography, Mr. Schwartz is interested in nesting studies, migration, and sound recording. He is also a member of the A. O. U., Cooper Ornithological Society, Laboratory of Ornithology of Cornell University, Sociedad Venezolana de Ciencias Naturales, Sociedad de Ciencias Naturales La Salle, and the Hawk Mountain Sanctuary Association.