

THE SINGING OF THE MOCKINGBIRD

WITH ONE ILLUSTRATION

By LOYE MILLER

More than fifteen years ago, Donald R. Dickey wrote for the *Condor* (vol. 24, 1926, pp. 153-157) a brief article on the singing of the mockingbird (*Mimus polyglottos*). It was a thought-provocative article in which he commented first upon the early age at which a certain individual appeared to have arrived at the mimetic stage, that is, by the time of the first winter plumage. In discussing the case, he suggested the possibility that long racial habit in mimicry of certain notes had eventually impressed those notes upon the genetic complex of the species, so that the young individual inherited, rather than learned, the song of its unrelated neighbor.

I feel, however, that he was not himself impressed with the plausibility of his own suggestion and during the remainder of his paper he placed the word *imitation* in quotation marks. Later on he makes the more credible suggestion of "parallel ability and adventitious similarity rather than actual and individual mimicry."

With this latter proposed explanation I find myself more nearly in accord. My contention from experiments with cage-bred linnets has long been that the racial song pattern is inherited and only the slight and more superficial variations from the norm may result from the impress of an auditory environment upon the individual. The susceptibility of different species to such environment differs greatly in degree. Even the various species of the parrot order are widely diverse in their response to "education." Nevertheless, we must concede that their vocal patterns can be modified in a great many instances, even though they remain fundamentally those of parrots.

May it not be similarly true of mockingbirds? We must concede that there is a limited number of sounds producible by even so complex an instrument as that of the mocker. He has an inherent psychic urge to run off a great variety of short samples of his song equipment, throwing his vocal apparatus into kaleidoscopic changes very much as a playful kitten may throw his body into a series of rolls, turns, and dashes without purpose other than to express his own exuberance. The best of us run out of ideas at times, and then all at once, in our association with our colleagues, we are inspired to new ones (too often they are imitated) and we are urged on to new expressions. The mockingbird, too, has a limited originality and his outpour of melody is not a continued forward stream. It comes back and repeats itself so often that the analytic listener is surprised at the brevity of his cycles. Might he not be inspired to new ideas by his auditory environment and from time to time add the note of another species to his set of records? I think he does just that thing. Should he, however, be branded as a plagiarist and his artistry held less perfect? To this day I well remember my first hearing of Dvorak's "New World Symphony." I sat fascinated by that wonderful tapestry of sounds emanating from a great orchestra, while now and again there came out first one and then another fragment of melody that had been with me from childhood—snatches of negro melodies woven as *motifs* into a splendid classic of orchestration. We call Dvorak an artist, not a plagiarist. The copyist is not creative. On the other hand, the artist seizes an inspiration, adds his own personality to it, and creates a masterpiece. I think the mockingbird comes near to earning the same title of artist.

But my presentation is perhaps too largely preamble—resembles a mushroom that is all top with but a slender thread of mycelium to relate it with the *terra firma* of fact. I have lately been making some more analytic studies of the mockingbird's song with results that greatly surprised me.

First of all I would refer again to what Dickey aptly called "adventitious similarity" and what I would prefer to call *fortuitous* similarity. One of the seemingly acquired notes that creeps into the song of many individual mockers is that of the California tree frog (*Hyla regilla*). This note is most faithfully reproduced, but had the tree frog anything to do with it? *Hyla* is a chorister rather than a soloist. Rarely is an isolated individual allowed to sing for any length of time without being joined by his choral background, hence the non-analytic mocker would have to imitate a whole frog pond rather than an individual frog. While collecting along the shore of a tiny islet in Carribean waters, I fired at a heron. Immediately there started up in the jungle a few yards back from the salt water, a chorus of perfectly good *Hyla* notes. These notes, however, came from a group of toucans, tropical birds who had never heard a California tree frog and who were giving their tribal note of surprise and alarm, not singing. My suspicion is that much of the mocker's mimicry is of this sort, that is, purely fortuitous.

The mocker's song seems at first impression to be but a tumbling sequence of unrelated notes. Close attention, however, shows it rather to be a linear mosaic of many records, each record presumably involving a special set-up of the vocal apparatus and consisting of several (often three or its multiple) repetitions of exactly the same *motif*. Such a record has been taken as a unit in my quantitative studies of the mocker's performance. These units soon become easily recognizable to the careful listener and he is surprised to find that their number is smaller than he had at first supposed. The bird soon comes back to a new start and begins "telling his beads" over again, though not necessarily in just the same sequence.

MAY 11 NO. 1	11 %	THU THU THU THU THU THU THU III ----- IIII
	NO. 2	7.4 %
FEBRUARY 3	2 %	THU THU THU THU THU THU THU THU II ----- I
JULY 8	4.8 %	THU THU THU THU THU THU THU IIII ----- II
APRIL 10	11 %	THU THU THU THU THU THU THU THU ----- II I I I

Fig. 59. Sample song chart, indicating percentage of imitated notes (see text).

We may next inquire as to the origin of the *motifs* from which these units are built. I have lived the larger part of two generations in the mockingbird's territory in southern California and have, most of that time, had a growing interest in, and appreciation of, the variety of notes produced by birds of all sorts that would form the auditory environment of this supposedly impressionable songster. In taking notes on his performances I have given him the benefit of every doubt, since the element of human judgment must necessarily enter into the study. The accompanying chart (fig. 59) represents a few samples of song charts made to determine the percentage of imitated notes. Each check mark represents one set-up of the vocal apparatus—one pearl in his rosary. As soon as he changed the set-up and shifted to another bead, another check was made. If the *motif* was original, the check went into the upper space, above the broken line, if possibly borrowed, the check went into the lower space. Seldom did the performance extend

to include as many as fifty changes without a more or less extended pause. Yet never did the rosary contain anywhere near that number of different beads. In other words, each bead may be repeatedly told.

The percentage of imitation is rather interesting. The figure is so surprisingly small! April and May records came from birds in full ecstatic song; February is a time prior to full ecstasy, whereas July represents a partial wane with the onset of postnuptial molt.

It will be noted that the percentage of mimicry increases within the breeding season, and I have previously observed that the amplitude of variability in song appears to be less during the winter, and mimesis may even entirely disappear.

Again, in none of these records did more than four neighbor species appear in the imitated repertoire, often only three and these would be repeated. Different individual mockers in the same locality do not necessarily borrow from the same neighbor species, hence the list of imitated species for an area is greater than the performance of any one mocker would cover. The following is a list of such neighbor species in the area most carefully studied whose notes have been recognized with a varying degree of certainty in the performances of a number of mockingbirds.

Species	Type of note	Nature of mimicry
Shrike	song and call note	excellent, probably true mimesis
California woodpecker	<i>jakob</i> call	excellent, probably true mimesis
Tree frog	breeding note	excellent, probably fortuitous
Brewer blackbird	<i>chuck</i> call	excellent, possibly fortuitous
Bullock oriole	chatter and part of song	excellent, probable mimesis
Killdeer	typical note	good, probable mimesis
California jay	rising note	excellent, possibly fortuitous
California quail	assembly call	poor, doubtful
Sparrow hawk	<i>klee, klee</i>	too high pitched, doubtful.
Black phoebe	song	fairly good, doubtful
Burrowing owl	chatter	fair, very doubtful

This list includes, I am quite satisfied, both fortuitous resemblances and true imitations. Reproductions of notes of some species that are marked doubtful are too crude to be the mimetic efforts of so accomplished a performer. Those marked excellent are too perfect to be fortuitous, except where their simplicity might permit coincidence. The perfect *jakob, jakob, jakob* note of the California Woodpecker was given within fifty yards of a communal storehouse of that species, but has not been heard about my home in Los Angeles two miles from the live-oak belt. The perfect notes of the shrike, on the other hand, are commonly used about the home place where shrikes abound, but they were not heard in the woodpecker's territory.

The arrival of Bullock Orioles in April seems also to have stimulated a mocker near my home, and he has begun only lately using the chatter and part of the song of the oriole which has not been heard earlier in the season.

The note of the Sparrow Hawk is a very simple one and quite likely would fall in the fortuitous class. I have heard it perfectly rendered, on higher pitch, by an ecstatic male Green-backed Goldfinch.

The very large element of personal judgment in this presentation is freely confessed and other students of the mockingbird are quite at liberty to point the finger of criticism at its unscientific frailties. Yet I am as great a lover of the mockingbird as any of them can claim to be. I would further contend that the more lasting appreciation is based upon the more rounded understanding. The inquiring iconoclast need not necessarily be a "dispeptic killjoy."

My personal reaction, then, in regard to the singing of the mockingbird, may be summarized as follows:

1. A single song is a mosaic of one dimension—a sequence of *motifs*.
2. Each *motif* is commonly repeated from three to nine times before shifting to the next *motif*, thus making up a unit.
3. The bird usually employs from thirty-five to fifty of these units to complete a mosaic, then pauses for a period.
4. An aërial performance may occur without interrupting the continuity of a mosaic.
5. The number of different units is actually smaller than the listener would at first suspect, so that the same unit may appear again and again in a completed mosaic.
6. The *motifs* are largely original. Rarely do as many as ten per cent of them resemble the notes of other species.
7. These resemblances may be purely fortuitous or they may be actually mimetic.
8. Mimesis of certain notes is so completely perfect as to be almost indisputable.
9. Certain mimetic notes are heard only in the area or at the season when the imitated species is present.
10. The fortuitous resemblance is held to be due, not to inherited mimesis, but to the great complexity of the mocker's vocal and psychic equipment.
11. Amplitude of variation in mosaic pattern is greatest in the spring months and may sink to the zero mark in winter.
12. During fall or winter the song may become almost ruminative in character. This effect may be the result of immaturity, sex, season, or momentary psychic state. The mocker is not a plagiarist. He is, in my opinion, a true artist.

University of California at Los Angeles, May 3, 1938.

SOME FEEDING HABITS OF THE RED-BREASTED SAPSUCKER

WITH ONE ILLUSTRATION

By CHARLES G. DANFORTH

From February 12, 1937, to March 29, 1937, records were kept of the feeding habits of a single Red-breasted Sapsucker (*Sphyrapicus varius daggetti*) on the University of California campus, Berkeley. It was not until further study was made of other individuals, however, that I felt justified in reporting these records. The sapsuckers subsequently observed were on the Stanford University campus and at Echo Lake in El Dorado County, California. The following field observations start with the individual on the University of California campus.

Method and Location of Work.—The feeding actions of this individual corresponded to those of other sapsuckers that were subsequently observed. Clinging by means of toes and tail to a tree trunk, the bird generally held its body well off the tree, and maintained a pose of motionless alertness. When actually feeding or working, the bird changed its position by hitching up or down the limb without use of the wings. Little if any work was done when on the under side of a branch. As a general rule, no noise was made, either vocally or in working on the green wood. The actual drilling of the holes was accomplished by a side-to-side "chopping" with the closed bill, this often causing chips to fly to distances of ten or fifteen feet. There was an average of two strokes to the second, and the bird required one and one-half minutes to make, or at least to start, a hole. However, the work was never continuous, there being a period of about three minutes or less of work, followed by a resting time of often as much as fifteen minutes.