

## WHY BIRD SONG CAN NOT BE DESCRIBED ADEQUATELY

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Almost as soon as a bird student delves into the subject of song, he discovers that it is extremely difficult—in many cases impossible—adequately to describe song. Of course the limitations of language are such that many songs are impossible of description; whistling can be attempted in a few cases, but we have no method of transcribing whistling to paper; musical notations are almost useless. There are only a few songs that lend themselves to this type of transcription. Onomatopoeic words or phrases definitely help in a limited number of cases; the Whip-poor-will does seem to say those words. But in the vast majority of cases it is absolutely impossible to describe or write down what the bird sound is so that it can be intelligible to any person except, perhaps, the writer himself.

Why this is, seems difficult to determine. Bird songs, in many cases, are quite constant. We can recognize them every time we hear them, yet we cannot describe them. Examples of constant songs, cases where each male of the species sings a song very like other males of the same species, are numerous. The songs of many of the flycatchers and some of the warblers are examples. The songs of such species as the Phoebe, Alder, Yellow-bellied, and Olive-sided Flycatchers, are very similar in most birds of the species; and the songs of the Black-throated Green and the Mourning Warblers, and the commoner song of the Chestnut-sided Warbler are essentially alike—each species' member's songs, much like his brother's—yet they can not be intelligibly described.

Of course, there is the method of using catch phrases, "Poor Sam Peabody Peabody Peabody", for the White-throat's song, "Cheerily cheer up cheer up", for the Robin, "Sweet-sweet-sweet-I'll-switch you" or "Very very pleased to meet you", for the Chestnut-sided; but no one claims that these are adequate descriptions. They are aids in practical identification, and as such are useful; that is all.

If, however, we attack the problem from a slightly different angle, we may understand why adequate description is really impossible. It is not a question of what sound is made, but what is heard. Hearing differs, in all probability quite markedly, from person to person. In the range of ordinary sound, these individual differences are rarely noticed; but in bird sound the range of frequency is quite different from other common sounds. The average fundamental frequency of most bird song is about 4000 double vibrations, approximately the

highest note of the piano keyboard; and many bird sounds are pitched in the octave between 4000 and 8000 double vibrations. Practically no other sounds of everyday life are pitched as high as bird song; certainly nothing musical or melodious approaches this range.

Individual hearing differs from person to person, and especially is this true as the pitch of the sound rises. In a recent experiment at Cornell University the hearing of some sixty persons, ranging in age from fourteen to sixty-six, was tested, in an attempt to discover how high they could hear. Most of the subjects were between the ages of eighteen and twenty-five. The results were similar to those usual in such tests. The younger people heard better; they perceived higher vibrations than did persons in middle life or later. The curve was quite normal; but what impressed the writer, who personally made a number of the tests, was that there were spots of apparent fading in a great number of the subjects; and these fading areas were not necessarily at a very high pitch; sometimes they occurred as low as 4000 double vibrations; at other times, at 6000, 12,000, or 15,000; sometimes a person who could hear quite clearly the highest pitch to which the oscillator was tuned, 17,000 double vibrations, had two or three fading areas, some of them, an octave or two below the high. Occasionally a person could not hear, at all 12,000 or 15,000, yet heard 17,000 perfectly well.

The variations in the fading point of the subjects were many and seemed to follow no obvious rules. They were noted in the higher ranges, at or above 4000 double vibrations. They might occur anywhere from 4000 to 17,000. Now within this range are many of the bird songs that are difficult to describe.

It is apparent that individual variation in hearing is very great: in addition, hearing and psychology are very closely allied; practically always there enters into hearing the psychological factor. We hear what we are listening for, and what we expect to hear. We can not, try as we will, hear objectively; it is impossible to separate the hearing apparatus from the thinking mechanism—the ear, from the brain. Hearing is a decidedly subjective function. Then if we remember that probably in no two people is hearing exactly the same, we will readily conclude that this, the subjectivity of hearing, is the reason why no two persons describe bird songs in exactly the same way. They do not hear them in exactly the same way; it would be absurd to expect them to describe them similarly.

A few examples of these subjective interpretations of bird song will serve to make the point clear. To the writer, the songs of the

Alder Flycatcher and the Phoebe are quite similar. The former has a three-note song; the latter a two; but the quality, to my ear, of both songs is very similar; in fact, one of our earliest film recordings of bird songs was made of an Alder Flycatcher which was mistaken for a Phoebe with a slightly peculiar three-note song. Not until the film had been processed and played back was it realized that the Alder Flycatcher and not the Phoebe had been recorded. Today, I never hear an Alder without being reminded of a Phoebe; probably my earlier confusion of the two songs has an unconscious effect upon my perception; be that as it may, I see a striking resemblance between these two songs. On the other hand, the three-note song of the Olive-sided Flycatcher, syllabized by Hoyes Lloyd as "Tuck three beers", has nothing in common with the Alder Flycatcher's song, so far as I can see. Its quality is different and distinct. The Olive-sided's song is shrill and clear; the Alder's is buzzy; its feature is a furry quality, a hoarseness suggestive of the Phoebe; at least that is my interpretation; yet Dr. Arthur A. Allen tells me that the Olive-sided's song and that of the Alder, to him, are quite similar. I cannot see the similarity in the least; yet I am forced to conclude that we are both right! The Olive-sided and Alder do sound alike—to one with Dr. Allen's hearing and thinking apparatus; the Alder's and Phoebe's notes are similar to a person with my make-up; to one with Dr. Allen's, they are quite dissimilar.

Numerous examples could be cited; to some careful observers' ears the notes of the Wood Pewee and Yellow-bellied Flycatcher are quite confusing; to others, they are not at all similar. There is no question here of inaccurate or careless observation; it is patently a case of difference in interpretation.

While playing a phonograph record of the song of the Western Meadowlark for Dr. James P. Chapin—a song that Dr. Chapin had never heard in life—his reaction was that here was a song that showed the relationship of the Meadowlarks to the Icterids. In the Eastern bird, he had never noted the peculiar strain. When he called this to my attention, I imagined or believed I saw this family resemblance in the Western Meadowlark's song, but it certainly was not the most important or characteristic feature of the song.

One of the values of bird sound photography—the recording of bird song on film—on the phonograph records made from such pho-

tography, is that it reproduces the song essentially as it is heard. The reproduction is not, in all cases, perfect; certain mechanical difficulties in reproduction, especially in the high frequencies, are often present. Even if a perfect piece of film is produced, getting the sound off requires a machine of excellent quality, able to reproduce frequencies of extreme height. Few machines in motion picture houses do not lose accuracy at 7000 double vibrations and even lower. In phonograph reproduction the same difficulty is met but it is more pronounced. Even the best commercial phonographs are not strictly accurate above about 5000 double vibrations. But even accounting for these discrepancies, the mechanical reproduction of photographed bird song has the advantage that it reproduces with more or less fidelity, what is heard by the human ear. We hear about what we would in the field; and it is interesting to note that the subjective reaction of the listener is much the same as in the open. Thus when they are mechanically reproduced, Dr. Allen hears in the songs of the Olive-sided and Alder Flycatchers the same similarities that he notes as peculiar in the field; while to me, the Phoebe's and Alder Flycatcher's songs, when reproduced in the laboratory, do not differ materially, and I note the same resemblances that always appear when I hear the birds in life.

In conclusion, I wish to advance the thought that probably the reason for the innumerable different and conflicting descriptions of the same song with which the literature of ornithology is replete, is, that rarely do two observers hear the same song in exactly the same way. The song is not noticeably different when produced by varying members of the species, but by the time the sound waves have affected the listener's hearing apparatus, and have been transferred by the nerves to the brain, and interpreted by that organ, it has created an entirely different sensation and impression on each individual listener. The cause of these differences is the differing receiving apparatus and psychological make-up of each individual listener. Bird song interpretation is a subjective phenomenon; interpreting what is heard can only be done subjectively.

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