

ment of the bird armies. When the sun is able in spring to loosen the tiny spark of life in the billions of seeds of plants in the ground, why should it not be equally able to turn the direction of the movement of birds into the direction of its own movement?

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THE SONG OF THE SONG SPARROW.

(A SYSTEMATIC STUDY OF ITS CONSTRUCTION.)

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ALL field ornithologists are familiar with the great variation in the song of the Song Sparrow. We are not aware, however, that any analytical statistical study thereof has been published. It therefore seems worth while that we place on record a summary of our graphic interpretation of 197 different Song Sparrow songs. These were obtained (W. C. W.) through many hours of careful listening to Song Sparrows in the field, all within a single song season (1923) and, furthermore, all in eastern Massachusetts. Since then this mass of material has been analyzed and studied (J. T. N.), with a view to determine what bearing it might have on current theories and hypotheses regarding bird song.

A few words as to our method of setting down each song graphically: Musical notation is almost out of the question in a case of this sort. Such notation does not clearly show the construction of the songs. It is the construction which the ear uses in differentiating one song from another, and which it is possible to represent graphically in a moderately satisfactory way. The individual bird is capable of modifying both pitch and quality to some extent. Of the four elements found in a Song Sparrow's song, namely, time, pitch, quality, and construction, although construction may be somewhat variable, we believe it is the most reliable factor on which to base a critical study. In making a graphic record of song, we have found the symbols shown in figure 1 of the accompanying chart most satisfactory for this particular species.

Setting down a song in this manner places the emphasis on construction. Relative pitch is indicated by the relatively higher or lower position of the symbols. The key in pitch was never taken, although an exceptionally high pitched song would be so noted on the record. Quality was noted sometimes by writing under the symbols the suggested pronunciation. Time was only distinguished as implied by the different symbols, which see. Even though we have disregarded, to a great extent, the musical element of the song, we have, in our opinion, some very satisfactory sheets of Song Sparrow songs, recorded in a system advantageous for comparing the construction of one with another.

The typical Song Sparrow song consists of short introductory notes, a central trill, and a flourish of notes or slurs at the end. The first thing that has struck us in attempting analysis is that, holding to this general form, songs may be classified in two groups, A and B. Two examples, one of group A and one of group B, are shown in figure 2 of the chart. It will be noticed that the main difference between the two groups is that the trill is higher in pitch than the introductory notes in the case of the A group, while in B it remains on the same pitch as the introductory notes.

Frequently a single bird has been found to have several songs. In most cases these songs are related somewhat to one another, that is, they belong to the same group. This is not invariably the case, however. A certain Song Sparrow sang the two types of song shown in figure 3.

The data is not sufficient to say definitely whether this is an unusual case or whether it is frequent for Song Sparrows to sing both types of song. To absolutely clear up this point it would be necessary to keep very close watch on a particular individual bird for some time, which was attempted in but few cases.

The maximum number of songs heard from one bird was 19, a small selection of which appears in figure 4. The main characteristic of these songs illustrated is that they are unlike any type, being very irregular and following no rule or form. It is our hypothesis that such irregular variable singing is the primitive song of the Song Sparrow which tends to become standardized to the double type of groups A and B.

If one listens closely for some minutes to a singing bird, one will

- note of average time
- ||| notes of quicker time
- ~~~~~ trill
- \ / upward and downward slurs

fig. 1

• • || ~~~~~
group A

• • • ~~~~~
group B

fig. 2

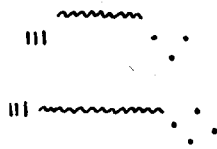


fig. 3

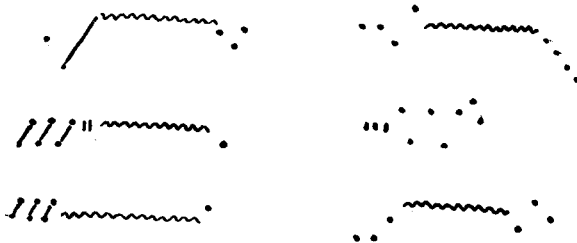


fig. 4

1. • • ~~~~~
2. • • ~~~~~
3. " ||| •
4. " ||| •
5. ||| •
6. ||| •
7. ||| ||| ~~~~~
8. ||| ||| ~~~~~

fig. 5

note sometimes a tendency for essentially the same song to change from complex to simple, in other words, instead of building up, it becomes shortened. To illustrate this point more clearly, we give our graphic record of 8 songs sung in succession during a period of a little less than 20 minutes by an individual Song Sparrow in figure 5. Each song was sung several times, Nos. 2, 4, 6, and 8 almost identical with Nos. 1, 3, 5 and 7, respectively. It is frequently noticeable, as in this case, that when a Song Sparrow simplifies the ending of a previous song, he is about to change into an entirely different song. Notice also the first two songs of this bird are true to group B, the middle songs are irregular, while the last two songs are approaching type again, and with the omission of one or the other of the two sets of introductory elements would be typical group A or group B songs. It seems to be the general rule that the more variations a bird sings the farther away from type it gets,—hence the hypothesis that Song Sparrows singing unlike any type, tend to revert to type, it being only a question of time before a bird will sing a true model song from either group A or B. Too few of our records follow an individual bird through a sufficient time period, likely to involve a pause in its singing, to present this phase of the subject, except as an hypothesis.

Fancy a Song Sparrow perched on a maple branch along the edge of the brook, pouring out its songs, gradually drifting away from type, "going off on a tangent" as it were. He suddenly brings to a close his irregular songs, perhaps original, perhaps merely careless, and returns to type. It seems that this holding to type is one of the striking features of Song Sparrow singing. How much, if anything has mimicry to do with it? Would not mimicry, by introducing chance elements from this side and from that, tend to break down rather than establish a standard or type song? Certainly there is no standard construction to the songs of those recognized mimics, the Starling and the Mockingbird. On the other hand, when we consider that Song Sparrows are abundant and widely distributed across America, with proven ability of song variation, some factor must be present to hold their song as closely as it is held to type.

When a Song Sparrow sings irregularly away from type, its song

is difficult to record for several reasons. First, this song is composed of a greater complexity of notes. Then the same song is seldom repeated, whereas ordinarily a bird sings the identical song several times, allowing opportunity to check up and correct for error. The bird which possessed 19 songs was difficult to record (see figure 4). The still more irregular and sometimes more or less continuous songs heard in late fall are practically impossible to record satisfactorily.

The Song Sparrow has a fall song which is quite unlike its ordinary summer performance. It is made up of notes similar to those used in summer, but lacking the volume of the summer song and connected by a wheezy trill, so that such singing is continuous. There is no evidence to hand as to whether or not this be the song of young birds,—though at the same season that it occurs one occasionally hears a regular song, like those heard in summer. The irregular singing of the bird illustrated in figure 4 approached this fall song; and as it occurred July 1, rather late, it may easily, as fall singing certainly is, have been from a bird not nesting at the time.

This brings us to our hypothesis of the evolution of the variation of song in general and Song Sparrow song is particular. Of various factors by which song is controlled, one important one seems to be the physiological condition of the singer, which we will speak of as the factor for expression. A second factor, scarcely to be denied in view of recent observations and discussion, is fixing the nesting site by repetitive singing. The short, definite, incisive summer Song Sparrow singing may well have been derived from a continuous, irregular song of a more warbling nature resembling the fall song, and this latter be the more primitive. Utility in fixing the nesting site by repetitive singing favors development of a short, incisive song. From studies of Gross¹ on the nesting habits of the Dickcissel there seems little doubt that this factor has become very important in the song of that species, and what a short, incisive song it has! Also, song of a warbling nature is very wide-spread among birds of the Sparrow family, as their primitive song type should be,—note the Finches. In fall, when the dry trill of the

¹Gross, A. O., 1921, 'Auk,' XXXVIII, Nos. 1 and 2.

Chipping Sparrow is no longer heard, it occasionally has a weak warbling song of some sweetness.

It would seem that when Song Sparrows are through nesting for the season, a standard type of singing being no longer of particular advantage, they tend to return to primitive irregular singing when still subject to the song impulse.

As regards the double standard, group A and group B songs, we have no satisfactory hypothesis to advance therefor. It would seem to be a rather general character in the song of many species, however, and doubtless is more than chance variation. Most Warblers have two types of song, each individual singing both. We have in mind a certain Parula Warbler which for some time sang one type almost exclusively in the morning, changing to the other as the day waned. Among birds having obviously two different songs are the Swamp Sparrow and American Redstart. In the case of the Redstart the two songs are sometimes sung in regular alternation with practically the same lapse of time between each song, while the Swamp Sparrow may sing one song over a period of time, and then, after a lapse of silence, change to the other song.

A little philosophizing on the part which imitation and originality may be supposed to play in Song Sparrow song variation, according to our concept, will not be out of place. All individuals may be supposed to inherit the indefinite continuous primitive song, and the tendency to replace it when nesting with a short incisive song of one or both of two types. Chance combined with a minimum of imitation or originality accounts very nicely for the observed result. If imitation were an important factor there would be a tendency for a single type to become dominant in a given area; if originality, a tendency for the two types to become lost in a multiplicity of design.

Like various other birds, the Song Sparrow has a flight song, which, in that it is sustained, continuous and irregular, has much in common with the fall song mentioned above. It differs strikingly therefrom in being given with increased rather than diminished volume and emphasis, and in its most typical form is frequently associated with chase of a rival male.

There can be no doubt that this flight song can be correctly

considered an emotional outburst into which the bird throws its entire vocabulary. The (so considered) primitive fall song would seem to be the background, but the standard ("nesting site") song is also present, and frequently the bird's two common call notes repeated one or more times with emphasis at the beginning. We believe we are safe in the assumption that this flight song is rather the emotional lifting of the flood gates of voice than any specialized structure raised on the standard song as a foundation.

A little reflection leads us to believe that the principles underlying its flight song, for the Song Sparrow, may be traced in flight songs of other birds. The flight song of the Meadowlark is a comparatively sustained performance, of which the standard song forms a part, and it is interesting and likely significant that it contains also liquid bubbling notes suggestive of the voice of the western Meadowlark, which notes are very likely primitive, inherited from the common ancestor of these two birds. The well-known flight song of the Ovenbird contains elements of its standard song, combined with call notes, and to us is much more suggestive of the songs of its relatives, the Water-Thrushes, than is its ordinary performance. This flight song of the Ovenbird, as well as that of the Maryland Yellowthroat, is not infrequently heard when the song season of each has waned. We explain this by supposing that whereas fall recrudescence of the impulses which lead to song, is doubtless weak in comparison with these impulses at the height of the nesting season, it does not expend itself in standard singing and other nesting activities, and therefore accumulates sufficiently to give the emotional flight song.

The above discussion is based on our recorded data, which have to do almost exclusively with the construction of the song. As a matter of fact, Song Sparrow song varies in other ways than in construction. For instance, in pitch, and in that subtle quality which may be designated as pronunciation. Although we have not the data at hand to substantiate such an opinion, we suspect that there is variation, regional or geographic in nature, in pitch, pronunciation or both, whereby it might be possible with sufficient familiarity to separate birds of one locality from those of another. Such might readily come about through imitation of tone values or their inheritance by a group of Song Sparrows through some common ancestor.

In writing this paper we have attempted, first, to present a summary of observed data on Song Sparrow song variation in one area; second, to call attention to the method of recording such data that we have found serviceable; and, third, to touch on lines along which it may be possible to analyze and explain bird song. We believe that having done this will be important just in so far as it leads to criticism, further observation, in short, continued investigation and discussion of the subject.

The editor has permitted us to add this note since the interesting article on bird song by A. A. Saunders in the April 'Auk', based on similar subject matter, has been available for study. Mr. Saunders has aimed for greater musical precision in his records and apparently has not been struck with any two main types into which Song Sparrow songs may be divided. In so dividing them we have used what we have translated as pitch of the main trill. Possibly what we have called pitch would be more readily recognized or translated by some observers as quality.

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BIRD BANDING AT THOMASVILLE, GEORGIA, 1924.

BY JOHN B. MAY, M. D.

Plates XXVII-XXVIII.

It was my happy privilege to spend nearly three months, from January 6 to April 10, 1924, carrying on the bird-banding operations at Thomasville, Georgia, which were begun there in 1915 by Mr. S. Prentiss Baldwin of Cleveland. Several accounts have already been published in the pages of 'The Auk' describing the results of previous years.¹

As the location and history of the Thomasville station are known to the readers of these previous reports, I shall confine myself in this article to merely recounting the actual results of my own activities compared with those of my predecessors.

¹"Recent Returns from Trapping and Banding Birds." S. P. Baldwin, 'The Auk,' Vol. XXXVIII, April, 1921.

"Adventures in Bird-Banding in 1921." S. P. Baldwin, 'The Auk,' Vol. XXXIX, April, 1922.

"Bird Banding at Thomasville, Georgia, in 1922." L. R. Talbot, 'The Auk,' Vol. XXXIX, July, 1923.

"Bird-Banding at Thomasville, Georgia, 1923." T. E. Musselman, 'The Auk,' Vol. XL, July, 1923.