# A STUDY OF THE SINGING OF OUR BIRDS.

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## INTRODUCTION.*

THE subject of the singing of our birds seems never to have been pursued as a distinct branch of ornithological study. Even in our most complete bird-biographies song is rarely introduced except descriptively or in poetical allusion. But the voices of birds, apart from their intrinsic interest and their associations, are closely related to the times and seasons of the birds themselves and to other phenomena of their lives. And yet, judging from our present ornithological literature, this seems to have been wholly overlooked. We have, indeed, scattered records of individual variation in the songs of birds and of variation in the notes of a few species at different seasons and in different regions, and some well-known examples illustrative of the latter fact, but we have little else. In view of these facts the present paper appears. But while the writer would have it understood that the subject is here considered solely from a local standpoint,† he fully feels that even within these limitations the sum of recorded observations at command is an insufficient basis for an intelligent treatment of many points. The presentation, therefore, of suggestions which the future may develop, while adding something to our present knowledge, is all that can at present be attempted. Let us remember that speculation and theory are not always mischievous or futile. At the threshold of an unstudied subject they have often the effect of stimulating investigation and giving direction to research. No apology is needed for certain somewhat speculative portions of the present paper if any such result is accomplished.

One entering upon the study of the singing of birds must soon recognize as an obvious fact that many birds have two dis-

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† The observations on which the present contribution is based were conducted in the vicinity of Riverdale on the Hudson, New York City, to which locality all remarks except under contrary statement apply.

tinct seasons of song, separated by a greater or less interval of silence. The first of these song-periods is that of the spring migration and the breeding season; the other a period variable as to time and duration with different species, but which may in general be said to succeed a time of silence which follows the breeding season, with some species continuing through their return migration from their breeding grounds. The greatest variation, however, with respect to its separation from the first song-period, the constancy, the extent and the time of the latter song-period, is exhibited among its exponents, as will be shown beyond.

Some of our summer resident birds cease to sing at the close of or soon after their breeding season, and are silent during the remainder of their stay. Others discontinue song with domestic duties, but resume it before their departure after a longer or shorter period of more or less complete silence. Still others continue uninterruptedly in song during the greater part of their sojourn. This much having been said, it becomes proper to inquire into the causes which produce these results.

Perhaps as a factor in sexual selection we perceive the chief office of song in the avian economy; its main purpose is thus subserved during the mating and breeding season. Thereafter song is not longer a necessity, and the inference would be natural that, after the enervating duties of this period, the vocal organs would be allowed to rest. But disuse of the vocal organs does not result from this cause. It is even true that those species whose family cares are lightest, that rear a single brood only, first become silent; those that bring up two or even three families being least ready to abandon song. Apart from the dominating influence of the breeding season, that which most directly governs the singing-times of birds, and, I may add in passing, their seasonal movements, their breeding seasons and the number of broods reared, is undoubtedly their periodical loss and renewal of plumage.*

* The relation between the moult and the migration of birds is a subject demanding the most careful study. It is indeed surprising that the connection between such obviously related phenomena has not long since been worked out. While it is true that many birds enter upon their migration with the growth of feathers still active in parts of their plumage, it is also undoubtedly true, as a general fact, that the moulting season is a time of inactivity and thus adverse to extended migration. Many birds migrate just before or shortly after the new plumage has completed its growth. Hence

In many cases the moulting periods of our Song-birds correspond more or less closely with periods of silence, voice being resumed with the renewal of plumage. The general statement may therefore be made, that birds are predisposed towards silence during the height of the moult. Though this fact may be by many regarded as one not requiring demonstration, it is by no means without exceptions. In the earlier and later stages of the moult the vigor of birds in general seems little impaired. Not only do many species enter on their migration while yet the moult is in progress or before the complete maturity of their renewed plumage, but birds may be found sitting upon their eggs with evident indications of activity in the growth of feathers. Still we must regard it as a general fact that singing and moulting are in some degree complementary.

But the loss and renewal of plumage in its resulting tendency of interference with the use of the vocal organs may be superseded by a counter influence which at times arises in the special seasonal development of the sexual organs. Thus birds in the spring are sometimes in song before their new plumage has attained its full growth, and it is probable that this is normally the case with many species. But cases of birds in full voice while undergoing their second semi-annual moult, when the sexual functions are inactive, appear to be uncommon, perhaps exceptional, unless the growth of plumage be almost completed.*

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it would seem to follow that the times of migration are in many cases regulated if not determined by the times of the moult. As the times of this process are variable with different species, it seems highly probable that a study of the subject would shed light on the causes of the different times of migration of allied species of birds. It is clear that the periodical mutations of the plumage of birds is involved directly or indirectly with much in their lives that we now but imperfectly understand—with their migrations, their distribution, their breeding habits. And it would not be going too far to claim for the moult a direct bearing on classification, for different species, and in all probability different families and genera, moult in different ways. The subject cannot be followed further here, but it is safe to assume that its careful study would lead to important and unexpected results. It may not be untimely here to suggest that in recording the condition of the moult or renewal of the plumage of birds great care must be exercised to distinguish between the sexes and ages of specimens examined. Often adult and juvenile individuals of a species will at the same time be found to present great differences in the relative maturity of their plumage, and, in less degree, males and females, as well as individuals of the same sex, will be found to differ.

* As bearing upon this topic I learn from Mr. C. F. Holden of New York, the well-known bird-fancier and importer, that while many Canaries become disinclined to sing, or even entirely silent, during the moult, some of the finer breeds sing uninterruptedly during that period.

There are facts which seems to indicate that vocal disability often accompanies the moult, thus imposing silence until power of voice is gradually regained with the renewal of plumage.

In its origin and use, song is undoubtedly to be classed as a sexual character, in the same category as the adornments of the plumage in the male bird. (It is not necessary here to consider the singing of the female of certain species, this being entirely secondary to the present consideration.) Taking this view of the song we can understand why with those species, the males of which undergo great semi-annual mutations in the color of their plumage, — in the fall assuming the plainer garb of the female,— have no second song period : attired like the females, they are, like them, songless. May we construe this fact as evidence that the silence of many birds in the autumn is not voluntary, but that the vocal function is lost with the other attributes of masculinity? It does not necessarily follow that male song birds are always songless when not attired in their nuptial costume. The males of some species while in immature plumage are equally melodious with the adults in full dress. But while I have never been able to study satisfactorily many cases bearing clearly on this point, I have observed in several instances that in apparently immature males which sang, the plumage, though that of the young bird, exceeded in color that of the female of their species. In other cases it seemed probable that sexual maturity had anticipated the phase of most highly developed plumage. The Purple Finch sings while attired in the plumage usually regarded as characteristic of the young male, but I have heard no songs from birds in this condition of plumage which did not show evident immaturity of expression. The female of this species also has been been said to sing. With species the females of which sing, we should expect the young male to have equal use of its voice.

But in these considerations we must not forget that our knowledge of the real significance of color-changes of plumage is but meagre, and that color-phases of plumage are not in all cases true to their usual indications in regard to the age of their subjects. I do not wish to be understood as stating that the males of all of our birds which in the autumn change to the plainer colors of their mates invariably cease to sing. There are at present no data upon which so general a statement can be based, and were the necessary data at hand not improbably exceptions would be

shown to occur. My statement is merely that, as a rule, so far as my own observation has extended, loss of voice in the males of our brilliantly plumaged birds always accompanies loss of other sexual characteristics at the second moult.

It is strictly true with species of such decided change of plumage with the second annual moult as the Scarlet Tanager, the Goldfinch, the Bobolink, and those of our Warblers which undergo material change of plumage.

But many common birds, which show no evident change of plumage with the second moult, have no second song-period. In discussing this class we must remember that it is not always a simple matter to ascertain whether a bird belongs more properly with those species which experience insignificant seasonal changes of plumage or with the reverse class. Among species of obscure plumage it is difficult to decide what constitutes a decided change. We can conceive how slight changes in certain groups of birds may be equivalent to much greater variation in other groups; but the relative value of the changes which we may observe is unknown to us. But in that class of singing birds we are now considering,—that class in which the males, without assuming the plainer garb of their mates, yet become silent after the breeding season,—the periods of silence and song of all, perhaps, may be accounted for. Let us first discuss summer resident species. Some of these which have no second song-period with us are our earliest departing migrants. Obviously among these there is no opportunity to observe a second song-period in their summer home, even if such takes place.

Another class of summer residents continue uninterruptedly in song during the greater part of their stay, thus appearing to have no second song-period. But there is little doubt that a period of silence is passed by each individual of such species. For though among its members as a body there may be no actual interruption of singing from spring to fall, a time of minimum vocal vigor seems always to follow the breeding season and to be partially recovered from at a later period. In the case of the species taken as a whole the silent period is obscured by the variation in the singing time of individuals. In other words, there is a sufficient difference in the time of the beginning and cessation of song among the component individuals to bridge with isolated songs the true silent period of the species. Hence the almost con-

tinuous singing through the summer of the Red-eyed Vireo, the Song Sparrow, the Baltimore Oriole, the Phœbe Bird, and the Great-crested Flycatcher. In all of these, perhaps, the silent period actually occurs with the species as a whole in certain years when conditions uncongenial to song prevail, but the records of several seasons taken collectively disguise any such break in the singing times which may have occurred.

We must now consider these species which, without exhibiting any marked seasonal change of plumage, are yet silent during a more or less protracted stay after the close of the first song-period.

Let us first take up some matters preliminary to the consideration of this class.

It is probable that extreme fatness engenders a constitutional predisposition towards silence. The majority of birds arriving on the spring migration possess little or no obvious adipose tissue. I have likewise found this to be the case with birds that are in full song in midsummer. If we examine a large number of spring birds some exceptions will be found, though there will be comparatively few, and very few that can be considered extreme exceptions. In the fall, however, the contrary will be found to be the case. At this season the majority of birds are more or less fat and many excessively so, fat often beginning to accumulate before the completion of the moult. If, then, excessive fatness tends to induce silence, we have in this fact a reason for the absence of a second song-period with many species: singing is first checked by the moult, and the adipose condition directly succeeding suppresses all inclination to resume it. In many birds which remain with us long after the second moult, without decided change of plumage, yet with no second period of song, we find illustrations of this sequence of physiological conditions.

A striking instance, afforded by the Red-eyed Vireo, may be cited. This Vireo is one of our most persistent songsters, and forms one of the exceptions to the rule that birds are not generally in song when the moult is in active progress. It is in full moult in August, in which month a silent period, although indicated, is obscured by individual variation in the time of discontinuance and resumption of song. In the month of August this species may be found in an active stage of moult. Though its vocal vigor is at low ebb during this time, especially in sultry sea-

sons, song is not discontinued until the moult is completed and fat has begun to develop. This species thus illustrates decadence of vocal vigor during activity of the moult, and complete cessation of song with the adipose condition supervening. Other similar evidence could also be adduced.

But I do not forget that our evidence is fragmentary and uncertain. Whether disuse of the vocal organs directly results from the physical condition with which we find it associated, or from some collateral cause, we are ignorant. But it is certainly easy to understand how excessive fatness might result in reduced emotional sensibility or indisposition to vocal effort, or how a development of adipose tissue about the vocal organs might interfere with their free action. Bird-fanciers recognize the injurious effect of over-feeding on the vocal power of cage birds.

Song, as an immediate result, appears to be the outcome of emotion or excitement, and reaches its highest expression, with its highest use, during the mental and physical excitement of the breeding season. Every one who has been an observer of birds must believe them to possess high cerebral sensibility. The influence of almost impalpable meteorological changes on the singing of birds cannot fail to have been remarked, and the effect of decided weather changes must often have been apparent even to the most unobservant. While with many species the habit of supplementary song, if I may so term the habit of singing in the autumn, is firmly established, with others it is inconstant and greatly dependent on favorable conditions of weather. The supplementary song-period is thus often of uncertain duration, and it even happens with certain species that it is confined to a few days, or, as it sometimes appears, even to one.

Instances of the effect of mental excitement on the singing of birds are constantly before us. Birds suddenly disturbed or startled from their retreats, or abruptly ceasing from a headlong chase after or flight from a companion, often break forth with sudden song, sometimes even at a time when the species is ordinarily silent. So, too, the excited repetition of an alarm note not infrequently leads up to a sudden burst of song.

This brings us to the consideration of a habit possessed by some of our birds of singing while on the wing. With some species singing during flight is but an ordinary occurrence, as in the case of the Bobolink, which continually overflows with melody during

its gambols in the May meadows; or the Orchard Oriole, which passes with uninterrupted song from tree to tree. With others the indulgence of the habit is less matter-of-fact, and singing on the wing is the accompaniment only of special flights. But the habit reaches a still greater specialization. Among those species with which it is confined to the season of courtship it is variously exhibited as a general habit, as a special habit, and again as a reserve habit apparently set apart for particular and infrequent indulgence. As an instance of a species with which the habit is a general one, the Yellow-breasted Chat may be cited. Where these birds abound their ridiculous acrobatic song-flights may be daily witnessed. With the Purple Finch, though the habit may also be regarded as a general one, it is much less frequent. In the Golden-crowned Thrush we discover a great specialization of the song-flight, the vocalization accompanying the flight being of a high order and utterly different from the ordinary song of the species. Nor it is commonly to be heard, for either the ability to produce it is confined to favored individuals, or it is only indulged on special occasions, or under an extreme degree of mental excitement. The cause of these song-flights, and of the extravagant demeanor with which they are conducted by some species, can be attributed only to some unusual state of mental excitement, which wields an irresistible power over its subject.

Compared with ordinary vocalization, singing under these circumstances seems to represent a higher vocal effort, as it certainly does a higher vocal accomplishment. Hence it is not suprising that these unusual demonstrations should occur under the intense sexual excitement of the breeding season, but why with some species they should be continued into the autumn, or even be deferred until the breeding season is passed, seems inexplicable. Yet with a number of our birds this is the case. So far as my own observation has extended, it is true of all those species with which aerial song-flight appears to be only occasional or exceptional. And thus in several cases where I have observed but a single instance of song-flight in a species, my record of the performance dates in the fall. The Indigo Bird and the Swamp Sparrow may be cited as examples. The Maryland Yellow-throat is a species with which aerial song-flight is not an uncommon habit, but appears never to belong to the early spring. Not until the summer,

when we may suppose the emotions of the nuptial season to have waned, may we commonly witness the song-flights of this species and hear the accompanying volubility of utterance so different from the usual song.

In many cases some particular bodily motion or set of motions accompanies the effort of song. It may not be irrelevant here to query whether this combined vocal and bodily activity, so often observable, is to be regarded as resulting from an intensity of emotion which fails to find satisfactory relief through a single source of expression, or whether song be ever from physiological necessity dependent on muscular action additional to the activity of the vocal organs. We often observe during a song-flight a tendency to greater bodily action than is required for simple flight. Indeed, I have seen such motions so marked in the case of the Orchard Oriole as strongly to suggest the Chat. The same may be said of the Maryland Yellow-throat. But undoubtedly the effort of singing on the wing, by disturbing the natural motion of flight and retarding the progress of the bird through the air, has much to do with the unusual demeanor of most species during the song-flight. The song-flight certainly argues some forcible mental process in the actor. That birds are subject to sudden and intense subjective motions, we cannot doubt.

Articulate or vocal variation in birds may be of five principal kinds. These may be designated as geographical, seasonal, individual, variation with age, and abnormal. As the present paper is intended to treat primarily of the times and seasons of song, each of these kinds of variation will be only briefly touched upon here as connected with and partially introductory to the general subject.

Of *Geographical variation* little can be said. Up to the present time it has hardly been formally recognized as in any way general, and though well illustrated in the case of certain birds, our knowledge of it is slight. It is, however, probably more general than has been supposed, and it is not by any means improbable that ultimately it may be found susceptible of formulation in special laws, as physical variation has been.

Perhaps the best exponents of vocal variation with longitude are our forms of *Sturnella*. While there appears to be no such conspicuous instance of vocal variation with latitude, such variation has been observed and recorded in the case of a few species.

In the passage of certain species on their spring migration, there sometimes appears to be a difference observable between the songs of the earlier and later comers. As the first comers of many birds undoubtedly represent the more northerly breeding individuals of their species, the fact above cited may be of significance in the question of geographical variation in song.

*Seasonal variation in song.*—In several species there is a difference, more or less decided, between the song of the breeding season and that of the later song-period. How far this may result from actual change of song with adults from spring to fall, or how far from the efforts of juvenile birds in the later season is uncertain. Certain it is, however, that the adults of some species show a variation in song from one season to another. This variation is not always that which would naturally result from a reduced vocal impulse, which we might expect to follow the breeding season, and to forerun decedent song. While in some species variation in song from spring to fall is doubtless to be attributed to this cause, with others the song of the later season is of equal tone with that of the earlier, and may even be more prolonged and much more varied, if not of greater power. These facts will be illustrated beyond.

*Vocal variation with age.*—Of this class of variation I have little to say, having never myself observed an unequivocal case of the singing of a wild bird of the year. We find the young male of the Orchard Oriole in full voice in its second year while yet showing in its plumage plain evidence of its immaturity. In seeming contrast to this instance of the song of the adult being attained before the adult plumage, I have found the male Purple Finch in the spring in the brown plumage of the female with a song decidedly inferior to and otherwise different from that of the mature bird. As an instance of the singing of the young of one of our native birds I may cite the fact of the young of the Mocking Bird singing at the age of a few months while yet in the speckled plumage. Mr. C. F. Holden assures me that this is the case, at least when the species is kept in confinement. Mr. Holden also tells me that the song of the young differs from that of the adult much in the same manner that the voice of a child differs from that of a grown person. In the summer the Redstart seems to possess two types of song differing in tone and accent, and observation goes to show that the more feeble performances are those of immature birds.

Occasionally singularly aberrant songs are heard from the common Robin, in which the mellow rolling quality is entirely lost. The notes are abrupt and separated, often with distinct rests, and sometimes terminate with a vibratory sound suggestive of the vibrant quality characteristic of the songs of our Wood Thrushes. I have not been able to ascertain if these sounds regularly proceeded from immature throats, but if this be the fact it probably affords an instance of an ancestral character of voice retained by the immature progeny of descendants.

*Individual vocal variation.*— Undoubtedly it can be said that in song, as in plumage, no two birds are precisely alike. But the extreme difficulty, or often impossibility, of comparing the songs of birds except through an untrustworthy mental agent, is a serious obstacle in the study of this branch of the subject. Nevertheless the statement that the songs of birds of the same species are subject to extreme variation, and that probably no two songs of different individuals of a species are identical, can be accepted with little or no violence to the truth. With the members of some species phonetic variation is especially evident. At the season when the Song Sparrow is in full voice, I can never walk with attention directed to the songs of these birds along the way without being forcibly struck with the marked variation shown in movement, tone, accent and other qualities either separately or in conjunction. The same thing is conspicuously true of many birds, as the Robin, the Field Sparrow, the Rose-breasted Grosbeak, and others which occur in sufficient numbers to afford ample scope for observation. But even the same individual will show considerable variation in its song at different times; indeed not a few of our birds possess two or more distinct songs.

We are slow to give birds credit for the capacity of vocal expression which many of them possess. Writing now in the autumn, with no opportunity for refreshing my memory, I can recall over half a dozen distinct utterances of the common Robin, and as many of the Song Sparrow. It is probable that they have many more, and that birds possess a greater power of oral communication than we ever suspect.

*Abnormal vocal variation.*— This kind of variation, probably caused by imperfections of development or injuries either of the vocal apparatus or adjacent structures, is perhaps not always

clearly definable from the preceding. Very extreme cases of individual variation will probably fall under this head. With the Song Sparrow I have observed several instances of abnormal variation in song, in one case the song being strikingly like that of the little Field Sparrow.

A case of abnormal variation in song of another species, the Red-shouldered Blackbird, may be here instanced. The song of this species is a characteristic and usually very constant one, especially when we take into consideration the number of birds that are commonly found singing together. Their song is thus written by Nuttall: "*Kong-quer-ree.*" I have, however, heard the first note doubled, and in one case it was the only note heard, the remainder of the song being either so faintly uttered as to be inaudible or entirely omitted. The low guttural quality of the single note, and its measured repetition, gave it a noticeably corvine character.

In treating of the songs of birds we must not confine ourselves too narrowly to the class Oscines or true Singing Birds. Birds of lower grade, which are denied the power of true song, are usually endowed with a capability of producing either orally, through physical action or mechanically, sounds as characteristic as the songs of their more gifted relations. Thus the hooting of the Owl, the drumming of the Grouse, the hammering of the Woodpecker, must be regarded as the equivalents of song.

(*To be continued.*)

## BIRD MIGRATION.

At the first congress of the American Ornithologists' Union, held in New York City, September 26–28, 1883, a Committee on the Migration of Birds was appointed. It is the purpose of this Committee to investigate in all its bearings, and to the fullest extent possible, the subject of the migration of birds in the United States and British North America. The work will not be limited to the accumulation of records of the times of arrival and departure of the different species, but will embrace the collection of all data that may aid in determining the causes which influence the progress of migration from season to season. For example, severe storms, gales of wind, protracted periods of