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UNUSUAL SONGS IN PASSERINE BIRDS¹

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ABSTRACT

Unusual songs of passerine birds fall into five categories: (1) special songs, sung only under certain circumstances, and considered unusual only because they are seldom heard; (2) developmental stages of primary song; (3) songs resembling those of another species (mimicry); (4) song types outside their usual geographic range, and rare or accidental where heard; and (5) atypical songs. Songs of each category are discussed, and illustrated with examples.

Anyone who listens carefully to the songs of passerine birds (perching birds) will occasionally hear songs that appear unusual. These songs may be so unusual as to be scarcely or not at all recognizable, or they may be recognizable but obviously a little different from the bird's usual songs. The purpose of this paper is to describe some examples of unusual songs, and to suggest reasons why a bird might sing such songs.

The "usual" songs of a passerine bird are its fully developed advertising songs; these are the songs described in guides to identification and they constitute the vast majority of the songs of a given species that the average observer hears. "Unusual" songs are songs that are seldom heard, and which in one way or another differ from the "usual" songs of the species. Some unusual songs may be atypical; others may be typical, but considered unusual because they are seldom heard.

The unusual songs of passerine birds fall into five categories: (1) special songs, sung only under certain circumstances; (2) vocalizations representing developmental stages of the advertising song; (3) songs resembling those of another species (mimicry); (4) song types outside their usual geographic range; and (5) atypical songs. Each of these categories is discussed below; most of the examples are taken from the collection of the Department of Zoology and Entomology, The Ohio State University, and copies of these examples can be made available to anyone interested in them.

SPECIAL SONGS

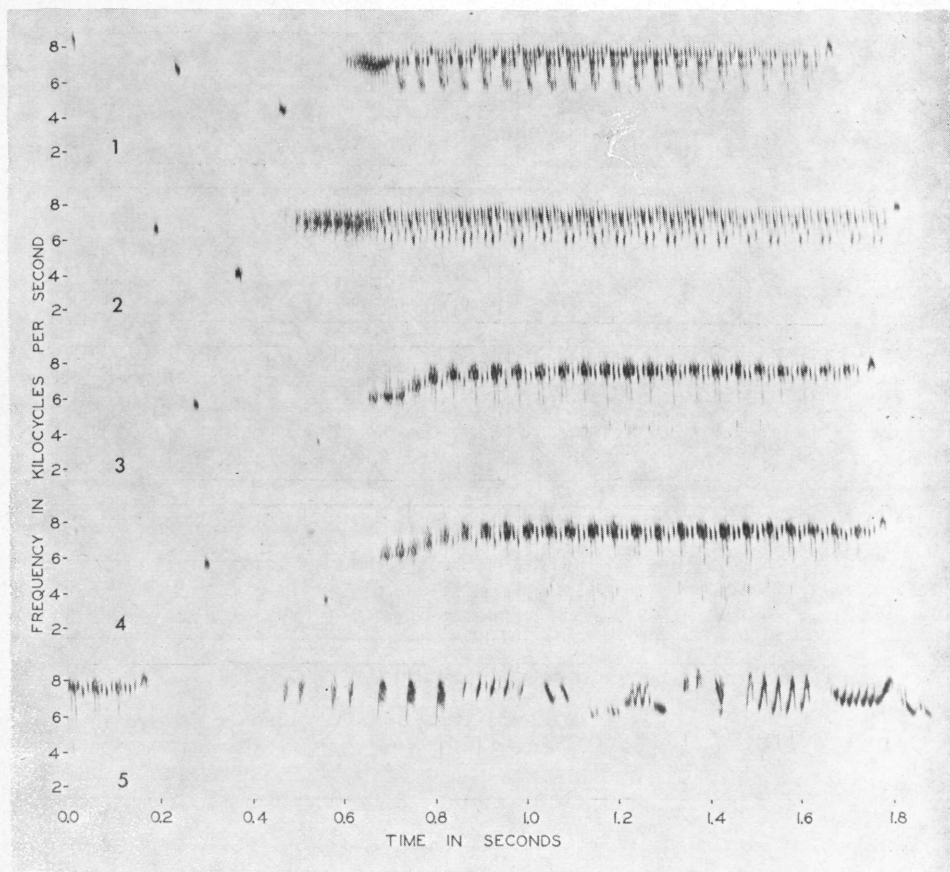
The passerine songs commonly heard (advertising songs) appear to function in advertising the presence of the male bird and proclaiming its territory. Other functions, such as attracting a mate, maintaining the pair bond, and repelling other males from the territory, may also be served by the advertising songs (sometimes sung at a different volume or with a different cadence) or by special songs; these special songs may be a little different from the advertising songs, and may be heard infrequently. Sometimes what appears to be the advertising song is sung a little differently under certain circumstances.

The advertising song of a Grasshopper Sparrow (*Ammodramus savannarum*) usually consists of three or four short notes, generally of decreasing pitch, followed

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by a long high-pitched buzz, with a short high note at the end (Borrer, 1961a) (figs. 1-3). The songs of a given individual generally differ only in the length of the buzz, or sometimes in the number of introductory notes. The songs of different individuals often differ in the detailed character of the buzz, or in the number of introductory notes, but these differences are small and the songs of different individuals sound very much alike. The Grasshopper Sparrow has another song, which is seldom heard, that appears to function in attracting a mate and maintaining the pair bond (Smith, 1959); this song resembles the advertising song, but has some additional buzzes on the end (figs. 4-5).

Most passerines use their advertising songs to repel other males from their territory; singing under these circumstances generally differs from unstimulated singing only in a somewhat faster cadence. A few species in this situation sing songs that are a little different from their advertising songs—lower in volume (sometimes described as “whisper” songs) and often lacking the characteristic



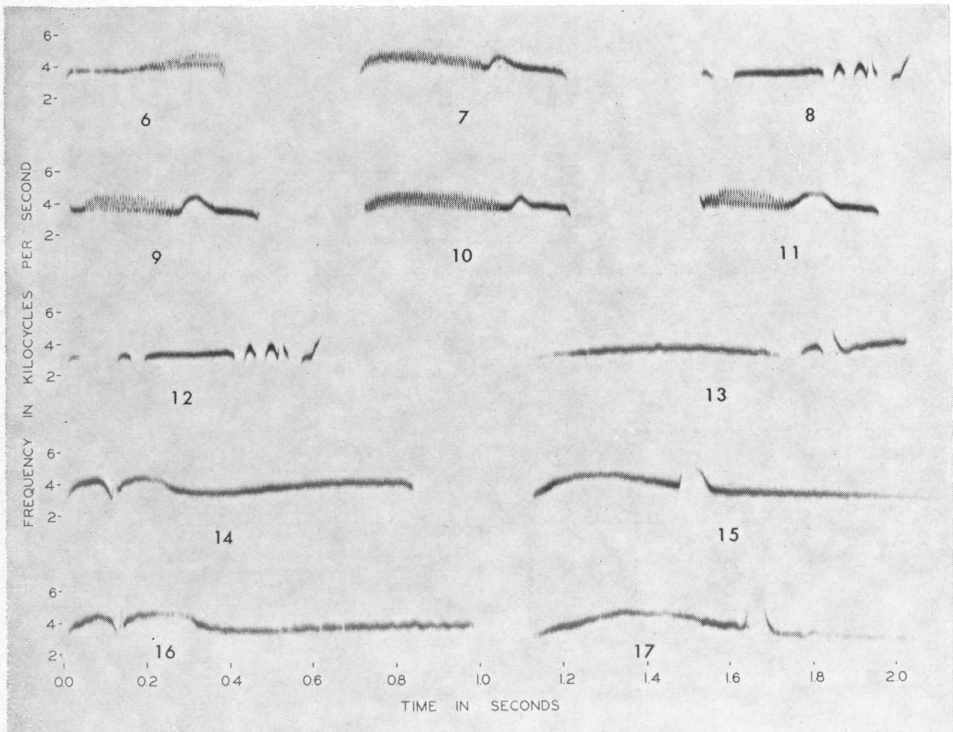
Sonograms of Grasshopper Sparrow songs. FIGURES 1-3, advertising songs; FIGURES 4-5 (5 is a continuation of 4), a courtship song. FIG. 1, Blacklick Woods, Franklin Co., Ohio, May 15, 1964 (6873-1); FIG. 2, same area as Fig. 1, May 20, 1961 (5171-1); FIGS. 3-5, Waterloo, Ont., July 17, 1958 (from a recording by W. W. H. Gunn, Cut 3). Numbers in parentheses in these figure legends (such as 6873-1 for Fig. 1) refer to the number of the recording, and to the particular song in the recording, from which the sonogram was made; all sonograms were made from tapes in the Ohio State University collection.

form of the advertising songs. Mayfield (1960) has described such songs for the Kirtland's Warbler (*Dendroica kirtlandii*). Some warblers that have two general types of songs use one type chiefly in sexual situations and the other chiefly in aggressive situations (Morse, 1966 and 1967).

Some of the flycatchers sing a little differently before sunrise than they do during the day; the significance of this twilight song is not well understood, but it is presumably in response to a low light intensity. The songs of the Eastern Wood Pewee (*Contopus virens*) during the day are of two types (figs. 14-17), sung more or less alternately at the rate of six to eight per minute. The twilight songs of this species are of three types, the two sung during the day, plus a third (fig. 13), sung at the rate of 15 to 20 per minute. The daytime songs of the Western Wood Pewee (*Contopus sordidulus*) are of one type (which may differ a little in different birds; figs. 6-7, 9-11), sung at the rate of about six songs per minute; the twilight songs are of two types, the daytime type plus another (figs. 8, 12), sung more or less alternately at the rate of 20 or more per minute.

DEVELOPING SONG

A male passerine bird does not suddenly begin singing perfect advertising songs when it reaches a certain age; the songs are developed over a period of time.



Sonograms of Wood Pewee songs. FIGURES 6-12, Western Wood Pewee; FIGURES 13-17, Eastern Wood Pewee. The songs represented by FIGURES 8, 12, and 13 are sung only in the twilight singing. FIG. 6, Corvallis, Ore., Aug. 2, 1965 (7941-1); FIG. 7, Corvallis, Ore., June 24, 1965 (7730-10); FIG. 8, Portal, Ariz., July 4, 1964 (7193-5); FIG. 9, Portal, Ariz., July 1, 1964 (7170-4); FIG. 10, Portal, Ariz., June 23, 1964 (7053-1); FIGS. 11 and 12, Portal, Ariz., July 4, 1964 (7193-6 and 7193-7); FIG. 13, Bloomington, Ind., June 1, 1958 (3452-18); FIGS. 14 and 15, Hog Island, Lincoln Co., Me., June 30, 1957 (2920-3 and 2920-2); FIGS. 16 and 17, Bloomington, Ind., June 1, 1958 (3452-6 and 3452-20).

This period may vary in length in different species, or in different individuals of the same species. The developmental stages of the fully developed (primary) song have been described for a number of species (e.g., Lanyon, 1960; Mulligan, 1966). Song in the Song Sparrow (*Melospiza melodia*) (Mulligan, 1966), for example, begins with a soft, barely audible warble, generally in late summer of the bird's first year. Later, usually during the fall or winter, some notes and phrases of the adult song appear; by February or March, these notes and phrases begin to be organized into a sequence, and songs (or fragments of songs) begin to be repeated. Before the final form of the song is developed, the songs may be similar to those of the adult, but more variable. By March or April (rarely a little later), when the bird is nearly a year old, the final form of the adult song becomes crystallized.

The songs of many birds (including some migrants) in early spring are in a pre-adult stage of development; they are often quite variable, and frequently lack the characteristic form of the adult song; they are often sung at a faster cadence. The song patterns are eventually perfected and, once perfected, are generally fixed for life. Developmental stages of song can usually be recognized by variations in the songs, imperfections of the song patterns, and the season in which they are heard.

Figure 19 shows part of an advertising song of a Chipping Sparrow (*Spizella passerina*), together with what is believed to represent a developmental stage in the song of the same individual (fig. 18). The two recordings from which these songs were taken were made in the same place a week apart. The earlier songs (fig. 18) contained two types of syllables; a week later one of these was eliminated to form the adult song containing a single type of syllable.

MIMICRY

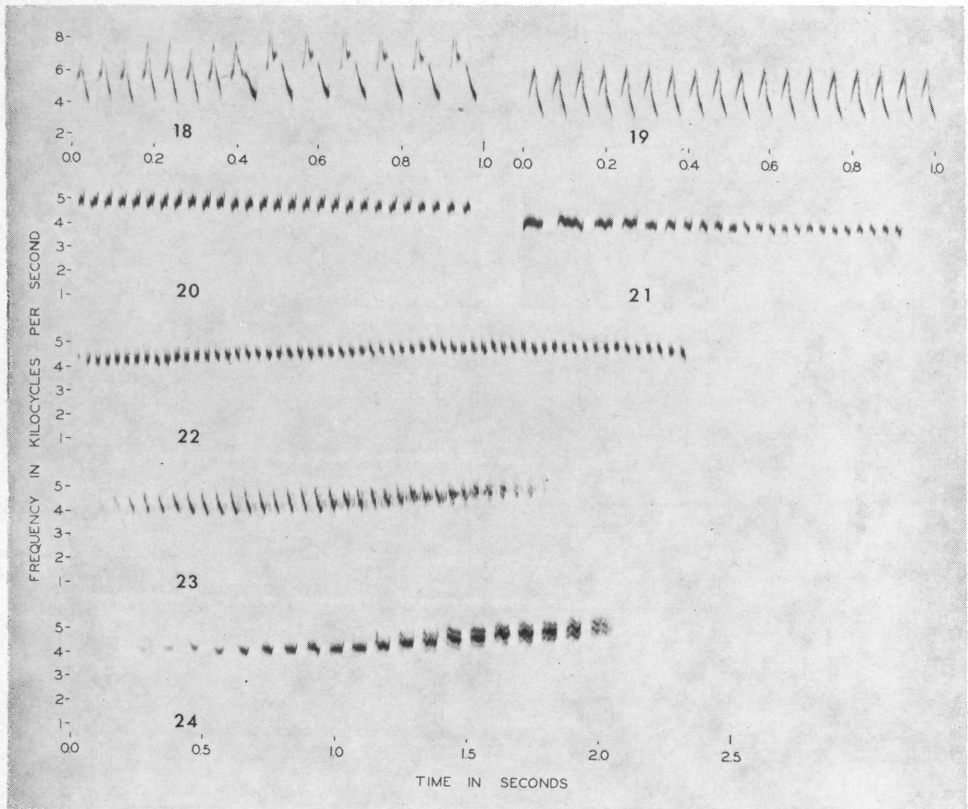
A basic question often asked about bird song is—just how does a bird come to sing the particular songs it sings? Heredity is undoubtedly involved, but how much is learned? There is a great deal of variation in the advertising songs of many passerines (Borrer, 1961b) so, if heredity is the sole factor in song acquisition, these species must have a great many genes controlling song. Learning is known to play a role in song acquisition in some species—including the White-crowned Sparrow (*Zonotrichia leucophrys*) (Marler and Tamura, 1964), the Song Sparrow (Mulligan, 1966), the Meadowlarks (*Sturnella*) (Lanyon, 1960), the Chaffinch (*Fringilla coelebs*) (Thorpe, 1954), the Blackbird (*Turdus merula*) (Thielcke-Poltz and Thielcke, 1960), and the Bullfinch (*Pyrrhula pyrrhula*) (Nicolai, 1959)—and is probably involved in many species. Each passerine must normally be receptive to, and picks up for its vocabulary, only certain types of notes and phrases; with an hereditary tendency to sing a particular type of song, it generally manages to develop normal or typical advertising songs.

Most passerines grow up in an environment where they hear the songs of many species in addition to their own, and the amazing thing is—if learning is important in song acquisition—that they so seldom develop the wrong song. However, it is probable that some unusual songs of passerine birds, particularly those resembling the songs of another species, are the result of the bird's hearing songs of that other species during the period in which it was developing its song. It has been shown experimentally that some birds (e.g., the Western Meadowlark, *Sturnella neglecta*, by Lanyon, 1957), if exposed to the songs of another species during their song-learning period, will incorporate motifs of that other species into their songs. A few examples of what is believed to be such mimicry are shown in figures 20–24; some cases reported in the literature (e.g., Short, 1966, a Field Sparrow singing a Chipping Sparrow song; and Tasker, 1955, a Chipping Sparrow singing a Clay-colored Sparrow song) may also represent mimicry.

I have examined, with a sound spectrograph, the songs of over 200 Chipping

Sparrows, and in all but one of these birds the elements of the song were very abruptly slurred (Borror, 1959a). In this one bird (fig. 20), which was recorded in the same place for two successive seasons, the syllables of the song were short and not distinctly slurred, and the songs lacked the mechanical quality typical of Chipping Sparrow songs. They were rather musical, and resembled the final trill in many Field Sparrow (*Spizella pusilla*) songs. I believe this atypical Chipping Sparrow song was the result of mimicry of a Field Sparrow (fig. 21).

The circumstances under which the Field Sparrow sang songs of the type shown in figure 22 indicate that these were fully developed advertising songs (not songs of some special type, nor a stage in song development). The date (May 5) seems too late in the season for this to be a developmental stage of primary song (and this song was heard in this same place several days before I recorded it). The bird sang from an elevated perch at a cadence typical of advertising songs, and no other Field Sparrow was in evidence near by when the recording was made.



Sonograms of Chipping Sparrow, Field Sparrow, and Prairie Warbler songs. FIGURE 18, a section from near the middle of a Chipping Sparrow song, the song with two types of syllables; Blendon Woods, Franklin Co., Ohio, April 21, 1963 (6251-9). FIGURE 19, a section from near the middle of a Chipping Sparrow song, the song with only one type of syllable; recorded in the same place as the song in FIG. 18, a week later (6270-1). FIGURE 20, the end of a Chipping Sparrow song; Blacklick Woods, Franklin Co., Ohio, April 20, 1966 (8119-3). FIGURE 21, the end of a Field Sparrow song; Blendon Woods, Franklin Co., Ohio, April 11, 1959 (3827-1). FIGURE 22, an atypical Field Sparrow song; Worthington, Ohio, May 5, 1959 (3960-4). FIGURE 23, song of a Prairie Warbler; Neotoma, Hocking Co., Ohio, June 28, 1954 (1180-1). FIGURE 24, song of a Prairie Warbler; Neotoma, Hocking Co., Ohio, May 10, 1958 (3364-1).

Therefore I believe that these songs represent another case of mimicry—mimicry of a Prairie Warbler (*Dendroica discolor*) (figs. 23–24).

The collection of bird recordings at The Ohio State University contains some other examples of unusual songs that probably represent mimicry: a Bachman's Sparrow (*Aimophila aestivalis*) mimicking a Field Sparrow, a Rufous-sided Towhee (*Pipilo erythrophthalmus*) mimicking a Field Sparrow, and a Red-eyed Vireo (*Vireo olivaceus*) mimicking a Rufous-sided Towhee. One recording of a Bachman's Sparrow (No. 1419, Blacklick Woods, Franklin Co., Ohio, May 15, 1955), with 37 songs, has 26 songs typical of the species and 11 resembling those of a Field Sparrow; another (No. 8487, Neotoma, Hocking Co., Ohio, June 5, 1966), with 111 songs, contains one song with a trill resembling a Field Sparrow's song (notes uniform in pitch but increasing in rate), while the other 110 songs are typical of the species (the phrase rate uniform through the trill). All the songs in one Towhee recording (No. 3146, Blendon Woods, Franklin Co., Ohio, April 2, 1958) resemble those of a Field Sparrow. In one recording of a Red-eyed Vireo (No. 2653, Columbus, Ohio, May 16, 1957) occasional phrases resemble songs of the Rufous-sided Towhee.

SONG TYPES OUTSIDE THEIR USUAL GEOGRAPHIC RANGE

The songs of many passerines are subject to geographic variation (Borrer, 1961b). This variation may be in song pattern, as in the White-throated Sparrow (*Zonotrichia albicollis*) (Borrer and Gunn, 1965), and the White-crowned Sparrow (Marler and Tamura, 1962), or in such features as song length, phrase rate, number of notes per phrase, or other features that can be measured. In species where there is an appreciable amount of intrapopulation variation in song, differences between populations can be demonstrated statistically. If a type of song common in one section of the country is heard in another section, where it is of rare occurrence, it might be considered unusual.

Songs of the White-throated Sparrow described as Pattern 3 by Borrer and Gunn (1965) are quite common in New England and the maritime provinces of Canada, being sung by one fourth or more of the birds in these areas. Borrer and Gunn do not record this pattern from Ohio, but I heard a White-throat singing this type of song in Ohio in the spring of 1967. This is an unusual White-throat song in Ohio, but not in the northeast. Similarly, White-throat songs of Pattern 2, which were sung by about one fifth of the Manitoba birds studied by Borrer and Gunn, would be considered very unusual if heard in the east.

Ohio songs of the Carolina Wren (*Thryothorus ludovicianus*) contain two to seven phrases, which in the fastest songs are sung at the rate of only about four phrases per second (Borrer, 1956). Songs of Florida Carolina Wrens contain up to 12 phrases, in the fastest songs being sung at the rate of about six phrases per second. A Carolina Wren song containing 10 or 12 phrases would be very unusual in Ohio.

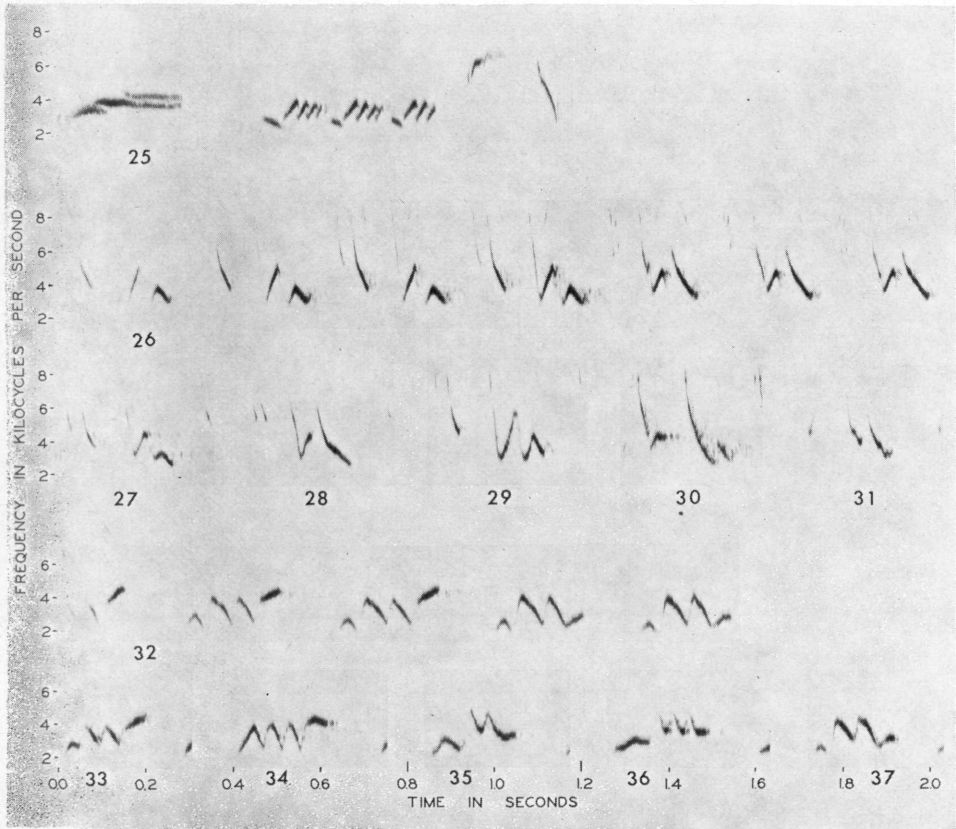
ATYPICAL SONGS

Songs are occasionally heard from passerine birds that appear to be fully developed advertising songs, but in one way or another are a little different from the typical songs of the species, and do not appear (from our present knowledge of the species concerned) to fit into any of the above categories. A few examples from The Ohio State University collection of bird recordings are given to illustrate such songs.

Songs of the eastern race of the Rufous-sided Towhee (*Pipilo erythrophthalmus erythrophthalmus*) typically consist of an introduction of from one to four notes followed by a trill (Borrer, 1959b). Occasionally the introduction or the trill may be lacking, or the trill may be double (a series of phrases of one type, then a series of another type). We have 12 recordings of one bird in Blendon Woods,

Franklin Co., Ohio (made in approximately the same place in 1963, 1964, and 1965), containing eight different song patterns; all of these patterns are normal except one, which ends in a peculiar hiccup-like sound (Fig. 25). This terminal hiccup-like sound was not found in any songs of nearly 300 other *P. e. erythrophthalmus* examined (containing some 550 different song patterns). The introduction in this one atypical song pattern, often uttered by itself as the characteristic *tawee* call of this race, appeared as the introduction in songs of ten other Towhees (one from Maine, one from Michigan, and eight from Ohio); the trill (preceding the final hiccup-like sound) was found in two other birds, both from North Carolina.

This peculiar Towhee song might be the result of a mutation, or the bird may simply have gotten a little mixed up when it was developing its songs. I have



Sonograms of Rufous-sided Towhee, Ovenbird, and Kentucky Warbler songs. FIGURE 25, an atypical Towhee song; Blendon Woods, Franklin Co., Ohio, July 24, 1964 (7232-1). FIGURE 26, the last seven phrases of an Ovenbird song, the song with two types of phrases (the last three phrases different); Neotoma, Hocking Co., Ohio, June 5, 1966 (8484-2). FIGURES 27-31, individual phrases of Ovenbird songs; FIG. 27, Neotoma, Hocking Co., Ohio, June 3, 1962 (5881-1); FIG. 28, Blendon Woods, Franklin Co., Ohio, May 4, 1955 (1357-1); FIG. 29, Neotoma, Hocking Co., Ohio, June 5, 1966 (8483-2); FIG. 30, Clear Creek, Hocking Co., Ohio, June 2, 1962 (5873-1); FIG. 31, Neotoma, Hocking Co., Ohio, May 9, 1959 (3974-1). FIGURE 32, a Kentucky Warbler song with two types of phrases (the last two phrases different); Blacklick Woods, Franklin Co., Ohio, May 4, 1953 (458-9). FIGURES 33-37, individual phrases of Kentucky Warbler songs; FIG. 33, Jacob's Ladder, Fairfield Co., Ohio, June 5, 1966 (8478-1); FIG. 34, Blacklick Woods, Franklin Co., Ohio, May 11, 1958 (3374-2); FIG. 35, Blendon Woods, Franklin Co., Ohio, May 11, 1955 (1392-1); FIG. 36, Worthington, Ohio, May 19, 1955 (1434-1); FIG. 37, Blendon Woods, Franklin Co., Ohio, May 5, 1959 (4009-1).

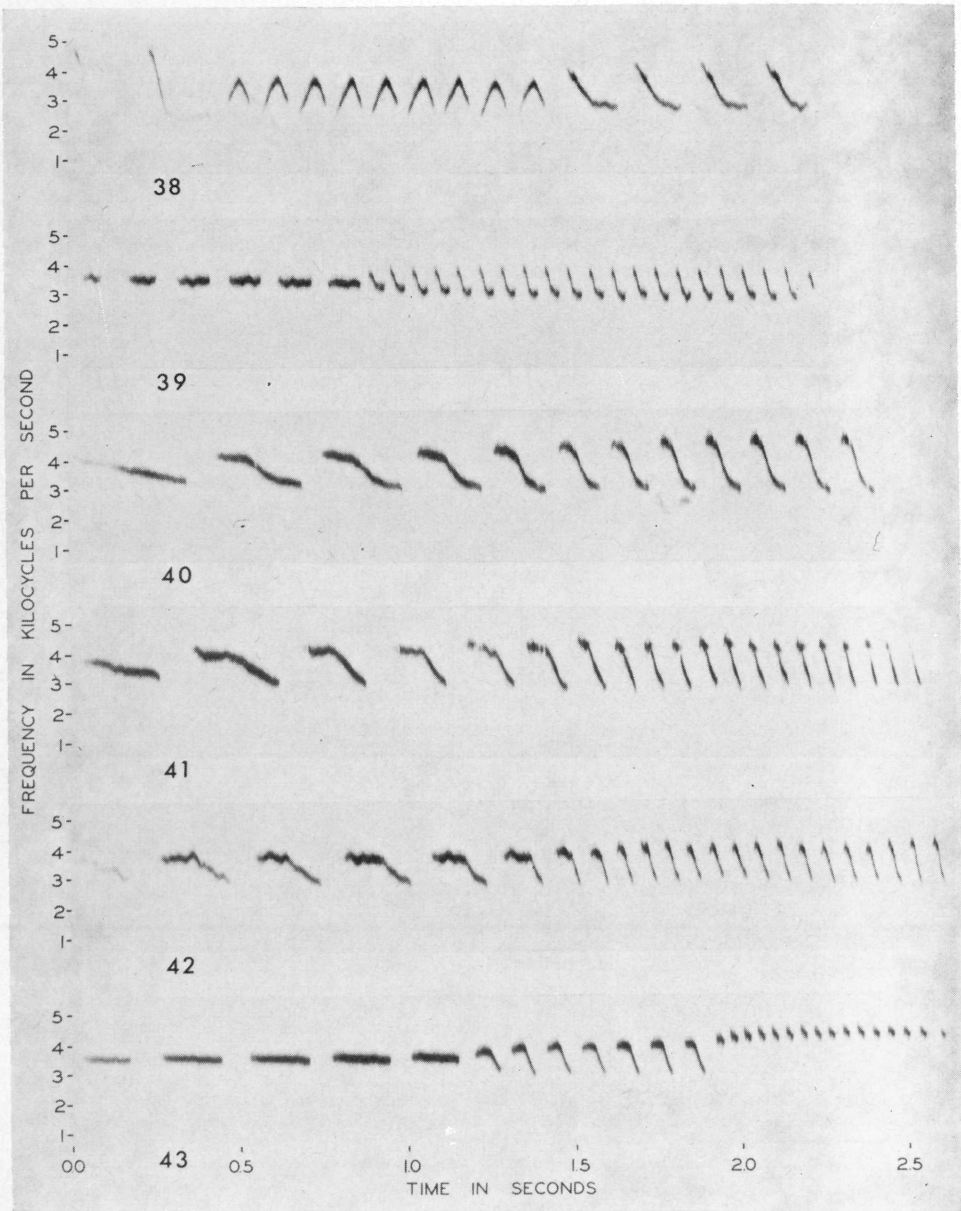
quite a few recordings of other Towhees from the same general area (Blendon Woods) made in 1964, 1965, 1966, and 1967; some of these recordings may have been from an offspring of this bird, but none contained a song with this peculiar ending. If this unusual song was the result of a mutation, the mutation hasn't shown up again. It seems more probable that this song pattern was accidental, but once developed, was fixed; it was sung by this bird for three seasons.

The songs of many species, including the Yellowthroat (*Geothlypis trichas*), Ovenbird (*Seiurus auricapillus*), and Kentucky Warbler (*Oporornis formosus*), typically consist of a series of similar phrases. Our collection of recorded songs of each of these three species contains one or more instances of songs containing two types of phrases (a few phrases of one type, then a few of another type); in each instance every song in the recording contained the two types of phrases. Cases of Yellowthroat songs of this sort are discussed by Borrer (1967); examples of such songs by the Ovenbird and Kentucky Warbler are shown in figures 26 and 32.

Songs of a Field Sparrow typically consist of a series of clear whistled notes that begin slowly and increase in rate toward the end of the song. The individual notes may be relatively steady in pitch, up-slurred, or down-slurred; they are usually all about the same pitch, or the pitch may rise or fall slightly toward the end of the song. Figures 39-43 show some typical songs of this species. We have five Field Sparrow recordings (Nos. 1748, 1766, 2450, 2462, and 3229) containing the same unusual type of song (fig. 38); these recordings were made in the same place in 1956, 1957, and 1958, and are undoubtedly of the same bird. The Ohio State University tape collection contains 146 recordings of Field Sparrow songs (from Ohio, Kentucky, North Carolina, Michigan, Indiana, and Pennsylvania), but none of the other 141 recordings contains songs like those of this bird.

These atypical songs may represent "errors" in song development, or they may be the result of mutation. I have no evidence that any of the examples mentioned above are of a type relatively common in some other section of the country; they all appear to be fully developed advertising songs, and they do not appear to represent mimicry. If they are the result of errors during song development, they would not be likely to appear in other birds; if they are the result of mutation, they *could* appear in succeeding generations. Song is believed to play a role in a bird's securing a mate; if an atypical song is very different from the species' usual songs, its singer might be unable to secure a mate. Unfortunately, I have no information on the matedness of the birds with the atypical songs mentioned above.

It is conceivable that an atypical song might be the result of some structural defect in the song-producing mechanism, perhaps analogous to such speech defects in man as lisping, stuttering, and the like. None of the birds mentioned above was collected and dissected, but since song differences are due principally to nervous control, it is doubtful if any structural anomalies would have been found, even if the birds had been dissected. I have occasionally found in the Song Sparrow instances of what might be analogous to stuttering in man—small breaks in trills, and a very short hesitation note inserted before a principal note—but most of these were scarcely noticeable to the human ear; most were apparent only when the recordings were played at a reduced speed, or when the song was graphed. In the case of the Towhee song mentioned above (fig. 25), the fact that this bird had several normal songs besides this atypical one would seem to rule out any defect in the vocal mechanism.



Sonograms of Field Sparrow songs. FIGURE 38, an atypical song; Blendon Woods, Franklin Co., Ohio, April 16, 1957 (2462-1); FIGURES 39-43, typical Field Sparrow songs; FIG. 39, Blacklick Woods, Franklin Co., Ohio, April 28, 1956 (1735-1); FIG. 40, Darby Creek Park, Franklin Co., Ohio, May 5, 1966 (8206-2); FIG. 41, University Park, Pa., April 18, 1956 (1706-1); FIG. 42, Delaware Co., Ohio, March 31, 1957 (2411-1); FIG. 43, Blendon Woods, Franklin Co., Ohio, April 2, 1967 (8732-1).

CONCLUSIONS

Unusual songs of passerine birds fall into the following categories:

1. Special songs, sung only under certain circumstances, and considered unusual simply because they are seldom heard (courtship songs, aggressive songs, etc.).
2. Developmental stages of the advertising or primary song.
3. Songs resembling those of another species, and probably developed under the influence of songs of that other species (mimicry).
4. Song types outside their usual geographic range—common in another section of the country, but rare or accidental where heard.
5. Songs that are atypical for unknown reasons, which do not appear to fall into any of the above categories; these songs may be the result of mutation, defects in the vocal apparatus, or, more probably, "errors" during song development.

When we know more about the variation in a bird's songs, when we understand more about how a bird comes to sing a particular type of song, and when we can follow up on individuals that sing unusual songs, through the season or through successive seasons, then we may begin to understand why a bird should sometimes sing what appears to be an unusual or atypical song. By noting the mating success of birds with atypical songs, we may get information on the role of song in mating and in reproductive isolation.

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