

THE SONGS AND CALLS OF THE WOOD THRUSH

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THE song of the Wood Thrush (*Hyllocichla mustelina*) is long-continued, and made up of phrases with comparatively long pauses between them. Each of these phrases is composed of up to three parts, differing from each other in quality and loudness. The parts are the introductory phrase, the main central phrase, and the termination. A bird may sing a phrase containing all three of these parts or omitting any one or two of them. The one most commonly omitted is the introductory phrase. The phrase most rarely omitted is the central phrase. This central phrase is the loudest, clearest, and most musical part, and from a distance often the only phrase heard.

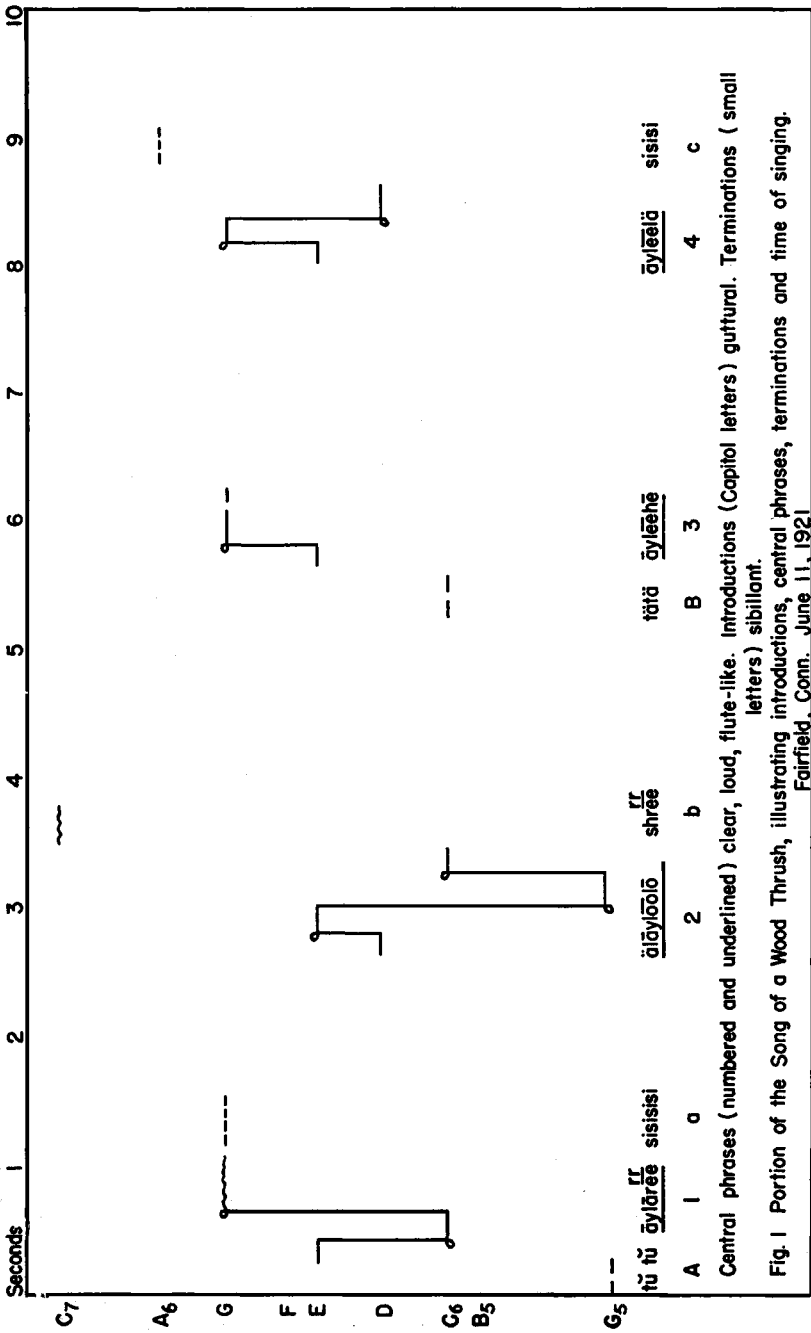
While I consider this song a long-continued one, the matter may have a different interpretation. In a recent publication (Borror and Reese, 1956) each phrase is considered to be a distinct song, and an individual bird is credited with 10 different songs, five of them being what I consider to be central phrases.

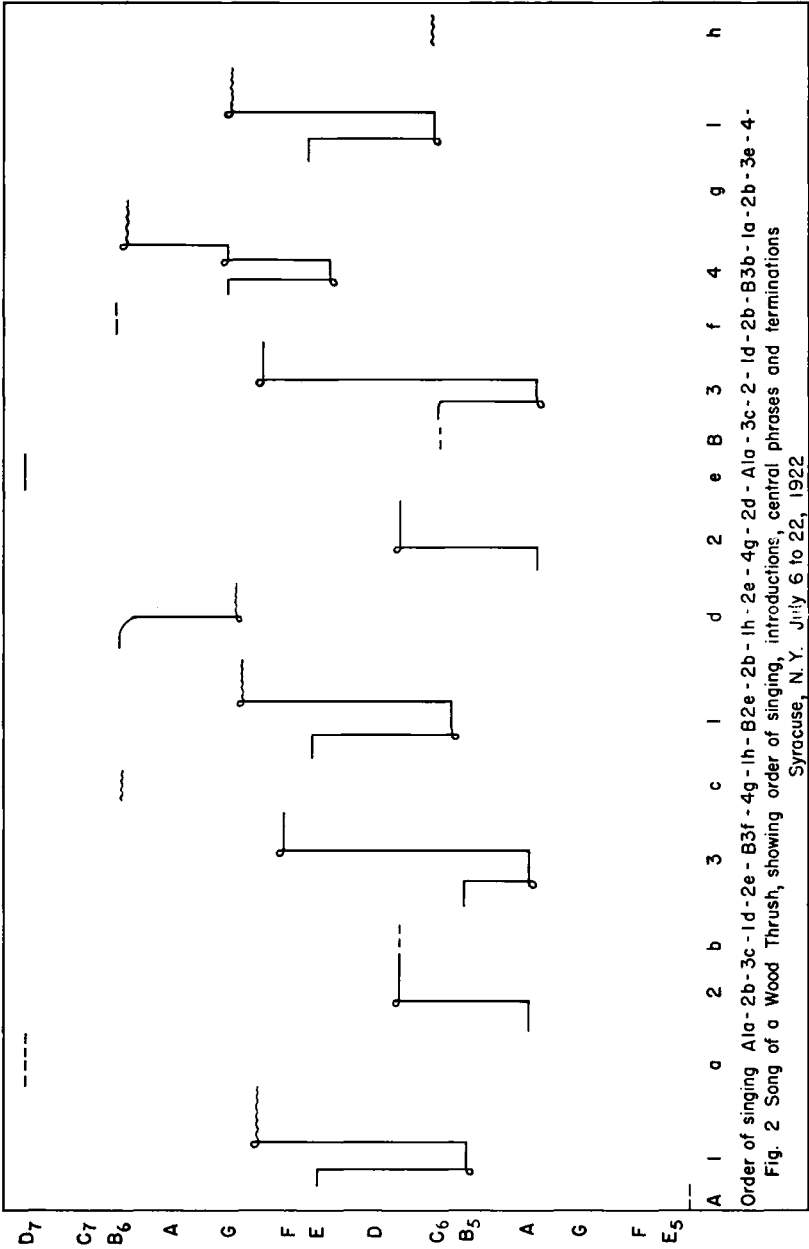
If there are those who do not understand the diagrams used in illustrations, these have been explained. The first explanation is in Saunders (1915), and a more detailed one is in Saunders (1929).

The song (Figure 1) is a difficult one to illustrate just as it is, because of rather long pauses between the phrases, that would require a large amount of space. The illustration shows a bird singing at a rate of about 10 phrases in 24 seconds, somewhat faster than the average song of nearly 10 phrases in 38 to 40 seconds. Some birds are very irregular, and slower than this, especially toward the end of the singing season. In illustrations other than Figure 1, I have not attempted to show the actual time, for altogether too much space would be required.

In singing, the Wood Thrush uses different combinations of introductory notes and terminations. For example, one bird (Figure 2) sings four different central phrases, and combines these with two introductory phrases and eight different terminations. Thus the singing of 24 phrases is recorded, and there are, in that time, 15 different combinations. I have labelled the diagrams (Figure 2) with capital letters for introductory notes, numbers for the central phrases, and small letters for the terminations. This record shows how the bird may sing occasional central phrases that stand alone, without either introductions or terminations.

The introductory notes are simple, but the terminations are exceedingly complex. To the ear they are quite perfectly pitched,





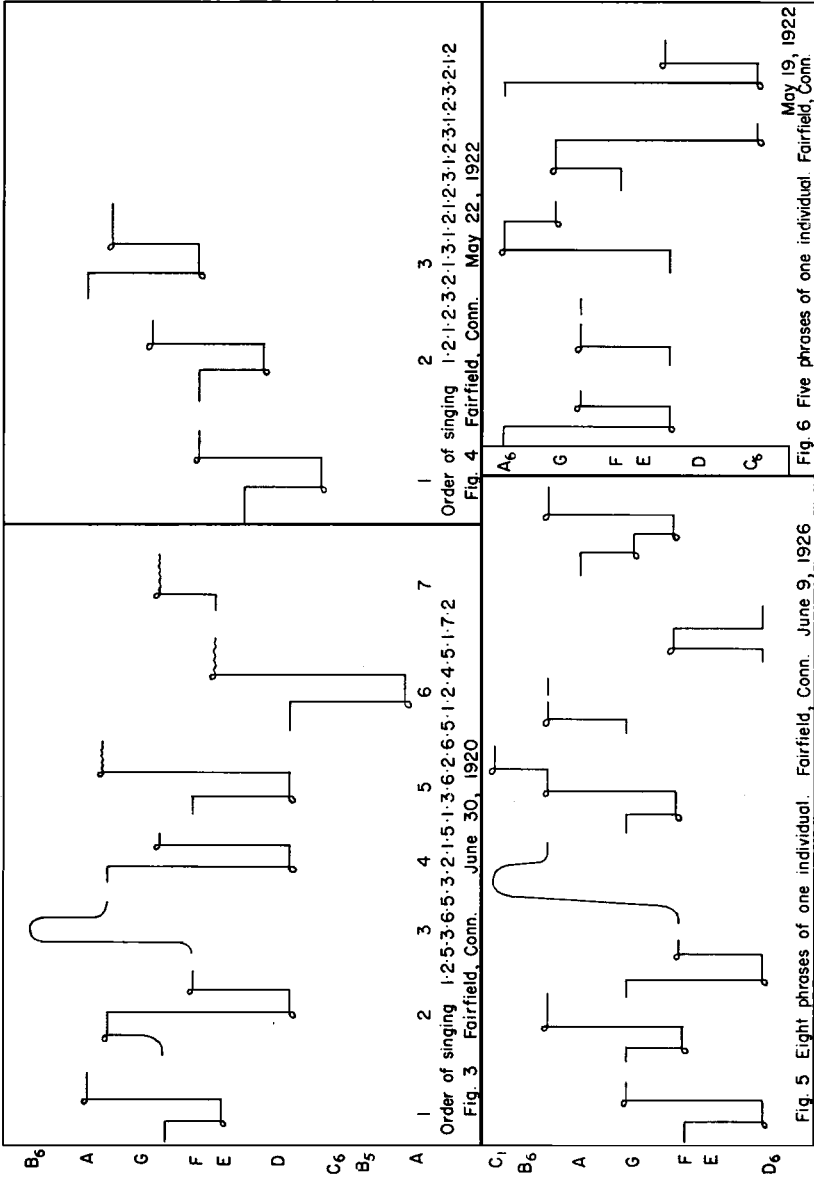
musically often just an octave, or a fifth above the last note of the central phrase that they follow. But Borrer and Reese (1956) have shown the complexity of these terminal notes, wherein the bird may sing three, four, or even five notes at once. They range high in pitch, even above 8,000 vibrations, which is about an octave higher than the highest note of the piano, and above the hearing of many people.

The study of the central phrases, the most musical part of the Wood Thrush song, is of considerable interest. The number of notes in a phrase varies from one to 10. In my records the variation is from one to seven, but Borrer and Reese, by means of the vibralyzer, show one that contains 10 notes. I have wondered whether, hearing this phrase by ear, I would have heard the middle notes as an L-like consonant sound. If that were the case I would have recorded it as a seven-note phrase. In any event I am writing from the standpoint of what the ear hears, and that may be more or less different from what the vibralyzer records (Saunders, 1959).

I have recorded the songs of 179 different individual Wood Thrushes. In these records are 583 central phrases. I have two phrases of one note, 43 of two notes, 428 of three notes, 90 of four notes, 14 of five notes, four of six notes, and two of seven. Thus nearly three-quarters of the phrases are of three notes.

The one-note phrases are represented in the diagrams in the first phrase of Figure 7 and the second phrase of Figure 8. There are two forms of two-note phrases, as shown in Figure 13. One of these is shown in Figure 2, phrase 2. Actually this one is less common than the other form, there being, in my records, only 11 of this form to 32 of the other.

In the study of the three-note phrases it is simplest to classify them with numbers, according to the differences in pitches of the three notes. I use 1 for the highest pitch, 2 for the medium one, and 3 for the lowest, when the three notes are on three different pitches. There are then six possible arrangements: 123, 132, 213, 231, 312, and 321. All but the last of these forms are illustrated in Figure 14. The last, 321, is not there because I have never heard this arrangement of pitches sung by a Wood Thrush. The first of these, 123, is also rare, for I have heard it only twice. The other four phrases occur regularly and constitute the greater part of Wood Thrush singing. One might write these phrases phonetically as *eelola*, *alolee*, *aleelo*, and *oleela*. Of these, 231 or *alolee*, is the commonest phrase of all, constituting more than 50 per cent of these three-note phrases. Arrangement 132, or *eelola*, makes



up about 25 per cent, and the remainder is almost equally divided between the other two.

The lack of such a phrase as 123 and the greater rarity of those forms with the 1 in the middle are an indication of a condition common in bird songs and calls in which there is a much greater tendency for the pitch to go from high to low than for the reverse.

In the case of the phrase 312 there occurs occasionally a phrase that has no liquid consonant sounds connecting the notes and sounds like *oweeay*. This is illustrated in the third phrase of Figure 3 and the fourth phrase of Figure 5. Eighteen, or about 10 per cent of the birds I have studied, have used such a phrase. I thought, for a time, that it might be a local phrase, common to birds in southern Connecticut, but 17 records of such a phrase come from 106 birds in Connecticut, and one record comes from one of 12 birds recorded from Allegany State Park, in Cattaraugus County, New York.

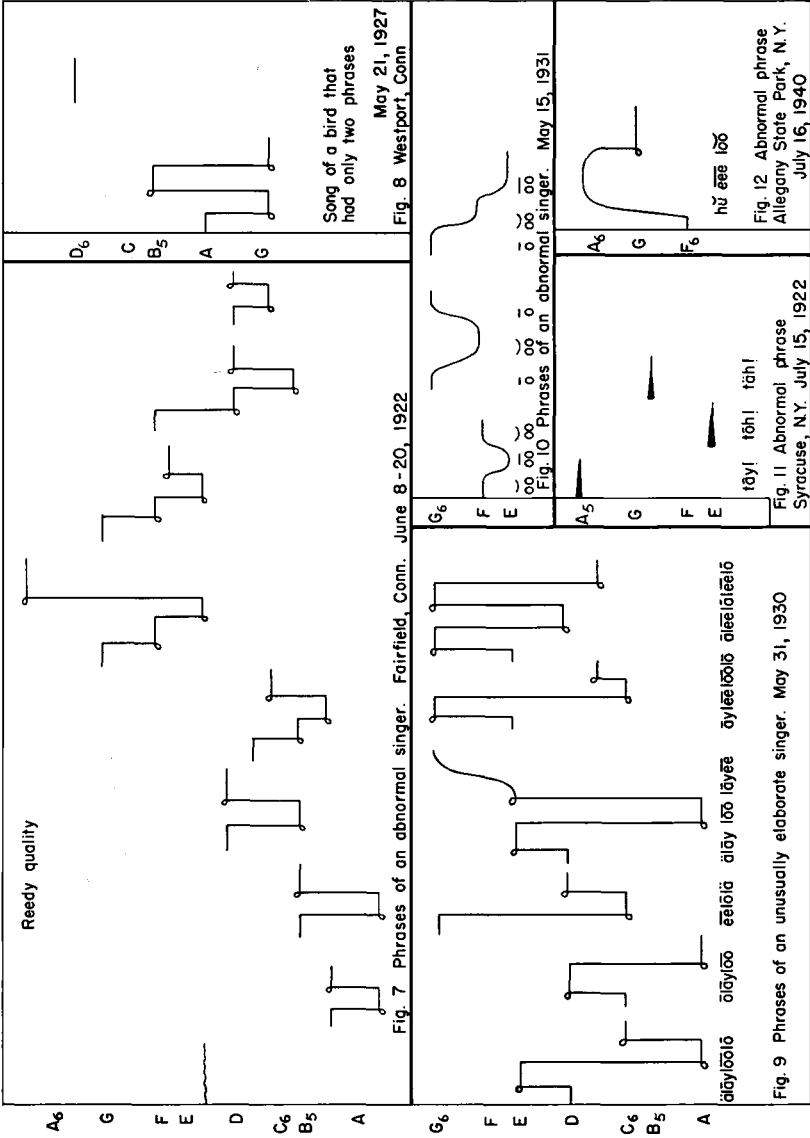
Other three-note phrases that are on only two different pitches are 112, 121, 122, 211, 212, and 221. These are not especially common. I have 20 records of 211 and 14 of 212, but very few of the others.

Classifying a phrase as 231 or some other arrangement does not mean that that phrase is always the same. I have 24 different 231 phrases. They differ in the pitch intervals between the notes. For example there are phrases 1, 5, and 6 in Figure 3, and phrases 1 and 2 in Figure 4.

I have recorded 25 variations in form of four-note phrases. Of these, only two might be called common phrases. These are 2321 (Figure 2, phrase 4) and 2143 (Figure 1, phrase 2). I have recorded the first of these 20 times, and the other 21 times. Eleven of the other four-note phrases have been recorded only once, but 2113 and 3421 have been recorded four times each. Some of the other phrases have been recorded three and two times.

Five-note phrases are not common, the majority of Wood Thrushes not using them. I have recorded 14 different forms. Twelve are illustrated (Figure 17). Of others 21314 is shown (Figure 9, phrase 6), but 21212 is not illustrated. It is a peculiar phrase, the bird sometimes adding another 12, which makes it a seven-note phrase. It usually sounds like *oolayoolayoo*. These phrases are mostly recorded but once each, but 43512 is recorded four times, and 32421 twice. I have recorded five-note phrases only 18 times.

Six-note phrases are very rare. I have recorded but three (Figure 18), each heard from a single bird. One of them, the third phrase, has been heard many times, for the bird lived in my yard for two successive summers, and that phrase, with a drop of an octave, marked it definitely.



The bird often sang within five meters of our screened porch, and had a habit of sitting in the bird bath and singing. It also perched on a certain hickory limb that slanted slightly downward, and slid slowly down the branch, singing at intervals as it did so.

I have recorded seven-note phrases twice, one mentioned above where a five-note phrase was prolonged to seven notes, and one illustrated (Figure 19) where the bird used a five-note phrase, like the second phrase in Figure 17, and added two higher notes.

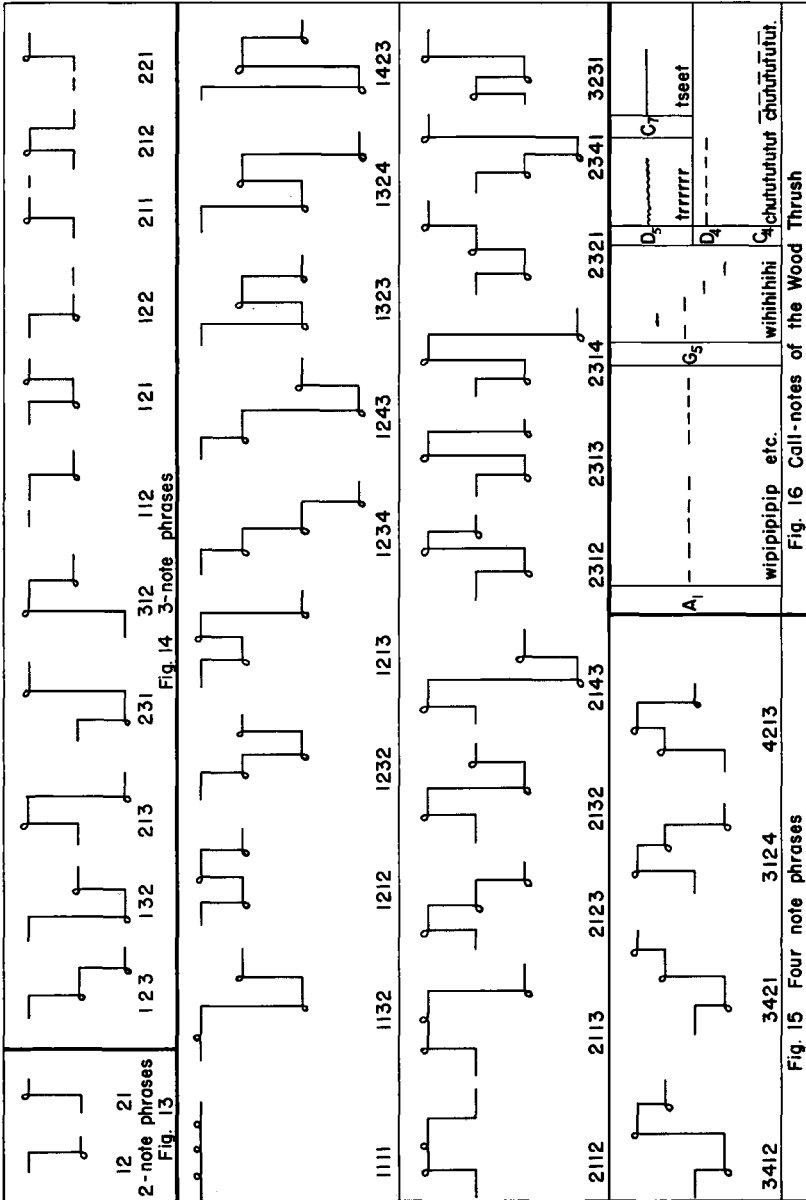
Some years ago a boy in one of my high school biology classes asked: "What bird is it that sounds like bugle-notes played on a flute?" Evidently he had been listening to a Wood Thrush. The notes of a bugle are always on the notes that make up a major chord, *do mi sol*. While by no means are all Wood Thrush phrases on the notes of a major chord, my records show that 109 of 580 phrases (18.6 per cent) are on the major chord notes. Most of these are three-note phrases, and eight of the 24 variations of the 231 phrase are on the major chord. A fairly common four-note phrase that is on these notes is 2321.

On the other hand occasional birds sing off the diatonic scale and flat or sharp some notes. Such is the case in the last note of the sixth five-note phrase (Figure 17).

In the very early days of my bird activities, when I was a boy first learning to know common birds, I heard, day after day, a Wood Thrush that had a particularly impressive phrase. At the time I had not identified the bird, so indefinite were descriptions of songs in the bird books. But I finally determined that it was a Wood Thrush. The special phrase was a four-note one 1212, the two notes a tone and a half apart, and the first and last notes each twice as long as the other two. This was at New Haven, and probably in 1898. For years I listened for this phrase again. Finally I heard it at Fairfield, Connecticut, 13 May 1928. Was it just an accident that the second bird sang the same phrase, or is there something in the heredity of Wood Thrushes that brings it out in an occasional individual?

In a similar way the four-note phrase, 2313 (Figure 8) has been recorded three times: in Fairfield, Connecticut, in 1920, in Westport, Connecticut, in 1927, and in Mt. Vernon, Illinois, in 1950. They were all slightly different in pitch intervals, and the Illinois record, lower in pitch but the same form, was there.

There occur, occasionally, certain peculiar phrases in individual Wood Thrushes. These are often nonmusical, or less musical than normal phrases. Such birds will have other phrases that are perfectly normal (Figures 11 and 12). The bird in Figure 7 was not a good singer,



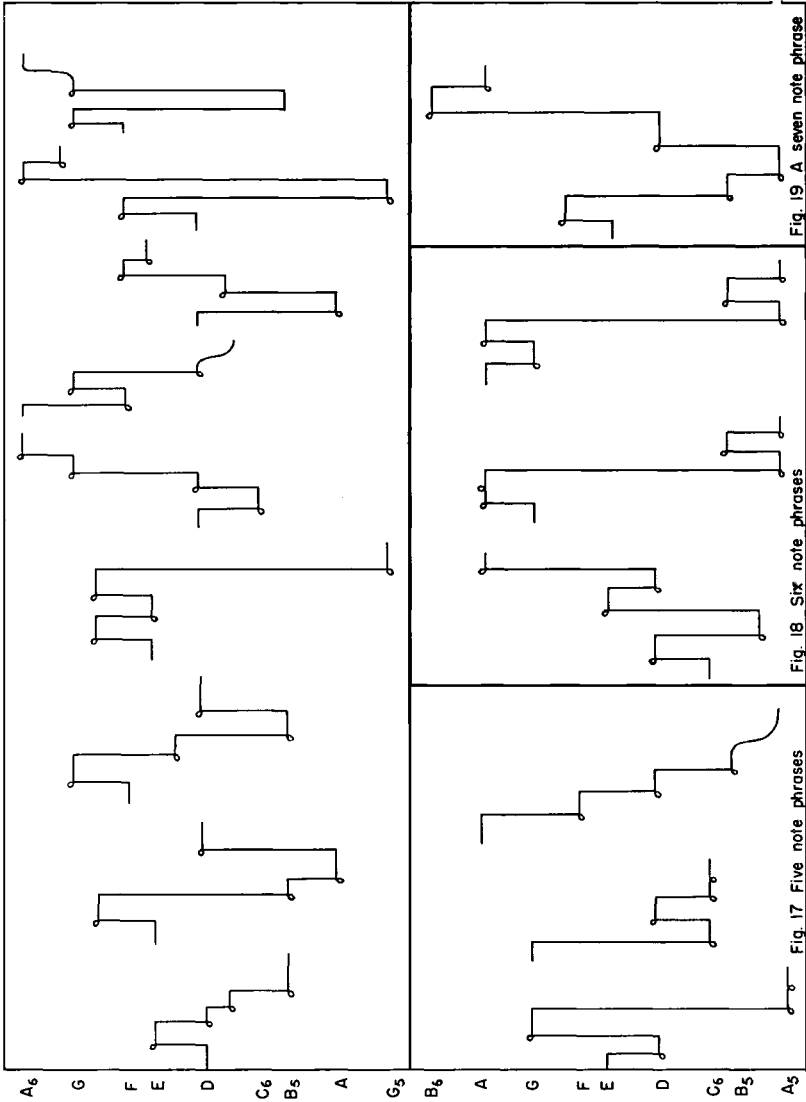
and its song was not normal. The bird in Figure 9, however, was extremely musical, and its phrases were unusually elaborate. The song in Figure 10 was altogether abnormal. The bird made me think of the attempts of certain people, who were monotones, to sing. Perhaps this bird had no "ear" for music. So we have in these unusual singers both the musical monotone and the musical genius.

There are times when Wood Thrush songs suggest human music other than bugle calls. Once, when a phonograph was producing a well-known piece of classical music, a friend remarked: "That music makes me think of Wood Thrushes." I noted the resemblance and examined the music. In it were certain groups of three notes that were like the central phrases of Wood Thrush songs. I found that I had duplicates of those three-note phrases in my collection of Wood Thrush records. The music was the first part of Rossini's *Overture to William Tell*. I once demonstrated this at an A.O.U. meeting. Evidently certain musical phrases appealed to the human composer that happened to be more or less inherent in the Wood Thrush.

Wood Thrushes begin singing with their arrival in migration. In southern Connecticut this is about 1 May; in some years in the last few days of April, and in others not until May has been with us for several days. The song continues with us through the early summer but begins to wane toward the end of July. Figures that I gave for the cessation are now slightly changed by data later than 1946 (Saunders, 1948a). General cessation now averages 3 August, the latest 9 August 1948. The date of the latest song averages 7 August: the earliest 21 July 1949 and the latest 19 August 1948.

Data on revival of song have not been changed so far as my observation goes (Saunders, 1948b). Mention should be made, however, of a remarkable observation (Hazen, 1928) in which a flock of birds in fall migration alighted in trees on a moonlight night in Washington, D.C., at 2200. Some 10 Wood Thrushes burst into full song for 20 minutes, and after that a single bird continued singing until 0245. Considering the time of night, such an occurrence may not be as rare as this one observation would indicate. It might happen more often in wooded regions, unheard by man at that hour, or only heard by someone who knew nothing of birds or bird songs. But if a similar observation should come again from someone who knows, and is prompted to publish his observation, I should not be greatly surprised.

Call-notes of the Wood Thrush are shown in Figure 17. The loud *pipipip* is used frequently, on one occasion repeated 25 times in succession. It is used as an alarm note when the nest or young are threatened,



and I have known it to be used when a Wood Thrush and several other kinds of birds were engaged in teasing a Screech Owl (*Otus asio*). The high-pitched *tseet* call I heard on but one occasion, when a bird was hunting food on the ground. It was not loud, and perhaps I had not noted it before because of that. It is probably used as a sequestration note (Grinnell, 1920).

The pitch of Wood Thrush songs in my records varies from E_5 to $D\#_7$. Call notes range lower than this, reaching D_4 . The highest notes are not central phrases, but terminations, and the vibralyzer records indicate that they are higher than the ear can determine.

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