

A GUIDE TO BIRD SONGS

*Descriptions and Diagrams of the Songs and
Singing Habits of Land Birds and Selected
Species of Shore Birds*

by

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I

HOW TO IDENTIFY BIRD SONGS

THE SONGS of birds vary according to five characters. These are time, pitch, loudness, quality, and phonetics. By combinations of these characters we get form, rhythm, accent, and other attributes. Hence, if we keep the five main characters in mind and listen to a bird song to note how to describe each of them, or to note how they vary, we soon find that which is distinctive of the song and which aids us in identifying it.

Some writers have tried the use of musical notation in descriptions of bird songs. Musical notation describes pitch, time, and loudness, and to such a record notes on quality and phonetics may be added. But there are several reasons why musical notation is not entirely successful in field use. Birds do not always sing according to human standards of pitch and time. In pitch they may use quarter-tones or even smaller intervals. In time they may vary the rhythm so irregularly that musical measures become inadequate. Then musical notation proves a difficult system to use in the field, and requires for its use and

understanding a greater special knowledge than the average bird student possesses.

I have devised a method by which the time, pitch, and loudness of bird songs may be recorded as accurately as by musical notation, and at the same time more quickly and without the aid or detailed knowledge of musical symbols. One might refer to it as musical shorthand. This method can also record songs that do not conform to the standards of pitch and time used in human music.

In making a scientific study of the details of bird songs it is necessary to measure the pitch and time as accurately as possible. This is done by means of a pitch-pipe and a stop-watch, as I have explained elsewhere in a detailed description of my method of recording songs.¹ But in describing songs as an aid to the bird student who wishes to know them, details of exact pitch and time merely complicate the record and make it confusing. In this publication, therefore, I have left out the detailed exactness of song characters, in an attempt to present a good general description of songs. Just as those books which describe the plumage of a bird almost feather by feather are of little use to the student of live birds out of doors, so, too, great scientific exactness in describing songs will rob such descriptions of their chief value for the field student.

In the method I use, the record of a song consists of a series of lines, chiefly horizontal. Each line represents one note of the song. Its horizontal length represents the period of time the note occupies. Its

¹ *Bird Song*, New York State Museum Handbook No. 7, pp. 132-83.

vertical height, in relation to other notes in the song, represents the note's pitch. Its heaviness represents its loudness or intensity. Thus three of the five characters I have mentioned are represented in the drawing of the lines.

Specific examples will probably make this clearer. A Chipping Sparrow sings its simple "*chip-chip-chip-chip-chip-chip*," etc., giving altogether, let us assume, sixteen "*chips*." They are all of the same length in time and all on the same pitch. They are all equally loud. We therefore draw sixteen short horizontal lines, all on the same level, and all of the same length and heaviness:



FIG. 1. REPRESENTING SIMPLE AND REGULAR TIME: A SONG OF THE CHIPPING SPARROW

Now let us consider another simple song, the "*phæbe*" whistle of the Chickadee. The bird whistles two notes of equal length, but the second is a little lower in pitch than the first. The notes are of equal loudness, and are longer than the "*chips*" of the Chipping Sparrow. So we represent the song by two longer horizontal lines, not on the same level, but the second lower than the first:

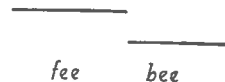


FIG. 2. REPRESENTING A SIMPLE CHANGE IN PITCH: THE "PHÆBE" WHISTLE OF THE CHICKADEE

Now let us consider a somewhat more complicated case. A White-throated Sparrow sings the song that has been interpreted "*Old Sam Peabody, Peabody, Peabody.*" The notes are all on one pitch except the first, which is lower. But the time is variable. The first two notes are long drawn out and equal in time, but the "*Peabodys*" are each of three notes, the first long, the second short, and the third medium. Each group of three occupies only half as much time as one of the long notes at the beginning. So our record is as below:

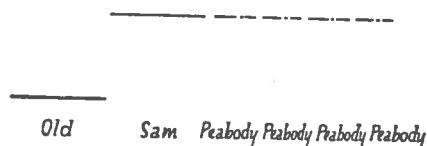


FIG. 3. REPRESENTING MORE COMPLICATED CHANGES IN TIME: A SONG OF THE WHITE-THROATED SPARROW

If we consider the song of the Blackpoll Warbler, we find another variation, that of loudness. The very high-pitched, wiry voice gives us ten notes, all on the same pitch and all equal in time, like the Chipping Sparrow's series of "*chips.*" But the notes gradually grow louder to the middle of the song and then fade away again toward the end. Thus we record the song as below, using the device of heavier lines for louder notes:



FIG. 4. REPRESENTING CHANGES IN LOUDNESS: A SONG OF THE BLACKPOLL WARBLER

These simple examples indicate how the three characters of time, pitch, and loudness are represented. There are some complications, however. A bird often sings a long trilled note. Perhaps it is a series of short notes so rapidly repeated that we cannot count them, or perhaps it is produced by a recurring consonant sound. For our present purpose it makes little difference what it is that produces the effect of a trill. We simply represent a trilled note by a wavy horizontal line, thus:



FIG. 5. REPRESENTING A TRILLED NOTE

I am aware that I have used here a mark commonly used in music to represent a musician's trill, and a bird's trill is not the same as a musician's. That is, the musician's trill wavers in pitch, while the bird's trill ordinarily does not. It must be understood that my wavy line is not meant to imply a change in pitch. But such trilled notes are extremely common in bird songs, and this seems the most convenient way to represent them.

I have already illustrated the Chickadee's "*phæbe*" whistle as an example of a simple change in pitch. The true Phæbe sings this somewhat differently. We might express this difference by saying that the Chickadee whistles "*fee bee,*" while the Phæbe calls "*feebe.*" That is, the second note of the latter song is shorter than and connected to the first one, with no pause between the two. This connection may be

represented by joining the two horizontal lines by a vertical one, as below:



FIG. 6. REPRESENTING CONNECTED NOTES ON DIFFERENT PITCHES: A PHRASE OF THE PHOEBE

Often, however, two or more notes in bird songs are connected by slurring them together. That is, the change in pitch is not abrupt, but more or less gradual. This is well represented in the singing of the Wood-Pewee as it alternates its "peeawee" and "peeoh." This slurring is represented by curving the lines connecting the notes, rather than by making them abruptly vertical. Thus the Pewee's two phrases would be represented as below:

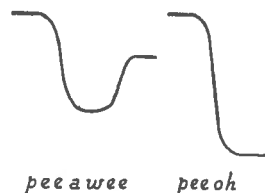


FIG. 7. REPRESENTING SLURRED NOTES: PHRASES OF THE WOOD PEWEE

Such slurred notes are quite common in bird songs, and are often an important factor that helps to distinguish one song from another.

Occasionally a note will not only slur from one

pitch to another, but will do so so gradually as to constitute a slide. Then the connection is represented by a more or less diagonal line. Such cases are less common than slurs, and are more often found in call notes than in songs. An alarm note of the Red-winged Blackbird, used when one approaches too near the nest for the bird's liking, which may be written "pee-iah," will represent this sort of note:



FIG. 8. REPRESENTING A GRADUAL SLUR: AN ALARM NOTE OF THE RED-WINGED BLACKBIRD

It is quite common, especially among the more musical bird songs, to find the different notes of a phrase or song connected together by liquid consonant sounds, like the sounds of the letters *r* or *l*. Such occurrences are so common that I have found it valuable to represent them in the diagrams by a loop. Thus, when a Wood Thrush sings the phrases "eelo-lah" or "ahlōlee," these phrases would be represented as below:

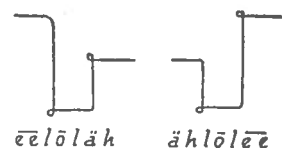


FIG. 9. REPRESENTING LIQUID-CONSONANT SOUNDS: PHRASES FROM A WOOD THRUSH'S SONG

This is the only case in which I have found it convenient to represent phonetics in the actual record of the song, unless we consider that the trill is caused by a phonetic sound.

We have still to consider the characters of quality and phonetics. By quality we mean such differences as we find in the tones of different musical instruments. The same note played on the flute and on the violin sounds different because of the distinctive quality imparted to it by each instrument. In the same

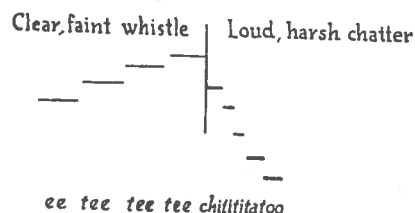


FIG. 10. REPRESENTING CHANGES IN QUALITY: A SONG OF THE GOLDEN-CROWNED KINGLET

way it would sound different if a Robin and a Baltimore Oriole should each sing the same note. This difference cannot be indicated by lines in the record, nor can it be described with scientific exactness by any present means we have. But we can use descriptive terms which give a fairly good idea of the quality. We can describe bird notes as rich whistle, clear whistle, flute-like, reedy, buzz-like, whispered, harsh, rasping, strident, etc. Such descriptive terms may be written above the record to indicate quality. Thus, we should write "rich whistle" over a record of the Baltimore Oriole, "clear whistle" for the Robin,

"hoarse whistle" for the Scarlet Tanager, etc. Sometimes a bird changes quality in its song. When this is the case, we divide the parts of different quality by a vertical line or lines and write the proper descriptive phrase over each portion. The song of the Golden-crowned Kinglet, in the diagram opposite, is a good illustration of this.

The character of phonetics relates to consonant-like sounds in the songs of birds. I have already discussed the liquid-consonant sounds which are common in the more musical songs. But there are often sounds that suggest *k*, *t*, *d*, *w*, *ch*, etc., in bird songs. To illustrate these I write below the record what the bird actually seems to say. I do not use English words, however, as these often give a false impression of the actual sound and sometimes obscure the descriptive value of the phrase.

I did use the words "*Old Sam Peabody*" in a previous illustration of the White-throated Sparrow's song, because the phrase is so well known in connection with that song. The word "Peabody" gives a good idea of the time relations of the notes, but the bird does not say "*Peabody*," and most certainly not "*Old Sam*." The song would be better rendered as "*Aaah-eeeh-eehehee-eehehee-eehehee*," for it is about as free from consonant sounds as any bird song we have.

Vowel sounds are not very definite in bird songs. Usually, as it seems to me, vowel sounds conform to pitch, high pitches giving sounds like a long *e*, and lower pitches broader vowels till we reach a deep *oo*.

Thus in writing phonetic records I use such vowel sounds to vary with the pitch, grading as follows, \bar{e} , \bar{a} , \bar{i} , \bar{e} , \bar{i} , $\bar{a}h$, \bar{o} , \bar{u} , \bar{o} , $\bar{o}\bar{o}$, from high pitch to low. Glance back at the Wood Thrush illustration (Fig. 9) and we see the significance of such phrases as "*eelo-lah*" and "*ahlolee*," and how, without the line record, the mere words can convey relative pitches of the notes.

Where English words have been used to illustrate bird songs, they sometimes conform in this way to pitch, as in the rendering "*Drink-your-tea*" for the Towhee's song (Fig. 12). In other cases they do not so conform, and often give confusing and totally wrong impressions to the beginner.

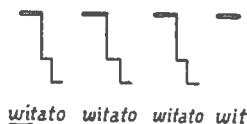


FIG. 11. REPRESENTING PHONETIC SOUNDS IN A BIRD SONG:
A SONG OF THE YELLOWTHROAT

An example of this is found in the familiar rendering of a song of the Yellowthroat as "*witchery-witchery-witchery*." To the bird student who already knows this song or has had someone illustrate to him just how it goes, this seems a good rendering. But in teaching beginning classes in the outdoor study of birds I have repeatedly tested it. The student who has been given no conception of how the words are to be accented or pitched will almost invariably pitch them with the middle note lowest and the last note

highest. But tell the student that the bird sings "*witato, witato, witato, wit,*" and he will generally get it right the first time, with the first note highest and the last lowest.

In the phonetic parts of the records in the main text I have used the following symbols to indicate the pronunciation of vowels:

\bar{a} as in <i>lake</i>	\bar{i} as in <i>sit</i>
\bar{a} as in <i>bat</i>	\bar{o} as in <i>home</i>
\bar{a} as in <i>father</i>	\bar{o} as in <i>stop</i>
\bar{e} as in <i>he</i>	$\bar{o}\bar{o}$ as in <i>book</i>
\bar{e} as in <i>wet</i>	$\bar{o}\bar{o}$ as in <i>moon</i>
\bar{e} as in <i>her</i>	\bar{u} as in <i>flute</i>
\bar{i} as in <i>like</i>	\bar{u} as in <i>but</i>

With certain species of birds the consonant sounds of phonetics are important and are the chief factor that distinguishes their songs. Human ears seem to differ, however, in hearing these consonant sounds. Probably no English letters are entirely adequate to represent the sounds produced by birds, nor, for that matter, the consonant sounds of other languages.

The different classes of consonant sounds, such as explosives, liquids, sibilants, and fricatives, are of greater importance than the particular consonant sounded. The consonants apparently most commonly used in bird sounds are explosives such as *t*, *d*, *p*, *b*, and *ch*; liquids such as *l* and *r*; sibilants such as *s* and *z*; and fricatives such as *f* and *th*. *W* and *y* seem to represent the sound when notes are slurred together, *y* when slurred downward, as in "*eeyo*," and *w* when slurred upward, as in "*owee*." When these

sounds are at the beginning of a note, they probably indicate a slight slurred sound, so short that we cannot detect it definitely (see Fig. 12 below).

Liquid, sibilant, and fricative sounds frequently seem to occur throughout the length of a long note, often producing a trilled effect. When this is the case, we can represent the phonetics of such a note by writing a row of consonants above the vowel sound of the note. This is illustrated in the last note of the Towhee song below:

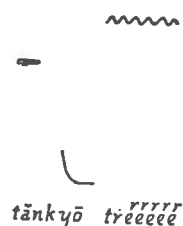


FIG. 12. REPRESENTING A RECURRING CONSONANT SOUND IN A TRILLED NOTE: A SONG OF THE TOWHEE

When the text of this book, rather than the figures, calls for representation of notes of this character, however, the typographically more convenient form "trēēēēē" has been used.

If, then, we have the diagram of a song, with the lines representing pitch, time, and loudness, and we have written above it a description of the quality of the song and below it a phonetic transcript, we have placed on record all five of the characters that distinguish that particular bird song from others.

The *exact* pitch and time of bird songs are gener-

ally variable between individuals, and therefore not characters that would be of great help in identification. But that those who may be interested in such details may determine them from the records, the diagrams in the text following have been drawn to a definite, uniform scale. Each one-half inch of horizontal length of a record represents one second of time, and each one-eighth inch of vertical height represents a half-tone in pitch. On the left-hand side of each record I have placed letters, such as C''''', A''', and others, each of which indicates the pitch of a horizontal line across the record directly opposite the position of the letter. In this marking middle C is C and the octaves above it C', C'', C''', etc., while the few cases of pitches lower than middle C can be represented by C-1, etc. The majority of bird songs are between C'''' and C''''''.

In the description of bird songs it is often valuable to employ such terms as "phrase," "slur," "trill," "warble," "twitter," "chatter." Such terms are often used, but sometimes in an indefinite manner. I have already defined "slur" and "trill." When a song is divided by short pauses or changes in rhythm into certain definite parts, each group of notes making up one of these parts may be considered a *phrase*. The notes that make up a phrase, however, are connected. I should hardly call the three introductory notes of a Song-Sparrow song (Fig. 163) a "phrase" because the notes are separated by short pauses.

A *warble* I would define as a song, or portion of a song, in which the separate notes are on different

itches, but connected to each other. The song of the Warbling Vireo (Fig. 87) is an excellent example. A *twitter* differs from a warble in that the notes are not connected. A *chatter* is similar in form to a twitter, but louder and of harsher quality.

While I have endeavored herein to describe songs chiefly, birds also produce other sounds. These sounds, call notes or alarm notes, are just as distinctive of the species, in many cases, as are songs. They are often but a single short note, so that a diagram such as I use for songs is of little value in such cases. An alarm note is used when some danger threatens or the bird is excited or angry. Call notes are used on other occasions. Sometimes there is no definite difference between call and alarm notes, except that as the bird becomes more excited, the sounds are louder or delivered more rapidly. These sounds have been described in many of the bird books phonetically, but lack of uniformity in the use of phonetics has produced a varied collection of renderings for what is probably the same sound.

In attempting to devise a key to the common bird songs I find many difficulties. The chief one is the variability of bird songs. After hearing and recording a number of examples of the song of a certain species, one deduces a rule as to the form and characteristics of the song of that species, only to find, soon after this, that a few individuals sing in such a manner as to violate the rule. For that reason a perfect and infallible key to bird songs is impossible.

Yet these individuals that so change their songs as

not to conform to the rule that applies to the majority are still usually recognizable as to species when heard. There is about a bird song something that distinguishes the species to the practised ear and that yet, after years of study, remains intangible and indescribable. Just as we know the name of a familiar friend who calls us on the telephone with the first sound of his voice, no matter what words are spoken, so we come to know each species of bird by its song, no matter how variably the individual sings.

After many attempts, I have come to the conclusion that the most useful key for beginners in bird study will be one which covers the rules by which the majority of birds of each species sing and which ignores the variations that do not conform to these rules. I do not expect anyone to be able to take the following Key into the field and immediately succeed in naming correctly every bird he hears. I do hope, however, that the Key will enable beginners to fix the main characters of a song and its differences from other songs that are likely to be puzzlingly like it, and that such beginners will, through its means, attain more rapidly the knowledge and experience that will enable them to name exceptional birds as well as typical singers.

Two or three records of the song of a species are generally not sufficient material from which to derive the rule by which that species sings. For that reason I have left out of the Key certain rare songs, where I feel that my own experience is too slight to include them. I have included descriptions of these songs, as

I know them, in the main text. I have also left out of the Key certain special songs, such as courtship songs, flight songs, and the less common variations of late summer. These songs occur infrequently even in very common birds, but the student will gradually become acquainted with them as his experience increases.

In presenting the following Key I am entirely aware that exceptions will be found to almost every line of it; but for the purposes of a key the main rules are the important factors, and not the exceptions.

II

KEY TO BIRD SONGS

THE USE of the Key is as follows: We begin to trace a bird song with the number 1 on the left. All songs in the Key come under this heading. Under 1, songs are divided into those that are short and of definite length, and those that are long-continued and indefinite. These divisions lead to the numbers 2 or 84 on the right, according to which description fits the song we are tracing.

We then go to number 2 or 84 on the left and find, following this number, further group divisions which lead to other numbers on the right, or finally to the name of a bird which, if all points in the descriptions agree without question, should be the bird whose song was heard. It would be well, however, for the student to verify this further by the song diagram and description in the main text and the description of the bird, if it was seen.

Following each number on the left is another number in parentheses. This is the number from which one has just proceeded. It enables the student to check his progress as he goes along or to follow the Key backwards, if desired.

- | | | |
|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| 1 | Song of definite length, and usually repeated over and over with little or no variation | 2 |
| 1 | Song without definite length, usually long-continued, and composed of short phrases with pauses between them; or of longer strains, each different from the one preceding it, and separated from it by an interval of silence | 84 |

Shorter Songs of Definite Length

- 2 (1) Song composed of a single, rather long trilled note, or of a series of rapid notes, too fast to be separated and counted 3
 2 (1) Song composed of two notes 6
 2 (1) Song composed of three notes 15
 2 (1) Song composed of more than three notes 18

Trilled Songs

- 3 (2) Trill rising in pitch to the end, non-musical and fricative *Parula Warbler* (Fig. 97, No. 1)
 3 (2) Trill all on one pitch 4
 4 (3) Trill very high-pitched, loudest in the middle, and faint at both beginning and ending
 Blackpoll Warbler (Fig. 111, No. 2)
 4 (3) Trill loudest at the beginning and fading away toward the end. Non-musical. *Worm-eating Warbler* (Fig. 90)
 4 (3) Trill of even loudness throughout 5
 5 (4) Quality quite musical. Trill long
 Swamp Sparrow (Fig. 182)
 5 (4) Quality somewhat musical. Trill rather short
 Junco (Fig. 154, No. 1)
 5 (4) Quality non-musical. Trill rather long
 Chipping Sparrow (Fig. 156, No. 2)

Two-Note Songs

- 6 (2) Second note of the song higher in pitch than the first 7
 6 (2) Second note of the song lower in pitch than the first 10
 7 (6) Second note slurred upward. A loud musical whistle
 Bob White (Fig. 14, No. 1)
 7 (6) Second note not slurred upward. Not a loud musical whistle 8
 8 (7) The two notes equal in time and accent, "quedee."
 Alder Flycatcher (Fig. 42, No. 1)
 8 (7) The second note a trill much longer than the first note
 Towhee (Fig. 147, No. 4)
 8 (7) The second note not trilled but longer than the first and more strongly accented 9
 9 (8) Consonant sounds all explosive, "tedick." Song heard among orchards, shade trees, or at edge of forests
 Least Flycatcher (Fig. 46)

- 9 (8) Consonant sounds sibilant, "tsezick." Song heard in open grassy areas, the bird singing from a tall weed or a bush *Henslow's Sparrow* (Fig. 150)
 10 (6) Second note slurred downward 11
 10 (6) Second note not slurred downward 13
 11 (10) First note long, high-pitched and squeaky. The second note beginning with a strong accent
 Cowbird (Fig. 137, No. 2)
 11 (10) First note rather short. Second note not strongly accented at the beginning 12
 12 (11) Loud, clear whistle, heard mainly in northern coniferous forests *Olive-sided Flycatcher* (Fig. 47)
 12 (11) Less loud, somewhat husky whistle, heard mainly from willow or alder thickets
 Alder Flycatcher (Fig. 42, No. 2)
 13 (10) Second note shorter than the first, and connected to it
 Phoebe (Fig. 40)
 13 (10) Second note about equal to the first, with a slight pause between the two notes 14
 14 (13) Quality, a clear sweet whistle *Chickadee* (Fig. 58)
 14 (13) Quality buzzy, not musical. The second note like a buzzy trill *Blue-winged Warbler* (Fig. 92)

Three-Note Songs

- 15 (2) All the three notes slurred together, the first high-pitched, the second low, and the third medium
 Wood Pewee (Fig. 44)
 15 (2) Notes not slurred together, but the last note of the song always slurred. The first notes short and abrupt, with slight pauses between them 16
 15 (2) Last note not slurred, or if so, the first notes not short and abrupt 17
 16 (15) Slur of the last note upward, like "wheet"
 Bob White (Fig. 14, No. 2)
 16 (15) Slur of the last note downward, like "deeah"
 Olive-sided Flycatcher (Fig. 47)
 17 (15) The first note long, high-pitched, and squeaky. The last two notes short and lower-pitched
 Cowbird (Fig. 137, No. 1)
 17 (15) The first two notes lower-pitched, rather long and equal in time. The last note higher and often slurred upward. Quality husky. The whole song slow and drawled
 Black-throated Blue Warbler (Fig. 101)

- 17 (15) The first two notes short and connected to each other and to the last note by liquid-consonant sounds. The last note a trill

Red-winged Blackbird (Fig. 132, No. 1)

- 17 (15) The first two notes short, but not connected. Consonant sounds explosive. Last note a trill

Towhee (Fig. 147)

- 17 (15) All notes of the song loud, clear, high-pitched, piercing whistles, from posts, trees, or bushes in open country. Notes variable in time and relative pitch.

Meadowlark (Fig. 130, No. 11)

Songs of More than Three Notes

- 18 (2) Song uniform throughout in pitch and time, that is, composed of single notes or phrases which are repeated in even time and on the same pitch or pitches throughout the song 19
- 18 (2) Song uniform in either pitch or time, but not in both. If time is even, the pitch rises or falls. If the pitch is even, the time becomes faster or slower 32
- 18 (2) Song mainly uniform, but a portion of it, usually at the beginning or ending, not uniform with the rest 39
- 18 (2) Song composed of two or three distinct parts, each part by itself uniform in pitch and time, but not uniform with the other part or parts 55
- 18 (2) Song not uniform in either pitch or time but varying 65

Songs that are Uniform Throughout

- 19 (18) Song a series of simple notes repeated in regular rhythm and all on the same pitch 20
- 19 (18) Song a series of two-note phrases repeated in even rhythm without change in pitch 25
- 19 (18) Song a series of phrases with three or more notes to each phrase repeated in regular rhythm without change in pitch 30

Songs of Repeated Simple Notes

- 20 (19) Song growing gradually louder toward the middle, and then fainter again toward the end
Blackpoll Warbler (Fig. 110, No. 1) 21
- 21 (20) Notes delivered rapidly, almost a trill 22

- 21 (20) Notes delivered rather slowly, easily separated and counted 23

- 22 (21) Quality quite musical. Song usually of more than twelve notes. Heard in marshes or swampy thickets
Swamp Sparrow (Fig. 162, No. 2)

- 22 (21) Quality slightly musical. Usually ten or twelve notes. Heard in northern or mountain forests in summer, but almost anywhere during spring migration
Junco (Fig. 154, No. 2)

- 22 (21) Quality lisping or fricative. Song rather faint. Except in portions of Maine and Minnesota, heard only in the spring migration in April or May
Palm Warbler (Fig. 114)

- 22 (21) Quality chippery and not musical, but loud and definite. Heard in orchards, shade trees, and more open wooded areas
Chipping Sparrow (Fig. 156, Nos. 1 and 3)

- 22 (21) Quality guttural. Heard in marshes among cat-tails or reeds *Long-billed Marsh Wren* (Fig. 67, No. 1)

- 23 (21) Song high-pitched and of few notes, usually less than ten 24

- 23 (21) Song medium high-pitched and of many notes (twenty to eighty). Very loud *Flicker* (Fig. 29)

- 23 (21) Song somewhat lower-pitched. Not loud. Fewer than twenty notes. A soft, sweet series of whistles, sometimes somewhat nasal
White-breasted Nuthatch (Fig. 62)

- 24 (23) Notes sibilant, like "zee" or "zeet"
Cape May Warbler (Fig. 100)

- 24 (23) Notes not sibilant, like "weet"
Prothonotary Warbler (Fig. 89)

Songs of Repeated Two-Note Phrases

- 25 (19) Song increasing in loudness to the end
Ovenbird (Fig. 115, No. 1)
- 25 (19) Song not increasing in loudness 26
- 26 (25) Song loud, clear, and musical 27
- 26 (25) Song not loud nor very musical 29
- 27 (26) Song of clear whistled notes connected by explosive consonant sounds, phrases like "peeto" or "waytee"
Tufted Titmouse (Fig. 61)
- 27 (26) Song clear and musical, but phrases slurred or connected with liquid consonants; the phrases when not slurred like "toolee" or "teelo" 28

- 28 (27) Song a melodious whistle, commonly of only four to six two-note phrases
Carolina Wren (Fig. 66, Nos. 5 and 6)
- 28 (27) Song a reedy whistle, commonly of ten or more two-note phrases *Cardinal* (Fig. 139)
- 29 (26) Song high-pitched, weak, but rather musical. Slightly sibilant. Of seven to twelve two-note phrases
Black and White Warbler (Fig. 88, No. 1)
- 29 (26) Song high-pitched, weak, with consonant sounds combinations of sibilant and explosive, like *ts*. Of three to five two-note phrases *Redstart* (Fig. 128)
- 29 (26) Song not so high-pitched, lisping or fricative, and not musical. Notes rapid . . . *Palm Warbler* (Fig. 114)

Songs of Repeated Three-Note Phrases

- 30 (19) Song usually nocturnal. The three-note phrase repeated many times, the last note of the three-note phrase highest in pitch . . . *Whip-poor-will* (Fig. 25)
- 30 (19) Song rarely nocturnal. The three-note phrases usually repeated only a few times 31
- 31 (30) Song high-pitched, and of less-musical quality. Consonant sounds explosive. Phrases of three, four or five notes, with one note of each phrase strongly accented *Yellowthroat* (Fig. 121)
- 31 (30) Song lower-pitched, and extremely musical. Consonant sounds both liquid and explosive. Phrases rarely of more than three notes
Carolina Wren (Fig. 66)
- 32 (18) Time uniform, but the pitch changing 33
- 32 (18) Pitch uniform, but time changing or irregular . . . 37

Songs of Uniform Time but Varying Pitch

- 33 (32) Song a series of simple notes in regular even time, but the pitch rising gradually to the end
Prairie Warbler (Fig. 113)
- 33 (32) Song of simple emphatic notes in regular time, the pitch irregular but in general falling, particularly at the end of the song. Notes musical, with prominent consonant sounds, both explosive and liquid
Northern Water Thrush (Fig. 117)
- 33 (32) Song consisting of a series of very rapid notes which vary irregularly up or down a half-tone in pitch
Pine Warbler (Fig. 112)

- 33 (32) Song of simple notes in loud, piercing whistle, the pitch variable in arrangement
Meadowlark (Fig. 130, Nos. 6, 7, and 11)
- 33 (32) Song not of simple notes, but a series of two-note phrases, or else slurs 34
- 34 (33) Song a series of slurred notes in even time, with the pitch of the slurs gradually falling to the end of the song 35
- 34 (33) Song a series of two-note phrases in even time, the pitch gradually and often irregularly rising or falling to the end of the song 36
- 35 (34) Song a series of downward slurs, each slur trilled, as though a repeated liquid-consonant sound ran throughout its length. The pitch becomes lower to the end of the song. The effect of the song is weird, but pleasing *Veery* (Fig. 77)
- 35 (34) Song a series of downward or upward slurs that are not trilled. The pitch falls to the end of the song, and the loudness sometimes increases
Cardinal (Fig. 139, Nos. 1 and 2)
- 36 (34) Quality weak and colorless, but musical. This form of the song is rare on migrations, but common in the summer home in northern coniferous forests
Myrtle Warbler (Fig. 103)
- 36 (34) Quality a loud, musical reedy whistle. Pitch falling regularly to end, and loudness sometimes increasing
Cardinal (Fig. 139, No. 4)

Songs of Uniform Pitch but Varying Time

- 37 (32) Notes simple and all on one pitch. Time gradually increasing till the song ends in a trill. Quality a clear, sweet whistle
Field Sparrow (Fig. 157, No. 1)
- 37 (32) Notes simple, weak, very high-pitched, all on one pitch, but the time of alternate long and short notes irregular
Bay-breasted Warbler (Fig. 110, Nos. 1 and 4)
- 37 (32) Notes simple, or sometimes slurred downward. The time gradually slower to the end 38
- 38 (37) A long series of notes of a somewhat guttural quality, fast at first and gradually slower, the last notes slurred slightly downward and each of them sounding like "kow" or "kowlp"
Yellow-billed Cuckoo (Fig. 19)