

WARBLER SONGS.

THERE are, or were at the last count, fifty-seven species and sixteen subspecies of warblers accredited to North America north of Mexico. Of this number the writer has been able to find described more or less fully the songs of forty-six species, leaving eleven species yet to be studied. Of the subspecies it may be said that the songs are so similar to the songs of the species from which they have sprung that they are practically indistinguishable and so need not be counted in the final result. If there are exceptions I have been unable to find them.

These forty-six species (with their subspecies where any occur) can readily be divided according to the style of song, and the divisions subdivided, but it must be understood that this style of division plays havoc with the accepted systematic arrangement of the group. For convenience we may first distinguish two groups: Those with whistling songs; those with song otherwise. Treating the latter group first because it includes the more generalized species if not the more generalized types of song, the sub-group which seems naturally to stand first may be designated:

THIN, WIRY, HIGH PITCHED SONGS.

While this may seem an arbitrary and therefore unnatural group, it is convenient in bringing together songs which are readily over-looked amid the May medley of stronger voiced singers. If, as seems likely, this type of song is the more primitive one, the group is not an unnatural one.

Perhaps the only character strictly common to every member of the group as here constituted, is the high pitch of the song. Some songs are wiry, some insect-like, some thin without being wiry, but all are high in pitch—so high that some ears seem incapable of hearing them unless close at hand. But it does not follow that these songs are weak. On the contrary, some of them carry far, just as the shrilling of the cicada carries far.

Grouping within this group seems so impracticable that a treatment of the species separately in systematic order would appear more desirable.

Black and White Warbler. *Mniotilta varia.* 636.

The migrating song of this warbler is a thin, wiry sibilant of repeated single syllables, or a series of double syllables, ending, in both cases, with two shorter syllables. The one type is well represented by the syllables *tse tse tse te te*; the other by *ki-tse ki-tse ki-tse se se*. Not seldom the performance seems to consist of a series of closely connected syllables, like "*che-a-wee-a-wee-a-wee*" (Burns). The accent on the syllable "wee." In every double syllabled song the accent is on the second syllable.

Apparently the migrants sing but little and then fitfully. Some seasons none are heard singing at any time. It is one of the last warbler songs that most of us are likely to learn, unless the circumstances be more than usually favorable. According to Nuttall the latter, presumably the breeding, songs are decidedly mellowed and somewhat resemble some songs of Redstart.

During the migrations the birds are to be found in considerable numbers in almost any sort of woods, as well as in village and city parks and tree lined streets. They are not found west of the Plains, but are birds of the eastern United States.

Blue-winged Warbler. *Helminthophila pinus.* 641.

The ordinary call song of this species has a decided insect quality. He seems to inhale a shrill *zre-e-e-e-e* and immediately exhale a buzzing *zwe-e-e-e-e*, the whole performance comprising a perfect double run thru about half an octave of the scale. Often it seems to be a simple *zwe-e-e-e-e ze-e-e-e-e*, the latter part merely a sputter. At its best the song is a drowsy, locust-like shrill, belonging rather to mid-summer than to spring.

There is another song which is usually given during the early summer months, but which I have heard shortly after the arrival of the bird in the last days of April or the first days of May. This song is far more varied and has a far

better claim to be called a song. Mr. Chapman renders it *wee, chi-chi-chi-chi, chur, chee-chur*. Mr. Burns reports still another: *che-de-de-e, che-e-de-de, che-de-de-dee*, resembling the Chickadee some what. These songs may possibly stand for passion songs, since they are far sweeter and more powerful than the other; but they are not flight songs.

There are two definite song periods, the first beginning with the bird's arrival and ending about the middle of June, during which time the insect song is given almost entirely; the second one beginning late in July or early in August and continuing to the third week in August, this period being characterized by the more varied song, but not to the entire exclusion of the other.

The Blue-wing delights in the second growth bordering uncut woods, where the ground completely dries only in mid-summer. Here he perches on the topmost twig of some ambitious young sprout or high bush and sings his hours away. For his later song he seems to prefer a less conspicuous perch among the lower growth.

This is another eastern species, ranging west to Nebraska and Texas, and north to southern New England and Minnesota.

Parula Warbler. *Compsothlypis americana*. 648.

Parula's song is hardly wiry, but it is fine and delicate—more like hair than wire. The more delicate singers seem to say *pe-tse, pe-tse, pe see see*, with a slight accent on the second syllable of each phrase. A rendering less delicate and probably more commonly heard, Mr. Burns represents thus: *cher-re-re, cher-re-re, cher-re-re*, and *cher-er, cher-er, cher-er che-e-e-e*. This is heard often during the migrations. There is a tendency to an increase in volume to the end, the first notes being more softly uttered.

Mr. Bicknell recognizes two distinct songs. "In one, the notes coalesce into a fine insect trill; in the other, four similar notes are followed by four others, weaker and more quickly given."

It sings thruout its spring migration, and is sometimes heard during its return south. I have been unable to find any record of the time when its song closes at its breeding grounds.

Northern Parula Warbler. *Compsothlypis americana usnea.* 648a.

The remarks on song are here given under the specific form for the sake of uniformity, but they really apply to the sub-specific form. The Parula Warbler is the southern form, occurring in the south Atlantic and Gulf states, north in the interior to Mt. Carmel, Ill. ; the Northern Parula Warbler breeds along the norther tier of states and into Canada, and west to the plains. There is nothing to indicate that the songs of these two forms differ perceptibly.

Cape May Warbler. *Dendroica tigrina.* 650.

The lack of much definite information about the song of this warbler in the literature of bird songs, will attest the general rarity of the species. The only studied attempt at a description seems to be that of Prof. A. W. Butler in his Birds of Indiana. "a-wit a-wit a-wit a-wit a-wit, each pair of syllables repeated five times with moderate rapidity in the same tone, with no inflection." This description answers very well for the songs which I have heard if it be added that the effect is only less wiry than that of the Black and White Warbler. The birds sing on their northward journey but have not been reported on their return south among the singers.

I have found more individuals in orchards than anywhere else. The only ones seen in Lorain County, Ohio, to my knowledge, have been in the orchards within the village. But they are known to flock with other members of the family in the woods.

In the nesting haunts the male seems to delight in mounting to the top of a tall tree and there pouring out his song while the female broods over the eggs in a low bush at some distance, thus misleading the nest hunter.

Another eastern species, west to the plains and north to the Hudson Bay Territory.

Cerulean Warbler. *Dendroica rara.* 658

Six different writers agree in their descriptions of this bird's song. It consists of two distinct parts, the first of several definite single syllables with a comma pause between

Bay-Breasted Warbler. *Dendroica castanea.* 660.

It has never been my good fortune to distinguish the song of this Warbler. Rev. J. H. Langille says of it: "The notes sound something like *tse-chee tse-chee tse-chee tse-chee*, but far too liquid to admit of exact spelling." While Mr. C. J. Maynard says of it: "It begins like Black-poll and ends like Redstart."

It seems to be a somewhat fitful singer during its passage north, and is silent on its return journey.

During the migrations it is not uncommon among the upper branches of the trees. I have seen it but seldom on the college campus.

Eastern North America, west to the edge of the Plains (Iowa, Missouri), north to Hudson Bay. Breeds mostly north of the United States.

each two, followed by a trilled syllable of about double the length of the first part. There is thus a marked resemblance to Parula's song. The syllables *tse, tse, tse, tse, te-e-e-e-e-e-e-e*, serve to recall it to mind. The song rolls up the scale quietly and evenly. The effect is less delicate than Parula's song, yet not more wiry. A larger song from a larger bird.

My notes indicate that this warbler sings from his arrival in the first week in May until the third week in May, and again during the last of June and first week of July. I have never heard it sing during the fall migrations and find no record of a song period then.

This is a bird of the interior of the United States between the Alleghanies and the Plains and north to Ontario.

SONGS OF STRIKING CHARACTER.

Under this heading are grouped those species in whose songs there is not only distinct individuality to so great a degree that resemblance to any other species is too faint to be considered, but in which there is a decidedly striking effect. It does not follow that the songs are loud; nor that they are always sharp and clear, but simply that they arrest the attention by reason of their individuality. Here, again, we are unable to arrange the group logically, so that we must fall back upon the systematic arrangement. First in order and probably also first in prominence is

Protonotary Warbler. *Prothonotaria citrea.* 697.

It is sufficient to say that *Prothonotaria* rings out a *peet, tsweet, tsweet, tsweet, tsweet, tsweet*, which sounds like the Solitary Sandpiper in the distance. One could hardly mistake it. It is high pitched, penetrating and startling. Mr. Nehrling calls him a fitful singer, but heard at all times of day and in all weathers. Mr. Nehrling also reports a passion song which is like the Oven-bird's passion song, reserved for select occasions only.

This is a water-loving species, frequenting low trees and bushes which hang over the water or which grow in swampy places. But there are many instances of more upland occurrence during the breeding season. In some regions at least,

the birds are familiar objects about the premises, and may also nest about bridges which are in constant use. Dr. Thomas S. Roberts has an interesting article in the July, 1899, *Auk*, in which he figures nests of this bird in a bridge over the Mississippi River opposite La Crescent, Minn.

I find no evidence of a second song period.

This Warbler is found over the eastern part of the country west to Kansas and Nebraska and north into Minnesota, breeding thruout its United States range.

Sennett's Warbler. *Compsothlypis nigrilora*. 649

The only note relating to the song of this Warbler that I have been able to discover is contributed by the discoverer, Mr. George B. Sennett. He says of it: "Its notes are so clear that they can be heard at a long distance, and are readily distinguishable from those of all other birds. There is thus a marked departure from the type of the other member of this genus.

In the United States this species is confined to the valley of the lower Rio Grande in Texas.

Black-throated Blue Warbler. *Dendroica
cærulescens*. 654.

This bird's versatility is one of his chief characteristics. And the college campus birds seem to be rather more musical and more versatile than those in the woods. Here, on the campus, in one season, I have recorded the following variations:

tu, euu euu ceee-e-e, soft at first, loud and rattling at the close.

chweu chweu chweu, uniform thruout.

chw' chw' chw' chwee, the last syllable strong and full.

two two two z-z-z-z-z { indistinct at first, gathering force
te zwee zwee zwee-e-e-e, } and closing high and shrill.

we we z-z-z-z-z, harsh and penetrating.

All writers agree that the song begins faintly, rapidly gathering force until the shrilling climax of the last syllable is reached. It is difficult to describe, but perfectly distinctive.

The spring migrants are with us for two or three weeks in May, singing during their stay, and returning in September when they rarely sing.

The birds love the underbrush in the woods, but remain well up in the trees on the campus where they associate with the other tree haunting species.

Another eastern species which ranges west to the plains and north to Labrador. The form which inhabits the higher Alleghanies has been described as

Cairns' Warbler. *Dendroica caerulescens cairnsi.* 654a.

The song and habits are likely identical with the species.

Golden-cheeked Warbler. *Dendroica chrysoparia.* 666.

This species is given this place on the strength of a statement that its song of 'tser, weasy-weasy-twea', bears a resemblance to the song of the next species. The song is described by Mr. Nehrling as composed of soft notes. It also suggests some of the variations of Redstart.

It is a Mexican species which crosses into south-western Texas.

Black-throated Green Warbler. *Dendroica virens.* 667.

While there is great diversity in the descriptions of this Warbler's song, there is clearly evident in all the descriptions the one peculiar type of song. No better illustration of the diversity in hearing and interpretation could be afforded than this list of syllable descriptions. The syllables which best describe the type song to me are: *pe, te, che-o, te,* or *pe, te, che-to, che.* The enunciation is clear cut and the effect very pleasing. It is an unique song. In musical notation it would stand something like this: Not seldom there is a double variation which might be represented thus: In every case the third and fourth syllables, and in the second case the fifth and sixth also are tied together, the others being staccato. It is the one Warbler song that students beginning the study of birds hear and heed.

During its stay, this Warbler is decidedly common on the college campus as well as in the woods. It also ranges the village streets—overhead.

The birds are usually with us for the first three weeks of May, singing during the whole time. They return again in

September, but I can find no evidence of another song period then.

The range is the same as the other eastern Warblers, reaching the Plains in the west and Hudson Bay Territory in the north.

Townsend's Warbler. *Dendroica townsendi.* 668.

Of this western species Mr. Merrill says: "The song is like *de, de, de-de, de*, all especially the first three notes, like Black-throated Green. It is different later in the season."

Western North America, east to central Colorado, north to Sitka, Alaska.

Prairie Warbler. *Dendroica discolor.* 673.

The remarkable quaintness of this Warbler's song cannot be suggested on paper, unless Dr. Coues has done so in his remark that it is "Like a mouse complaining of the toothache." The notes seem to suggest *zee* syllables repeated six or seven times, deliberate at first, increasing to rapid at the close. It is perhaps sufficient to say that no one, not even the novice, could listen to the song without having his attention instantly riveted.

I find no notes regarding the length of its song period, nor as to whether it has a second song period.

The bird delights in thickets and brushy fields and pastures, or almost any treeless thicket.

It is another eastern species, ranging west to the Plains and north to Michigan and southern New England.

Macgillivray's Warbler. *Geothlypis tolmiei.* 680.

Rev. W. L. Dawson's description of this western species' song seems to fit the case, *sheep, sheep, sheep, shear, shear, sheep*, or *sheep, sheep, sheep, sheep, shear, sheep*, bearing a good resemblance to the song of Dickcissel.

It is a bird of the western United States, from the eastern foot hills of the Rockies to the Pacific coast, and north into British Columbia.

Hooded Warbler. *Wilsonia mitrata.* 685.

Mrs. Wright represents this Warbler's song thus: *che-*

wco-tsip, tsip, che-we-co. While Mr. Chapman makes the bird say, "You must come to the woods or you won't see me." Rev. J. H. Langille recognizes a day song, *che-ree-cherree, chi-di-ce*; and a twilight song, *whe-ree-whee-ree-eeh*. The first three syllables of the day song are loud and bell-like, the next two uttered rapidly, the last with falling inflection.

According to Mr. Bicknell, the first song period closes late in June or rarely as late as early in July, the second during the fourth week in August. He recognizes the two sorts of song which seem to be of the nature of individual variation rather than two distinct sorts.

Eastern North America, west to the Plains, north and east to southern Michigan, southern Ontario, western and southeastern New York, and southern New England. Breeds from the Gulf of Mexico northward.

SONGS RESEMBLING THAT OF CHIPPING SPARROW (AND JUNCO).

The common character of this group is the trilling. Some of the songs are decidedly shrill and almost wiry, but lack the distinctive characters of the first group. Some are fairly round and full, but could not properly be designated whistles. Some are somewhat striking in character, but all are distinctly trilled. It must not be understood that the songs necessarily bear a close resemblance to the monotonous trill of the Chipping Sparrow because that species has been used as a comparison, but simply that the sparrow is the bird most likely to be most generally known. The order adopted in this group will be from the closer to the less close resemblance to the song of Chipping Sparrow, which is a trill or twitter of successive chipping syllables, monotonous, high pitched and weak in utterance.

Worm-eating Warbler. *Helminthorus vermicivorus.* 639.

Song of the Chippy quality, but weaker, and bearing some resemblance to that of Junco. Mr. Burns describes a song that resembles that of Goldfinch: *chat-ah-che-che chee-chee-chee*, which seems to correspond well with a passion song in the manner of utterance.

The favorite resort of this bird is a dry, wooded, moderately rough region, where the brushy hillsides and ravines furnish a cover. He sometimes ventures into the open also.

This Warbler sings from his arrival in early May until the end of the first week, rarely into the second week, of July. Mr. Bicknell records a second song period during the latter part of August.

Eastern United States, west to Nebraska, north to southern New York and New England. Breeds throughout its United States range.

Bachman's Warbler. *Helminthophila bachmanii*. 640.

According to Mr. O. Widmann, this Warbler, the Worm-eating, Junco and Chipping Sparrow sing remarkably alike. But the song of Bachman's Warbler is shriller than that of Chippy instead of being weaker. There is a little unconfirmed evidence that it also has a passion song. Mr. Brewster describes the migrating song as resembling that of Parula Warbler.

I find no evidence of a second song period.

While migrating it keeps well to the treetops, but Mr. Widmann found the breeding birds in the St. Francis region of Missouri singing in the trees perched rarely higher than forty feet. His paper on the finding of the first nest of this species, in the *Auk*, Vol. XIV, page 305 to 309, is an admirable account of the habits of the birds.

Hitherto Bachman's Warbler has been assigned to the south Atlantic States (southern Virginia and Florida) and westward to Louisiana, but Mr. O. Widmann's labors have extended its range into south-eastern Missouri.

Golden-winged Warbler. *Helminthophila chrysoptera*.
642.

The monotonous is emphasized in this bird's song by its being lazily and and drawlingly uttered. It is an unmusical song. Mr. Samuels has described it: *zee-zee-zee-zee-zee*.

There seems to be nothing relating to the length of the song period, nor whether there may be a second one.

The bird haunts the scrubby second-growth, or even the

borders of dense woods, but when singing prefers the tops of the taller trees.

Eastern United States, north to southern New England, southwestern Ontario, and southern Minnesota, breeding only in the northern parts of its range.

Tennessee Warbler. *Helminthophila peregrina.* 647.

The song would be scarcely distinguishable from that of Chippy but for the first two syllables, They are not the ordinary "chip," but more like "twip." There is also a tendency to acceleration and increase in volume as the song proceeds, in this also being unlike Chippy.

It arrives during the first week in May and tarries well into the third week, singing during its stay. There is no second song period on its return, about the middle of September.

My experience indicates that this Warbler is far more common in orchards than anywhere else, particularly orchards in the middle of village blocks. Comparatively few are met with in woods. Others, however, in other places, find him commonly in the woods with other Warblers.

Eastern North America, north to Hudson Bay Territory, breeding in the northern parts of New York and New England northward.

Hermit Warbler. *Dendroica occidentalis.* 669.

The song is a penetrating twitter, harsher and more run together than that of Chippy. Mr. Chester Barlow describes the song thus: *tsit tsit tsit tsit chee chee chee*, the first four syllables gradual and of uniform speed, ending quickly with *chee chee chee*.

There is no mention of the length of the song period, nor of a second one.

This species ranges from the Rocky Mountains to the Pacific coast and from Washington southward.

Pine Warbler. *Dendroica vigorsii.* 671.

Mr. Chapman says of the song of this Warbler, that the southern ones sing like Field Sparrow, but the northern ones like Chippy. I have heard but one sing, and his song

closely resembled the song of Chippy, but was higher pitched and more deliberate.

The birds probably sing during their stay in the migrations, but I find no record of a renewal of song on the southward journey.

Eastern United States, west to the Plains, north to Manitoba, Ontario and New Brunswick.

Palm Warbler. *Dendroica palmarum.* 672.

The trill remains as a prominent feature, but the note is no longer a true chip. Better *tsee tsee tsee tsee*, with a distinct swell. Each syllable should be given a half double utterance except at the middle of the swell, where the greater effort seems to completely coalesce the half double quality into one distinct syllable. There is a little similarity to the song of Myrtle Warbler, but lacking the liquid quality of that species.

The Palm Warbler arrives late in April and carries well into the third week of May, singing fitfully the while. He returns again in the second week of September, but does not sing.

The Spring setting for this Warbler is a low, damp or wet woods with a profusion of undergrowth.

This specific form occupies the interior of the United States, north to Great Slave Lake. Rare in the south Atlantic States during the migrations. While the

Yellow Palm Warbler. *Dendroica palmarum
hypochrysea.* 672a.

Occupies the Atlantic States, north to Hudson Bay. This sub-species, from all I can learn, does not differ in song from the species.

Myrtle Warbler. *Dendroica coronata.* 655.

There is some variation in utterance with this species, but the general effect is a trill or twitter, therefore bearing a closer resemblance to the Chippy than to any other group. The syllable *tswe* repeated several times gives a fair idea of the quality.

The Myrtle Warbler is with us from the third week in April until the third week in May, singing constantly; and

again throughout October, when no song has been heard nor reported.

Except when Myrtle bushes entice him away, the Myrtle Warbler keeps well to the higher woods during the vernal migration, but seems just as partial to fields during the return.

This is a bird of North America, chiefly east of the Rocky Mountains, breeding from the northern United States northward. A Pacific coast form has been described as

Hoover's Warbler. *Dendroica coronata hooveri.* 655a.

Audubon's Warbler. *Dendroica auduboni.* 656.

Dr. Coues states that the song of this species closely resembles the song of Myrtle. Without describing it Mr. Merrill states that the male has two distinct songs, and that the female sings.

The species replaces the preceding one west of the Rockies, north to British Columbia. It is accidental east to the Atlantic coast.

Black-poll Warbler. *Dendroica striata.* 661.

In execution the song resembles that of the Myrtle—all in the same pith and containing a perfect swell, but sounds more like "striking two pebbles together," therefore lacking the liquid quality of Myrtle. There are two renderings, the more musical one containing a prelude of three or four distinct notes, like *tsip tsip tsip*, followed by a twittering *tsee tsee te*. The other song is merely a twitter.

The Black-polls arrive late and make but a short stay, singing the while. They have no song period on the southward journey.

They remain well up in the trees, and seem rather partial to the woods to the almost entire exclusion of parks.

Nearly the whole of North America east of the Rockies, and to Alaska and Greenland. Breeding from northern United States northward.

SPECIES WHOSE SONGS RESEMBLE THAT OF YELLOW WARBLER.

Considered according to the manner of utterance this is a

fairly satisfactory group, and as to quality of tone there is evident correspondence, but beyond these it is an unsatisfactory arrangement. The four species which sing alike in many ways may perhaps be sub-grouped by themselves, leaving the remaining four in another sub-group.

This type of song has a marked singleness and earnestness of purpose which at once arrests attention. The song is not given as a sort of afterthought, or a thing of secondary importance, but it requires a pause in the other activities until the lay is finished. The syllables are clear cut, and the song has a distinct beginning and as distinct an end. It is complete in itself. The earnestness of utterance often becomes vibratory, approaching the passionate, yet distinctly non-passionate in style.

All of the songs are high pitched, but clear and smooth, just too high to be called a shrill whistle. They are simple songs, every one, yet with a distinct touch of sweetness that makes them pretty. Perhaps no better idea of the style of this song-type can be given than by a careful description of the song of the

Yellow Warbler. *Dendroica aestiva.* 652.

While there is no little variability there is little likelihood of confounding any of the variations with other species. Now it is *sweet sweet sweet sweet sweeter sweeter*, now *sweet sweet sweet sweetie*, again *wee-chee, we-chee, wee-i-u*; once more *wee-chee, chee, chee, chur-wee*. Over all presides the bird's distinct individuality. In all the variations I have heard the penultimate syllable is at a higher pitch, if the last phrase be three syllabled, lower if the last phrase be two syllabled. There is also a tendency to an increase in cadence to the last. The whole song is forcible and loud, but smooth and pleasing. It will be seen that in each variation there are two parts, though the last may be but a double syllable.

There is no second song period, because singing does not cease until the last of July or the first week in August. It should be remarked, however, that there is a marked decrease in singing after the middle of July, at least in northern Ohio. Sometimes individuals are heard singing after the middle of August for a few days.

This Warbler's haunts are even more distinctive than his song. He frequents brushy woods and low gardens which abound in small shrubs, and is a well known orchard singer. But his favorite nesting place is a swamp tangle of small trees, bushes, vines and weeds. He does not hide in the foliage while singing, as some others do, but mounts to the top of some conspicuous tree or bush and makes a business of it. He is not to be seen within the taller woods, but about its edge in the fringing brush.

In southern Arizona, western Texas and north-western Mexico this species is represented by

Sonora Yellow Warbler. *Dendroica aestiva*
sonorana. 652a.

And in the coast region of Alaska by

Alaskan Yellow Warbler. *Dendroica aestiva*
alaskensis. 652b.

Otherwise the true Yellow Warbler may be found in North America generally, breeding nearly throughout its range.

Chestnut-sided Warbler. *Dendroica pennsylvanica.* 658.

While the resemblance to the Yellow Warbler is certainly close in many respects, the song is distinctly weaker and usually shorter, uttered with less vehemence. Miss Ethel Dane Roberts' description is happy: "tsee tsee tsee, happy to meet you." To my ear the syllables *te te te te we chu* are the most suggestive. But allowing just a little for poetical license in Miss Roberts' rendering, there is no difference at all. In both the next to the last syllable must be given a third higher than the others, which are all on the same pitch would suggest the same arrangement. The song is often shortened at either or both ends, but six syllables seem to be the limit. It is refreshing to find such uniformity of description among writers. Nowhere is there greater discrepancy than in the two descriptions given.

This Warbler arrives about the first of May and remains two or three weeks, singing during his stay. On his return in September he is silent.

The Chestnut-side also frequents brushy places, but more wooded ones where the brush forms an under-brush. He shuns swamps, for the most part, as well as villages, preferring the woods; yet he regularly visits the college campus—that Mecca of the Warbler host.

His range is eastern North America, west to the Plains, and north to Manitoba and southern Ontario, breeding in the northern part of the range.

American Redstart. *Setophaga ruticilla.* 687.

In general tone and quality there is a strong resemblance to the Yellow, but the range of variation is greater, and the song distinctly belongs to the "ringing aisles" of the woods. The commoner utterance can be recalled by *che che che che-pa*, the last syllable abruptly falling and weakening. A soft, sweet song is like *wee-see, wee-see-wee*, with a suggestion, at least, of lower pitch for the last syllable. Mr. Chapman represents a strongly accented song by *ching ching chee, ser-wee, swee, swee-e-e-e*. The fundamental difference between this bird's song and that of the Yellow Warbler is that there is a tendency to acceleration in the Yellow, while there is always a retard in Redstart. But even more distinctive, the two are not found in the same situations. Redstart builds him a house within the woods, singing to the accompaniment of his own echo.

It is well known now that the female of this species sings at least the more simple of the variations. I have never heard her sing the *staccato* described by Mr. Chapman.

My observations all point to continuous song from the early May arrival well into August, but Mr. Bicknell has found that there may or may not be a period of silence in July, followed by a second song period in August.

The Redstart inhabits the whole of North America to Fort Simpson, west regularly to the Great Basin, irregularly to California. It breeds from the middle of the United States northward.

Magnolia Warbler. *Dendroica maculosa.* 657.

Here the song differs from Yellow Warbler in ending in a falling inflection and from the Redstart in having the first

part distinctly double syllabled. I am now speaking of the commoner songs. There is such great variation that one is at a loss how to make comparisons. During the few days of migration I have already distinguished five variations, while Mr. S. E. White, in the Auk, describes seven. Rev. J. H. Langille distinguished the three types for three stages of the migration northward. In the south the song is a soft *whce-cho, whce-cho, whce-cho*; in the north it is *chce-to, chce-to, chce-te-cc*; while the breeding song is *cree-c-e-e-e-e*.

To Mr. Galloway the song suggests a "twisted caterpillar."

Mr. White's seven variations are well worth reproducing here.

1. Three notes, followed by one lower: *che-weech che-weech che-o*.

2. Three sharp clear whistles with a strong sound, then a warble of three notes, the middle the highest, the latter clear cut and decisive: *pra pra pra r-c-oo*.

3. Two quick sharp notes, followed by a warble of three notes, the middle the highest; the warble is soft and slurred: *prut prut purraeo*.

4. A soft falsetto warble, different in tone from any other bird song: *purra-e-whu-a*.

5. Of the same falsetto tone, uttered rapidly: *prut-ut-ut-ut-ut*.

6. A harsh note like, in miniature, the cry of a Jay: *d kay kay kay*.

7. A harsh *k-e-e-e-dl*, the last syllable higher by a shade, quick, and subordinated to the first part. The alarm is a sharp *zeek*.

These fully cover the five which I have heard. The first is distinctly like the Yellow Warbler.

This species sings during its stay in spring, but I find nothing to indicate that it sings on its return journey.

The species inhabits the spruce and hemlock woods when breeding, but in the migrations it is found in any woods, and not seldom in village parks.

Eastern North America, west to the base of the Rocky Mountains and north to Hudson Bay Territory, breeding mostly north of the United States.

The remaining four species may be regarded as forming a transition to the Chipping Sparrow Group, the transition being most marked in the last species to be described under this heading. Yet it must be borne in mind that these species in no small sense belong to this group, all of them, rather than to the other one.

Canadian Warbler. *Wilsonia canadensis.* 686.

Without being very marked, there is a certain similarity to Yellow Warbler. The pitch is higher, lending a shrill effect, the song averages shorter, or if longer there is a distinct swell or small run, before the end instead of at the end. — — — — — might serve to represent it. Or — — — — — The syllables I have written are *tu tu tswe tu tu*, the long syllable being higher pitched. Retaining this general character, the song may be lengthened or shortened. Mr. Thompson's *rup-it-chee*, *rup-it-chee*, *rup-it-chit-it-lit* must be a variation of rendering which I have never heard. The style of utterance suggests both the Yellow Warbler and Goldfinch.

The birds keep well to the trees, but are common on the college campus as well as in the woods. They seem to rather prefer the smaller growths.

Singing during its stay in spring, but silent in fall.

Eastern North America, west to the Plains and north to Newfoundland and Lake Winnipeg.

Orange-crowned Warbler. *Helminthophila celata.* 646.

The song is full and strong, not very high pitched, and ends abruptly on a rising scale. My note book renders it *chee chee chw' chw'*. The first three syllables rapidly uttered, the last two more slowly. One heard late in the season sang more nearly like Mr. Thompson's description: *chip-e*, *chip-e*, *chip-e*, *chip-e*, but with the first vowel changed to *e*, thus eliminating what would appear to be a marked similitude to the song of Chippy. Even in this song the ending is retained.

The Orange-crown sings while migrating northward, but I find no evidence of any song during the southward movement.

One must look for this bird in the bushes fringing woods,

Blackburnian Warbler. *Dendroica blackburnia*. 662.

We might reasonably expect this rather large Warbler to favor us with a robust song. On the contrary, he seems unable to produce more than a shrill, thin song, which runs up the scale to end in a high *z*. I can recall it by the syllables *tswe tswe tswe, te ze ze z-z*. Mr. Minot detects some difference between the spring and summer songs. The summer song is a repetition of the syllables *wee-see*, with the accent on the second; while the spring song is more ambitious: *wee-see, wee-see, tsee-tsee, tsee, tsee, tsee-tsee, tsee, tsee*, ending shrill and fine. While the song differs in execution from the Yellow Warbler it yet retains somewhat of that character, and should form the beginning of the transition to the Chippy type.

Blackburnian is not a persistent singer, and may sometimes pass northward in almost silence. He has not been heard singing during the return journey.

This promethean presence gleams from the upper foliage of trees, but delights in the shade trees of parks and lawns fully as much as the wood-land, usually shunning the deeper woods. His is a familiar presence on the Oberlin campus during the early days of May.

Eastern North America, west to eastern Kansas and Manitoba, breeding from the northern United States northward to Labrador.

or in the dense undergrowth of woods, where he conceals himself when singing.

Eastern North America, breeding as far north as the Yukon and Mackenzie River districts. Rare east of the Alleghanies, north of Virginia.

In the western United States, from the Rocky Mountains to the Pacific, the species is represented by the

Lutescent Warbler. *Helminthophila celata*
lutescens. 646a.

And on San Clemente, Santa Cruz, and Santa Rosa Islands, California, by the

Dusky Warbler. *Helminthophila celata sordida.* 646b.

Wilson's Warbler. *Wilsonia pusilla.* 685.

There is a variability in this Warbler's song which lies wholly within the group. Miss Roberts has summed it up in the following sentence: "It is sometimes like the ordinary song of Yellow, sometimes more like Redstart, sometimes almost unaccented." But it is always shriller than either, besides showing a tendency to marked *z* sounds. Mr. Nuttall describes it by the syllables *ts tsh tshea*, which strongly suggest a short song of Yellow Warbler. It is a small song, both in volume and quantity.

This black-capped Warbler sings during his northward journey, and I have heard weak songs on its return in autumn.

Brushy underwood is its favorite haunt, occasionally going higher up in the trees. It seems partial to places near water.

Eastern North America, west to and including the Rocky Mountains, north to Labrador, Hudson Bay Territory and Alaska. Breeds north of the United States chiefly.

From the Great Basin to the Pacific and north to Alaska the form is

Pileolated Warbler. *Wilsonia pusilla pileolata.* 685a.

Nashville Warbler. *Helminthophila rubricapilla.* 645.

There is considerable variation in execution of the song,

some renderings approach closely to the song of Yellow Warbler, while others resemble Chipping Sparrow. This is the pivotal species of the transition from one group to the other. Those which resemble the Yellow Warbler type are halting and less rotund. Mr. Minot represents this type by the syllables *wec-see, we-see, wit-a-wit-a-wit*. Rev. J. H. Langille by *ke-tse, ke-tse, ke-tse; chip-ee-chip-ee-chip-ee-chip*, which satisfies my ear better. Mr. Galloway also well represents it by *ka-cheepa cheepa cheepa cheepa, pichipe chip*; the transition syllable from the first to the second part of the song is admirable. The more Chippy-ward song may be represented thus: *k-chip; k-chip; k-chip; che-che-che-che*. The manner of utterance is also transitional, but the whole song is on the same pitch.

The Nashville spends little more than the first two weeks of May with us, singing constantly, but on his return he is silent.

I have found this Warbler everywhere that trees are growing, but rather more numerous in moderately brushy woods than elsewhere. There he ranges rather low, but spends much time in the trees.

Eastern North America, west to the Plains, north to the Fur Countries.

West of the Rocky Mountains it becomes

Calaveras Warbler. *Helminthophila rubricapilla gutturalis*. 645a.

WHISTLING SONGS.

Of the Whistling songs little need be said in general, except to define what we mean by whistling. True, there are a good many different kinds of whistles. Well, this is none of them. You make it yourself: pucker your lips and blow! That's the kind! The types selected are the Cardinal and the *pe-tee* whistle of Chickadee. Here, again, we clearly recognize a few transition species which it seems best to place last.

The group is readily subdivided into two sub-groups: Yellow-breasted Chat, all others. Giving them this order, we may first treat

Yellow-breasted Chat. *Icteria virens.* 683.

The song of the Chat is unique, not merely in this group, but in the whole class of birds. It is ventriloquial to a marked degree, but it possesses a timbre all its own. It would be far more proper to call the Chat's a performance rather than a song. To the uninitiated he appears to imitate every other sort of bird in the woodland, from the Crow and hawk to the sparrows; but to one familiar with him the Chat appears in it all. The imitation is not perfect, but approximate. Mr. Burns gives the best syllabled description of the describable part of the performance that I have seen: *cop! chick! cock! chack! co-co-co-co-co-co.*, the first softly, second, third and fourth emphatically, the remainder loudly and rapidly. There is usually a considerable pause between each of the first four syllables. There is endless variation in the performance, but these syllables are conspicuous and form a large part of the so-called song proper. While the Chat's range of imitation embraces nearly every voice of the woodland, he does not attempt an elaborate imitation, but rather snatches here and there from such parts as best suit his purpose.

The "flight song" of this species is apparently not a passion song at all, but rather comparable to the broken wing tactics of so many birds, or to the pitiful undone flutter of Killdeer, since danger seems necessary to call it forth. You have been cautiously searching hither and yon for a bird that ought to be attached to that voice, but all in vain, when you suddenly become aware of a loose bundle of feathers apparently suspended in the air above you, jerking like a witch and gradually settling down; while the air seems filled with a most bewildering medley of every sort of bird voice. You are too near his nest.

While performing, the bird remains well concealed high up in the foliage of some small tree, or in a thicket, but he will unmask if approached unawares. He is wary and alert. His favorite haunts are the brushy thickets bordering woods, or brier thickets with a few small trees.

He is one of the few night singers, singing at all hours of the night, but less frequently from twelve to two. It is no dreamy performance, but a wide-a-wake intentional song that rings and rings again on the still air.

He is singing when he arrives in the first week in May, and does not cease until the last of July or first of August. He has no second song period.

This species occupies nearly the whole of the United States to Ontario and southern New England, west to the Plains; west of the Plains to the Pacific it becomes

Long-tailed Chat. *Icteria virens longicauda.* 683a.

The remainder of the group need not be definitely subdivided. The transition species will be mentioned when they are treated. For lack of any evident logical order, we may begin with the best known species.

Oven-bird. *Sciurus aurocapillus.* 674.

The well-known double syllabled cry of this bird would scarcely need more than mention were it not that there is honest difference of opinion regarding the place of accent. As Mr. Chapman has well said: "It is a long, ringing crescendo chant, to which Mr. Burrough's description of 'teacher, teacher, TEACHER, TEACHER, TEACHER,' is so applicable that no one would think of describing it in any other way." The accent must evidently be upon the first syllable. The birds that I have heard have persisted in accenting the second syllable, the first one being weak and short: *p'*-CHEE. But this difference is rather technical than fundamental, since any one could readily identify the bird by Mr. Burrough's description. The description of the passion song will be deferred so that the "Water Thrushes" may be treated together.

The birds arrive very near the first of May, usually many together, and are singing. They sing well into the middle of July, but after the third week of June there is a marked waning. Song is resumed, but less vehemently, in August, usually ceasing before its close. Very few songs are full and strong during this second period.

The accompaniment of the Oven-bird's chant is a high, damp to wet woods where the upturned roots of fallen trees leave hollows for little ponds to form.

North America east of the Plains, north to Hudson Bay Territory. The breeding range extends from Kansas, the Ohio Valley and Virginia northward.

Water-Thrush. *Seiurus noveboracensis.* 675.

I shall not soon forget the anxious days and nights that this water sprite caused me before I could rightly say that I had seen him singing. The song was burned into my memory: *sweet sweet sweet chu-chu-wee-chu.* The first three syllables strongly accented and staccato, the last four short and run together into one phrase, the next to the last a third or more higher. Occasionally one sang *to to che-we che-we che.* The first two indistinct, the third, fifth and last strongly accented and a sixth higher, the fourth and sixth a little lower than these. Both songs are high pitched, clear, liquid whistles that carry far.

The Water-Thrush comes to northern Ohio near the first of May, and sings during his stay of three weeks. On his return early in September he is singing as vigorously as when he departed, for aught I can tell.

I have heard the song only in wet brushy places, preferably low woods or brushy clearings. The bird has sometimes been seen in wooded uplands. One regularly visits a wet tangle well within the village of Oberlin.

From Illinois eastward, north to Arctic America. From Illinois west to the Pacific coast the form becomes

Grinnell's Water-Thrush. *Seiurus noveboracensis notabilis.* 675a.**Louisiana Water-Thrush.** *Seiurus motacilla.* 676.

The ordinary song is, to my ear, a series of double syllabled, clear, ringing whistles, followed by a soliloquizing twitter. It is a thrilling burst that is startling and wild. The proper accompaniment is a wild, wooded glen in which a stream tumbles over its rocky bed.

Like the Water-Thrush, this species has two song periods, the first closing late in June or early July, the second beginning early in August. I have heard the passion song in August also.

West to the Plains, north to southern Michigan and southern New England, casually to Lake George.

The passion song of the water thrushes are so much alike that a description of one will serve for all. There is in each

the same ringing ecstasy of joy. The song seems to swing once round a great circle with incredible swiftness but perfect ease, ending in a bubbling *diminuendo* as the performer lightly touches the perch or ground with half rigid wings held high. The song is a flight song, usually occupying less than half a minute, but packed with the intense life of the bird. I have seen the Oven-bird suddenly vault into the air, mounting to the tree tops on quivering wings, then dart back and forth in a zigzag course swift as an arrow, and finally burst into a song as he floated gently down. There is some difference in the passion songs of the three species, which seems to be in the use of some notes of the ordinary song at the close, rarely at the beginning. Sometimes the Oven-bird closes his passion song with a burst of the perfect call song.

It seems hardly fair to say that the songs of the Water-Thrushes are thrush-like, since there is almost nothing of the true thrush timbre to their songs. On the contrary, a careful analysis discloses, rather, a true Warbler timbre, obscured as it is.

Swainson's Warbler. *Helinaia swainsonii*. 638.

Mr. O. Widmann, who has probably given the breeding song of this Warbler more careful study than any other person, says of it: "It begins like the Water-Thrush and closes like the Louisiana Water-thrush." Mr. Wm. Brewster describes the song as "A series of clear ringing whistles, the first four uttered rather slowly and on the same key, the remaining five or six more rapidly and in a descending scale." He also says that in general effect it resembles the song of Water-Thrush. The Warbler is not a regular singer, according to Mr. Widmann, but seems to wait for an inspiration, and when it comes he must needs deliver his message.

I can find nothing definite concerning the song period, nor as to whether there may be a renewal in the fall.

The haunts of this bird are the vast swamp tracts of the southern states, as far north at least as the southern-most counties of eastern Missouri, where Mr. Widmann found it nesting. It apparently ranges to south-western Indiana and west to Texas.

Mourning Warbler. *Geothlypis philadelphia.* 679.

In quality and style this Warbler's songs bears a strong resemblance to that of Water-Thrush, the variations having the same general quality, but the song is considerably less in volume and lacks the wild thrill of the Water-Thrush. The song which I have heard most frequently is *tee te-o te-o te-o we-se*, the last couplet accented and much higher pitched. A less common form slightly resembles the *crescendo* chant of Oven-bird, but is weaker. It is rather a swell than a *crescendo*. Dr. Merriam describes a variation which I have never heard: *true true true true too*, the last and next to the last syllables with falling inflection and more softly. The song is clear and whistling.

Song is incessant during the northward movement, but there is apparently none on the return journey.

This Warbler frequents low brush thickets in rather damp places, and appears to be solitary in its habits when migrating.

West to the Plains, north into Canada, breeding from the northern states northward.

Olive Warbler. *Dendroica olivacea.* 651.

Very little seems to have been written of the song of this Warbler. From that little one would be led to expect a high pitched, melodious, liquid, whistling song, on a descending scale; the separate notes not unlike the first note in the Whipporwill's lay; possibly resembling the last cadence of Swainson's Warbler.

The Olive Warbler lives in the highlands of Guatemala and Mexico, north into southern New Mexico and to Mt. Graham, Arizona.

The songs of the next three species bear a resemblance to the clear whistles of Carolina Wren; but the resemblance is rather in the quality of the whistle than in the manner of utterance.

Yellow-throated Warbler. *Dendroica dominica.* 663.

This song seems to resemble that of Indigo Bunting as well as Carolina Wren, but it is wilder and more ringing than

the Indigo. Mr. Brewster describes it thus: *twsee-twsee-twsee-see*, the last two rising and terminating abruptly. I find no mention of a song period in fall. The song has a certain ventriloquial quality.

The birds frequent the tops of trees bordering streams, moving about rather leisurely for warblers.

This species is confined to the southern United States, north to southern Maryland and Virginia, rarely to southern New England. The sub-species

Sycamore Warbler. *Dendroica dominica albilora.* 663a.

Is the form which inhabits the Mississippi Valley from western North Carolina to the Plains, north to southern Michigan.

The described songs seem to be practically identical with those of the species. Prof. A. W. Butler gives the fullest description: *twit, che-e, che-e, che-e, che-e, che-a*, the first abrupt with rising inflection, the next four following after a pause, all on the same pitch, the last rising sharply. While the syllables are different the description is almost exactly as above.

As the name indicates, this Warbler is most at home among the upper branches of sycamore trees which fringe the streams. His untiring activity makes study tantalizing.

Kirtland's Warbler. *Dendroica kirtlandi.* 670.

The song of this rare Warbler shows a marked tendency toward the Maryland Yellow-throat type, with a full oriole-like quality, "in marked contrast to the high notes of many warblers." It also resembles the song of the Yellow-throated Warbler. There are no syllable descriptions.

The rarity of this Warbler makes his geographical distribution somewhat uncertain. But he seems to be one of the warblers of the eastern part of North America, west at least into Illinois and Wisconsin, and east to Washington, D. C. He probably breeds north of the United States.

Kentucky Warbler. *Dendroica formosa.* 677.

The song of this species is probably more like the whistle of the Carolina Wren than any other Warbler. Mr. Burns has

studied the song so carefully that he is fully qualified to speak for his locality at least. He has clearly distinguished a type for the earlier migrants and another for such as remain to breed. The migration type is: *peer-ry peer-ry peer-ry peer-ry peer-ry*, often *chee chee chee pere-ey pere-ey pere-ey*. The breeding song is: *too-dle too-dle too-dle too-dle*. The style of delivery is Cardinal-like, but weaker and finer in tone. The song carries far, ringing thru the woods. The bird seems to prefer to sing while perched, and rarely if ever does so while feeding.

One must look for this Warbler in rather densely grown wet or well watered woods, more often on the ground than in the trees. He is one of the Warblers that walk.

Mr. Burns states that the song period ceases about the middle of July (17 in 1899), and no mention is made of renewal of song later.

West to the Plains, north to southern Michigan. Breeds from the Gulf states northward.

This properly closes the group of true whistlers. While the species which follow are transational they are more closely allied to those which precede than to any others. They are strong-voiced birds whose songs possess a carrying power second only to the preceding species, and exceeding some of them. The most familiar one is

Maryland Yellow-throat. *Geothlypis trichas*. 681.

The call song is a repetition of three or four syllabled phrases, one of the syllables strongly accented. Sometimes the accent is on one, sometimes on another syllable. The variation is neither individual nor seasonal, as any one may readily prove by listening to an individual sing for half an hour. The song is well represented by the syllables commonly used to describe it: *wichity, wichity, wichity*, or *wec-che-te*, for the three-syllabled song, and *wec-te-chee-te* or *wec-tee-sce-tee*, for the four-syllabled. In every three-syllabled song that I have heard the accent has been on the first syllable. In the four-syllabled it may be on either of the four, at the pleasure of the performer. The accented syllable has the appearance of being longer than the others, and it is often on a higher pitch. Not infrequently the third and fourth syllables

are raised in pitch more or less, in which case the accent is likely to be spread over both, the third taking rather more of it. The song usually increases in volume as it proceeds.

The tone is shrill, but loud and clear, and closely approaches a whistle, but having a suggestion of the Warbler hiss. The bird throws his whole being into the utterance. His perch is usually elevated somewhat above the surrounding brush, while singing, but is seldom on the topmost twig.

This species has a passion flight song which is delivered much after the fashion of the Oven-bird, and is not unlike it in being a medley of its call song notes.

The Maryland Yellow-throat arrives singing with the host of warblers in late April or early May, and sings well toward August. After about a month's rest he resumes the song, but ceases again about mid-September. Rarely one may hear the song all summer long. Mr. Bicknell regards the September singing rare, but my record of four years shows no late August singing, but always early in September full songs.

The specific form is confined to the region east of the Mississippi River and south of Hudson Bay and Labrador. From the Mississippi Valley to the Cascade Mountains it becomes

Western Yellow-throat. *Geothlypis trichas occidentalis*. 681a.

And from Florida to southern Georgia the

Florida Yellow-throat. *Geothlypis trichas ignota*. 681b.

The Pacific coast form is

Pacific Yellow-throat. *Geothlypis trichas arizela*. 681c.

It seems likely that the two south-western forms,

Belding's Yellow-throat. *Geothlypis beldingi*. 682.

which inhabits the southern part of Lower California, and

Rio Grande Yellow-throat. *Geothlypis poliocephala ralphi*. 682.1.

which is found in the lower Rio Grande Valley, are not

greatly unlike our eastern form in song. At any rate this is as good a place for them as could well be found.

Connecticut Warbler. *Geothlypis agilis.* 678.

In this song there is a mixture of Oven-bird and Maryland Yellow-throat, but the resemblance is no doubt closer to the latter. Mr. Thompson's *free-chapple free-chapple free-chapple-whoit* will recall it to some. Mr. Butler prefers the word "beecher." Mr. Gault describes six variations which seem well worth repeating here.

1. *Wheat-a; wheat-a; wheat*, gradually increasing in volume to the last.
2. *Wheat, our winter wheat, or our winter wheat.*
3. *Chip chee-a-wee; chip chee-a-wee; chip chee-a-wee.*
4. *Wheat, winter wheat, winter wheat, winter wheat.*
5. *Wheat here*, and sometimes only *wheat*: this on bright moon-light nights.
6. *Wheat-it-ta, wheat-it-ta, wheat*, the last syllable sometimes omitted.

No one could doubt the resemblance to Maryland Yellow-throat from these representations.

I find nothing to indicate the duration of the song period, nor whether there is the recurrence of song in fall.

The northern tamarac swamps and bogs are the home of this Warbler. It is one of the "ground warblers," spending much time on the ground.

It is another of the numerous company of warblers of eastern North America, breeding north of the United States. It passes north with the Warbler host in early May.

There are several species whose songs have not been described at all, or inadequately described for the purposes of this paper. They may be given in systematic order.

Lucy's Warbler. *Helminthophila luciae.* 643.

Arizona and extreme southwestern Utah, from the Santa Clara Valley southward to Sonora; New Mexico.

Virginia's Warbler. *Helminthophila virginia.* 644.

“The male is very musical during the nesting season, uttering his *sweet* ditty continually as he skips thru the bushes in search of his morning repast; or having satisfied his appetite, he mounts to the top of some tree in the neighborhood of his nest, and repeats at regular intervals a song of remarkable fullness for a bird of such minute proportions.”—Mr. Aikin, in Nehrling's *Our Native Birds of Song and Beauty*, Vol. I, p. 189.

Rocky Mountain region of the United States, from Wyoming, Colorado, Utah, and Nevada southward on the tableland of Mexico and Guanajuato.

Grace's Warbler. *Dendroica gracia.* 664.

“This beautiful Warbler is pre-eminently a bird of the pines. It is found as soon as the pine belt is entered, and continues almost to its upper limit; but I did not meet with any in the aspens, firs, or spruces above the pines. Its song is a sweet warble, frequently uttered from the lower boughs.”—Dr. E. A. Mearns in *The Auk*, Vol. 7, p. 261.

Southern New Mexico and Arizona, and south into Sonora.

Black-throated Gray Warbler. *Dendroica nigrescens.* 665.

The only description that I have been able to find is that by Nuttall, “*t-shee-tshay-tshaitshee*, plaintive.” It would be difficult to assign its position from so meagre a description.

Western United States, north to Colorado, Oregon and British Columbia west of the Cascades.

Painted Redstart. *Setophaga picta.* 688.

Mountains of Mexico, north to southern Arizona.

Red-bellied Redstart. *Setophaga miniata.* [689.]

Highlands of Mexico. Texas (Giraud).

Red-faced Warbler. *Cardinella rubrifrons.* 690.

Southern Arizona and southwestern New Mexico, thru Mexico to Guatemala.

Red Warbler. *Ergaticus ruber.* [691.]

Highlands of Mexico. Texas (Giraud).

Brasher's Warbler. *Basileuterus culicivorus.* [692.]

Central America, from Panama north to Eastern Mexico. Texas (Giraud).

Bell's Warbler. *Basileuterus belli.* [693.]

Guatemala and Mexico, north to the temperate regions of Vera Cruz. Texas (Giraud).

 CONCLUSION.

It is painfully apparent, from the foregoing discussion, that the subject is far from exhausted. We have hardly more than scraped the rind of it yet. We need first of all to learn the songs of the remaining species and sub-species. We need to devise some more perfect method of representing the songs which will admit of more fruitful comparisons than those now in use make possible. We need to follow the whole course of the migrating birds in order to learn what the variations are, where there are any, in the course of the journey northward; and if the breeding song differs from the migrating songs, what the difference is and why. We know so little about the second, or autumn, song period, that it is necessary to study it from the beginning with most species. We know that the females of some species sing, but under what circumstances and what part of the whole song of the species is not known. These are questions which can be answered by careful study.

There are other problems which belong more particularly to the wider subject of bird song, but which a study of Warbler songs will greatly help to solve. How far the sub-species

have departed from the song - type of the species ; whether there is a recognizable longitudinal variation in keeping with color variation, as the process of differentiation grows toward the formation of sub-species from merely geographical races ; what the difference is between young and old, bright plumaged and dull plumaged birds within the species ; what is the effect of environment upon the same individual to determine its effect upon the species ; how far imitation determines the quality of the song of the individual. And so we might go on suggesting topics for study to the end of the page. We need only to perceive that the subject is inexhaustable, and a fruitful one for investigation.