

SOME ASPECTS OF SPRING WARBLER MIGRATION

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MANY records of migration based upon observation alone are without object. After I had made records of that kind for sixteen years, it occurred to me that much real information might be obtained by using special methods of observation on a single group of birds. This paper is a discussion of the results of applying such a method to warblers.

Unfortunately, frequent migrations of my own made it very difficult to keep accurate and complete records, and the material in this paper represents that extracted from a great deal of chaff. Consequently the results are suggestive rather than final. However, identifications were made as thoroughly and carefully as field conditions would permit, and the notes made at Chicago were checked against the banding records of Mr. Karl Bartel, who was operating a station in the Oak Hill Cemetery where my own observations were made. The remaining data were

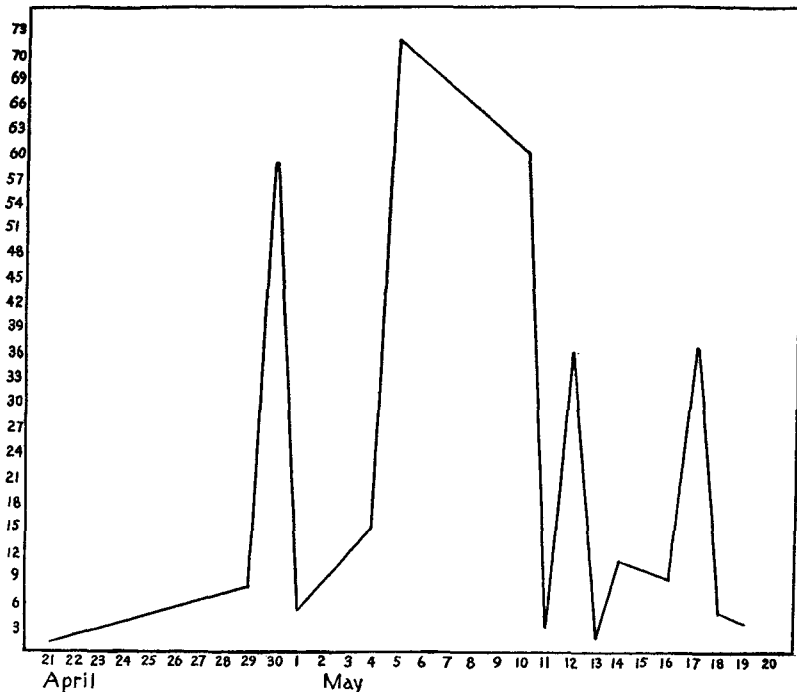


Figure 1. Spring migration of all species of warblers at Chicago in 1934. The column on the left represents numbers of individuals seen.

collected at Searcy during the spring seasons of 1939 and 1940. Searcy is a poor place for such observations because the bulk of the birds apparently passes east of that region. Data collected at Chicago in 1933 and 1935, though corroborative of other material collected, were too fragmentary to record here.

The method employed was extremely simple. Beginning early in the season, and equipped with a pair of binocular field glasses and a pack of 3" x 5" cards, observations were begun about 6:00 A.M., and continued for about an hour and a half over an area of approximately half a square mile. In Searcy this included the campus of Harding College and adjacent territory. Each card bore the name of a species of warbler known to occur in the region; whenever a bird was seen, a check mark was made on the appropriate card. Since warblers do a great deal of moving about within small areas, it is easy to recount individuals.

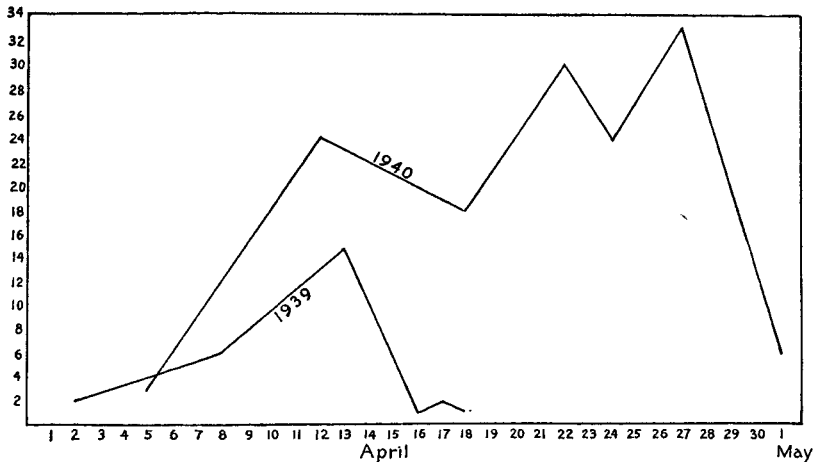


Figure 2. Spring migration of all species of warblers at Searcy, Arkansas, in 1939 and 1940. The column on the left represents numbers of individuals seen.

For this reason count was taken very rapidly in one or two trees and another count made some distance away. It was also necessary to avoid following a group of moving birds to avoid counting them over again. Even with such precautions a wide margin of error was inevitable. But, on the other hand, what was wanted was a series of comparisons rather than exact figures.

That the method was reliable for the purposes intended is indicated by the fact that the results tallied both with more casual observations and with banding records. The purposes were several: to form a general estimate of the numbers of warblers migrating at different periods of the season; to test the wave theory of migration; to compare the

relative numbers of various species; and to determine the migratory peculiarities of different species of warblers.

Graphic representation makes the results evident. For instance, examination of Figure 1 indicates that migration does occur in waves, and that it has a seasonal optimum so far as numbers are concerned. But it indicates further that the peak of migration is skewed toward the latter part of the season. It is evident from Figure 2 that this peculiarity is not accidental, since the data in the latter figure were taken at a different place and different times from those given in Figure 1. This means that there is a tendency for warblers to "pile up." That is to say, they arrive at a given point faster and in greater numbers than they leave it.

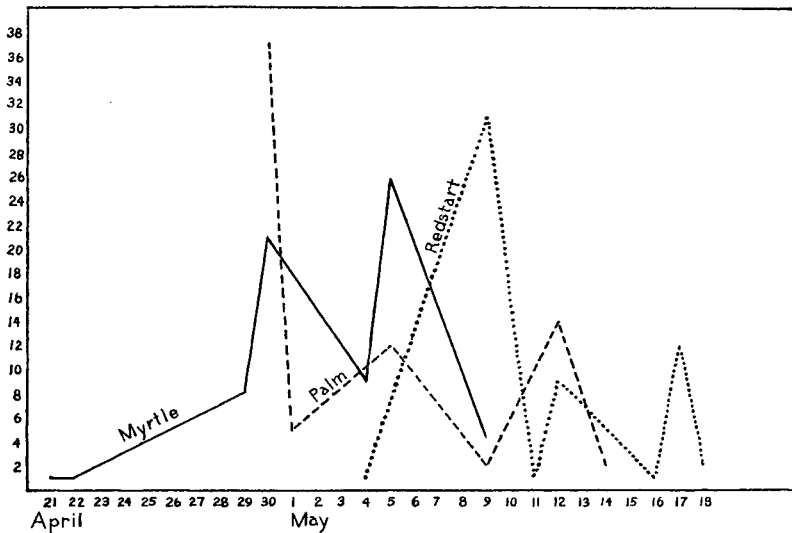


Figure 3. Spring migration of the three most common species of warblers at Chicago in 1934. The column on the left represents the numbers of individuals seen.

The graphs in Figure 3 indicate that, although the migrations of the Myrtle Warbler (*Dendroica coronata*) and Redstart (*Setophaga ruticilla*) overlap, the latter species arrives later and leaves later than the Myrtle Warbler. Yet, curiously enough, the peaks of migration for the two species are close together. My casual observations of other years substantiate this conclusion.

For years before making these observations it was my impression that the Palm Warbler (*Dendroica palmarum*), instead of appearing in increasing numbers, followed by a gradual decline, appears *all at once*,

and then declines in numbers rather rapidly. This is certainly what occurred in Chicago in 1934, as the graph clearly indicates. Very few, if any, members of that species appeared there before April 30.

A frequency histogram of species plotted against numbers of individuals for the year 1934 seems to indicate that as the *total number of individuals declines the variety of species increases*. That is to say, the peak of the migration consists of great numbers of a few species, and as the number of warblers becomes smaller the variety of species increases. Thus, of the 302 warblers observed, 204 (about 67 per cent) belonged to one of three species (Myrtle, Palm Warbler, or Redstart), and these all appeared early in the migration. The remaining 18 species were scattered through the season, but with a greater number of species toward the end of the season.

In conclusion, I believe that these observations indicate that:

1. The warbler migration as a whole occurs in waves, with a distinct peak or seasonal optimum.
2. There is a seasonal optimum for each species.
3. The seasonal optimum for warblers as a group is skewed, indicating a tendency for the birds to accumulate.
4. Some species, such as the Palm Warbler, exhibit individual peculiarities of migration.
5. The greatest variety of species occurs near the end of the migration.

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