

MIGRATORY BEHAVIOR IN SONG SPARROWS

WITH TWO ILLUSTRATIONS

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The Song Sparrow (*Melospiza melodia*) in common with various other species differs in its migratory behavior in different races, some subspecies making long migrations while others are sedentary. How often members of the same subspecies and even of the same community show opposite behavior in this matter is not known. Ten banded individuals of the Eastern Song Sparrow (*Melospiza melodia melodia*) have been found to be resident in regions where most of their kind are migratory; in two localities in Pennsylvania (Gillespie, 1927; Middleton, 1929), in New York State (Baarsch, 1927), and at Martha's Vineyard (Eustis, 1931).

With the Mississippi Song Sparrow (*M. m. beata*) that nests in large numbers near our home, I have found the following situation: About one-half of the males and one-tenth to one-fourth of the females are permanent residents, the rest of the breeding birds leaving in October and returning from late February to early April. My birds are identifiable in the field, since they are banded with celluloid as well as aluminum bands; moreover, the bird that has wintered somewhere to the south of us, presents a bright, clean appearance on its arrival, in marked contrast to the resident bird that has been subjected for months to the soot of Columbus.

Stability of Migrating and Non-migrating Behavior.—It is generally accepted that young birds are more prone to wander than adults (some of the herons being notable examples), but I do not know of any definite instance in the literature of a known individual making a true migration the first year, and afterwards remaining stationary, either at its birthplace or in its new home.

The character of migrating or not migrating has proved stable in the majority of my birds. Twenty-one males have remained consistently resident, fifteen for two years, five for three years and one for four years. Twenty-three males have been consistently migratory, thirteen for two winters, seven for three winters and three for four winters.

But eight other males and one female have changed their status. During the fall and winter of 1931-32, one two-year-old male (19M) changed from summer resident to resident, while another bird (9M) of the same age that had passed his first two winters near our house went south in the fall and returned in the spring. Both of these birds were well known to me. Unfortunately both came to their ends during 1932.

The following fall and winter, one summer resident remained, while five residents migrated, returning from February 26 to late March. The summer resident and two of the residents were year and a half old birds. One of the residents (96M) must have been two and a half years old, while I have no data as to the age of 131M. But one of my birds (54M) I banded in the nest, May 11, 1930; he remained on his territory continuously till late October, 1932, returning to it bright and shining on February 26.

The only female that has changed status was a resident, first seen February 15, 1932, and last recorded that season in June; on March 18 she was back again near her former home in clean plumage.

Inheritance of Migratory Behavior.—When I first found the difference in the migratory behavior of my Song Sparrows, I believed there were two strains and that sons would do as their fathers had done. The accompanying charts give all the data as yet obtained in the inheritance of the migratory status in my Song Sparrows.

Chart I (fig. 44) gives a number of examples of resident sons of resident fathers, and of migratory sons of migratory fathers, but it also shows many exceptions. (All my breeding Song Sparrows are given "field numbers" in the order in which I become acquainted with them; the males are named 1M, 2M, etc.; the females, K1, K2, etc. The numbers have no reference to the band numbers, nor to any relationship with any other bird.) Number 87M was the resident son of summer resident parents, 23M having migrated four winters. The two sons of the summer resident 12M are of much interest; 52M remained resident for two years and then came

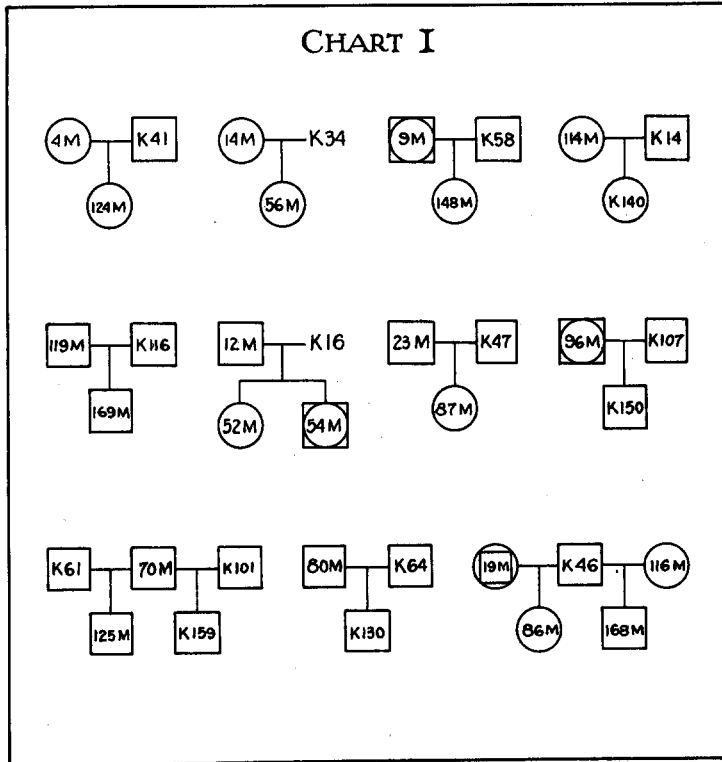


Fig. 44. GENEALOGIES SHOWING INHERITANCE OF MIGRATORY BEHAVIOR IN SONG SPARROWS. M=MALE; K=FEMALE; CIRCLES INDICATE RESIDENTS; RECTANGLES INDICATE SUMMER RESIDENTS. WHERE BIRDS HAVE CHANGED STATUS, FIRST STATUS IS INDICATED INSIDE SECOND. NUMBERS OF BIRDS NOT ENCLOSED ARE OF UNKNOWN STATUS.

to his end, 54M migrated his third winter. Another, K140, had a resident father and a summer resident mother; this young bird is one of my two resident females banded as nestlings, the other ten returns of this sex being summer residents. Two mates and a son and daughter of 70M were all migratory.

The two sons of K46 deserve mention; with a migratory husband (it was the fall after this nesting season that 19M remained here), she had a resident son, while the next year with a resident husband, she had a migratory son—my only example of a summer resident son of a resident father.

Each of the four genealogies on chart II (fig. 45) is of considerable interest. There is one straight summer resident line for three generations, 22M and his descendants, all five birds involved being known to have been migratory.

Mates of K2 were both summer residents, as she was herself, yet she had one resident son (55M) and two resident grandsons. I am sorry that I did not know the status of her son-in-law, 13M. But with her mate in 1930, 5M, we have a clear case of a summer resident pair having a resident son, just as with 23M and K47.

The history of the descendants of 25M and K28 is especially interesting, because of the remarkable fact of three young from one brood surviving. Unfortunately the

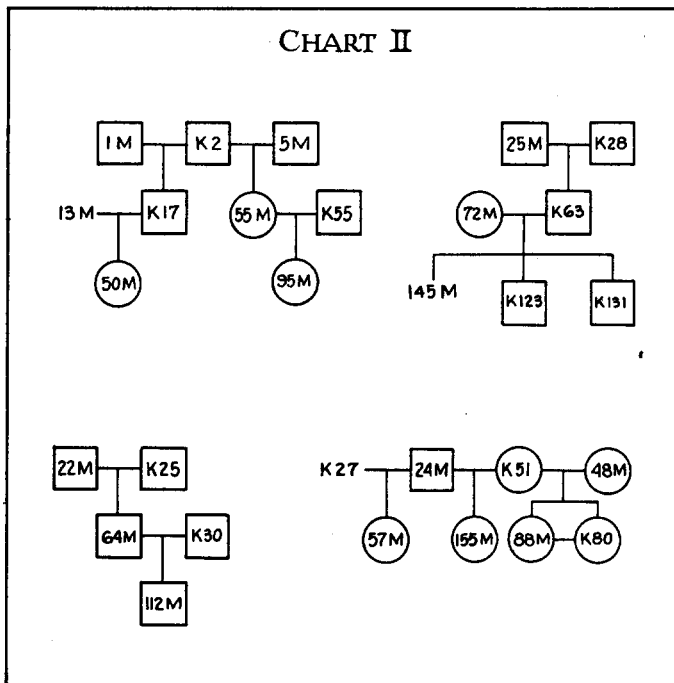


Fig. 45. ADDITIONAL GENEALOGIES OF SONG SPARROWS. FOR LEGEND SEE FIGURE 44.

status of 145M is not known; he was caught about 50 yards to the south of our grounds, October 4, 1932, when 16 months old and has not been seen again. Possibly he nested in town and had left his territory in the fall because it no longer offered food and shelter. Interestingly enough, the two sisters nested here in 1932 (one 150 yards from her birthplace, the other 500), and the grandmother also; on May 25, I had the pleasure of banding K28's children in the nest and on May 28 and 31 her two broods of great grand-children.

The family histories of 24M and K51 show several points of interest. In 1930 24M, a summer resident, and a mate of unknown status had a resident son 57M. In 1932 24M and K51, a resident female, had a resident son, 155M. But the year before, K51 and a resident male, 48M, had had a son and a daughter survive from one nesting; these juveniles wintered in the same locality and mated in the spring. (Sometimes in cases of inbreeding hatchability is poor, but with this pair all three

eggs in the first nesting hatched.) These three half-brothers were each hatched in a different year.

Numbers of Residents and Summer Residents.—The status of all the banded nesting males on or near Interpont (the forty acres of flood plain near our home, see Nice, 1931 *a* and *b*) in the last four years has been as follows: At the beginning of the nesting season, 1930, 13 of each category; 1931, 23 residents, 22 summer residents; 1932, 44 residents, 30 summer residents; 1933, 25 residents, 29 summer residents. It will be noted that the proportion of residents rose from 50 per cent to 57.9 per cent during the third year, but dropped the next year to 46.3 per cent.

The increase was not due to a greater death rate among the summer residents, since both sets of birds survived about equally; it was due to the very large number of young birds that wintered here in 1931-32. Among the summer resident males approximately a third were juvenile, but this was true of more than half of the residents, 23 out of 44. The decrease in residents the following year appears to be due to the change of status of six individuals.

It is possible that the weather in October may have something to do with some of the birds staying or leaving. In 1931, October was mild and pleasant throughout, but the same month in 1932 was bleak and cold during the first half. In those birds that change status the migratory urge cannot be very strong; perhaps the warm weather of 1931 nullified its promptings, while the unpleasant temperature of the following year gave sufficient stimulus to start the birds south. Rowan (1931, p. 91), in telling of the Mallards (*Anas platyrhynchos*) some of which fail to migrate each fall from Alberta, says, "In years in which the fall is late and open, a far larger number stay behind."

The females have shown a consistent increase in residents. In April, 1931, there were five residents out of forty-six birds on Interpont, or 12.2 per cent; in April, 1932, there were 14 out of 63 or 22.2 per cent, and in April, 1933, 11 out of 41 or 26.8 per cent. The total number of resident females that joined mates was '6 in 1931, 15 in 1932 and 14 in 1933.

Differences between the Residents and Summer Residents.—There is no difference between residents and summer residents in length of wing or tail, nor in weights taken at the same time of year. In the matter of coloring there is no difference in the fall, but an artificial one in spring due to Columbus soot. As to zeal in singing, there is considerable variation between males in this respect, some of the most enthusiastic being residents and also some of the least so. Among the females the only two really energetic singers have been residents. (Female Song Sparrows sometimes give a harsh, unmusical song early in the season before nesting begins.) Resident females may occasionally start to nest earlier than some of the late-arriving migratory females, but on the whole there is little or no difference. Resident females do not differ from the others in the number of eggs laid.

Comparison with Other Species.—It seems a strange thing that part of a population of breeding birds should migrate for the winter while others are permanent residents. Thomson (1921) has called this "individual migration." Two aspects should be considered here: the preponderating number of females that migrate, and the contrast in the behavior of the males. Do similar conditions obtain with other species?

In some cases males regularly winter north of the females, as with Chaffinches (*Fringilla coelebs*), Song Thrushes (*Turdus philomelus*) in Switzerland (Dorno, 1924), Cabanis Woodpeckers (*Dryobates villosus hyloscopus*) (Lofberg, 1928), and

Prairie Chickens (*Tympanuchus cupido americanus*) in the past, for Cooke (1885, p. 34) wrote, "It is the females that migrate, leaving the males to brave the Winter's cold." Burkitt (1925) found the male Redbreast (*Erithacus rubecula*) permanently resident, while many of the females migrated.

I have noticed that when an individual winters north of its regular winter range, it is almost always a male. This was true of many different species in Oklahoma, and also of the specimens of such birds in the Ohio State Historical and Natural History Museum in Columbus. There are also many scattered references in the literature that bear out this theory. Schuster (1931) in discussing the exceptional case of the Hen Harrier (*Circus cyaneus*), where more females than males wintered in the Mark says it is well known that, in so far as the migratory instinct is differentiated according to sex, the male is more faithful to his home and less apt to wander than the female.

In quite a number of European species some of the breeding population are known to be resident, while others go south for the winter: the Cormorant (*Phalacrocorax carbo sinensis*) (Haverschmidt, 1933), Lapwing (*Vanellus vanellus*) (Thomson, 1926), Woodcock (*Scolopax rusticola*) (Thomson, 1929), Buzzard (*Buteo buteo*) (Bernhardt, 1930), Hooded Crow (*Corvus cornix*) Thienemann, 1922), Greenfinch (*Chloris chloris*) (Boyd, 1931), Song Thrush (Witherby, 1930), and Blackbird (*Turdus merula*) (Drost, 1930). But this situation is known certainly of only one American species besides the Song Sparrow, namely the California Shrike (*Lanius ludovicianus gambeli*), as described by Miller (1931).

With the Buzzard and the Blackbird, members of the same brood were found to behave in opposite ways in the matter of migration. Unfortunately the sex of these birds is not known, nor do there seem to be data as to whether the females are more migratory than the males, nor whether the character is stable in the individual. In Germany it has been found that two- and three-year old Blackbirds migrate as well as birds of the year.

Conclusions.—Perhaps the migratory instinct is latent in all my Song Sparrows; it functions normally in some individuals, but for some reason lies dormant in others most of the time. It is possible that the weather at the time of the fall migration has an influence on the effectiveness of the urge in some of the birds. The situation with these Song Sparrows is not a matter of the young wandering and the old remaining, nor of the instinct disappearing in some males and this strain being more successful than the other. In Hungary during the last forty years the Blackbird has developed into a resident (Csörgey, 1930). Last year I thought perhaps the same thing might be happening with my Song Sparrows, but now I am less sure.

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