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RELATIONS BETWEEN THE SEXES IN SONG SPARROWS

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During the past four years I have concentrated on the study of the Song Sparrows (*Melospiza melodia beata*) that live in large numbers near our home, in 1929 spending all my time on two pairs, but after that taking an interest in more and more birds. I am keeping track of the major events in the population on the forty acres of Central and North Interpont (see Nice, 1931a and 1931b), but at least fourteen banded birds and probably quite a number more have scattered out to all points of the compass, two having settled a whole mile from our house. Up to the present I have banded (with colored as well as aluminum bands) 154 breeding males and 125 breeding females, not to mention about 250 nestlings and about 150 transients and winter residents.

The Relations Between the Pair

About half the breeding males and one-tenth to one-fourth of the females are permanent residents; the rest of the birds leave in October and return from late February to the first week in April. The male is strongly territorial from February to July, but although (if a resident) he stays on or near his territory during the rest of the year, he does not defend it except in the case of a young male settling on it with a view to permanent residence during the molt of the rightful owner. He does not drive his mate from it at the end of the breeding season, as Burkitt (1925) found with the Redbreast (*Erithacus rubecula*); both birds remain but gradually become indifferent to each other.

The male is the guardian of the territory and of his mate and young; he is zealous in feeding the latter, often taking sole charge of the little birds soon after they have left the nest, while his mate busies herself with preparations for the next brood. The female builds the nest, takes entire charge of incubation, broods the young and also feeds them. She is attached to the home territory and helps defend it,

but she never holds territory by herself alone, as do female Redbreasts (Burkitt) and some Shrikes (*Lanius ludovicianus*) according to Miller (1931). The tie with the young is broken when they are about a month old. The tie between the pair is broken at the end of the nesting season, for even when a resident male and female are mated two years in succession and both have stayed in the vicinity of the territory throughout the fall and winter, they do not associate together at these seasons, taking no interest in each other except during the breeding season. This is in contrast to the behavior of some birds —Carolina Chickadees (*Penthestes carolinensis*) and Carolina Wrens (*Thryothorus ludovicianus*) (see Gillespie, 1930) for instance—where a banded pair often remain together throughout the year.

Song Sparrows cannot tell the sex of one of their own kind except by its behavior and notes, unless the birds are personally acquainted with each other. This has been evident in experiences with a new method I have developed for capturing my birds; I find that it is often possible to catch a male by using a male neighbor as decoy in the trap, or a female by means of a female neighbor. But a male or female placed in a territory that is not contiguous to its own, elicits very little interest from the male owner of the territory and even less from the female.

The female in the early breeding season announces her identity by her notes—either a high-pitched, nasal *eeeeeee* or a kind of chatter; she also indulges in various growling, grumbling expressions. The male does not strut, nor puff, nor sing a special love song for the benefit of his new mate; indeed, the suppression of his almost constant singing indicates the arrival of a female. His one method of courting is to fly down suddenly, hit his mate and fly away with a triumphal song! This "pouncing" is evidently analogous to the "sexual flight" described by Howard (1929) in the Yellow Bunting (*Emberiza citrinella*) and Reed Bunting (*Emberiza schoeniclus*); but the Song Sparrow female does not try to escape; she stands her ground and says either *eeeeee* or gives a gruff note of dismissal, *jee*. Mated males "pounce" on neighboring females when the mates of the latter are at the other ends of their territories; the females always repulse them and their husbands usually come dashing to the rescue, whereupon battles ensue. Pouncing takes place from the first arrival of the female to the beginning of egg laying; a new cycle is initiated by the reappearance of pouncing. Copulation comes later—usually shortly before the beginning of nest building—and lasts until incubation begins; the male never gives any note after the act, but the female often says *eeeee*.

The male is very solicitous over his mate when she has first joined him, giving the fear note *tit-tit-tit* at the approach of a person; he watches after her, usually mounting bushes and trees, while he is careful to keep between her and another male. She follows him at times, again he follows her. During the first few days they usually do not keep close together, but after that they may almost always be found in company.

Schjelderup-Ebbe (1924) makes much of "despotism" between birds, stating that the normal situation is that of a benevolent despotism of the male. Between Song Sparrow mates each bird is the despot in certain relations, the male notably so in his pouncing and in driving his mate home if she happens to be frightened from the territory by a person, but the female rules in the little affairs of every day life. He never drives nor pecks her, but she often opens her bill at him, gives him small pecks or drives him to a moderate extent. She says *jee* to him, but he never says it to her.

The Situation During One Season

My Song Sparrows usually remain with the same mates throughout one nesting season. There are two reasons why these birds are generally faithful in contrast to the House Wren (*Troglodytes aedon*) (Baldwin, 1921) that usually change mates, and the Bluebird (*Sialia sialis*) and Brown Thrasher (*Toxostoma rufum*) that often do so (Nice, 1930a). First, they are so markedly sessile on their territories that they seldom stray from them; second, their nesting cycles usually overlap, so that there is no opportunity for the parents to become separated.

There is a high mortality of both males and females during the nesting season (Nice, 1931a, 1932); the loss of females is always greater than that of the males, but the replacement in this sex is also greater. The disappearance of the females has averaged thirty per cent during three seasons, while replacements have amounted to slightly over one-third as many—i. e., of 115 females[1] 41 disappeared during the breeding season, while 15 new birds came after the nesting season was well under way. Of 96 males 22 disappeared and 6 new ones came in during this same period.

Only once has a new male appeared and joined a widow that was trying to raise a young family alone (Nice, 1932). Replacement in

[1]These statistics are based on the Song Sparrows on Central Interpont in 1930 throughout the nesting season, and in 1931 until June 6; in 1932 the birds on North Interpont were also included and the record kept until June 14. A few of these birds were not banded.

the case of females is seldom prompt; almost always a male has to sing for several weeks—one as long as six weeks—before being joined by a new mate, while a number remain widowers till the end of the season.

Is there a reserve supply of unmated birds? There is a slight preponderance of males in the population, but the unmated birds, almost without exception, are settled on territories. Sometimes a male tries in rather a half-hearted way to establish a territory and later disappears. One such bird returned the following year and procured his home and mate with little trouble. When there is a surplus of birds as was the case in 1932, a few of the young resident males appeared to be crowded out by the adult summer residents. Whether such a bird finds a territory elsewhere, or wanders about during this year I do not know. I believe he would settle down, if it were at all possible. The few males that have come into Interpont during the nesting season, might well have been dispossessed of their territories by human activities.

I do not believe there is any floating population of unmated birds among the Song Sparrows. Both males and females that come into Interpont during the nesting season seem to me probably birds that have been for one reason or another driven out from their original homes.

Desertions. In only one case has a male deserted a female and here two abnormal features were involved. The pair—27M[2] and K29[2]—were driven from their territory south of Central Interpont by the ploughing of their land on April 12, 1930; after some difficulties they settled some 300 yards to the north. On May 20 I tried to capture the birds by placing a trap over their nest containing two six-day-old Cowbirds (*Molothrus ater ater*); K29 entered readily, but 27M was so upset that he deserted. I believe he settled about 200 yards to the west, where I caught a new male I called 29M. In the meantime K29 continued to care for her step-children and on June 4 her neighbor 26M was seen assisting her in her onerous task and afterwards they raised a brood together.

Howard (1929) never found a female that deserted her mate after once joining him. With my Song Sparrows faithfulness is the rule, yet I have observed a number of cases of desertion with banded birds,

[2]The birds are given field numbers in the order in which I become acquainted with them; the males 1M, 2M, etc., the females K1, K2, etc., each number belonging exclusively to one bird and not referring in any way to its mate. I thought at first (Nice, 1930b) that it would be sufficient to name a female according to her mates, but this has proved impracticable.

especially in the "bethrothal period", or Howard's "second phase"—the period (which may last almost two months) between the arrival of the female and the start of copulation. Two desertions have taken place just at the beginning of nesting activities—Howard's "third phase"—and two in between broods.

In two cases desertions occurred when the pairs were driven from their homes. This spring Interpont has been taken over for gardens for the unemployed, and the consequent "cleaning up" of the weeds and elders that started March 1, drove two pairs and two unmated males from North Interpont. Two of the males have moved so far away that I have not been able to find them; one settled just across the river; and another came down into Central Interpont some 300 yards south of his former territory. The mate of one of the first two birds joined a male in Central Interpont about 150 yards from her former home, while the mate of the fourth male disappeared entirely.

Four birds (with no reason that I could see) have changed their minds as to which mate they wished to stay with. One resident, K42, joined 9M on February 22, but on March 2 was with 66M; from March 5 to 17 she stayed with 11M, but rejoined 9M by March 22 and remained and nested; all these males were fairly near together. K58 has moved from one mate to another two years in succession. In 1932 she returned to her former territory March 3; her last year's mate was dead, but she stayed with his young successor until March 19, when she took up her abode with 9M about 100 yards southeast. This spring she joined 4M who has settled on 9M's land (the latter having died) on March 13, but three days later had moved 100 yards west and became 143M's mate. Two other females deserted mates for no known reason, one having been with her first choice from February 15 till March 25, but the other making the change after only about a week's stay with the first bird. In this last instance an interval of bleak weather had disorganized the pairs, but usually in such cases the birds return to their proper mates.

By February 15 K83 had joined a juvenile resident male, but when on February 26 he was driven out by the summer resident owner of the territory, his mate stayed with the victor. This is my only instance where a mated male has been driven out by a later comer; typically territory affairs are pretty well settled before mating begins.

In all these cases the deserted males were normal individuals that later raised families with other mates. But in two cases there was an abnormality in the male. 95M sustained a broken leg that never

healed properly, so that it hung useless; he sang less than most of the normal males, nevertheless by March 30 he had a mate, K106. On April 22, when the other Song Sparrows were starting to build, I found a curious situation in the family; 95M was singing busily, but K106 was sitting high in a tree. 95M came near to feed, but she failed to join him. Ordinarily a female keeps low in the bushes and the pair are almost constantly together. I never saw this female again. 95M sang to some extent, but soon became inconspicuous; he was seen in December, but evidently came to his end before spring.

The story of 68M is rather strange. In 1931 his mate, K60, laid five eggs; one of these disappeared; two were infertile; one hatched into a normal bird, but the other nestling was deformed. At the age of nine days when it died, its right side showed development proper for a six-day-old bird, but its left only four days. Its right femur was 27 mm in length, its left 16 mm; its right toes 8 and 11 mm, its left 5 and 6 mm; the sheaths of its right primaries 21 mm, its left 4 mm.

In 1932 68M returned February 27 and got a mate, K100, March 26. K60 came two days later and joined the male next to the south; her first set contained four eggs, all of which hatched and were raised successfully. So it would appear as if the defect were in 68M. On April 28 or 29 K100 deserted 68M and joined 66M 100 yards to the west, 66M having lost his first mate about April 26; these two birds nested and achieved the unexampled feat of raising two Cowbirds and two of their own young. It looks as if 68M, although normal in size, weight, and singing behavior were somehow lacking in his sexual behavior. He has returned for the third season and has for his mate a bird I banded in the nest in 1932.

In two cases mothers have followed their young into the territories of widowers, and instead of returning to their mates, have stayed and nested.

The Situation from Year to Year

In only five instances has there been remating a second year among my banded Song Sparrows. In two of these cases the females were residents; they stayed permanently in the same regions, and their former mates having survived, it is natural that they should remate the second year.

Other banders with only a few pairs of Song Sparrows in their vicinity often report the presence of the same pair two years in succession (Baasch, 1927, Burtch, 1925, Haldeman, 1931, Hamill, 1926, Higgins, 1926). I believe it is of comparatively rare occurrence on

Interpont because of the large number of birds and the many chances a male has to get a mate before his former mate arrives, the presence of the resident females being a complicating factor. I do not have any case of a female joining a new mate when the old was available; either the former husband was dead or was already mated, or, in one case, returned later than she did.

Female Song Sparrows do not fight each other over mates. They do exhibit a defensive attitude towards their neighbors of like sex, dogging each other's footsteps in a hunched up or puffed out attitude, in the meantime busily eating. In 1929 the two pairs I was studying often met at the feeding station I maintained on the boundary line, whereupon the males would threaten each other and the females do the same, once the latter staging a real battle.

Bigamy

Twice I have found male Song Sparrows with two mates at the same time. The habit of the male of pouncing on neighboring females opens the way for the acquisition of an extra mate, although under ordinary circumstances a female repulses any male but her mate.

It was most astonishing to me to discover on May 1, 1931, that 48M had two mates. The two nests were about fifty yards apart in the same ditch; the young in the nest with his original mate, K51, left May 12; those in the other nest hatched May 13 and 14. It was not until the latter date that I realized that 48M was doing double duty, feeding the young out of the nest and calling K76 off of her nest, besides driving other birds from its vicinity. During the hour and a half that I watched, 48M did not feed the small young in the west nest. The two females did not meet while I was there. Unfortunately K76 was killed on her nest that night by a dog and her young were dead beneath her.

The second case I had much more chance to observe. On February 26, 1932, I first noticed a sooty-looking (and hence a resident) male, 113M, in the ditch next to 12M's land. He was a puzzle to me, for he almost never sang and his neighbors did not seem to resent his presence. He remained and finally—April 18—got a mate, K131, whom I had banded as a nestling the previous summer.

About April 24 my fine old male 12M disappeared and his mate, K89, instead of joining one of the mateless males in the vicinity, simply stayed on as the second wife of 113M. She must have had a nest started with 12M and thus felt anchored to her territory; I never found this nest which was evidently destroyed, for she built

another in which she laid May 11 to 15. K131 laid her set May 8 to 11. Each female stayed in her respective ditch for the most part; once I saw them meet on the dike, but neither showed hostility. 113M shared his time between them, although appearing to prefer K89 and to be more anxious when her nest was visited than the other. He called both of them off the nest, and helped feed both broods, although not zealously. Both nests held Cowbird eggs. Some enemy must have carried off all the Song Sparrow young from K89's nest, so only a Cowbird was raised. K131 had three young of her own (one egg being sterile); a severe drought was causing losses in most of the Song Sparrow nests at this time, and K131 had but inefficient help from her preoccupied husband; she succeeded in raising only one of her own young besides the Cowbird.

It was a curious situation that such a self-effacing male should have two mates, while eight or ten of the other males on Interpont were mateless, including his next-door neighbor. In 1933 113M got a mate in February; when his two former mates returned in March, neither insisted on becoming a supernumerary mate, but joined other males in the vicinity.

Some Concluding Observations

The male chooses the territory, although it seems to be more or less haphazard and without much intelligence. At any rate those territories with water or with large trees, those less frequented by people, and those that appeal aesthetically to us, are not taken any more readily than those covered merely with bushes or even with weeds and rubbish. The male appears to exercise no choice as to his mate, but is happy to welcome the first comer that greets him with the appropriate notes.

The female returns to her former nesting site if possible; if that is preoccupied, she usually settles as near as she can. She appears to exercise no choice as to desirability of territory, as to beauty or variety of song in the male, nor even in the matter of physical perfection. 11M had half of one of his legs shot off, but both years he got mates earlier than some of his neighbors. (I know the history of only one of his nestings; in this three out of five eggs were infertile). A female with only one foot was at no disadvantage in getting a mate; she was able to build an elaborate nest and raise a brood. When we also remember 95M, we are forced to conclude that Song Sparrows are not very observant when choosing mates.

We are accustomed to think that birds that hold territory must do so vigorously or fail ignominiously to reproduce themselves. Nichol-

son says (1929:27), "The proper quota of inhabitants will be made up from the strongest and most self-assertive birds". But, although most of my Song Sparrows are zealous in singing and in territory defense, a few are not, yet they appear to prosper equally well. This has been true of 57M, although inconspicuousness is his rule of life; and I have seldom heard him sing. He was hatched June 6, 1930, and has lived on North Interpont ever since. Each year he has had a mate, yet he is so retiring that it is usually impossible to find him, although I repeatedly search his territory. Thus this bird that never properly proclaims territory has survived for nearly three years and raised young at least once and probably several times. 113M is also an example of an unassertive bird that was doubly successful.

I hope that this paper will not give a false impression of the marital relations of my Song Sparrows; although considerable space has been devoted to desertions and to two cases where males had two mates at one time, yet the majority of my birds are models of devotion to home, mate, and family.

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