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NESTING OF THE FIELD SPARROW AND SURVIVAL OF THE YOUNG

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ONE of the most common birds on the open uncultivated areas in southern Michigan is the Field Sparrow (*Spizella pusilla pusilla*). Oscoda and Crawford counties in the northern part of the Lower Peninsula, and Menominee county in the extreme southwestern part of the Upper Peninsula are the northernmost parts of the state where the species is found (Van Tyne, 1938, p. 42). Consequently we are dealing with a species in the most northern part of its breeding range.

The summary of seventy nests found in the southern part of the state, from 1919 through 1935 has been published by the author (1936, pp. 94-101). Since that time 62 nests have been found and some detailed studies at certain nests made. The most extensive part of the work was carried on in part of section 31, Pennfield township, Calhoun county and the adjacent area across North Avenue in the Orchard Park division of Battle Creek, Michigan. An accompanying map shows the area.

Approximately one hundred acres in Pennfield township and fifteen acres in Battle Creek constituted the area studied. Of the former 100, about sixteen were woodland and marsh and thirty acres covered merely with grass, so that fifty-four acres, uncultivated and grown up to shrubs proved the most suitable to the species. The fifteen acres along the Battle Creek limits were similar to the fifty-four acres. Through the tall grasses of these regions were to be found patches of blackberry (*Rubus*), staghorn sumac (*Rhus typhina*), dwarf sumac (*Rhus copallina*), New Jersey tea (*Ceanothus*) and bush clover (*Lespedeza*). Small trees, oak (*Quercus*), hickory (*Carya*) and hawthorn (*Crataegus*) were scattered along the side hills and valleys. On this favorable 69 acres, 23 pairs of birds were known to nest, a ratio of one pair to each three acres. On the complete 100 acres, excluding the marsh and woodland, 27 pairs nested or one pair to each 3.7 acres. Nests of 24 pairs were actually found.

NESTING

The Field Sparrow selects a wide variety of shrubs, weed clumps and grasses in which to nest. Earlier nests are closer to the ground, later ones higher when the vegetation becomes thicker. Five found during the month of May averaged 58 mm. from the ground to the rim and three of these rested directly on the ground. Two were built in old dead grass, two in low blackberry bushes and one in a dense new tuft of alfalfa (*Medicago sativa*).

Ten June nests averaged 151 mm. above the ground to the rim, ranging from 100 to 250 mm. Five of these were in black raspberry bushes, two in blackberry bushes, one each in grass, timothy (*Phleum pratense*) and cinque foil (*Potentilla*).

Forty-three nests have been recorded during July, of which seventeen were in blackberry bushes, six in New Jersey tea, five in small oaks, four in hawthorns, two in small maples (*Acer*) and one each in grapevines (*Vitis*), timothy, hazel (*Corylus*), red raspberry (*Rubus*), vervain (*Verbena*), sorrel (*Rumex*), bush clover and a small hickory. One nest was only 40 mm. from the ground, two others only 100 mm. but the majority were much higher, averaging 340 mm. to the rim, the highest of which was 1200 mm.

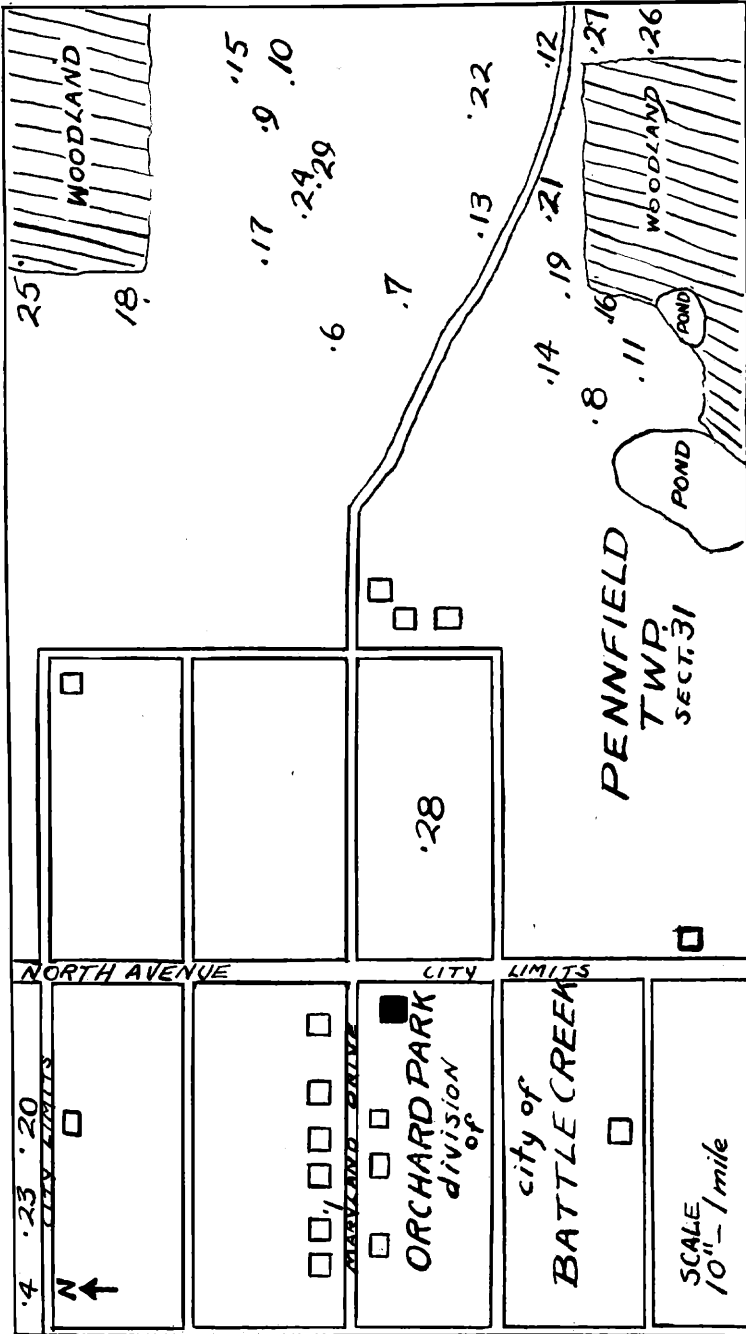
Of six nests constructed in August, two were in hawthorns, and one each in blackberry, spirea, a small oak and a small pine (*Pinus*). They averaged 432 mm. from the ground, ranging from 200 to 825 mm.

On the area studied during 1938, nine nests were located in blackberry bushes, six in New Jersey tea, four each in small oaks and hawthorns and one each in grass, bush clover, sumac, hazelnut, spirea and a small hickory. One May nest rested on the ground in dead grass. Two June nests averaged 289 mm. from the ground to the rim. Twenty nests constructed between July 1 and July 25 averaged 337 mm. from the ground and six nests constructed after July 26 through August averaged 354 mm. above the ground.

One notes that nests as the season advanced were progressively farther from the ground when the leaves became thicker on the low shrubs and trees. The average height of 64 recorded nests was 297 mm. from the ground and the average of the 29 on the area studied during 1938, 326 mm.

The Field Sparrow finds nesting material fairly close to the nest site, grass stalks, weeds, finer grasses, hair. I have watched the female collect material, and have never observed her more than 100 yards from the site. In comparing nests, however, the materials of which they were made were very different. Some were lined entirely with black horse hair, others with very fine grasses while still others had coarser grasses, sometimes fine rootlets.

On the area studied during 1938 this difference was noted and since most of the nests were collected, they were easily compared with neighboring nests. Nests 6, 17, 24 and 18 were lined almost entirely with jet black horse hair. Nests 28 and 29 had a little in



FIELD SPARROW NESTING AREA

July-August-1938,
numerals - nest sites

2.3
2.5

their lining. These nests were all located in adjacent territories. The only other nests having black horse hair for the lining were nests 2, 3 and 5, also located very close together and evidently all belonging to the same pair. Nests 22, 12 and 27 had white horse hair in the lining while down the hill below nest 27, nest 26 had some bay-colored hairs in the lining. None of the others had any. Nests 21, 22, 29 and a little in 13 had in the inner half, worked into the general mass, some fine sporophytes of the moss found on the side hills of the region.

The nests were placed in natural crotches of shrubs or trees or in tufts of grasses, alfalfa, clover, bush clover, etc., where there was some natural protection. Not woven onto the branches at all, they were merely placed there and the bulk aided in holding most of them securely until after the young left. During heavy wind storms when the young were older, several of the nests tipped over, allowing the young to fall to the ground where they died or were devoured by ants.

The outer parts were always made of stalks of grass, the coarser parts being used. These were worked into a circular formation, then a lining of the finer materials, fine grasses, sometimes coarser grasses, horse hair, very fine rootlets forming a well woven lining, much more compact than the outer loosely woven portion.

The average dimensions of 25 nests were as follows:

	<i>Exterior diam.</i> <i>at top</i>	<i>Interior diam.</i> <i>at top</i>	<i>Interior</i> <i>depth</i>	<i>Depth</i> <i>overall</i>	<i>Wt. in</i> <i>grams</i>
Average	105 mm.	53 mm.	42 mm.	75 mm.	5.32
Max. . .	120 "	65 "	50 "	110 "	8.1
Min. . .	85 "	47 "	35 "	55 "	3.0

I have never observed the male Field Sparrow help in the construction of the nests, but in nearly all cases he accompanied the female while she collected material, flying right along beside her. The female, except in beginning construction, when larger pieces of material were used, usually carried a good many particles in her bill on each trip to the new nest. These she worked carefully into the mass, shaping it for final use. Most nest building was accomplished during the early hours of the morning. While the birds were flying back and forth to the nest they often uttered a low chipping.

Nest 8, 1938 was found when only a few stalks of grass had been placed in a bunch of bush clover and I was not even certain that it was a new nest, for the adults were feeding young recently out of the old nest fifteen feet away. This was on July 12 and on July 14, in the late afternoon, it was completed except for the lining which was added on July 15. The first egg was laid during the following morning, July 16. At nest 24, 1938 the usual pair of birds was noted flying together to the new nest one hundred thirty-three feet from the previous site where the eggs had been destroyed by some predator. This was early in the morning of July 29 and the eggs were

taken from the other nest late during the day July 27. They completed this nest on July 31 early in the morning and the first egg was laid August 1. These were about the average in time for normal nest construction. Even May nests were very similar to those made during the late season. Two, three or four days were required, after which the birds rested either one day before the first egg was laid or deposited it the very next day.

The first nests of the season are sometimes made during the last few days of April here in southern Michigan but usually it is during the first half of May. A few early nests found have been as follows: May 11, 1920, nest with four eggs; May 4, 1922, one nest under construction; May 12, 1922, nest with two eggs; May 10, 1925, nest with three eggs; May 13, 1928, nest with four eggs; May 2, 1931, nest with three eggs and May 10, 1938, nest under construction, in which the first egg was laid May 12.

Three late nests on record are: one found during 1922 from which the three young left on August 24; one found during 1933 from which the young left August 29 and one during 1938 from which the last two of three young left September 10. Nests have been found at different stages from early May until at least late August.

Two pairs were followed during most of their nesting season and the summary of the happenings are as follows: The first pair was found nesting (nest 2) in a blackberry patch on June 8, 1938. The nest contained three young, two of which were about three days old and the third two days. (It was estimated that the nest was built about May 20-22, the eggs laid May 24, 25 and 26 and the young hatched June 5 and 6. They left the nest about June 13.) The second nest, nest number 3, was found July 1, fifteen feet from the first. It contained one Field Sparrow egg and one Cowbird egg. The next day, July 2, it contained two Field Sparrow eggs. (It was estimated that this nest was built June 28-30.) It was deserted July 3 when one of the eggs disappeared. The third nest, number 5, was found completed only six feet from the second on July 6. It contained no eggs. (It was estimated the nest was built July 4-5.) The eggs were laid July 8, 9, 10 and hatched July 20 (eggs 1 and 2) and July 21 (egg 3). The three young left this nest without being disturbed on July 28. The complete summary of the nestings of this female follow; her mate was not banded. The period of reproduction from the building of the first nest until the young left the third nest was seventy days. Eight eggs were laid and she required only two or three days to build her third nest. The incubation period was eleven days and the nestling period seven and eight days even when the young were not disturbed. She did not care for the young from the first nest after they were fifteen days old. Five days elapsed between the desertion of the second nest and the laying of the first egg in the third.

The second pair was found nesting for the first time, probably after one or two unsuccessful attempts elsewhere, on July 24, 1938

when the nest contained three eggs. These eggs were fairly fresh. They were destroyed on July 27 late in the evening. (It was estimated the nest was built about July 15-17 and the eggs were laid about July 18, 19 and 20.) This was nest number 17. This same pair moved over a small knoll one hundred thirty-three feet away and built their second nest July 29-31. The eggs were laid August 1, 2 and 3. The young hatched August 13 (eggs 1 and 2) and August 14 (egg 3) but they were deserted when I caught the female by the use of a net frightening her into it from a blind. This nest was deserted August 15. I did not expect them to renest but was surprised to find a third nest. The parents were marked with Biological Survey bands and colored bands. This nest was found on August 26, seventy-one feet from the second and contained three eggs. (It was estimated it was built August 17-19 and the eggs were laid August 20, 21 and 22.) The young hatched on September 2. They left the nest, one on September 9, the other two on September 10 when seven, eight and eight days old. This female was known to lay nine eggs and probably laid more. It was known that both parents were mated for the last two nestings and according to their behavior that they evidently were mated for the first nesting recorded also. The period of the three nestings from July 13, until September 10 was fifty-nine days.

The period from the earliest nest recorded, approximately April 25 until August 25 is one hundred and twenty-two days. Probably few birds breed during this entire period but it is my belief that certain ones will be found to have a longer reproductive period than the seventy days of the first female recorded.

THE EGGS

The eggs of fifteen banded females were observed. There was some difference in each individual set, but the eggs laid by each female were quite definitely marked. The ground color was quite similar in most sets, a pale greenish blue. The female at nests 17, 24 and 29, recorded above, laid three sets of three eggs all almost identically marked, having a wreath of fine regular shaped spots about the larger end, then a few scattering spots over the remainder of the egg. These eggs were shorter than most of the others and were more pointed. The female at nests 3 and 5 had eggs quite identical but hers were longer and the spots with more irregular outlines and larger. The smaller end of these eggs was more rounded.

The average measurements of sixty-eight eggs was 18.3 x 13.9 mm. and the average weight of the same number, 1.67 grams when in fresh condition.

The number of eggs laid by the Field Sparrow has been recorded from 1919 through 1938 and the full complements of 71 nests aver-

aged 3.39 eggs. A similar record has been kept of the Chipping Sparrow (*Spizella passerina passerina*) during the same period. Thirty-three nests of this species averaged 3.66 eggs. Following is a table of both species as classified per month:

FIELD SPARROW					
No. of Eggs per Set	NO. OF SETS				Total
	May	June	July	August	
2.....				1	1 set
3.....	7	4	29	4	44 sets
4.....	8	9	5	1	23 "
5.....	3				3 "
Total number of sets per month.	18	13	34	6	71 sets
Average number of eggs per set per month.....	3.77	3.69	3.14	3.0	3.39 eggs

CHIPPING SPARROW					
No. of Eggs per Set	NO. OF SETS				Total
	May	June	July	August	
3.....	1	4	5	1	11 sets
4.....	11	9	2		22 "
Total number of sets per month.	12	13	7	1	33 "
Average number of eggs per set per month.....	3.91	3.69	3.28	3.0	3.66 eggs

One notes that the number of eggs per set during each month is about the same for both the Chipping and Field Sparrow and that during June and August, with what information I have at hand, the sets are exactly the same. In the aggregate the Chipping Sparrow sets averaged larger than those of the Field Sparrow. With both species, as with most birds, the sets became progressively smaller as the nesting season advanced.

INCUBATION

The female performed the incubation entirely. When she left the nest, the male often joined her and both searched for food. Until the young hatched he spent most of his time singing from some favorite perch.

Incubation started, often the day the second egg was laid, late during the day, but more often, early in the morning after the third egg had been laid. Two young, almost invariably, hatched within the same hour, followed during the next 24 hours by the third, and if there was a fourth egg, sometime during the next day by that one.

During 1938 the incubation periods were obtained at four different nests where the eggs were marked as laid. Following is a summary of the events at these four nests:

Nest No.	Nest Built	Eggs Laid	Eggs Hatched	Young Left Nest
5.....	Complete July 6	July 8, 9, 10	July 20, 8 A.M.—3 eggs July 20, 12 M.—(1, 2) July 21, 8.00 A.M.—(3)	July 28 (1, 2, 3)
8.....	July 12-15.....	July 16, 17, 18	July 28, 6.00 A.M.—3 eggs July 28, 12.00 M.—(1, 2) July 28, 5.30 P.M.—same July 29, 7.00 A.M.—(3)	Aug. 2 (1) Aug. 3 (2, 3)
23.....	Complete July 29	July 30, 31 Aug. 1	Aug. 11, 7.00 A.M.—3 eggs Aug. 11, 2.00 P.M.—(1) Aug. 12, 5.30 A.M.—(2) Aug. 12, 6.00 P.M.—(3)	Aug. 19 (two) (other had dis- appeared)
24.....	July 29-31	Aug. 1-2, 3	Aug. 13, 6.00 A.M.—3 eggs Aug. 13, 7.00 P.M.—(1, 2) Aug. 14, 7.00 A.M.—(3)	Aug. 16 (young drowned)
Average.	3½ days	Daily	10¼ to 11 days	7 days

The numbers in parentheses in the column, eggs hatched, are the numbers of the eggs which had hatched since the last visit. These incubation periods were almost identical, practically eleven days. During 1935, at two nests where the eggs were not marked, the eggs hatched either ten or eleven days after they were laid but in each case one egg failed to hatch. At another nest during 1935, the eggs hatched eleven days after the nest was found with its full complement of eggs.

At two nests of the Chipping Sparrow in southern Michigan, the incubation period was identical, eleven days, and at two nests of the Clay-colored Sparrow (*Spizella pallida*) the incubation period was found to be eleven and eleven and one-half days in Crawford County, Michigan. The closely related Tree Sparrow (*Spizella arborea arborea*) has recently been observed to have an incubation period of twelve to thirteen days at Fort Churchill, Manitoba (Baumgartner, 1937, p. 100).

At nest 21, 1938, I examined the two eggs at both 5 and 7 A.M. on August 7, eleven days after I found the nest with the same two eggs. (A third was later found underneath the bush.) At 8.40 A.M. I again returned to the nest finding one young hatched and the eggshells gone. The other was nearly ready to hatch. He hatched in my hand, pushing with his head, neck, feet and wings, finally splitting the egg in two. The egg was split nearer the larger end and the shell weight was .3 grams. It required several minutes for him to complete the work because he rested between each attempt. After being placed in the nest, he curled up in the bottom but when I touched the nest responded immediately by raising his head and opening his mouth.

(To be continued)