

A CHIPPING SPARROW FAMILY

Observed at the U. of M. Biological Station

June 28 to July 11, 1934

Elisabeth Rohrer

A Chipping Sparrow Family

The chipping sparrows under observation evidently did not care for human society, for they had built their nest about two hundred yards from any building, on the far side of the hill behind camp. The cup-shaped nest was placed in a small Norway pine, two and one-half feet from the ground on a platform made by three horizontal branches. The nest was partly shaded by overhanging pine needles, but was rather poorly concealed from view. It was made entirely of grasses, weed stems, and rootlets; and was lined with fine rootlets instead of horsehair, there being no horses in the vicinity. There were over four hundred separate pieces of nesting material, about half of which were rootlets. Some of the weeds and grasses were over a foot long but were neatly woven in.

The Incubation Period

On June 28, when the nest was found, it contained four eggs, but only two were the chipping sparrow's own; the others were those of a cowbird. The greenish-blue sparrow eggs had a wreath of small blackish spots around the large end and measured 18.5mm. by 13.7mm. The cowbird eggs were much larger, 23.5 by 17.5 mm., and were white thickly speckled with brown. Probably the sparrow's eggs were laid first, but whether there were more than two originally I do not know.

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Before the eggs hatched I made my observations from the shrubbery ten or fifteen feet away. On the first afternoon the parent bird left the nest at my approach but stayed very near, chipping gently and hopping about in the bushes for fifty minutes. At last it left the vicinity of the nest and returned soon after with its mate. The pair chased each other about for a time, as if taking a little recreation; then the female (presumably) went almost directly to the nest and settled there, having left the eggs alone an hour and twenty minutes. The next day when the nest was disturbed the parent returned after forty minutes; and on the third day she returned after fifteen or twenty minutes absence. She was gaining confidence rapidly. However, she seldom went directly to the nest; she would alight first in the Amelanchier bush directly behind her pine and would approach the nest again and again before finally settling there. Only once did I see her fly directly to the pine; on that occasion I was sitting behind the Juneberry bush.

On the three days before the eggs hatched I observed for eight hours altogether. The incubating parent remained on the nest twenty minutes at a time, on the average. At one time she remained for half an hour. Except when disturbed, she never left the eggs alone longer than thirty minutes. The weather during this time was quite uniformly warm. The position of the eggs was changed at least once a day; I found them in five

3.

different positions during the four days before hatching. The presence of two kinds of eggs made it possible to observe this. The incubating female (I assume it was the female) obtained her own food while away from the nest. Even while the two adults were chipping in alarm at my presence they took time to peck at the twigs as if looking for insects. Once I saw the two birds touch bills so perhaps he was feeding her. Several times the pair took short flights together, both chipping softly. At ten-thirty one evening after an electrical storm, I found the eggs warm and dry. The parent, who was chipping nearby, had evidently just left the nest.

Hatching

On Monday, July 2, four days after the nest was found, the first cowbird hatched. That evening the parents were seen bringing caterpillars. When I approached the nest, the parent sat very close, allowing me to come within five feet of the nest instead of ten or fifteen feet as before. By eight-thirty the next morning another young cowbird had appeared, and before evening one of the chipping sparrows had hatched. The parents stayed very close to the nest that first day. I found a bird brooding whenever I approached, and the other parent was always near, which was not the case before hatching. While the blind was being set up both parents showed their distress by loud chipping, and one of them ran off trailing its wing to deceive me.

4.

The next morning I moved the blind closer to the nest and then left the birds alone for several hours, hoping they would overcome their fright. When I returned at one o'clock the other sparrow had hatched. I was unable to learn what became of the eggshells, for they were nowhere to be found.

Appearance and Development of the Nestlings

When first hatched the nestlings had down upon all the feather tracts except those on the ventral surface. On the second day the cowbird was opening his mouth for food continually. Down was just beginning to show on the ventral feather tracts. He was first heard cheeping on the fourth day, and by this time all the feather tracts had appeared. On the fifth day he moved about in the nest a great deal, stretching and shoving and spreading his wings. By the sixth day his eyes were open. On the seventh he was able to stand upon his feet, and was a very lively youngster indeed, grasping at my finger with his toes and trying to take the whole nest lining with him when I picked him up. By the tenth day he was quite respectably clothed with bluish-gray feathers which covered him everywhere except on part of the ventral surface.

The chipping sparrow's natal down was a darker gray than the cowbird's and the edge of his bill was also dark, while the cowbird's was bright yellow. The sparrow's development was very similar to the cowbird's but his growth was less rapid. On the

third day the sparrow's feeble chipping was heard; and at this time feather tracts were appearing on the back, shoulders, wings, and ventral surface. All feather tracts had appeared by the fourth day. On the fifth day he stretched his feet and wings valiantly, but even so could not hold his own against the huge cowbird, who was on top of him most of the time. At any rate the cowbird kept him warm.

A Fatal Accident

On the sixth evening after the first egg hatched I noticed that only one sparrow was raising its head for food. Not a trace of the missing bird could be found. Of course it may have fallen prey to some nest-robber, but it seems more likely that the young sparrow was crowded out of the nest and removed by the parents. At the time of the accident the cowbirds weighed about four and one-half times as much as the sparrows, and the nest was crowded to the rim. It was interesting to note that the day before this fatal mishap the feeding had been especially good and the nestlings had gained more rapidly than usual (see growth curves between fifth and sixth day). Unfortunately the missing sparrow was the one whose measurements had been taken; but as the surviving sparrow was about one day younger, I was able to obtain overlapping measurements. The next morning I took out the younger cowbird on the advice of people with experience who told me that the one remaining sparrow could not possibly survive with two cowbirds in the nest. When I visited the nest later in the morning the

distress of the parents was greater than ever before. One of them flew within a foot or two of my head, and when I entered the blind one alighted on the ridgepole and one hopped on the ground right up to the canvas. That evening the male showed that he was still much disturbed by fluttering all around the blind, chipping constantly, although his mate went on caring for the young. The birds' alarm gradually subsided, but their behavior was never quite normal until two days later when I obtained success by taking with me a companion who walked away from the vicinity after I had entered the blind.

Feeding

The earliest feeding I observed was at four-thirty a.m.; the latest, at eight twenty-eight p.m.; but whether the sparrows' working day is even longer than that I did not determine. During a total of twelve hours the parents made 81 visits with food, which consisted almost entirely of caterpillars and other soft insects. As far as I was able to determine, the male and female shared this work about equally. (I assumed that the brooding bird was the female and identified the male thereafter by a small dark spot on the side of his head.) Sometimes one and sometimes two nestlings were fed at one visit, but rarely more than two. Usually the mouth that reached highest and opened widest received the food. During one period of sixty-nine minutes, the largest cowbird was fed nine times, the other cowbird once, and one sparrow once. Out of a total of 117 feedings, the two cowbirds received food 91 times, or 78 percent of the time.

The activity of the parents increased daily as the nestlings

required more food. On the first day after all the eggs were hatched, the parents averaged one visit every fifteen minutes during the time that I observed. The next day the average was once in six and two-thirds minutes; on the third day, once in five minutes. Evening seemed to be the time of greatest activity; and they were slower than usual in rainy weather and in the early morning. Whenever the chip of an arriving parent was heard the young birds opened their mouths, and as soon as they were able, called for food as well. A person passing near the nest or a robin calling nearby produced the same effect.

The feeding process was most interesting. If the insect was small enough it was swallowed whole, but long caterpillars were dangled from the parent's beak so that the young birds could get a small piece at a time. Often after putting food into a nestling's mouth the adult would pull it out and feed it to a different bird. According to Chapman,¹ this is because the first nestling did not respond to the food and is a device to prevent overfeeding. Usually the male and female alternated in bringing food, but three times I saw the female take a caterpillar from her mate's beak and pass it on to the young. On one of these occasions it was raining and the female no doubt was shielding the nest. Once when the male arrived with a fat yellow caterpillar, the female did not leave as she usually did at his approach. Instead she hopped upon

¹Chapman, Handbook of Birds of Eastern North America, p.87

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the rim of the nest, took the caterpillar from his beak, and dangled it in turn before three of the nestlings. She finally thrust it into the throat of a cowbird but it was yanked out at once by the male. Then began a comical performance; the adults passed the caterpillar back and forth between them for fully five minutes, and it must have changed hands (or beaks) twenty times at least. Each time the birds drew the insect from head to tail between their mandibles, as if trying to macerate it. Once the male tried to feed it to one of the young but his mate seized it and continued the crushing process. I was anticipating a fine big meal for the nestlings when, to my great surprise, the female suddenly snapped up the whole thing herself.

Nest Sanitation

The sanitation of the nest was cared for by both parents, who ate the excreta ten times and carried off the sac twelve times during my observation. Many times while brooding the female would peck at the inside of the nest, possibly to clean it, but I was rarely able to see exactly what she was doing. The tendency was to devour the excreta at first and to carry them away more often as the nestlings grew.

Brooding

The average length of the brooding period was eight minutes and the average time the young were left alone was slightly less:

than eight minutes. There was considerable variation in the length of the brooding period, depending on the stage of the nestlings' development, the weather, and the arrival of the male. The female nearly always left the nest when he arrived in the Amelanchier. The first few days after hatching the average length of the brooding period was greatest. When the nestlings were older they were brooded more often but for shorter periods. During warm weather the periods away from the nest averaged longer than the periods of brooding; in cold or wet weather the opposite was true. On one occasion the female brooded constantly for forty-six minutes while her mate's alarm chip was heard nearby. She very seldom sat quietly while brooding but hopping upon the edge of the nest, she plunged her head down into it and poked about with her bill. At times she actually changed the position of the nestlings; sometimes she seemed to be pulling at their feathers; and at other times I thought she was cleaning the nest. Then, after carefully surveying her brood, she would settle down with a rocking, cuddling motion of her body. Often this whole performance was repeated six or seven times in succession.

The parent was always on the alert while brooding; and she turned her head toward the source of every sound. Once she was frightened away by the noisy flutterings of waxwings in the June-berry, and once by a strong gust of wind. During a gentle rain she shielded the whole nest by spreading out one wing.

Ordinarily she sat facing the road, which was about thirty feet away; but occasionally she settled in a different direction. This could be explained sometimes by the location of the sun, but I could not always account for her position. She sat facing the blind one day when the birds were unusually nervous. When leaving the nest she nearly always flew off toward the road-- almost never by way of the Amelanchier.

Voice

While observing the nest I became quite well acquainted with the voice of the adult birds and I noticed four different kinds of chipping. First, there was the sharp chip of alarm heard whenever I approached the nest. Usually both birds took part in this. Another kind was the short, gentle chipping which nearly always announced the arrival of one of the adults. Very similar, but continued longer, was the fine, rapid chipping heard whenever the pair flew off together. Then there was the usual song of the male, which I heard very seldom. Unfortunately there was another male chipping sparrow within hearing distance, so that I was seldom sure which one was singing.

The End of the Nestling Period

On the tenth day after hatching the cowbird hopped out of the nest at my approach and started down the hill at a great pace. I followed, but soon lost his trail and gave up the search. Returnin~~g~~

to the nest, I found that the week-old chipping sparrow had left during the chase and was nowhere to be found. I did find the cowbird, though, looking like a clod of earth only three feet from the nest, and I was able to obtain one more measurement. It was an interesting fact that he had lost weight since acquiring the use of his wings.

I returned the cowbird to the nest about eight-thirty that evening. He was there at ten o'clock and probably stayed until morning. I visited the vicinity of the nest daily for a week after that, and never failed to hear the parents' alarm call, which assured me that one or both young birds were still about. Several times I had glimpses of a juvenile bird which, judging by its size, must have been the cowbird, now larger than its foster parents but still dependent upon them for food.

Summary

In the study of this chipping sparrow's nest I was impressed with the importance of habit in the birds' behavior. Some of the actions which were performed in the same way almost invariably were the following:

1. approaching the nest from a certain bush
2. announcing their arrival by chipping
3. leaving in a definite direction
4. facing a certain direction while brooding.

Other actions were influenced by the weather, including temperature, and by the stage of development of the nestlings.

1. The brooding periods were longest in unfavorable weather and while the nestlings were very young.

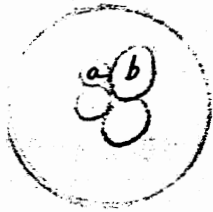
2. The frequency of feeding increased with the age of the nestlings.

3. The frequency of feeding depended also upon upon the weather and the time of day.

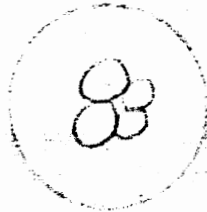
4. The method of cleaning the nest depended partly upon the amount of excrement.

It was interesting to note the reaction of the adult birds to intruders. To a certain extent they became accustomed to my presence near the nest. For several days after the disappearance of the sparrow they were more easily alarmed than usual. On one occasion at least, the male seemed more easily disturbed than the female, who went on caring for the young while he showed great distress.

A comparison of the growth rates of the nestlings shows that the cowbird gained weight faster than the sparrow; and I have no doubt that he received more than his share of food, even taking his greater needs into consideration. My observations merely confirmed the old familiar story of cowbirds crowding out the rightful occupants of a nest. However cruel this may seem, judged by human standards, it probably has its place in nature as a desirable check; and the presence of those cowbird eggs certainly added color and excitement to the study of this chipping sparrow's nest.



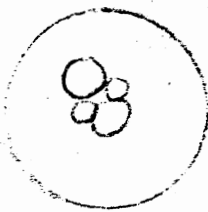
7-28



7-29 (7 p.m.)



7-30 (4 p.m.)



8-1 (1:40 p.m.)



8-1 (7:30 p.m.)



8-2 (7:15 p.m.)

- a. Egg of Chipping Sparrow
- b. Egg of Cowbird
- c. Newly Hatched Cowbird

Diagram Showing Positions of Eggs

(looking directly down on the nest from the north side)

Date	Time	Weather	Avg. Length of Time	
			on nest	away from nest
7-4-34	1:00-4:30 p.m.	Warm Fair No Wind	11 min.	13 min.
7-6	8:25-11:25 a.m.	Warm Partly Cloudy Fresh Breeze	5	8
7-6	7:15-8:30 p.m.	Cold Fair Strong Breeze	5	5-
7-7	4:20-5:20 a.m.	Cold Fair No Breeze	6	5.5
7-10	3:00-4:00 p.m.	Cool Rain No Breeze	13	8

Length of Brooding Periods

Date	Time	Weather	Average Length of Time	
			on nest	away from nest
6-29	2:40-4:00 p.m.	Hot Fair No Breeze	21 min.	19 min.
6-30	8:20-8:40 a.m.	Warm Fair No Breeze	20	—
7-1	1:40-3:45 p.m.	Hot Fair Slight Breeze	23	21

Length of Incubating Periods

Date	Time	Weather	No. of Visits	No. of Cowbirds	Feedings Sparrows	Average Frequency of Feeding
7-4-34	1:00 - 4:30 p.m.	Warm Fair No Wind	14	18	3	Once in 15 min.
7-6	8:25 - 11:25 a.m.	Warm Fairly Cloudy Fresh Breeze	27	26	11	" " 6 ² / ₃ "
7-6	7:15 - 8:30 p.m.	Cold Fair Strong Breeze	15	16	2	" " 5 "
7-7	4:20 - 5:20 a.m.	Cold Fair No Breeze	8	8	1	" " 7 ¹ / ₂ "
7-8	7:13 - 7:33 p.m.	Cool Fair Fresh Breeze	9	8	1	" " 2 ¹ / ₂ "
7-9	7:42 - 8:15 p.m.	Cool Fair Fresh Breeze	6	4	2	" " 5 "

Record of Feedings

July

2-

	3	4	5	6	7	8	9	10	11	
Weight--gms.	3.56	6.87	9.65	13.4	17.74	23.7	26.74	30.24	33.0	32.4 ^a
Length--mm.	43	46	51.5	55	61+	69.5	77-	81+	84	87
Bill-eye	6.5	7	9-	10-	10-	11	13	13	13.5	13.5
Bill-gape	8	10	13-	15-	15-	15	16	16	16	16
Extent	32.5	44.5	55.5	72	90	111	126+	131	144	144
Tarsus-toe	13.5	16	21.5	27	33.5	36.5	43	46.5	48.5	50.5
Foot	11-	13+	15+	20	25.5	30.5	35	37.5	40	40
First primary					4-	6+	11	14	18+	

Growth Record of Cowbird

July

3

	4	5	6	7	8	9	10	
Weight--gms.	1.1	1.59	2.6	3.13	3.71	5.28	7.37	8.1
Length--mm.	31	33.5	40	40+	39	43	45	50.5
Bill-eye	6-	6+	7	7	7+	8-	9+	9+
Bill-gape	7	8	9+	9.5	10.5	11.0	11.5	11.5
Extent	26	30.5	41.5	42	51	55+	69-	81
Tarsus-toe	11	12.5	16	17+	19.5	22.5	25	27+
Foot	9	10	11.5	15	14	18	21	22
First primary				1	2.5	3	7	9-

Growth Record of Chipping Sparrows

No.1--July 3-6

No.2 (one day younger) July 7-10

No. of Days

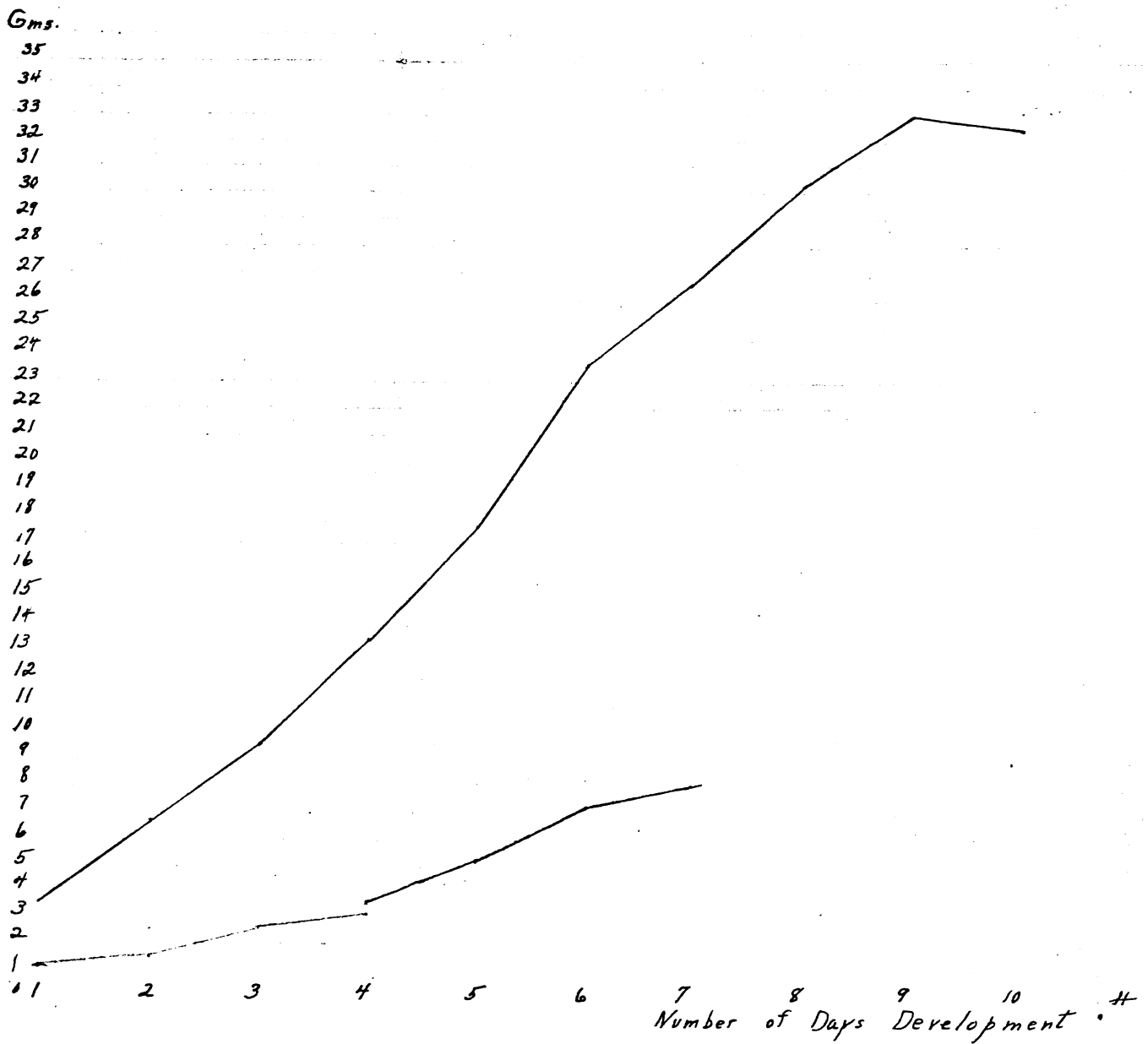
Percent of Increase in Weight

	Percent of Increase in Weight	
	Cowbird	Chipping Sparrow
1	93	44
2	40	63 (probably in error)
3.	38	20
4	32	--
5	33	20
6	12	9
7	13	
8	9	
9	1.5 decrease	

Comparison of Growth Rates of Cowbird and Chipping Sparrows

Date	Times Removed during time of observation	Times Devoured
7-4	----	4
7-6	3	2
7-7	5	4
7-8	1	-----
7-9	2	-----
7-10	1	-----
	----- 12	----- 10

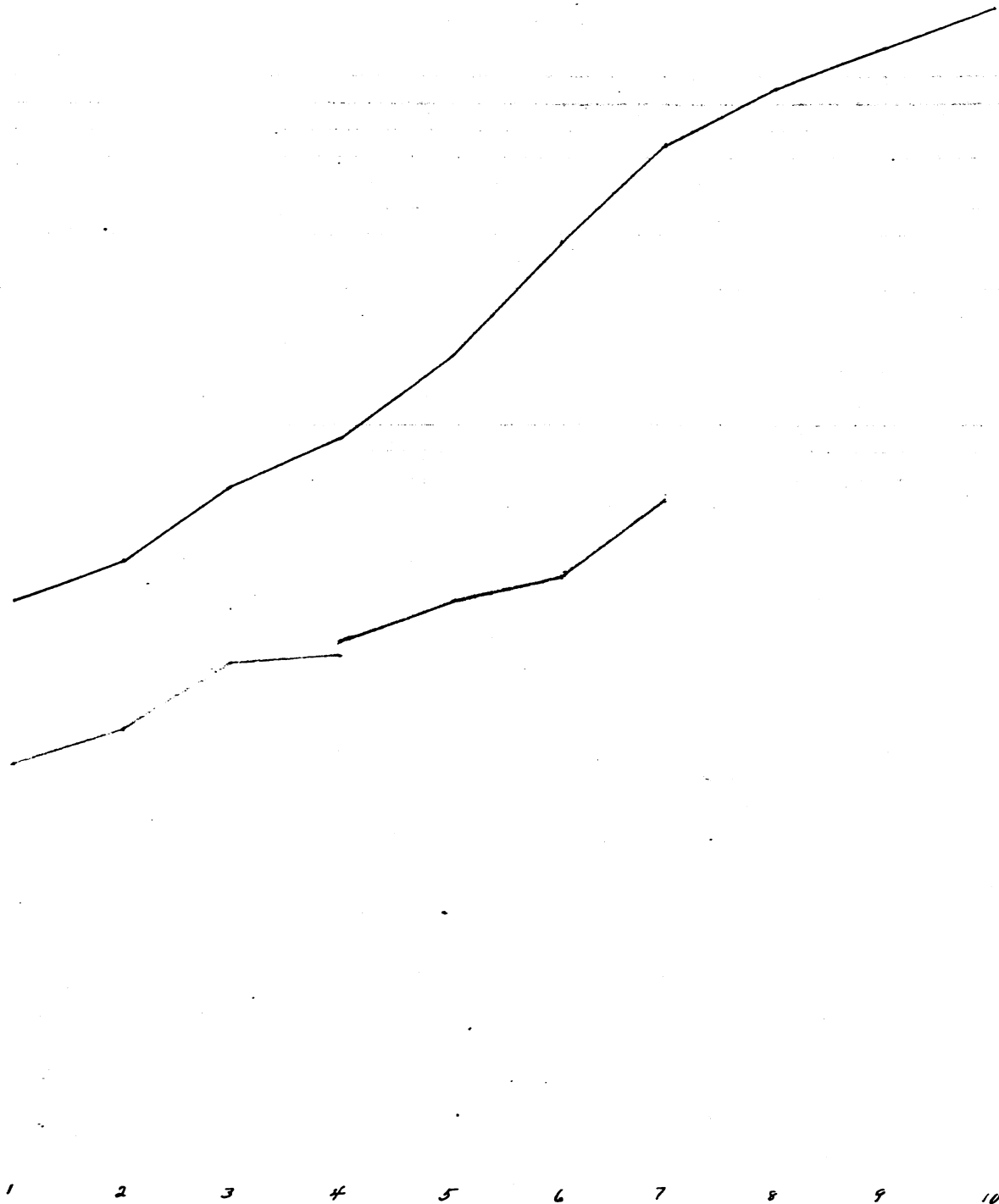
Means of Nest-Sanitation



Weight Record of Nestlings

- Cowbird
- Chipping Sparrow No. 1
- Chipping Sparrow No. 2

Mm.
96
88
86
84
82
80
78
76
74
72
70
68
66
64
62
60
58
56
54
52
50
48
46
44
42
40
38
36
34
32
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28
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18
16
14
12
10
8
6
4
2
0



Number of Days Development

Growth in Length of Nestlings

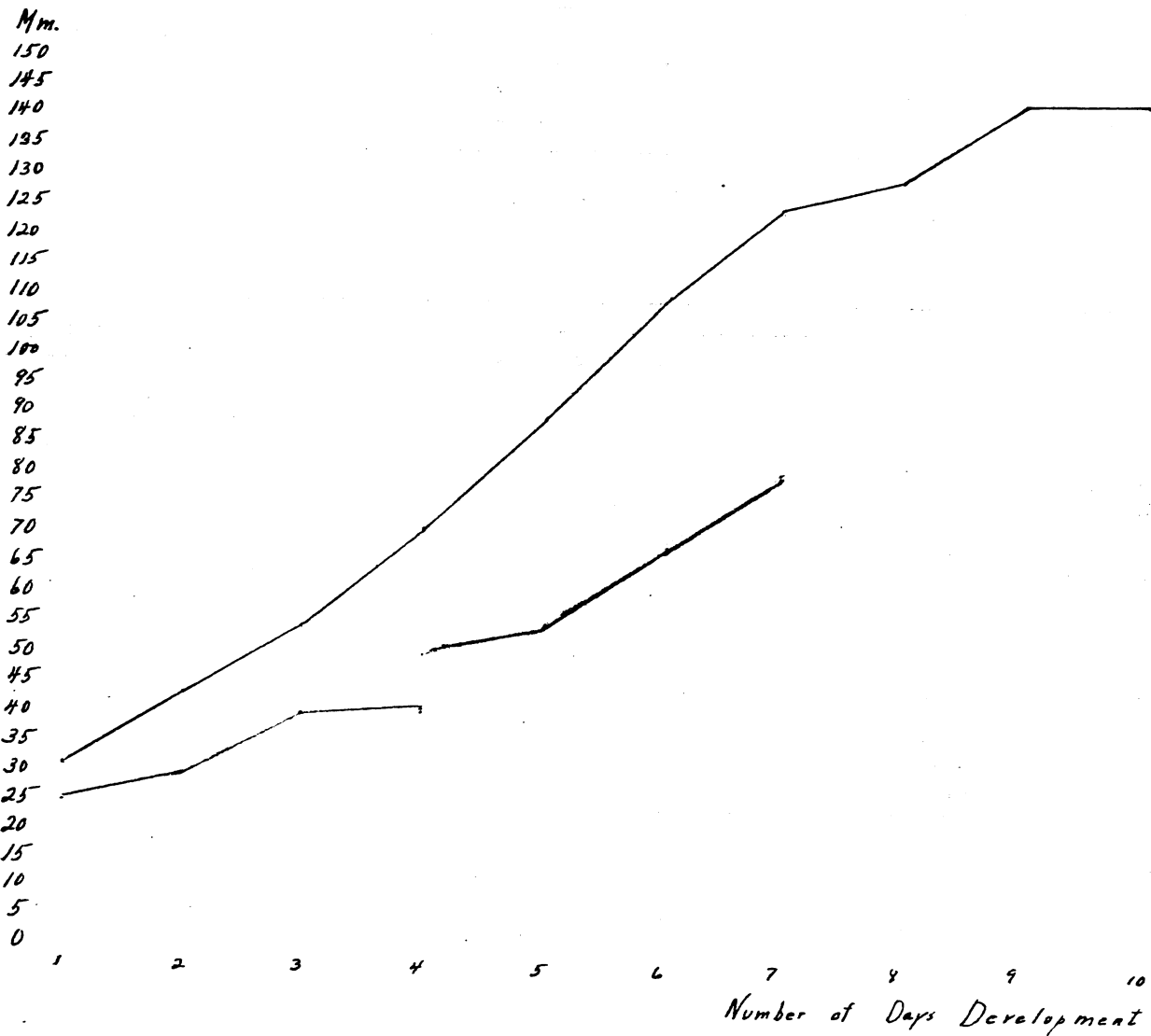
- Cowbird
- Chipping Sparrow No. 1
- Chipping Sparrow No. 2

Mm.
150
145
140
135
130
125
120
115
110
105
100
95
90
85
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75
70
65
60
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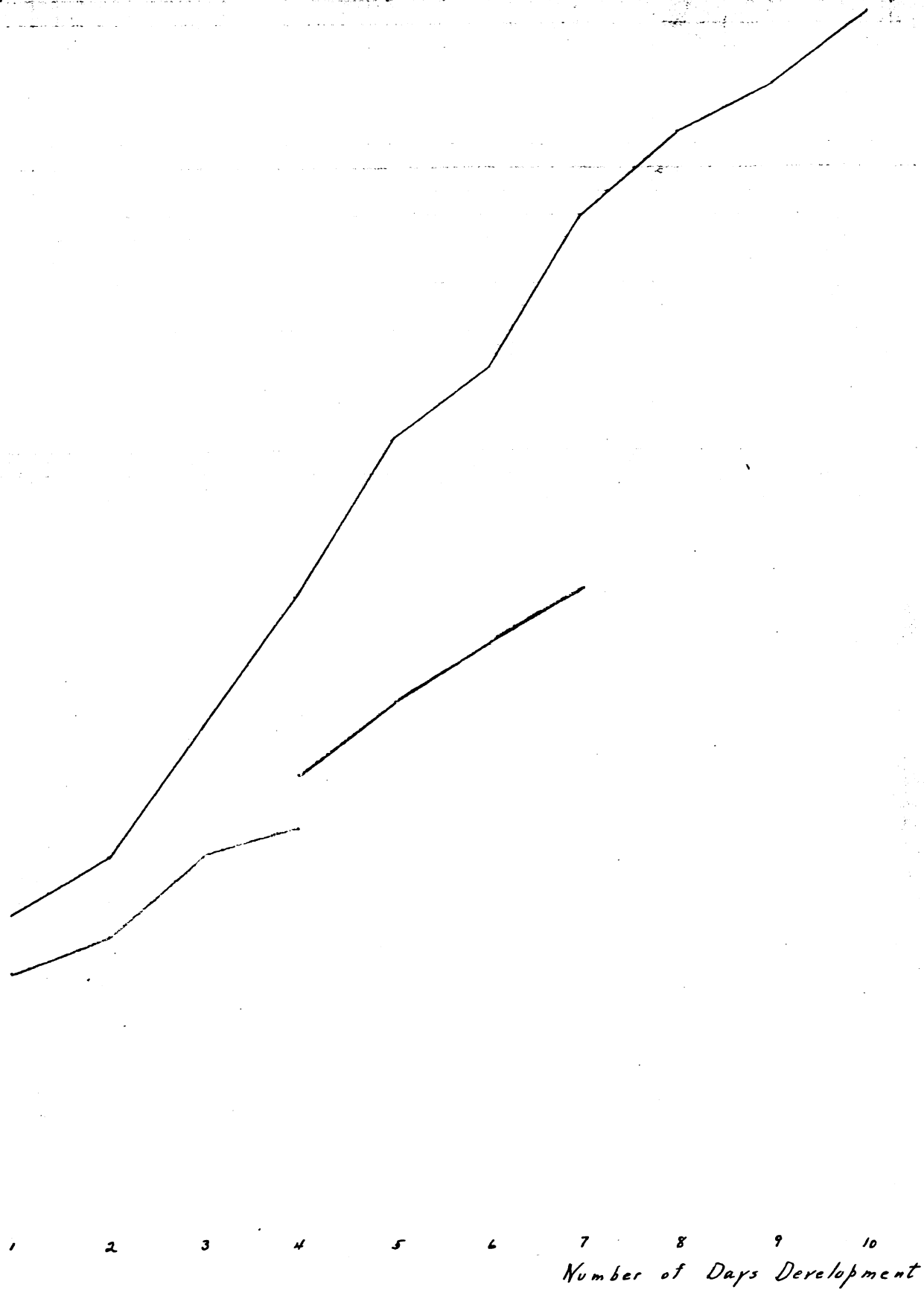
1 2 3 4 5 6 7 8 9 10
Number of Days Development

Growth in Extent of Wings

- Cowbird
- Chipping Sparrow No. 1
- Chipping Sparrow No. 2



57
 50
 49
 48
 47
 46
 45
 44
 43
 42
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Growth of Tarsus-Toe

- Cowbird
- Chipping Sparrow No. 1
- Chipping Sparrow No. 2