

OBSERVATIONS ON THE NESTING OF THE EASTERN GOLDFINCH  
(SPINUS TRISTIS TRISTIS)

by

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"In the leisurely golden time of the year , when the fields are yellow with grain and the roadsides gay with golden rod , the dainty pair , in love with the summer , the sunshine , and each other , plan their home . "

"To watch a Goldfinch's home is a privilege that brightens the whole summer , and one would like to write their story with a pen dipped in sunshine . " ✓

1. Bruce , M . E. A Month with Goldfinches . Auk, 1898, 15:239 .

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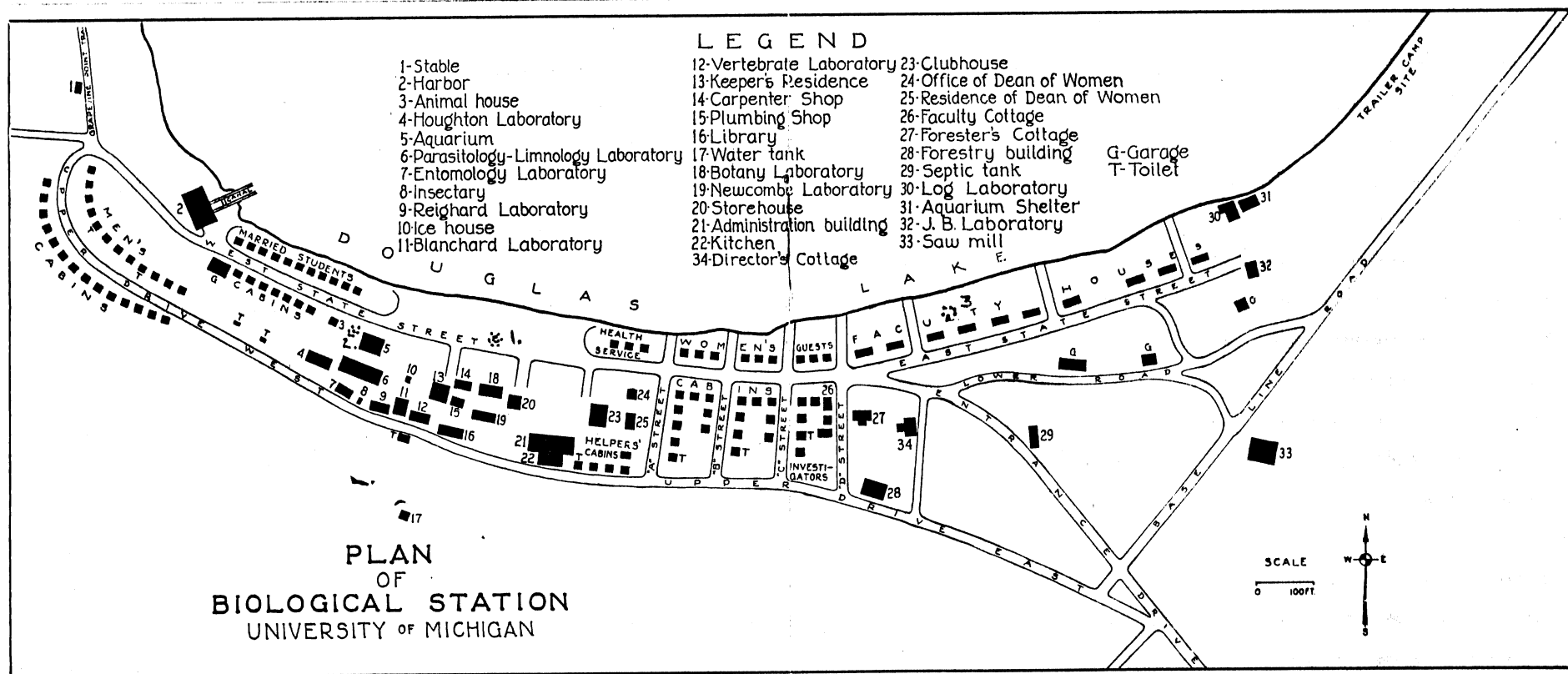
## OBSERVATIONS ON THE NESTING OF THE EASTERN GOLDFINCH

By Marcus E. Erickson

As a partial fulfillment of the course in Advanced Ornithology , this paper summarizes original field observations of the Eastern Goldfinch (Spinus tristis tristis (Linnaeus ) ) . These observations were made in the camp area during the days from July 24 to August 16 , 1945 . The total time of observation was 25 hours and 21 minutes . Methods of study included observation of the immediate nesting activities with the aid of a blind , observation from nearby without the blind , and field glass observation of flights and routes of the birds to and from the nest .

### Habitat

The nest under observation was located 15 feet from the ground in a small maple (Acer rubrum ) 30 yards from the edge of the lake on South Fistail Bay, Douglas Lake , Cheboygan County , Michigan . (Map 1 . ) By some observers (Allen 1928:287) the maple is considered a preferred nesting site . Out of 78 nests located by Walkinshaw (1938:6) 27 were in dogwood which he observed to be the most common nesting site in Michigan . In Quebec it is small birches (Mousley 1933 ) , and, in other localities , thistles. (Lewis 1944:83) Apparently the goldfinch nests in anything from thistles to a tree fork 25 feet from the ground .



MAP 1.

Nest 1. (OBSERVED)

Nest 2.

Nest 3.

Trees in the camp area about the nest included Red Oak (Quercus rubus borealis), White Pine (Pinus strobus), Red Pine (Pinus resinosa), White Birch (Betula alba papyrifera), Hemlock (Tsuga canadensis), and Pin-cherry (Prunus pennsylvanicum).

The area beyond the camp is essentially an open maple-aspen association. Several varieties of the Compositae are found in the area of the camp.

Fauna of the immediate vicinity of the nest site included Robin (Turdus migratorius migratorius), Cedar Waxwing (Bombycilla cedrorum), Eastern Kingbird (Tyrannus tyrannus), Purple Martin (Progne subis subis), Red-eyes Vireo (Vireo olivaceus), Eastern Chipping Sparrow (Spizella passerina passerina), American Redstart (Setophaga ruticilla), Striped Gopher (Citellus t. tridecemlineatus), and Chipmunk (Tamias striatus peninsulæ). No dogs, cats, or predators were seen in the area about the nest.

#### Territory

In Map 1 the nest under observation is indicated, as well as a second nest 25 feet from the ground in a maple to the west, and a third to the east about 20 feet up in another maple. From the observation of flying male Goldfinches, it is evident that

other nests are undoubtedly located on a hill rising abruptly to the south of the camp area . The territories represented by these nests are typical of those described by Margaret Drum (1939:71 ) , but Goldfinches seem to abound everywhere in the camp area . No strong territorial tendency was observed as in the observations of Margaret Drum (1939:75 ) . As was observed by Walkinshaw (1938:5) and Margaret Nice (1939:123) the Goldfinch tends to be social in its habits during the nesting period .

It may be of interest to compare the Goldfinch with another common bird , the Song Sparrow . Margaret Nice (1937:57) observes that "territorial behavior is deeply ingrained " in the Song Sparrow . In another account (1941:458) she classifies the Song Sparrow territory as the "mating , nesting , and feeding ground for young " . The area is about three fourths of an acre and the complete nesting and feeding of the young is carried on here . It is vigorously defended by the male . Nice(1941:462) classifies the Goldfinch in a "mating and nesting territory " . Feeding may or may not be carried on here . This seemed to be in accord with the observations of Gross (1937 ) and Walkinshaw (1938). During the present observations no evidence of territorial defense was observed. Goldfinches in the camp area seem

to be sociable , and at no time was another Goldfinch observed near the nest , or in the same tree .

#### Nest

As was previously indicated the nest under observation was located in a Red Maple . By estimation it was 15 feet from the ground and about six feet from the center of the tree . It was firmly built into a three prong fork of one of the branches growing obliquely out from the tree trunk .

Compactly constructed in the tree fork the nest was well made out of fine bark , grasses , string , a maple leaf , and was lined with fine grasses . There was little or no downy plant material in the lining as is usually reported , and this may be due to the late season for thistles and milkweed . This nest measured 78 mm. wide and 65 mm. deep on the outside . Inside the width was 53 mm. and the depth 33 mm.

For 19 nests studied Walkinshaw (1938:8) found the outside diameter varying from 70 to 100 mm. and the outside depth from 60 to 110 mm. Of 17 nests the average inside diameter was 50.25 mm. and from 28 to 52 mm. deep . Weights of two nests were 6.2 and 9.0 grams.



### Eggs

When the nest was located on July 24 it contained four white eggs . They seemed to have a slight reflection of blue which became more evident as incubation progressed . Of 17 complements of Goldfinch eggs studied by Walkinshaw (1938:10 ) the size varied from three to six eggs and averaged 4.5 eggs per nest.

The nest under observation here presented a problem in checking the incubation period since it already had four eggs when located ; however , the appearance of a fifth egg on the following morning made the calculation of the beginning of the incubation period quite simple . It could now be figured on the basis of some Walkinshaw studies .

Of the many nests observed by Walkinshaw (1938:9) all eggs were laid daily . For a clutch of five eggs he found that incubation usually began the day the third egg was laid . The incubation period varied from 12 to 14 days , and for 33 marked eggs he found it was 12 days and 21 hours , or about 13 days .

On the basis of these observations by Walkinshaw , the present clutch of eggs should have begun to hatch on August 4 , but this was not the case . Table 1 summarizes the nesting activities of the incu-

TABLE 1

SUMMARY OF EGG LAYING AND  
INCUBATION ACTIVITY

DATE	ACTIVITY	DAY OF INCUBATION
July 23	Three eggs in nest. Incubation began.*	1
" 24	Four eggs in nest. Nest first located.	2
" 25	Five eggs in nest.	3
" 26	Egg laying completed. Incubation continued	4
" 27	Incubation by female.	5
" 28	" " "	6
" 29	" " "	7
" 30	" " "	8
" 31	" " "	9
Aug. 1	" " "	10
" 2	" " "	11
" 3	" " "	12
" 4	One egg hatched.	13
" 5	Two more eggs hatched during night or early morning	14
" 6	One hatched at 4:15 p.m.	15
" 7	Fifth and last egg of clutch hatched in the p.m.	16

\* Calculated on the basis of studies by Walkington (1938).

bation period . Since the first egg hatched on August 4 and the last on August 7 , the incubation period was within the 12 to 14 day limit calculated by most observers .

#### Incubation

All incubation was done by the female . During 845.6 minutes of observation the female was on the nest 820.4 minutes , and off the nest 25.2 minutes . While on the nest she was fed by the male about once each hour , or approximately every 46 minutes , as indicated by the average length of inattentive periods for the male in Table 2 . The table indicates that she was attentive 97 per cent of the total time observed . During this time she always incubated except on some warmer days when the sun shown directly on the nest , she was high on the nest with wings spread . It has been explained (Pettingill :lecture ) that eggs being incubated in direct sunshine need "refrigerating " . Sitting on the nest with wings spread , beak open , and panting would indicate that the bird was warm and at the same time shading the eggs .

The male was inattentive 99 per cent of the observation time and could be heard "bounding" back and forth in the nesting and feeding territory singing

TABLE 2

## ATTENTIVE AND INATTENTIVE ACTIVITY DURING INCUBATION

DESCRIPTION	DATA										
	July 25	26	27	29	Aug. 1	2	4	4	6	7	Average Totals
Date	25	26	27	29	1	2	4	4	6	7	—
Day of incubation	3	4	5	7	10	11	13	13	15	16	—
Weather	Fair	Fair	Cloudy	Fair	Fog. to Fair	Fair	Fair	Fair	Fair	Fair	Fair
Wind Velocity	0-5	10-15	5-10	0-5	0-3	0-5	0-5	5-8	0-3	0-3	0-15
Temperature at Beginning of Observ. (F)	66°	69°	66°	70°	87°	74°	64°	74°	71°	69°	71°
Temperature at end	66°	64°	65°	84°	88°	74°	75°	74°	70°	64°	
Began observing	9:17 a.m.	5:55 a.m.	7:30 p.m.	7:20 a.m.	9:00 a.m.	7:30 a.m.	7:45 a.m.	5:00 p.m.	7:05 p.m.	7:25 a.m.	—
End observing	10:00	6:45	8:40	10:56	10:44	8:00	11:05	6:00	7:50	7:45	—
* Total observing time	43.0	50.0	70.0	212.7	104.4	30.0	200.5	60.0	45.0	30.0	845.6
Male attentiveness	0.4	0.3	0.6	3.0	0.6	0	1.9	1.0	0.5	0.5	8.8
Number of periods	1	1	1	4	2	0	3	1	1	1	15
Extremes	0.4	0.3	0.6	2-1.5	2-4	0	4-1.0	1.0	0.5	0.5	2-1.5
Average period	0.4	0.3	0.6	0.8	0.3	0	0.6	1.0	0.5	0.5	0.6
% of total obser. time	.9%	.6%	.9%	1.4%	.6%	0	.9%	1.7%	1%	1.7%	1%
Male inattentiveness	42.6	49.7	69.4	209.7	103.8	30	198.6	59.0	44.5	29.5	836.8
Number of periods	2	2	1	4	2	1	3	2	2	1	18
Extremes	13-29.6	24-25.8	69.4	2-110.7	51.3-52.5	30	25.4-125.0	59.0	20-24.5	29.5	2-125.0
Average period	21.3	24.9	69.4	52.0	51.9	30	66.2	59.0	22.3	29.5	46.5
% of total obser. time	99.1%	99.4%	99.1%	98.6%	99.4%	100%	99.1%	98.3%	99%	98.3%	99%
Female attentiveness	43.0	50.0	66.5	204.5	104.4	30	196.0	51.0	45.0	30	820.4
Number of periods	1	1	2	3	1	1	2	1	1	1	14
Extremes	43.0	50.0	29-37.5	28.5-112	104.4	30	25-171	51.0	45.0	30	25-171
Average period	43.0	50.0	33.2	68.2	104.4	30	98.0	51.0	45.0	30	58.6
% of total obser. time	100%	100%	45%	96.2%	100%	100%	97.7%	85%	100%	100%	97%
Female inattentiveness	0	0	3.5	8.2	0	0	4.5	9.0	0	0	25.2
Number of periods	0	0	1.0	2	0	0	1	1	0	0	5
Extremes	0	0	3.5	1-8.2	0	0	4.5	9.0	0	0	1-9
Average period	0	0	3.5	4.1	0	0	4.5	9.0	0	0	5
% of total obser. time	0	0	5%	3.8%	0	0	2.7%	15%	0	0	3%

\* Time in minutes and tenths of minute.

its characteristic per-chic-o-ree. Whenever the male was heard near the nest he was always answered by the female with a quick tee-tee-tee-tee. At feeding times she would answer his call with a more spirited tee-tee-tee-tee, which was continued with a fluttering of the wings as he fed her by regurgitating the white pulpy food material, presumably from seeds. The total attentive time of the male ( 1 per cent ) was used in feeding which averaged .6 of a minute each time. Twittering and wing fluttering of the female apparently incited the male to feeding. He usually left the nest in the direction of the lake and then flew directly East and South. At times he would perch momentarily on a maple 15 feet away and wiped his bill and then flew East.

After feeding the female usually rearranged her self on the nest, sometimes turning the eggs. At times she was observed to open and close her beak for a period of five to 10 minutes as if chewing.

From Table 2 it may be noted that the average length of male attentive periods increased as the time of hatching approached. The same is true with the length of the female inattentive periods.

Weather affected incubation activity little. Fair weather was constant with no rain during any period of observation. On the tenth day of incubation the temp-

erature went up to 88 degrees Fahrenheit by mid-morning , causing the female to spread her wings , crouch to a more shaded side of the nest , and pant . On this day the male attentive time was the least , and the female never left the nest . The average temperature was 71 degrees F. In general the weather had little effect on incubation activity .

Below is a detailed account of one observation period of 200.5 minutes on August 4 that may reflect the trend of incubation activity . This was the thirteenth day of incubation , and the first egg hatched about five hours following this observation period . Other information will be found in Table 2 .

- 7:45 Began observation . Female on the nest incubating as usual .
- 8:10 Female left nest but remained in the same tree.
- 8:11 Male appeared on the nest . Looked at the bird less nest , then flew to the female and fed her by regurgitation . He stayed with female one minutes which was longer than usual .
- 8:12 Male and female flew out of the tree in a southeast direction .
- 8:14 Female returned to the nest .
- 8:30 Female left the nest . During these last days of incubation the female seems to leave the nest more frequently .

- 8:36 Female returned to nest as she uttered her call note , answering the note which can be heard distinctly in the distance . Both continued to call vigorously .
- 9:38 Female turned eggs and changed nesting position.
- 9:50 Male call heard in distance . Female answered .
- 9:53 Female changed position , looked at eggs.
- 9:54 Male called , female answered .
- 10:14 Male and female call notes .
- 10:17 Female call more vigorous , wings began to flutter and male immediately appeared on nest. Female twittering and wing flutter continued during feeding .
- 10:17.4 Male flew .
- 11:05 Male and female calling . Male usually flies directly to the nest but this time perched on a branch 10 feet away and then perched on the nest and fed the female .
- 11:05.5 Male flew .
- Observation period closed .

Examination of the nest during the night in the incubation period found the female low on the nest with the tip of her beak sometimes under her wing .

### Parental Care of the Nestlings

Up until the age of nine days (camp closed) a summary of parental care is given in Table 3 for 10 hours and 25 minutes of observation .

For about three days after hatching the young were brooded almost 100 per cent of the attentive time . While observing for a few minutes during a pouring rain she was seen to cling close to the nest with wings outstretched to shed the rain . Only the female brooded and the male continued to appear periodically to feed her on the nest . Usually less than half a minutes after the male flew away , the female would feed the young . Her twittering and fluttering of wings was still characteristic . As nesting progressed the male would appear on the nest when the female was perched on the rim while not brooding . At such appearances he still fed the female and she then regurgitated the food and fed the nestlings. When the male appeared during the female's absence he fed the young , regurgitating the food in the usual way .

As indicated in Table 3 the female made more feedings per hour than the male . Also her attentive periods were much longer. During these attentive periods she fed the young , preened herself and the young . The nest was teeming with small black mites.



TABLE 3

## SUMMARY OF ACTIVITY DURING PARENTAL CARE OF YOUNG

DESCRIPTION	DATA					Total Ave.
Date	Aug. 10	11	11	16	16	—
Number of Nestlings	5	5	5	5	5	5
Age of Nestlings (average)	3	4	4	9	9	—
Weather	Fair	Fair	Fair	Fair	Fair	Fair
Wind Velocity	0-3	0-5	0-5	10-15	10-15	0-15
Temperature at beginning	68° F	70°	72°	72°	75°	70°
Temperature at end of obs.	68°	70°	75°	74°	75°	
Began observing	6:00 a.m.	11:00 a.m.	1:10 p.m.	7:15 a.m.	1:00 p.m.	—
End observing	6:45 a.m.	12:00 a.m.	2:00 p.m.	11:05.5 a.m.	5:00 p.m.	—
Total time of observation	45.0	60.0	50.0	230.5	240.0	625.5
Male attentiveness	0.5	1.0	0	1.5	1.0	4.0
Number of periods	1	1	0	4	2	8
Extremes	0.5	1.0	0	.2-.5	.5-.5	.2-1.0
Average period	0.5	1.0	0	.4	.5	.5
% of total observation time	1%	1.6%	0	.1%	.4%	.7%
Feeding visits per hour	1	1	0	1	.5	.8
Male inattentiveness	44.5	59	50	227.1	239.0	621.5
Number of periods	2	2	1	4	3	12
Extremes	16-28.5	27-32	50	2-67.6	49.5-100	2-100
Average period	22.5	29.5	50	56.8	79.6	51.7
% of total time	99%	98.4%	100%	99%	99.6%	99.3%
Female attentiveness	44	18	15	43	27	147
Number of periods	1	1	1	2	3	8
Extremes	44	18	15	10-33	2-21	2-44
Average period	44	18	15	21.5	9	18.2
% of total time	98%	30%	30%	15%	4%	23%
Feeding visits per hour	1	1	1	0.5	1	1.6
Number of brooding periods	1	1	0	0	0	2
Extremes	44	18	0	0	0	18-44
Average time of brooding	44	18	0	0	0	31
% of total attentive time	100%	100%	0	0	0	21%
Female inattentiveness	6	42	35	187.5	213	478.5
Number of periods	1	1	1	3	4	10
Extremes	6	42	35	10.5-77	30-65	6-77
Average period	6	42	35	62.5	52.7	47.9
% of total time	2%	70%	70%	85%	94%	77%

No effort was made to remove excreta . By the ninth day the rim of the nest , prongs supporting the nest , and leaves below the nest were exceedingly messy with droppings. During the first three days the female was observed to eat the excreta following feeding . The male did likewise after some feedings and once carried it away as he flew from the nest .

Table 4 shows a comparison of the totals for the attentive and inattentive periods during incubation and care of the nestlings for the first nine days . It will be noted that the male was quite constant throughout the entire period . His sole activity of feeding may account for this . The female became less attentive as the nesting progressed . To account for this change it will be remembered that she was fed on the nest by the male during incubation . Later when brooding became unnecessary she increasingly aided in bringing food to the young .

For food the Goldfinch has a diet of seeds and a very few insects (Walkinshaw 1939:9) . Barrows (1912:477 ) mentions the seeds of the Compositae which are abundant in the camp area . Birch , alder , aborvitae , and scrub pine , as well as some insects , were included in his list . I have observed Goldfinches feeding on the flowers near the dining hall and several times

TABLE 4  
COMPARISON OF ATTENTIVENESS AND INATTENTIVENESS  
DURING INCUBATION AND FEEDING

DESCRIPTION	INCUBATION	FEEDING - NINE DAYS
Total observation time	845.6 minutes	625.5 minutes
Weather	Fair	Fair - Rain
Wind Velocity	0-15	0-15
Average temperature	71° F	70° F
Male attentiveness Totals	8.8.	4.0
Number of periods	15	8
Extremes	.2-1.5	.2-1.0
Average period	0.6	0.5
% of total time	1%	0.7%
Male inattentive totals	836.8	621.5
Number of periods	18	12
Extremes	2-125	2-100
Average period	46.5	51.7
% of total time	99%	99.3%
Female attentive total	820.4	147
Number of periods	14	8
Extremes	25-171	2-44
Average period	58.6	18.2
% of total time	97%	23%
Female inattentive totals	25.2	478.5
Number of periods	5	10
Extremes	1-9	6-77
Average period	5	47.9
% of total time	3%	77%

the female of the nest under observation has flown directly into the area from the nest .

### The Young

Before hatching the eggs were slightly pipped for about 10 hours . When the young birds hatched they lay still in the nest as the female ate the broken shell . Their only response immediately after hatching was raising of the head when the female called for feeding .

Hatching with eyes closed the young were able to see after three to five days for this clutch of five eggs . The color of the skin , legs , and feet was flesh-colored , the tomlia yellow , and the region about the eyes blackish blue . There were scanty areas of grayish down about four mm. long . No feather tracts were in evidence at the time of hatching .

On the first day the nestlings were measured as follows : length , 37 mm. ; extent , 25 mm. ; tarsus , three mm. ; tomlia, three mm. They uttered no sounds , showed no signs of fear , and movements consisted of raising the head to feed . Feet and wings were used in adjusting nesting position .

By the end of the third day the feather tracts could be seen in the form of little black dots .

The eyes in two of the five young were beginning to open. No sounds were made and they showed no signs of fear. Leg movements aided by the wings were increasing. When placed on their backs the young would turn over and then lie still with head outstretched. Measurements at this time were as follows: length, 40 mm.; extent, 42 mm.; tarsus, seven mm.; and tomsia, five mm.

At the age of nine days the nestlings began to appear like Goldfinches. Feathers were well unsheathed. Short black rectrices with buffy coverts, black buffy barred wings, olive head and backs, and yellowish ventral sides were evident. Downy tufts still showed on the crown.

The nestlings were quite noisy at feeding time and stood high in the nest fluttering their wings like the female when being fed. Between feedings the young slept, preened (the nest contained hundreds of black mites) and at times began to twitter with outstretched necks as if begging for food. The gape is still quite bright reddish.

On this ninth day the wind blew the nest quite violently at times for a distance of two feet. All five young were able to maintain their position in the nest with apparent ease - even the one that is crowd-

ed to a position almost on the rim of the nest . The nest is well filled as they now measure as follows: length , 73 mm. ; extent , 130 mm.; tarsus , 13 mm.; and tomsia six mm.

Between 11 and 15 days of age (Walkinshaw 1938:5 ) the young are fledged - an event I missed with regrets due to the closing of the station .

### Song

The characteristic per-chic-o-ree of the male has been described as he calls the female which answers with her tee-tee-tee-tee . Whenever the female was flushed from the nest after the young were hatched she flew to the maple 15 feet away and gave a continuous faint Blue-Jay like alarm note . During the later part of the nesting period , males were seen and heard singing a canary-like song used early in the summer .

### Summary

1. These observations of the incubation and feeding activities of the Eastern Goldfinch (*Spinus tristis tristis*) were made from July 24 through August 16 , 1945 for a period of 25 hours and 21 minutes, at the University of Michigan Biological Station , Cheboygan County .
2. The nest was located 15 feet from the ground in a red maple .
3. Most of the observations were made from a blind placed

30 inches from the nest .

4. There were no predators in the area and nesting was successful through the ninth day after hatching when the station closed .

5. Territorial tendencies were not evident . A second nest was located 200 feet away and a third nest about 600 feet away . Several males in the area reflected social activity .

6. The clutch of five eggs was white with a bluish reflection . Since the nest was located with four eggs , determination of the incubation period was difficult to calculate . The first egg hatched in 13 days on the basis of Walkinshaw's studies (1938:9).

7. All incubation was done by the female . She was fed on the nest by the male . He fed by regurgitating pulpy seed materials . During incubation the female was attentive 97 per cent of the observation time of 845.6 minutes . The male was attentive 1 per cent of the total time .

8. As the nestlings grew older the female was increasingly less attentive , being at the nest only 23 per cent of an observation time of 625.5 minutes . The male was attentive 0.7 per cent of the time .

9. The young were fed directly by the male and female . When the female brooded the male fed the female and she in turn fed the young .

10. At the age of nine days the nestlings showed characteristic goldfinch coloration .
11. Nest sanitation was lacking for the nest and surrounding leaves became covered with droppings .
12. In relation to man the Goldfinch has considerable esthetic value since it is common as the "wild canary" of the summer months . Economically it has been know to eat a little lettuce seed .

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