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THE EVENING GROSBEAKS RETURN TO HARTFORD

BY G. HAPGOOD PARKS

The observations which this paper will discuss were made during a study of 2,429 Eastern Evening Grosbeaks (*Hesperiphona vespertina vespertina* (Cooper)) trapped at our Hartford, Connecticut, banding station between December 13, 1945 and May 24, 1946. Of this number, 874 were released wearing bands for the first time; twenty others were recoveries from other stations; three returned to us still wearing the bands we had affixed at the time of their previous visit; seven others were recoveries, victims of the hazards of avian migration; the remaining 1,525 were repeats. Forty-two of the birds were picked up by hand as they fed on the trays and in the feeders. Four traps were employed in taking the remainder.

TABLE I

METHOD OF CAPTURE

Trap	Bandees	Foreign Recoveries	Returns	Recoveries	Repeats	Total
Flat	355	11	3	0	1004	1373
False-bottom	185	2	0	0	202	389
Two-cell Chardonneret	232	6	0	0	113	351
Government Sparrow	72	1	0	0	194	267
By hand	30	0	0	7	12	49
Totals	874	20	3	7	1525	2429

This study was made during the third season that Evening Grosbeaks have visited us in Hartford. In 1942 two females remained with us for a few days during early February. Both were successfully trapped and banded. One of them returned when our station was again visited, irregularly and unpredictably, from January 14 to April 28, 1944. Upon this occasion we banded forty-nine more (*cf. Bird-Banding*, vol. XVI, no. 1, January, 1945, pp. 32-36). It may be of interest to report that during the intervening seasons, the winters of 1942-43 and 1944-45, not even one bird of this species was seen at our station.

That the two female returns from our 1944 banding may have led

this winter's flock to our feeding trays is, of course, mere conjecture, yet it is significant that, of the two individuals which composed the first group to be observed in this locality, one was a banded female. That they stayed with us for 163 consecutive days is more readily explained. Although our station is located in a thickly populated city area with no park close by, the neighborhood is a relatively quiet residential one. Tall elm trees line both sides of the streets and several proximate maples and oaks actually tower above the 76-foot Cucumber Tree (*Magnolia acuminata* (Linn.)) which stands in our back yard less than thirty feet from our living room window. These tall trees were especially attractive to the perching grosbeaks and served always as their place of assembly from which clamorously to greet each sunrise.

Although our station was visited on four occasions by hawks, the frenzy which they inspired among the grosbeaks was of short duration. Other predators gave no trouble of consequence. The drinking water which was made constantly available proved to be very popular. That they found a plentiful supply of food at all times is evident from the fact that, during their stay with us, these birds consumed 775 pounds of sunflower seeds. The abundant supply of food and water was evidently the predominant factor which inspired the birds to remain in our locality.

SIZE OF FLOCK

Our first inkling that Evening Grosbeaks were in our vicinity came on the evening of November 18 when a West Hartford acquaintance phoned that they had appeared on his feeding trays. Not until November 25 did we see any. On that date two females, one of them with a band on her left tarsus, perched for about five minutes on the tip of a maple tree in the yard of our next door neighbor. At about two o'clock on the afternoon of December 1 a flock of twelve was seen to fly from east to west overhead and at almost exactly the same time of day on December 9 a flock of six flew over in a north to south direction. One was heard at seven o'clock in the morning, December 10, but none was seen. December 12 saw nineteen males and five females eating the fruits of a maple tree within easy view of our home.

Then December 13 brought the first ones of the season to our feeding trays. Three females were feeding there soon after seven o'clock in the morning. A group composed of five males and two females was observed feeding there later in the day. From December 13 to May 24 not a day failed to bring from several to several hundred of these birds for a repast of sunflower seeds and water. Counts were made each day and a record was kept of the maximum number simultaneously present. Although the composition of the flock was extremely fluid and the turnover in the feeding groups continuous, the graph which we drew by plotting these maximum counts against the corresponding dates has supplied us with a picture from which we may determine with

reasonable accuracy the fluctuations in the Evening Grosbeak population at our station.

Our graph reveals a steady increase in the size of the flock from the date of their first arrival, December 13, until December 27. A brief lull followed, but January 1 brought the second wave with its preponderance of females. Most of January saw the population remain quite steady until a third wave appeared on the 30th. The peak of population held through most of February with waves appearing on the 7th, 20th and 26th. March was most unseasonably warm. The birds became very uneasy and the early part of the month brought a marked decrease in our flock. This decrease was abated in part by waves on the 15th and 30th, but a gradual decline was distinctly in evidence. The last-mentioned wave persisted through April 4.

There follows a flat valley in the graph indicative of a steady population through most of April about equal to that during March. The last, and very conspicuous, wave arrived on April 26 and the final fadeout of the flock started immediately thereafter. The curve slopes from this point persistently downward with hardly a tremor until it reaches May 24, the date upon which the last of our Evening Grosbeaks, a male, disappeared.

SEX RATIO

Whereas 1942 brought only females (two of them) to our station, and 1944 also a very large percentage of females (we banded 44 females and only 5 males during that winter), there prevailed throughout most of the winter of 1945-46 a remarkable numerical equality between the sexes. That the sexes were present in approximately equal numbers was apparent as even the first flocks arrived. Banding began on December 14 and our traps soon provided conclusive evidence of the accuracy of this observation. By December 23 the 110 bands which had been used were worn by 55 males and 55 females.

For a time after that date, however, a distinct female predominance prevailed. The influx of females was readily discernible as we observed their increased numbers on the feeding trays and in the trees. Our traps again provided the substantiating facts. On New Year's Day we trapped 66 bandable grosbeaks; 44 of them were females. Twenty-two females were banded on January 5 as against only eight males. Constantly, during this period, the ratio swung in favor of the females.

An examination of our records on January 24 revealed that the banding score had become 284 to 184 in favor of the females. From January 24 until May 15, the day we banded our last two grosbeaks (a male and a female), the numerical equality of the sexes, as indicated by our observations and substantiated by our banding records, held with almost unbelievable exactness. On eleven dates during this part of the season our records indicated in each instance an excess of one hundred banded females over banded males, as follows:

TABLE II

DATA INDICATING NUMERICAL EQUALITY OF SEXES

Date	Number banded to date Females	Males	Female majority
January 24	284	184	100
February 28	387	287	100
March 20	402	302	100
April 13	435	335	100
24	445	345	100
30	454	354	100
May 1	456	356	100
5	465	365	100
11	483	383	100
14	486	386	100
15	487	387	100

There were instances of minor numerical fluctuations during this period which, for example, found the female majority sagging to only 95 on March 5 and soaring to 110 on April 3, but upon by far the greater number of days the excess of females varied only inconspicuously from the century mark.

LENGTH OF STAY

Although 329 individuals (157 females and 172 males) gave no repeat records, a great majority of the birds persisted in our traps more or less throughout the winter. A female (44-223908) set the season's record by repeating 18 times subsequent to her original capture on January 5. Another female (44-214619) repeated 17 times. The complete picture is indicated by the following table:

TABLE III

NUMBER OF REPEAT RECORDS

No. of Repeatings	0	1	2	3	4	5	6	7	8	9	10	12	13	14	17	18	Totals
Females	157	116	75	44	32	13	22	12	4	4	1	1	3	1	1	1	487
Males	172	79	68	31	11	13	4	5	2	2	0	0	0	0	0	0	387
Total	329	195	143	75	43	26	26	17	6	6	1	1	3	1	1	1	874

The total number of repeat records indicated by Table III is 1,495. These have been plotted, along with 30 others provided by our returns and foreign recoveries, on six sheets of coordinate paper, each 18 x 24 inches. The date of banding, or of original capture at our station, and the date or dates of any subsequent recapture were plotted against the band number in each instance. The resulting picture revealed most vividly the persistence of our winter visitors.

To a male (44-201572) belongs the distinction of remaining longest with us. His record indicates a sojourn of 150 days. Originally banded

on December 15, he repeated the following day and was again trapped on May 13. Six other members of the flock (5 females and 1 male) remained with us in excess of 140 days. It is certain that some of the birds spent parts of the winter at other more or less remote points and came back to us long enough to be trapped before they left again for the spring migration. As evidence of this fact we have the record of female 44-214431. She was banded on December 22 and repeated four times within the next two days. On January 4 she entered a trap in Cheshire, Connecticut, which Mrs. B. N. Bennett was using to capture English Sparrows. Cheshire is about twenty-five miles southwest of Hartford. Being aware of her capture in Cheshire we felt justified in recording this bird as a return when, on May 10, we again trapped her in Hartford. After repeating once more on May 14 she disappeared.

The following table summarizes the length of time the Evening Grosbeaks remained in Hartford as indicated by our repeat records.

TABLE IV

LENGTH OF STAY (DAYS)

Length of Stay	1	2–20	21–40	41–60	61–80	81–100	101–120	121–140	More than 140	Totals
Females	165	88	39	35	41	38	49	27	5	487
Males	177	51	27	20	29	23	32	26	2	387
Total	342	139	66	55	70	61	81	53	7	874

If there is a seeming discrepancy between the initial entries in Tables III and IV let it be explained that, of the 342 individuals whose records indicate that they spent but a single day at our station, 13 were trapped twice on the day they were banded, thus reducing to 329 the number which supplied no repeat record at all.

The fact that it was possible to trap only a mediocre sampling of the large flocks that crowded our station every day requires us to admit that our figures cannot hope to paint the perfect picture, but rather to indicate the trend of the flight with a reasonable degree of accuracy. We believe that the large number of records indicates reasonable reliability.

SELF REMOVAL OF BANDS

We were banding Evening Grosbeaks so rapidly that by Christmas we began to question our own results. It was definitely unbelievable that we had banded more than one hundred and fifty of these rare birds in less than a fortnight. It seemed that they must be removing the bands with their strong beaks and that we were rebanding the same individuals again and again. Such a possibility was suggested by several bird students who raised experienced eyebrows when we told them our story. Certainly it was impossible that so many Evening

Grosbeaks were present as our rapidly accumulating records seemed to indicate. We decided to determine the truth of the matter by marking every bird as it was banded and to study all repeats for evidence of any self-removal of bands.

Consequently on December 31 we began notching the outer right tail feather of each bird we banded. As weeks passed and more and more of these marked birds repeated and more and more hundreds of unmarked ones were trapped for banding the actual immensity of the grosbeak invasion became unquestionably apparent. A table will serve to summarize our results:

TABLE V

MUTILATION OF BANDS

No. of birds marked	Marked individuals retaken	Total marked repeats	No. of bands mutilated	No. of bands self-removed
782	491	1268	44	0

Three types of mutilations were noted. Some bands were flattened, others were overlapped, and still others were opened, but not even one of these specially marked birds was recaptured with its band missing. The distribution of the mutilation was as follows:

TABLE VI

TYPES OF BAND MUTILATIONS

No. of individuals examined	Bands flattened	Bands opened	Bands overlapped	Bands without mutilation
491	5	15	24	447

When originally placed on the tarsus every band was carefully adjusted so that its ends met accurately together. When reexamined, fifteen of these bands showed that their ends had become separated. In most cases the separation amounted to less than 1 mm. Three bands revealed that their ends had become separated by 1.5 mm. On rare occasions there was observed at a feeding tray a grosbeak whose band appeared to have become reopened more than the amount of our maximum 1.5 mm. measurement, but none such was ever captured.

The greater frequency of overlapped bands points to the fact that the No. 2 size is rather large for the tarsi of many of the individuals of this species. The next smaller, No. 1A, size is correspondingly too small for an even greater proportion. One foreign recovery which we captured wore a No. 1A band. This band fitted very snugly, but bird and band were both in apparently perfect condition. Overlapped bands were sometimes found to be closed so tightly about the tarsus as to prevent the band being turned to allow for the examination of its

serial number. In no instance, however, was even the slightest injury to the tarsus apparent. Because of the liability of harming the bird, no attempt was made to readjust overlapped bands.

A study of those birds which repeated more than once indicated that the mutilation of the band occurred within the first few days after it had been placed on the tarsus. The one outstanding exception to this rule was supplied by female 44-223959. Banded on January 11, she repeated five times between that date and April 23, in each instance with her band unscathed. Then on April 25 she was again trapped, this time with the band overlapped. Flattened and opened bands were carefully reset on the twenty birds involved. Seven of these were recaptured with the band again mutilated.

The evidence revealed by this study leads us to conclude that if Evening Grosbeaks ever succeed in removing their bands such instances are distinctly exceptional.

SOUTHWARD DRIFT INDICATED

Twenty foreign recoveries were trapped. The magnitude of this number is misleading, perhaps, because thirteen of these birds had been banded during this same winter at Windsor, Connecticut, almost exactly ten miles north of our station. The following table reveals the history of the other seven recoveries.

TABLE VII

FOREIGN RECOVERIES TRAPPED AT HARTFORD, CONNECTICUT

Band No.	Sex	Banded by	Date	At	Recovered
42-208064	♀	M. J. Magee	May 16, 1942	S. Ste. Marie, Mich.	Dec. 28, 1945
B225381	♀	D. Wetherbee	Feb. 24, 1944	Worcester, Mass.	Jan. 11, 1946
38-238552	♂	R. Allison	Jan. 15, 1944	Athol, Mass.	Jan. 26, 1946
40-122513	♂	Mrs. G. E. Ramsdell	Feb. 20, 1944	Lewiston, Me.	Feb. 19, 1946
C162350	♂	L. R. Marland	Jan. 1, 1946	Ware, Mass.	Apr. 1, 1946
42-202207	♀	Mrs. H. A. Drew	Mar. 27, 1942	Barre, Vt.	Apr. 4, 1946
42-225020	♀	Mrs. H. A. Drew	Dec. 7, 1943	Barre, Vt.	Apr. 18, 1946

It is worthy of note that every one of these twenty recoveries was originally banded at a point geographically farther north than our Hartford, Connecticut, station. Their records consistently indicate, therefore, a southward drift at the coastal end of their west-to-east migration. Further evidence of this southward drift is contributed by eight supplementary records provided by birds banded at our station.

TABLE VIII

SUPPLEMENTARY EVIDENCE OF SOUTHWARD DRIFT

Band No.	Sex	Hartford	Reported at	Date	By
42-220796	♀	Jan. 25, 1944	Norwichtown, Conn.	"late April"	Mrs. R. E. Knup
44-201576	♀	Dec. 15, 1945	Denville, N. J.	Feb. 11, 1946	J. A. Sauer
44-214431	♀	Dec. 22, 1945	Cheshire, Ct.	Jan. 4, 1946	Mrs. B. N. Bennett
44-214457	♂	Dec. 23, 1945	Denville, N. J.	Feb. 11, 1946	J. A. Sauer
44-214472	♀	Dec. 23, 1945	Tenafly, N. J.	Jan. 26, 1946	Mrs. B. Carnes
44-214628	♂	Dec. 26, 1945	Westbrook, Ct.	Jan. 24, 1946	J. Rintoul
44-214651	♀	Dec. 27, 1945	Norwichtown, Conn.	"late April"	Mrs. R. E. Knup
44-214663	♀	Dec. 27, 1945	Clintonville, Conn.	Apr. 21, 1946	J. W. Kelley

Cheshire, Norwichtown, and Westbrook, Connecticut, and, of course, Tenafly and Denville, New Jersey, are all located geographically south of Hartford.

It will be noted that the records indicated in Table VIII were made, with one exception, by birds which were banded very early in the season. Another individual has supplied us with a record which indicates that not all of the drift was southward. This male (44-201592), which we banded on December 16, 1945, was found dead at Northampton, Massachusetts, by Miss M. A. Sampson, on April 1, 1946. It is not improbable, however, that this bird may already have started his seasonal homeward flight. The early April date makes his exact status difficult to ascertain. Whatever the facts may be in his case, four other individuals have provided records which should assist in plotting the course of their homeward trek.

TABLE IX

ON THE HOMEWARD TRAIL

Band No.	Sex	Banded at Hartford	Reported at	Date	By
44-214617	♀	Dec. 25, 1945	Ticonderoga, N. Y.	May 20, 1946	T. C. Warren
44-224329	♂	Jan. 24, 1946	Ticonderoga, N. Y.	May 11, 1946	T. C. Warren
45-200003	♀	Feb. 20, 1946	Northampton, Mass.	May 10, 1946	E. A. Mason
45-200128	♂	Apr. 7, 1946	Northampton, Mass.	May 9, 1946	E. A. Mason

One of our females (44-224452) was trapped "in breeding condition and accompanied by a male" at Lake of Two Rivers, Algonquin Park, Ontario, on June 24, 1946, by Clifford E. Hope, taxidermist for the Royal Ontario Museum of Zoology. We are indebted to Mrs. D. H. Speirs for this information. Her letter describes two Evening

Grosbeak nests which were discovered, also, at Lake of Two Rivers. One of the nests, with four eggs, was about thirty feet from the ground in a black spruce. The other, with three eggs, was twenty-eight feet up in a balsam. The former nest and eggs were collected for the R. O. M. Z. exhibit, and were "the first set to be taken in the field in Ontario and the fourth nest to be discovered in the Province." All three of the eggs hatched in the other nest. Regarding them, Mrs. Speirs writes: "I was able to follow one of the fledglings for four days after it left the nest. It was entirely in the care of its father."

That Mrs. Knup and Mr. Warren (Tables VIII and IX) were each able to supply accurate data on two living banded birds without recourse to the use of traps deserves a word of consideration here. In each case the band number was obtained by observing the birds carefully while they were feeding on a window tray. Mrs. Knup writes that she watched the birds at close range through a bedroom window and that it took "several days of checking and rechecking" before she was sufficiently certain of the band numbers to report them. Since one of the banded birds (44-214651) had a broken leg (which injury had occurred since the date of banding) it was readily identified on the feeding tray. Mr. Warren's modification of a similar method of observation was ingenious and efficient. "These birds were all observed on a feeding station outside of our dining room window," he writes, "and I got the numbers by placing a piece of heavy blue paper over the bottom glass and cutting a narrow slit to look through. With this arrangement I was able to observe the birds from a distance of less than a foot and to gradually record the band numbers as the birds fed around the platform of the feeder." Such cooperation as this is highly commendable and our appreciation of the accurate data supplied by these interested non-banders is sincere.

PLUMAGE CHARACTERISTICS AND CHANGES

A study of plumage characteristics was made in an effort to establish age groups. Although we were unable to take consistent measurements, a wide variation in the size of the individual birds was conspicuously apparent as we handled them. There were certainly no consistent corresponding plumage characteristics, however, which would signify that there is any distinct correlation between size and age in this species.

On page 251 of "The Book of Birds," Vol. II, A. A. Allen states, "Young Evening Grosbeaks, when they leave their nests, all resemble their mother, but before winter the males have acquired their yellow body feathers, though they retain their juvenile wings and tails until the following fall." We watched the wings and tails of our flock, but we were unable to discover anything which amounted to a consistent agreement with the statement made by this authority. In fact, the range of coloring was so wide and the individual variation so great

as to become more and more baffling and less and less enlightening the further our study progressed. We found only two males (44-223884 and 44-224316) whose wing feathers showed markings which were characteristically like the female.

The color variation among the females was far less conspicuous than among the males though the range from the yellowest to the grayest individuals was distinct and there seemed to be some correlation between grayness of plumage and largeness of size. One conspicuously yellow female was observed on January 28, but efforts to trap her were unsuccessful.

There was a wide variation in the markings on the tail feathers of the males. Whereas many had completely black tails others showed almost every conceivable gradation from scarcely discernible grayish areas to brilliantly conspicuous white patches. Usually the white areas matched quite consistently on corresponding left and right feathers, but it was not at all exceptional for one or both of the feathers in one outer pair to show conspicuous white spots underneath while the opposite pair showed none at all. Two males who showed this characteristic were 44-224430 and 45-200013.

Cases were also noted in which the whiteness of the spots varied distinctly on the same tail. One outstanding instance was that of 44-224336, who was trapped with only half of his tail feathers intact. When the replacements matured not only was the whiteness of their spots conspicuously whiter, but the area of each spot on the new feathers was at least twice as great as that of the white spot on the corresponding feather which had not been lost. Although no definite conclusion was found possible as to plumage characteristics indicative of age, our impression was that those males whose plumage was characterized by the brilliant yellows and glossy blacks were the less mature birds. Those males whose plumage tended more to olive and golden green and whose tails were duller left with us the impression of greater maturity, but we have no definite proof.

Another male plumage variation was the infrequent presence of black "leopard spots" on the yellow undercoverts. Male 45-200012 possessed this characteristic very conspicuously.

Evidence of molting was sought throughout the winter and spring with little success. There seemed to be a paling of the yellow undertail parts of the males in late February and a brightening of their golden breasts in March, but there was no accompanying evidence of molt. Throughout the flight we captured individuals with tail feathers missing, but it was impossible to unveil evidence that there was any consistent shedding of these feathers. That no normal molting of the tail feathers occurred is indicated by the fact that so many of the individuals which we released with the outer feather notched during our study of band

removal repeated over a period of several weeks with the notched feather still present.

Judging from our observations it is apparent that molting is distinctly an individual matter during the months from mid-December to mid-May. Only two specific cases were discovered. They were 44-214639, when she repeated on April 10, and 45-200138, a male, when he was originally banded on April 14. In both of these instances the body feathers on both sides of the abdomen were in process of being replaced by young pinfeathers. Neither of these birds showed any evidence of loosening of tail feathers though their body feathers were very loose. On January 6, female 44-214425 revealed a small area of new, tufted pinfeathers on the right side of her breast, but no molt was indicated. A very tiny female, 45-200037, who was trapped ten times, revealed a small patch of pinfeathers on the left side of her neck on May 6, although they had not been conspicuous enough to be recorded when she was taken on April 6, nor upon the occasions of her two later repeatings on May 10 and 15.

That some individuals lost tail feathers during the winter was apparent. As early as Christmas two females were captured with their tail feathers totally missing, though one of them possessed replacements about half an inch long. Whether the feathers had been shed normally or were lost through accident was impossible to determine.* We know, however, that whatever the cause of the loss, the feathers were rapidly and completely replaced.

Nine females and two males were trapped who had tail feathers missing or only partly replaced. Measurements of the length of the replacements were made every time each of these birds was retaken. With chance recapture determining the irregularity of the observations which were made, it is impossible to draw any very definite conclusions. It is apparent, however, that the speed of growth varied with the individual bird as well as with the stage of development of the feather. Our observations showed average daily growths varying from less than 1 mm. to as much as almost 3.8 mm. Three significant instances of rapid growth are shown in the following table.

TABLE X

RATE OF GROWTH OF TAIL FEATHERS

Band No.	Sex	1st Measurement		2nd Measurement		Time Lapse	Growth	Daily ave.
44-224443	♂	Feb. 3	39.7 mm.	Feb. 9	52.0 mm.	6 days	12.3 mm.	2.06 mm.
44-223833	♀	Feb. 16	12.7 mm.	Feb. 26	44.5 mm.	10 days	31.8 mm.	3.18 mm.
44-223968	♀	Jan. 12	25.4 mm.	Jan. 20	55.6 mm.	8 days	30.2 mm.	3.77 mm.

*Such cases are almost certainly due to accident.—ED.

During the early stages of the feather's development, and again as the feather neared maturity, the speed of growth was markedly slower than that indicated by Table X. One female (44-223811) was trapped with only a single white tail feather on January 1. She repeated 91 days later, on April 2, with her tail complete. She gave no intervening record. Another female (44-214639) was trapped on December 26 with the right side of her tail missing. She repeated on January 16 with replacements 41.3 mm. long. When she repeated again on February 26 (62 days after her original record was made) the tail was complete. The longest feather measured 63.5 mm.

An unexpected type of molting was observed first on April 14. Although we had felt that the color of the birds' beaks was changing during April, it was not until the 14th that we discovered a very thin layer peeling back from their tips and edges. As the peeled area enlarged the beak assumed a greenish tinge not unlike the color of a cake of pure ice. The color reminded us vividly of the crystal liquid green of a freshly bitten "swamp apple." At no time during the peeling process did we notice any loose membranes or any fluttering edges where the membrane had separated from the surface of the beak. In a letter dated May 30, Mr. James Rintoul of Westbrook, Connecticut, reported having observed this same change in the color of the beaks: "We noticed that the beak which was bone color in winter became definitely tinged with green in spring."

VOCAL CHARACTERISTICS AND BEHAVIOR PATTERNS

Early in the winter we began an ambitious study of the vocal characteristics of the birds, but very soon we found ourselves inextricably enmeshed in a complex maze of calls and cries. Although defeated in our attempt to make a complete analysis we were able to make some interesting observations.

It was evident that such factors as size of flock, proximity of individuals to each other and to food, confinement, and presence of humans, each had its effect on the tones used by the birds. The greatest variations, however, resulted from individual differences in temperament which caused individually characteristic responses to similar stimuli. Our observations have guided us into complete agreement with Mrs. D. H. Speirs of Toronto, Ontario, who wrote us, "Each member of the flock is indeed an individual with their own private reactions and attitudes toward society."

The most common note we heard was the characteristic chirp so typical of the Evening Grosbeak in flight and at rest. We had intended to describe this call as that of a glorified English Sparrow until we discovered that A. A. Allen had beaten us to this description in his "Random Notes on Tanagers and Finches" ("The Book of Birds," Vol. II, p. 251). Still we are at a loss to improve on that description

of the note or even to improvise a satisfactory substitute. This typical cry when heard from a distance is so similar to that familiar chirp of the House Sparrow near at hand as to make further description superfluous. The fact that the sound carries to the ear from distances which hide the bird itself might seem to lead to the possibility of confused identity. The tone possesses a quality, however, which precludes any such difficulty. Each morning at almost precisely a half-hour before sunrise this call heralded the flock's approach even before the first group circled into the top of the cucumber tree. As the flock swelled the identification of individual chirps became impossible and to describe the resulting chorus as a symphonic din is a mild exaggeration indeed.

But the sound was not a confused symphony of "glorified English Sparrow" chirps. New notes were audible, the most apparent of which was a conversational "chitter" of about the same musical pitch as the typical chirp, but lacking in the same tone quality. This chittering persisted while considerable groups perched together in the tops of the trees. Infrequently every sound would suddenly cease and the surprising silence which ensued seemed impossible. For several seconds, although the birds appeared naturally at ease in the treetops, there would be no more sound than as if no bird was within earshot. No warning note nor any other apparent cause was ever noted which might explain these conversational lapses. A single chirp would finally break the period of silence, then a second, then several, and very soon the conversation was again in full swing. Often when we went to the feeding trays to renew the supply of sunflower seeds our appearance in the yard was greeted by a distinct crescendo in the volume of the chittering. As spring approached and the birds became more uneasy this same crescendo usually preceded the sweeping mass flights which often included every bird within the range of our vision. Once the flock was on the wing the chittering diminished and became largely displaced by the more common chirp notes.

It was almost unique to find a single grosbeak alone in the vicinity of the feeding trays, but whenever this condition did prevail the bird proclaimed its presence by a widely spaced sequence of chirps. This chirp was used indistinguishably by both sexes. The inflection of the voice varied perceptibly as environmental conditions changed. A sharp, shrill rise in pitch seemed to indicate mixed curiosity and uncertainty. This modification of the tone was commonly heard when a single individual tarried after the main flock at the close of a day's feeding. A very similar note was usually voiced by the first bird of the perching flock to essay the customary bough-to-bough descent from the treetop to the feeding trays.

Crowded feeding trays were the scenes of almost continuous arguments. The sound of the chattering (not "chittering"), which went on unabated whenever a feeding flock alighted there, defies our every

descriptive endeavor. The chattering note itself was not unlike that of a domestic chick whose curiosity had been aroused to the point of vocal expression. It seemed that the note trilled ever so imperceptibly, though listen as we might we were never entirely sure that our imagination was not deceiving us. The sound could have become monotonous were it not for the fact that it was capable of being interpreted in so many ways. One could hear variations of inflection and intensity which expressed the excitement of the eager food seeker, the warning to the unwanted new arrival, and the distinct threat against his (or her) continued presence.

No foil-wielding professionals ever showed greater skill in the art of thrust and parry than was exhibited by these grosbeaks. Beak to beak, never once ceasing their chatter, never hesitating in their shucking of the sunflower seeds which they held, they advanced or retreated until the one or the other was forced to the edge of the shelf and had to take to the wing. We had read somewhere that individuals of this species frequently stole seeds from others' beaks. With this in mind we watched thousands of these vociferous arguments and months of thrusting and parrying, but not even one instance was observed of a bird taking, or attempting to take, a seed from the beak of another. Nor was there ever noted an instance of one of the contenders actually biting the other. It is not improbable that a contributing factor to this record of good sportsmanship may well have been the very ample supply of sunflower seeds which was always available on the trays.

Although these arguments occurred most commonly between members of the same sex, male-female clashes, with eventual supremacy about equal, were frequently seen. Sometimes an unsociable male or female would face first one and then another until every bird had been forced in turn from the tray. The driven birds, more frequently than not, fluttered immediately back to a new footing on the same tray behind the driver and resumed eating until they were again forced off.

Many of the birds were silent when trapped alone, but the more excitable individuals expressed themselves in divers ways. The most common note was a shrill, parrot-like chirp which seemed to denote displeasure, excitement, or fear. A few individuals exhibited a temperament that so resembled a sulky child as to be positively humorous. As we approached a trap which held one of these birds she (our records indicate that they were all females) assumed a defiant, try-and-make-me-do-it attitude, wings and body feathers slightly raised, beak threateningly alert. The screech which issued from that beak upon the occasion of our every movement would do justice to a disgruntled parrot. These birds frequently shamed the most persistent mules with their show of obstinacy against being driven into the gathering cage and no mule ever gave more eloquent voice to its malintent. Finally in the gathering cage the frequent screeches continued. Usually, however, and again

after the fashion of the subdued, sulky child, when these birds were finally taken in hand they were silent and submitted most amicably to banding.

Many of the grosbeaks were silent while being removed from the gathering cage. About two out of every three birds, however, did respond audibly to the stimulus of the hand closing upon their bodies. This response cannot be described as a chirp, but usually as a single, sharp, parrot-like screech, modified in the cases of some individuals into what should better be called a squeal. A small number continued their screeching, or squealing, as long as they were being handled, but in most instances two or three repetitions of the sound while the hand was closing about the bird's body sufficed to satisfy its reaction.

In addition to the screechers and squealers we found about as many which "talked" in a quiet, confiding, pleading tone while being handled. This tone was remarkably like that which one frequently hears while banding Purple Finches. These "talkers" were most often the tamer birds which had shown little agitation or fright in the traps. In some instances the voice was almost squeaky, but in most cases the tones were calm and plaintive. One very tame female we dubbed "Sweet Tweeter" in echoing reasonably well the note which she repeated persistently every one of the twelve times she was trapped. She identified herself vocally with unerring certainty every time she entered the gathering cage. Only two other grosbeaks were heard to voice a similar note, one of them providing a single instance, the other repeating the note a second time.

It was exceptional for a released bird to fly away in silence. The large majority greeted their freedom with a single chirp as they took wing. Sometimes this note was modified to the parrot-like screech and, sometimes, it was repeated two or three times before the bird reached the bough upon which it came temporarily to rest. Several individuals expressed themselves in a manner that sounded like "chewy, chewy." Still others repeated "churtle, churtle" several times as they flew away. Males and females gave expression to all of these sounds indistinguishably. The two latter notes came sometimes from perching flocks, also. We noted them especially during the unseasonably warm March days.

There were several instances of unique sounds which we observed not more than once or twice each. One male gave two shrill whistling notes. Another male sounded unbelievably like a Fourth of July rattle. Still another male repeated a "chick, chick" note and was also our second individual to whistle shrilly. One mewed twice surprisingly like a cat. Another provided a remarkable imitation of a squeaky hinge. A few individuals while confined in a trap gave voice to a quiet, plaintive cooing similar to a young pigeon.

Only once was any semblance of a song heard. This occurred on January 12 when a male who was perched in the top of the cucumber

tree repeated very softly and almost breathlessly a sound which was very much like "chuh, chuh, chuh, w-e-e-e-e-e." Anything at all resembling musical quality was entirely missing from his vocal endeavor, however.

Almost every attempt we made to remove a grosbeak from the gathering cage while in the sunlit out-of-doors was greeted by a volley of screeches. These screeches on the part of the trapped bird stimulated its untrapped companions to excited chirping and nervous flying about. The untrapped birds under such conditions crowded into the tree above the gathering cage, chattering fluently. More often than not a mass flight followed which took every bird temporarily from the immediate vicinity. To avoid unnecessarily agitating the untrapped birds we adopted the procedure of carrying the loaded gathering cage into the house. This step was doubly successful, for the trapped birds registered far less excitement at being handled in the dimmer light of the hallway in which we operated.

A study of repeating individuals revealed that a very large proportion showed consistently similar vocal characteristics upon the occasion of each subsequent recapture. That this was particularly true of "talkers" and "screechers" is amply witnessed by scores of records in our files. The case of "Sweet Tweeter" who supplied us with a dozen consistent records has already been cited.

It was evident, however, that in some instances the conditions of capture had a distinct influence on the bird's vocal response. When trapped in company with an excitable individual those which had otherwise shown little or no inclination to struggle or to screech often became nervous and noisy.

FOOD

There is no argument against the fact that a sunflower seed diet is acceptable to Evening Grosbeaks. Members of the flock we studied were observed also in the act of eating seeds of the catalpa (*Catalpa catalpa* (Karst)) and fruits of the Norway maple (*Acer platanoides* (Linn.)). Although we had read of this species' desire for apple seeds the several apple cores which we supplied to our flock went untouched as they lay in the tray with the sunflower seeds which were being devoured eagerly enough. Nor were the squash seeds eaten which we sometimes threw onto the same trays.

During thaws or after traffic had churned and softened the snowy surface, groups of as many as fifty grosbeaks each were observed on the ground in the street pecking at the slush. These groups assembled especially in that area at the junction of two streets where sand mixed with rock salt (sodium chloride) had been spread as a safety measure by the street department. It was apparent that the salty, gritty slush was being eaten, but when we placed salt and sand separately on the ground near

to our supply of sunflower seeds neither was touched though the seeds were devoured to the very last one. On January 5 a group of twenty-five was observed pecking at a slushy spot in a driveway where coal and coke ashes had been strewn. On March 16 a smaller group of a half-dozen were observed pecking and pulling at the shreds of an old stump in the middle of the street while thirty others were pecking simultaneously at slushy sand in the ditch nearby. The macadam surface which had previously hidden the stump in question had been broken away by winter traffic.

A strong desire for water was indicated by our flock's conduct. One rainy day a row of more than twenty was observed as they perched along an eaves-trough drinking repeatedly. Newly fallen snow appealed to these birds also. They were seen frequently to take beaksful of it especially from that which stuck to the boughs upon which they were perching. Some were observed thus eating snow while others were drinking from puddles on the ground or from the wooden bowl which we kept constantly available for them. When the water in this bowl froze over the birds forced their beaks through the thin coating of ice to drink. Warm water was added frequently throughout every freezing day and it was almost as great a rarity to see the bowl without at least several birds drinking as to see one of the feeding trays without its feasting complement.

Since the birds frequently drank while still in the act of shucking sunflower seeds there would often accumulate in the bowl during the course of a single day as much as a handful of shucks and seed meats. While the flight was at its peak almost a gallon of water was drunk from this bowl by the birds every day. Not even one Evening Grosbeak was observed in the act of bathing or attempting to bathe even when, in April and May, robins, starlings, and Blue Jays frequently used the bowl for that purpose.

The Evening Grosbeaks, in the process of eating, shucked the seeds after the fashion employed by Purple Finches. Hundreds of seeds were studied in the process of being shucked and it was noted that by far the greater number were held with the narrower, more peaked, end pointed into the mouth. The dexterity with which each seed was rolled over, reversed end for end, and made to yield its tasty meat from inside the dry husk was fascinating, indeed, to watch.

INJURIES AND CASUALTIES — PARASITES

When so many birds are trapped and handled as was true during this study it is incredulous to believe that there would be no injuries. The Evening Grosbeaks are a hardy species, however, and only two serious accidents occurred.

In one case a female sustained a compound fracture of one wing as she struggled violently when a gray squirrel climbed momentarily

upon the Chardonneret trap which she had just entered. The other accident also involved a female. She was one of two members of the same sex who were being removed simultaneously from the flat trap. When shrill screeches began emanating from the gathering cage we hastened to remove one of the birds for fear that they were attacking each other. The bird which still remained in the gathering cage continued to shriek as if in terror or in pain. As soon as the one could be released we removed the other, still shrieking and blood-stained. We then discovered that she was holding the middle joint of her own wing in her beak and was biting it violently, screeching from the pain and anger aroused by her self-inflicted wound. The bones at the joint were seriously mutilated. We drowned these two injured birds to relieve their suffering.

The most common injury sustained by trapped birds was a bruise on the wing near the carpal joint. These bruises were almost never apparent the first time a bird was trapped. Those individuals who repeated frequently aggravated the condition until in a few instances some bleeding ensued. Not even one single case of serious injury from this cause occurred, however, and we were able to record several repeats whose previously bruised wings had healed completely. Since this type of injury occurred most commonly in our government sparrow trap we made only very limited use of it.

The other injury which was fairly common involved the toes. An exact record was not kept of the number of individuals whose toenails became snarled in the mesh of a trap or of the gathering cage, but we can report that there was not even one instance of serious injury from this cause and we have records which indicate that such injuries as did occur healed rapidly and completely.

A more serious type of foot injury occurred, however, in the cases of four birds each of which was bitten by another simultaneously present in the gathering cage. In each of these instances the bleeding was profuse. Blood wet the biter's bill and breast feathers and, on occasion, dripped through the mesh of the gathering cage onto the carpet. A more or less successful attempt was made to stem the flow with powdered alum. Repeat records made by three of these bitten birds showed rapid healing of the injury and no more than a very brief handicap was indicated. One of the most seriously bitten of these birds (our "Sweet Tweeter," by the way) repeated two days after having been bitten. Although the injured member was swollen its healing had progressed so rapidly as to preclude any chance of permanent handicap. Subsequent repeatings by this same bird revealed that her foot had healed and the swelling had subsided completely.

Of the four individuals who suffered these foot injuries three were females and one was a male. The biter in two instances was a female and in two instances a male. Even while the victim's foot was still held

in the attacker's beak the amount of struggling that ensued was surprisingly little and the vocal response on the part of the victim amounted at the most to no more than plaintive tones of protest.

We learned very early in the winter that it was inadvisable to allow more than three birds to enter the gathering cage simultaneously. By adhering to this rule we had a minimum of injury from struggling and biting.

Of the more than twenty-four hundred Evening Grosbeaks we handled inside the rooms of our home only one escaped prematurely. This female flew across the kitchen and crashed against a window pane. She fell, stunned, to the floor. We picked her up and a small cut was found in her scalp. There was only slight bleeding. Since she appeared too dazed to fly she was kept over night in a cage. Next morning she flew away readily enough. She repeated twenty-two and twenty-five days after her release. The scalp wound was so completely healed as to elude our attempt to discover and examine it, nor could we find any other ill effects of her experience.

Two males provided us with surprisingly parallel symptoms of temporary loss of ability to fly. On January 3 a repeating male, upon being released, plunged headlong into the snow without more than weakly opening his wings. He hopped about spryly enough, however, but when he was finally cornered and captured he was panting huskily and appeared to be very weak. During the twenty days that he was kept in captivity he slowly recovered the use of his wings and on January 22 he was released. On February 17 a second male exhibited very similar symptoms. During a nineteen-day confinement he, also, recovered and was released. Subsequent repeat records indicate that the recovery of both of these birds was so complete that they were able to resume normal participation in the activities of the flock. Some interesting observations which were made while these two birds remained with us have already been recorded (Parks, 1946: 71-74).

On four occasions grosbeaks out of doors were observed to fly against window panes and twice against the screens of a porch. One of these accidents occurred when a hawk flashed through the yard, a second resulted from surprise when the Chardonneret trap snapped shut. The provocation in the other instances was not apparent. Two of the birds were stunned by the impact, but after a few minutes on the ground they both flew away apparently none the worse for the accident. That the shock of the blow was no more serious is probably explained by the fact that the birds we observed collided with the obstruction after only a very short flight from rest and were not yet moving at top speed. That similar accidents may be serious is evident, for three persons who recovered the bodies of birds which we had banded from this flock reported the cause of their accidental death as, "Flew against window."

The physical condition of most of the birds which we trapped was excellent. They were very uniformly plump and vigorous. Three instances were noted of healed injuries to legs and feet. One of our own bandees (44-214651) has already been reported as having sustained a broken tibia subsequent to her banding, but prior to her arrival at Mrs. Knup's feeding station in Norwichtown, Connecticut. Three other birds were each found to have one eye inflamed, swollen, and wet as if by a copious flow of tears. It was impossible to determine whether the condition was the result of infection or injury.

Although a quick examination was made of every bird we were able to discover only one parasite and this one we were unable to identify with certainty. Its characteristics, however, were very similar to those of the common chicken-louse.

SUMMARY

Of the 874 Evening Grosbeaks banded at our Hartford, Connecticut, station during the winter of 1945-46, 487 were females and 387 were males. Except for a distinct numerical supremacy enjoyed by the females during the first three weeks in January the sexes were present during the entire flight in almost unbelievably equal numbers. The birds remained at our station during 163 consecutive days: December 13 through May 24. In all, 2,429 individuals were handled. One male stayed with us for 150 days and one female repeated eighteen times. The flocks appeared in nine waves with the peak of population persisting through most of February. The birds exhibited a wide range of individual characteristics. The bands of 44 out of 491 specially marked repeats (about 9 per cent.) showed some degree of mutilation inflicted by the bird, but no marked bird repeated with its band missing. Our records indicate a drift of the birds southward along the coastal end of their west-to-east flight. Only isolated indications of molting were discovered. The regrowth of tail feathers which had been lost during the winter was rapid and complete. Except for a very few deformities and healed injuries the birds we trapped were plump and in generally excellent physical condition. Only one parasite, a louse, was discovered.

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