

June 26, 1957 at Beaufield Marsh near Kerrobert, Sask. and shot May 21, 1961 near Anadyr', Chukotka, U. S. S. R.—C. Stuart Houston, 863 University Drive, Saskatoon, Sask.

Notes on Ant-Tanagers in Panama.—*Distraction display*—On 18 May 1963, I caught a female-plumaged Dusky-tailed Ant-tanager (*Habia fuscicauda*) in a mist net placed parallel to a trail running through a dense secondary growth jungle about 2 miles east of Albrook Field, Panama Canal Zone. This bird may have been an immature of either sex, but it was not in the soft plumage of a fledgling. I saw no other birds in this plumage during the following course of events and the subsequent behavior suggested a female. While extricating her from the net, she began calling and an excited male appeared and put on a convincing "broken-wing act" on the ground of the narrow clay trail. In an attempt to capture the male I induced the female (still in the net) to call again, but the male must have perceived the net as he repeatedly flew back and forth under it. When the female was released she joined the male whereupon they fluttered wings and rubbed bills. I am unaware of a reported case of distraction display where diverting from a bird older than a fledgling was involved.

Immature plumage and adult gonadal development—In a woods near Curundu, Panama Canal Zone, on 20 April 1963, I caught two Red-crowned Ant-Tanagers (*Habia rubica*) side by side in a mist net. Since one was in the red plumage of the male and the other in the drab plumage of the female, I presumed them to be a pair. However, upon dissection of the specimens I found that not only were they both males but both had enlarged testes (left testis 7 x 11 mm in the red plumaged bird and 6 x 8 mm in the other). This would seem to indicate that males of this species can breed without reaching definitive plumage, as is the case with the Euphoniias (*Tanagra*) in the same family.

I would like to acknowledge Mr. Eugene Eisenmann's generous assistance in the preparation of this note.—Storrs L. Olson, 700 Stiles Avenue, Tallahassee, Florida.

Supplementary Notes on an Evening Grosbeak Nesting Area Study.—In *Bird-Banding*, 34(1): 22-30 and 34(2): 73-86, we described our study of a concentration of Evening Grosbeaks (*Hesperiphona vespertina*) in the Patapedia River watershed of Canada's Quebec Province during June, 1962.

Working for 11 days (June 15-25) in that location we banded 500 Evening Grosbeaks and captured an additional 16 foreign retraps. We observed behavior patterns which indicated that many of these birds were interested in, or were actually engaged in, nesting. It seemed apparent that we had found a natural nesting area of this species. Our experience during those 11 days inspired us to consider a continuation of our study during future nesting periods. Then, on the very last day of our stay, the spraying of the area with DDT by airplanes from the Quebec Department of Forestry injected a complication which was sure to modify the normal ecology of the region and which would, at the same time, provide us with an opportunity to assess the effect of forestry spraying upon these birds. We decided to return the following year and study the situation further.

On June 14, 1963 we again pitched our tent near 39-Mile Camp on the Patapedia. We brought with us the same traps we had used the previous spring. We set them as nearly as possible in exactly the same location as upon that occasion, baited them in the same manner, and allowed them to remain set during the corresponding period (June 15-25).

Our purpose in duplicating our 1962 techniques was to eliminate as many extraneous factors as possible while we attempted to learn what effects the 1962 spraying might have had on the Evening Grosbeak population. Our results are compared in the following table:

Year of Banding	Evening Grosbeaks Banded	Foreign Retraps	Returns	Repeats	Total Birds Handled
1962	500*	16		231	747
1963	5	0	0	0	5

*Many more than these 500 Evening Grosbeaks could have been banded from among the large flocks present had not our supply of bands become exhausted.

Observations of the bird populations in the region during these two periods indicated that our trapping success was proportionately quite consistent with the numbers of Evening Grosbeaks actually present at the time. Other species showed no such radical decline in numbers, however; in fact, some of them showed a population increase in 1963.

Our plan to return again for a followup study in June, 1964, was affected drastically by the fact that our good friend, congenial host, and guide, Thomas (Pete) Brousseau, was struck down by an automobile and killed while he was in Amqui (P. Q.) on August 12, 1963 to procure supplies for his camp. Later on that fall, also, new lessees, unfamiliar to us, assumed control of trespass rights to the Patapedia River area. So it was not until July 15, 1964 that we were able to visit 39-Mile Camp again. No trapping was attempted; in fact, not even one Evening Grosbeak was either seen or heard. The new salmon guardian told us that during the more than four months he had been at the camp since having replaced M. Brousseau he had seen a total of not more than 15 of them. Other bird species were present in apparently normal concentration.

We are indebted to Dr. J. R. Blais, forest entomologist with the Quebec Department of Forestry, for some insight into the reason for this spectacular decrease in the Evening Grosbeak population. First of all, during its larval stage, the spruce budworm (*Choristoneura fumiferana*) is especially appealing to the Evening Grosbeak as food. This insect, meanwhile, causes serious damage among the softwoods of boreal forests and natural predation has not sufficed to keep it in check. Forestry interests have found a successful control, however, in aerial spraying with DDT in an oil solvent.

To explain the dense concentration of Evening Grosbeaks which we had originally found at 39-Mile Camp let us call attention to the fact that repeated sprayings during several years had been employed in an attempt to gain mastery over a spruce budworm outbreak which involved forests in New York, Maine, Ontario, and New Brunswick, as well as in Quebec. Since the birds no longer found an adequate supply of the budworm for food in the sprayed areas they moved on to unsprayed tracts where the insect still persisted.

Examination of the maps on which the sprayed regions had been plotted shows that the effort to control a particularly obstinate budworm infestation near Quebec's Gaspé had approached, but had never quite reached, the Patapedia River prior to 1962. So, as this "island" of budworm-infested forest (with 39-Mile Camp situated very close to its center) became smaller and smaller the concentration of Evening Grosbeaks which was attracted to its abundance of edible larvae became heavier and heavier. Then 1962 witnessed the spraying of even this area and the resultant successful elimination of the pests which had been damaging the trees. Come the spring of 1963, the almost completely eradicated budworm population was no longer adequate to attract and hold more than a very few of the Evening Grosbeaks which might be returning to, or migrating through, this area.

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Our 1962 bandings at 39-Mile Camp on the Patapedia have produced a few significant records in addition to the 14 which we have already reported in 34(2): 85, 86. Reports received from the Banding Laboratory indicate that our birds did not wander far during the first winter (1962-63), but they they journeyed well to the west and south during the second winter after the banding occurred (1963-64). Our evidence is summarized in the two tables which follow:

WINTER FLIGHT OF 1962 - 1963

Band No.	Sex	Banded	Recovered	At	How
52-195436	F	06-19-62	03-07-63	Pointe Claire, Que.	Trapped and released
451	M	06-20-62	03-15-63	Cape Neddick, Me.	Trapped and released
499	M	06-21-62	01-20-63	Ballston Spa, N. Y.	Trapped and released
699	M	06-24-62	03-03-63	Arvida, Que.	Trapped and released
726	M	06-24-62	05-11-63	St. Adolphe D'Howard, Que.	Found dead

WINTER FLIGHT OF 1963-1964*

Band No.	Sex	Banded	Recovered	At	How
52-195541	M	06-21-62	10-30-63	Cedar Grove, Wis.	Trapped and released
549	M	06-22-62	12-??-63	Luray, Va.	Shot
573	F	06-22-62	03-17-64	Terra Alta, W. Va.	Caught in trap
648	M	06-23-62	12-15-53	Stevens Point, Wis.	Trapped and released

*We are indebted to Mrs. Robert W. Patterson for one additional record which fits very neatly into this part of our story. This record involves male Evening Grosbeak No. 57-128591. Mrs. Patterson banded this bird at Mt. Desert, Me., on January 14, 1960. We trapped and released him, as a foreign retrap, at 39-Mile Camp, on June 18, 1962. Mrs. Patterson was notified by the Banding Laboratory that he has been trapped and released again, this time at Strasburg, Va., on April 3, 1964.—G. Hapgood Parks, 99 Warrenton Avenue, Hartford, Connecticut.

Fat Levels and Estimated Flight-ranges of Some Autumn Migratory Birds Killed in Panama During a Nocturnal Rainstorm.—During the pre-dawn hours on October 13, 1963, individuals of several species of birds collided with telephone poles and other obstructions in the town of Almirante, Republic of Panama. The event occurred during one of the heavy rains which are common in this area in the fall. Upon leaving my living quarters early in the morning, I observed children chasing birds and picking up others which were too weak to attempt any escape. In addition to live birds, there were numerous dead ones lying in the streets and yards. Several live specimens were sacrificed and kept in a freezer together with others which were picked up dead. These frozen specimens were brought back to the United States and put through a fat-extraction process to determine fat reserves as an indication of how far they could have flown had their migratory flights not been interrupted.

As can be seen from Table I, none of the birds had exhausted their fat reserves. It is clear that they were forced down by the rainstorm and either killed outright or injured to the extent that they were unable to fly again.

The existence energy requirement of passerine birds has been estimated to be 0.04 - 0.05 Kcal/gm of fat-free wt/hr. That flight energy may be roughly twice existence energy has been suggested by Odum (*Proc. XlIth Int. Orn. Cong.*, pp. 563-576, 1958) and substantiated by Nisbet, Drury and Baird (*Bird-Banding* **34**: 107-157, 1963). According to the latter authors weight losses during flight between New England and Bermuda indicate an energy expenditure of 0.1 Kcal/hr/gm fat-free weight. Estimated flight-ranges listed in Table I are based on this value and on the following assumptions: (1) the flight speed of passerines is approximately 30 knots (Nisbet *et al.*, 1963) (2) the caloric value of fat is 9 Kcal/gm and (3) approximately one gram of fat in thrush-sized birds and one-half gram in warblers is unavailable as fuel. Extractions of extremely thin birds shows that about this much ether-soluble material is present as part of tissues and, therefore, unavailable as fuel except as a last resort when tissues themselves are burned.

When the specimens were collected, they were slightly damp resulting in a slight overestimate of the fat-free weight (and, therefore, lowering the value of the estimated flight range). However, on the basis of previous extractions of dickcissels, tanagers, vireos and Swainson's thrushes, the fat-free weights of all specimens mentioned here were within two standard deviations of the established means for the particular species.

It is evident that many of the birds killed in the October 13 rainstorm in Panama could have continued their flight well into South America in so far as fuel reserves are concerned. However, mean fat levels of the Panama birds were less than half that of thrushes and tanagers killed at a Gulf Coast Television Tower in early October. For example, 29 Scarlet Tanagers (*Piranga olivacea*), 44 Summer Tanagers (*Piranga rubra*), and 101 Veeries (*Hylocichla fuscescens*) killed on nights of October 5, 1956 and October 5, 1957 averaged about 16.7 gms fat/bird (Odum, Connell and Stoddard, *Auk*, **78**: 515, 1961) as compared with about 7.4 gms/bird for the 14 thrushes and tanagers in Table I. The difference, or 9.3 gms (83.7 Kcals) is sufficient fuel for a 32 hour or 960 mile flight, not enough for a non-