camp telephone became more persistent as the crescendo of the wardens' interest rose. Some of these men, too, had mistakenly shot Evening Grosbeaks to obtain the bands. Through Pete Brousseau's publicizing of our work they were learning to mend their ways—we hope.

What does the future hold for this study?

Our initial plan to do a bit of missionary work in behalf of the harrassed Evening Grosbeaks seems to have taken on unexpectedly important proportions. We have been successful in trapping and releasing in their breeding area 16 birds which were banded at 13 different stations south and west of that area. For the first time birds taken in this region remain alive to write further records. Where will they winter? (At the location where they were banded, perhaps?) Is the Patapedia River locale their chosen breeding grounds to which they will return again?

How about those 500 Evening Grosbeaks, probably the first ever banded in this nesting region? What sort of story will they tell? Where will they go? Will they return here to nest again?

And, overshadowing all of these questions there is the DDT. What will be its effect on this Evening Grosbeak nesting area and its feathered population? We must return and endeavor to find out.

REFERENCE

SHAUB, B. M. 1960. The destruction of nearly one hundred Evening Grosbeaks at St. Leon le Grand, Quebec. *Bird-Banding.*, **31**(3): 150-156.

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RESULTS FROM BANDING GLAUCOUS-WINGED GULLS In the Northern Gulf of Georgia, B.C., from 1922 to 1949

BY THEED PEARSE

All of these Glaucous-winged Gulls (*Larus glaucesens*) were banded at Mittlenach, an isolated, rocky island in the extreme northern part of the Gulf of Georgia, about halfway between Vancouver Island and the mainland of British Columbia. It is some five-eights of a mile long by a quarter wide, rising in the center to 157 feet.

During the period 1922 to 1949, banding was carried out only in the following years: 1922, 1923, 1925, 1927 to 1931, inclusive; 1938 to 1941, inclusive; 1946 and 1949. The original object was a personal one: to try to ascertain whether the young birds tended to stay in the vicinity of Mittlenach, or joined those of this species that pass down the gulf in great numbers each Fall. In 1938 the Western Bird-banding Association's scheme for color-banding young gulls was initiated, and Mittlenach was chosen for Glaucous-wings. After the

close of the period for color-banding, any further banding was carried out to check with earlier years.

Articles by the present writer, dealing with the early years of banding, and giving a general description of the island, appeared in the *Canadian Field Naturalist* ("Banding Glaucous-winged Gulls", **37**: 132, 1923; and "Notes on a colony of Glaucous-winged Gulls in the Gulf of Georgia", **42**:9, 1929). The present article takes in the period covered by them, and supplements them. As 13 years have elapsed since the last of the years covered, the record of recoveries can be considered to be virtually complete.

Since those two articles were written, there have been fires on the island; the fires do not seem to have affected the gulls, possibly because they generally nest where a fire would not run. Otherwise conditions have scarcely changed. What changes have occurred have been beneficial. The extensive human predation of eggs in the earlier years has almost ceased; and the sheep, which must have disturbed nests as they nosed about for food (see p. 10 of my 1929 paper), have gone. Crows (*Corvus caurinus*), though always present, seem to leave the gulls alone. A possible future menace may be the fast-growing colony of Pelagic Cormorants (*Phalacrocorax pelagicus*), which tend to push out the gulls, as has happened elsewhere (see my "Notes on changes in bird population in the vicinity of Comox, Vancouver Island", *Murrelet*, **27**:4, 1945). At present there is ample room for both species. Cormorants were not recorded in 1946, but there were 24 nests in 1949 (per R. Fryer, assisting in banding); in 1960 there were 123 (per D. Stirling, personal communication).

On different occasions estimates of the adult population have been attempted—a difficult operation as birds flock to where the human intruder may be and later return to their own nesting area, and so may be counted more than once. In 1922 the estimate was 500 pairs, probably too low; later figures have been consistently around 1,500 birds. Except in 1922 and during the color-banding scheme, the number of young banded has not represented the crop. On several occasions, time only permitted looking over a portion of the island. Mittlenach is not like some Glaucous-winged Gull colonies where it is possible to walk from one nest to the next; nesting there is spread over the whole island, though there are places more favored, possibly as giving more direct access to the sea. Then too the young birds have to be searched for, and are often well hidden in crannies of the rock. To cover the island fully takes one person two days; fortunately, on most occasions I had one or more assistants.

Mittlenach birds would seem, for no accountable reason, to be later than gulls nesting more to the south, in the Gulf of Georgia. Bent (*Life Histories of North American Gulls and Terns*, p. 73, 1921) gives as egg-dates for Washington (State, U. S. A.) 19 records: May 29 to July 23 and 10 records, June 14 to 19. For British Columbia (Mittlenach would not have been included), Bent listed 16 records from June 14 to July 15, including 8 from June 15 to 24; while locations were not specified, if they were from the Gulf of Georgia, they must have been in the more southern part. On Mittlenach it is doubtful if there would be any eggs as early (the published records

TABLE A.

Description of Banding			Ages of Recovered Birds											
Date of Banding		Numbers Banded	Under 6 mos.	7-12 mos.	Years (under) 2	3	4	5	6	7	8	9	10	over 10	Total
1922	29-31 July	104	1	1	1	1		1		1					6
1923	25 July & 12 Aug.	52	1		1	1			1						4
1925	23 July	72	1	1	1		1							1	5
1927	16-18 July	57	1												1
1928	11, 14 Aug.	71	1			1									2
1929	1 Aug.	156	1		1				1					1	4
1930	3 Aug.	100	1		3	1									5
1931	1 Aug.	67		1											1
1938	7 Aug.	184	2		4										6
1939	8 Aug.	316	18	1	1			1			1		1	1	24
1940	3 Aug.	349	11	2		1	1	2	1	1				4	23
1941	3 Aug.	110	6					2							8
1946	27 July	129	3				1								4
1949	18 Aug.	127	3	1	2					1					7
Totals		1,894	50	7	14	5	3	6	3	3	1	—	1	7	100

do not state stage of incubation). Experience has shown that to get satisfactory results, the right date must be chosen. In 1927 mid-July was too early, as there were no young birds old enough to carry a band. In 1949 it was too late, as the majority of the young birds were either on the wing or took off when approached.

The disproportion of young to adults has always been noticeable, even in the years when the island was well covered. Comparing the bad old days of human predation and sheep disturbance with the years of the color-banding scheme shows no corresponding increase in the crop of young (in 1940, my bands ran out and a hundred or so young may have been left out). The years of incomplete coverage really point the same way, as on all occasions it was generally possible to account for the full complement of three young either in the nest or hidden, or trying to hide, in foliage or rock crannies nearby.

Most years there would be the odd bird of the previous year, sometimes as many as 50 mixed with the older birds, which showed no resentment. The Glaucous-wing is a peaceable bird; very little squabbling was noticed and it does not appear to be strong territorially. Apart from these "brown" birds, it was exceptional to see a bird showing signs of any previous year's plumage.

This disproportion between adults and nestlings is difficult to account for, particularly in later years when detrimental factors had more-or-less ceased. Fifteen hundred adults should represent 750 pairs, and produce up to something like two thousand young, but such a figure was never approached. It therefore is evident that not all of the adult birds nest, for which there must be a reason. There are plenty of nesting sites, and the only solution would appear to be a limited food supply to which the adult population adjusts itself; somewhat as, in the Arctic, birds that depend on Lemmings for their main food do not nest in off years for the Lemmings.

There is no food on Mittlenach. It seemed clear from observations that the main feeding ground is an extensive foreshore, some four to five miles away, exposed at low tide; during the nesting season, one low tide (varying in degree) occurs each day. The main food, as disclosed by young gulls disgorging when being handled, was Starfish and a small fish, possibly Herring; both would be available only at low tide. This may be the factor controlling the number that nest.

In Table A, the first year is divided in two to show the heavy mortality during the bird's early life. Recoveries are credited to the nearest year (in the first year, to the nearest six months). The slight difference in totals in Tables A and B results from insufficient data. The place of recovery is as shown in the return, and may not always be accurate; for instance, Shingle Bay, officially, is in the Queen Charlotte Islands, but as likely as not is just a local name.

The returns, over the years covered, seem to confirm the earlier conclusion: that the young birds do not, as a rule, join the numerous passing flocks of old and young gulls going south in the Fall; and further, that there is no serious migration of adults from this colony. Thousands of migrants of this species pass through this area every Fall.

TABLE B. APPROXIMATE DISTANCES OF RECOVERIES IN MILES

Year of Banding	10	25	50	100	150	200	250	over 250	Total
1922	3		1	1			1		6
1923	1	2					2		5
1925	3			2					5
1927			1						1
1928				1					1
1929	1	1		2					4
1930	4			1					5
1931			1						1
1938	2		2	2					6
1939	7	4	2	7	3	1	1	2	27
1940	6	7	1	4			1		21
1941	1	2		4	1				8
1946			1			2		1	4
1949	2	2		3					7
Totals	30	18	9	27	4	3	5	3	99

For Glaucous-wings to spend the winter here in the Comox District is regular, for both old and young. This is not to be wondered at, as Bent (*op. cit.*, p. 73) gives the winter range as "from the Aleutian Islands, Kodiak and southern Alaska Coast southward to Lower California", and Gabrielson and Lincoln in their recent work, *Birds of Alaska*, describe the bird as resident in Alaska. Then too, human activities over the past decades have provided so many more feeding opportunities; though, on the other hand, overfishing has greatly reduced the number of dead salmon, left after spawning,

TABLE C — OLD BIRDS

Year banded	Place of recovery	Approximate Distance miles	Date
1925	Egmont, B. C.	100	17 Sept. 1936
1928	Harlan, Oregon	300	5 Sept. 1940
1929	Quadra Is. B. C.	10	15 Nov. 1944
1939	Campbell River, B. C.	10	21 July 1952
1940	Cortez Is., B. C.	10	28 Dec. 1951
1940	Bliss Landing, B. C.	10	3 Sept. 1951
1940*	E. Coast Vancouver Is.	10-20	6 Dec. 1953
1940*	Comox-Alberni District do do	10-20	6 Dec. 1953

*The date of recovery is doubtful; the two returns were sent in by the local Game-warden and the date probably was when notified or when mailed to the Canadian office. "Comox-Alberni District" is vague and could extend fifty or more miles south from Mittlenach. Enquiries have shown that both birds were recovered in the Merville area, south-east from Mittlenach on Vancouver Is.. The numbers of the birds were only four apart in the series (four is too many for one nest but suggests close neighbourhood). Then too there is the rather remarkable fact that both birds were recovered from the same area at, approximaately, the same time. This could point to their having been a pair, and that they spent their lives in the vicinity of their origin.

TABLE D. DISTANT RECOVERIES, NORTH AND SOUTH

NORTH

Place of Recovery	Date	Approximate distance	Age
Simoon Sound, B. C.	Dec. 25	100 m.	under 6 m.
Shingle Bay, Sandspit, Queen Charlotte Is., B. C.	3 Jan. 40	350	do
Smith Sound, B. C.	7 do	150	do
Port McNeil, B. C.	27 Jan. 40	100	do
Port Hardy, Vanc. Is.	9 Feb. 40	150	do
Bella Bella, B. C.	20 Dec. 40	200	6 years

SOUTH

South of Canada-U. S. border, over 150 miles from Mittlenach

Hood Canal, Wash.	Prior to 25 Apr. '24	250 m.	under 6 mo
Seattle, Wash.	29 Sept. '24	225	do
Bainbridge, Wash.	15 Nov. '28	225	5 years
Clinton, Wash.	23 Nov. '39	200	under 6 m.
Oakland, Calif.	28 Jan. '40	1300	do
Port Townsend, Wash.	7 June '40	200	1 year
Harlan, Ore.	5 Sept. '40	300	12 years
Bellingham, Wash.	24 Oct. '40	200	1 year
Marin County, Calif.	4 Jan. '41	1000	under 6 mo
Vancouver, Wash.	Fall '46	350	do
Kingston, Wash.	Dec. '46	200	do

that used to provide food for thousands of birds. It is also notable that all but one of the old birds (Table C) were recovered in the neighborhood or their origin. The oldest birds recovered were within a few miles of Mittlenach, at about 13 years of age, and so may have spent their lives near their birthplace.

Two birds were recovered from the West coast of Vancouver Island, one under six months, the other an adult. The former is an instance of reverse migration. As migrating gulls follow the coastline, this bird probably rounded the southern tip of the island, turned north, and continued in that direction until a suitable feeding ground turned up (it was killed at a cannery). No doubt it would have wintered there, which leads to speculation on what it would have done the following spring. The direct line from Mittlenach crosses Vancouver Island; though this would reduce the distance by two-thirds, it is a line that no gulls take. Then too, on its flight up the West coast of Vancouver Island, this bird must have passed hundreds of its own species moving south, and yet carried on northward.

The adult bird was recovered in spring. Doubtless it was with a company of gulls bound for their nesting quarters on Vancouver Island or further north, and carried on up the West coast instead of turning into the Straits of Juan de Fuca (to the East coast) — probably a matter of frequent occurrence with northbound birds.

Though this paper deals with the period down to 1949, banding has been carried out, on and off, by myself and others, since then. The latest was on 27th July, 1960, when Messrs D. Stirling and W. J. Merrilees banded 300, and ran out of bands with much of the island uncovered. Merrilees estimated that half was left, but from his written description, rough map, and my own knowledge, I would say that two-thirds of the young were banded, so results would compare well with earlier full years. No signs of predation were seen, though the Cormorants had increased.

Comox, British Columbia, Canada

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THE NATAL PTERYLOSIS OF TANAGERS

By Charles T. Collins

In recent years a great deal of information has been collected on the natal pteryloses of passerine birds (Wetherbee, 1957, 1958). However such information on the tanagers (Thraupidae), a large and diverse assemblage of mostly tropical birds, is limited to but one temperate region species, *Piranga olivacea* (Wetherbee, 1958: 236). In the course of field work in Trinidad it was possible to obtain additional data on two tropical species, *Thraupis palmarum* and *Tanagra violacea*.

A single specimen of *Tanagra violacea* was collected from a brood of five which hatched on August 6, 1962 (age at collection < 24 hrs.; weight 1 1/8 grams). This species possesses a very reduced number of blackish neossoptiles as compared with the other two species of tanagers (Table 1). The distribution of these neossoptiles is given in Table 2.

Table 1. Total Number of Neossoptiles in Tanagers

Species	Total number of neossoptiles
Tanagra violacea	32
Thraupis palmarum	184 - 224
Piranga olivacea*	227

*from Wetherbee, 1958:236

Two nestlings of *Thraupis palmarum* were collected on July 27, 1962. These nestlings were of an unknown age but on the basis of their weights (4 and 6 grams) were judged to be but a few days old (Stage A, Wetherbee, 1957: 356). As the weight of evidence supports the view that neossoptiles are entirely prenatal in development, the data from these nestlings may be used along with those from newly hatched young of the other species. The amount of variation, if any, due to abrasion in these specimens cannot be accurately determined.