

The process of family disintegration in Black Brant

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Summary

A study of family behaviour in Black Brant in Izembek Bay, Alaska, in the fall of 1965 revealed that family groups arriving in migration from the nesting grounds disintegrate before resuming the migration southward. Birds arrived in flocks of non-breeders or of family groups and after family disintegration departed in flocks of random mixture.

Students of wildfowl have long observed the existence of family groups in geese and swans. The present authors studied family behaviour and groupings in Black Brant *Branta bernicla orientalis* while conducting age group counts as described by Jones (1964) on the Izembek National Wildlife Range in Alaska. The age group counts have become a regular function on the Wildlife Range, and have been expanded not only in numerical size, but in the complexity of population analyses. This time a minimum of 30,000 observations was deemed necessary to fulfil planned studies. We sought to apply the methods of Lynch and Singleton (1964) for developing annual productivity data as a check on our own, but achieved little success. Brant decoying to a feeding or resting flock in Izembek Bay approach at low elevations and pitch into the water without ceremony. There is rarely an opportunity to identify families in flight except when the family flock is by itself. Moreover, Brant movements in Izembek Bay tend to be on such a large scale that groupings of near birds are obscured by those behind.

In Izembek Bay there are no emergent aquatics so the observer has a clear view of flocks resting on the water. Most of our observations were of such flocks, although we often followed identifiable family groups after they flew from the water. We employed good quality, tripod-mounted telescopes from a firm base on the beach. Usually a 20 power eyepiece gave the best results, but occasionally we found a 30 power useful. Wind is the limiting factor in choice of high power lens. We rarely worked in calm, and as motion of the telescope is amplified by the power of the instrument, the choice turned on how much motion could be tolerated. Lighting conditions regulated our ability to identify plumage characteristics accurately, the worst conditions occurring when direct sunlight glared on the water.

Compiling the age group counts is the major enterprise on the Wildlife Range during the time the Brant are present, which this year (1965) was from 1st

September to 15th November. In the final tally we recorded some 34,000 observations, of which these authors compiled almost half. Because these observations entail a goose-by-geese analysis of plumage characteristics, a splendid opportunity was offered to study behaviour.

We set out to look for social groupings, of which the basic unit is the family. Members of family groups fly together, swim and feed together, and defend their bit of space together. Brant arriving from the north were in flocks of family groups and flocks of non-breeders. The age group counts revealed a tendency of non-breeders to reach Izembek Bay earlier than the reproducing adults and juveniles. In the counts prior to 20th September the percentage of juveniles was low, starting at about 10% and rising to the final 22.1%. Though it is not always possible to see the final big influx of birds, the quantitative data of the counts leaves little doubt. By 20th September the population of Brant was disposed in (1) flocks entirely of family groups and (2) flocks almost exclusively of non-productive birds. The family group flocks were relatively small and yielded high counts of juveniles while the non-producers gathered in much larger flocks almost devoid of juveniles (see Table I). The latter exhibited a placid disposition and little social interaction.

The flocks of family groups, however, were easily excitable and quarrelsome. They scrambled into flight at the approach of an airplane as well as an avian predator. The most common of these in Izembek Bay is the Bald Eagle, *Haliaeetus leucocephalus*, the approach of which puts all species of geese to flight. Aircraft have the same effect on Brant as long as the family groups are intact, but later, following family group disintegration, only low flying aircraft disturbed the large amorphous flocks that then form.

Family groups in Izembek Bay are readily distinguishable and offer the classic form of two adults plus one to five juveniles. Four and five young in Brant families are rare indeed, but we do observe such families

Table I. Age group counts of Black Brant in Izembek Bay, Alaska, in 1965.

Date	Adults	Juveniles	Total	% Juveniles
September				
3	190	30	220	13.6
13	1012	232	1244	18.6
14	35	36	71	50.7
15	1316	59	1375	4.2
20	307	177	484	36.5
23	345	232	577	40.2
24	921	310	1231	25.2
27	313	73	386	18.9
28	427	241	668	36.0
29	201	59	260	22.6
30	665	217	882	24.6
October				
4	3320	587	3907	15.0
6	1740	430	2170	19.8
7	1055	317	1372	23.1
8	1456	405	1861	21.7
9	1220	257	1477	17.3
10	2	4	6	Disregarded
13	1966	418	2384	17.5
14	669	276	945	29.2
15	865	313	1178	26.5
18	3052	887	3939	22.5
19	950	283	1233	22.9
20	2738	833	3571	22.2
21	2025	568	2593	21.8
	26790	7244	34034	21.2

occasionally. Single adult families and orphans are unusual because hunting mortality is small to this point. Sometimes a third adult attaches itself to a family group for a short while but this condition is transient. Hanson (1965) suggests that yearling Canada Geese sometimes rejoin the family following hatching of a new brood, but we have no single example of additional permanent adult-plumaged birds with the family group in Brant.

We observed little strife in flocks consisting of two or three family groups, but in the larger aggregations with the enhanced opportunity of invading another family's space, hostile encounters were common. Except in rare cases these encounters seemed purposeful, at first to maintain the integrity of the family group, but later to insure its dissolution. Competition for food does not occur in Izembek Bay. The most extensive eelgrass beds in the world (McRoy, 1965) constitute the food resource of the Izembek Range.

On the order of 16,300 hectares (or 40,260 acres) (McRoy, 1965) these eelgrass beds furnish food for the entire population of Black Brant (currently estimated at about a quarter million), a population of Pintail *Anas acuta* considered to be at least equal in size to that of the Brant, roughly 100,000 Lesser Canada Geese *Branta canadensis parvipes*, and

about 40,000 Emperor Geese *Anser canagicus*. McRoy (1965) has calculated eelgrass utilization by 300,000 geese for 60 days to represent 1.2% of the existing summer standing stock. Hence the birds are never in competition for food.

In the rare cases where hostile encounters seemed purposeless we ascribed the 'bully' role. These were cases of an adult bird (never a juvenile) swaggering through a family-group flock making unprovoked attacks to right and left. Some of these attacks drew hostile rejoinders, but more often the birds just moved out of the 'bully's' way. The senior author observed this type of hostile encounter while attempting to capture Brant in 1952 with a projection net.

Hostile encounters were executed on the water or on land but we have no record of any occurring while the flock was in flight. An attacking bird thrust its head and neck forward and with the bill opened rushed at its opponent. The opened bill suggests that a call accompanied the attack. This may also be an identification posture, since we have noted the apparent hostility-posture employed in situations where it was not directed to an adversary. Instead the posturing bird would receive an answering posture from another bird some distance away, whereupon they would join and go off together. Frequently this was

the means by which a family member regained its group. We also observed this in Lesser Canada Geese when mingled with the Brant.

While the family integrity is maintained there seems to be a role differentiation in the adults. One takes the lead while the other brings up the rear, evidently spurring lagging juveniles to keep with the group. These roles do not appear interchangeable, except when the group is not travelling in a given direction. The flocks as a whole may swim consistently in one direction or 'mill' in one area. In the latter case continuity of observations is difficult to maintain. The Brant feed as they swim, or walk when the eelgrass beds are exposed at low tide. As the fall advances, more and more leaves are sloughed from the plants and these float. The Bay is quite filled with floating eelgrass leaves and many dense mats form. This grass tends to form in windrows along which the Brant swim while feeding. The flock thus strung out offered optimum conditions for our purposes. While observing social behaviour we recorded many of the comfort movements described by Weller (Delacour, 1964). Somersaulting in the water while bathing was one of the more obvious of these, and we repeatedly noted sleeping birds swimming with a feeding flock. They seemed to experience no difficulty in keeping position in the moving flock even though their head was thrust under the closed wing.

We detected no cohesion in flocks without family groups. A flock of adult-plumaged birds arriving together from a flight did not remain together. The average time we could maintain such a group under observation was about 20 minutes. In this time non-family groups merged with the big flock and when they took flight the small flocks were composed of different individuals. We saw many examples of what we considered pairs, and these remained together.

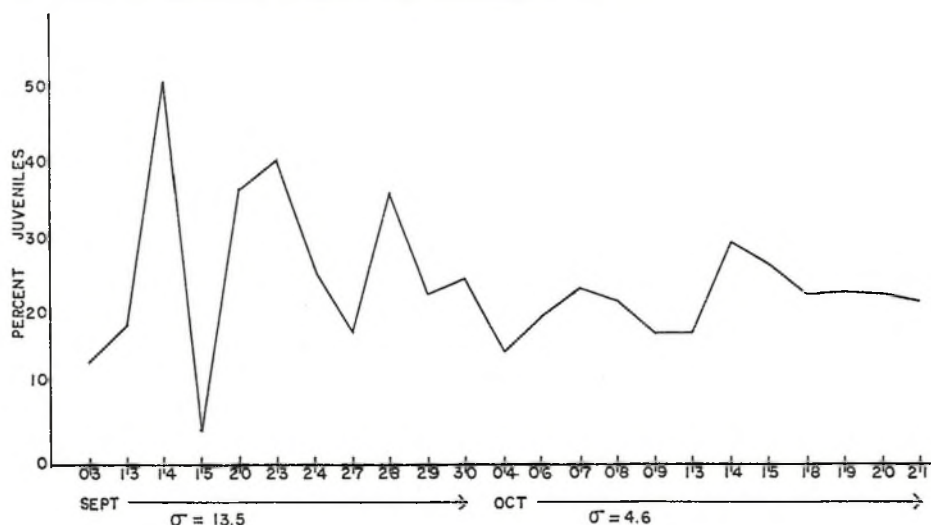
Non-family flocks decoying to a family-group flock did not alight with the latter. In many instances they alighted nearby and swam away but more often, after determining the nature of the flock, flew elsewhere. This trait is quite striking. We observed single birds and small flocks veer sharply off course to decoy to a family-group flock, then veer just as sharply back in the direction they had come. We observed small numbers of family groups associated with the large non-family flocks but these groups were always on the periphery.

In a letter dated 16th November, 1964, T. W. Barry of the Canadian Wildlife Service wrote, 'The banding data (of Brant) seem to show that the young tend to separate out on the wintering ground.' He suggested the process might begin on the Izembek Range. Our observations show that the process does indeed begin here and at least this year was completed before departure of the birds. The southward migration of Brant and Canada Geese from the Izembek Range depends upon atmospheric pressure patterns that develop westerly winds blowing all the way across the Gulf of Alaska. When the birds have accumulated sufficient fat and protein reserves to be ready for the flight, suitable pressure patterns will initiate the migration. The earliest migration recorded since 1948 is 21st October and the latest (this year) is 14th November.

In September, when we made our first observations of family behaviour, we recorded no examples of juveniles unattached to family groups. Between 23rd September and 18th October, the degree of interaction in these flocks clearly increased, and so did the disposition to fly at the approach of an airplane. The increased interaction manifested itself in more frequent hostile encounters, including one involving two entire families. The most common encounters at this time occurred between adults and juveniles. We first regarded this as an action to defend the family space, but an alternative possibility was suggested when it became apparent that the family groups were losing their identity. The possibility is that the parents were themselves forcing the dissolution.

The first unattached juvenile was observed 13th October. On this same date a group of two adults and three juveniles with differing plumage development was noted. One juvenile had a fully developed white neck band, the second had none, and the third showed a band in intermediate development. This we concluded was not a family group which, with the observation of unattached juveniles, suggested that the group structure was changing. The number of unattached juveniles rose from this date until 18th October, by which time the process was essentially complete. As the family groups disappeared there was a decrease in irritability. When the dissolution was complete, the population was disposed in a relatively few very large flocks in which all age groups were represented. In these flocks hostile encounters were rarely observed and the flock was not disturbed by the approach of an airplane.

Figure 1. Percent juvenile Black Brant in age group counts showing changes in flock composition with family disintegration.



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