

INTER-FAMILY DOMINANCE IN CANADA GEESE

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SEVERAL factors combine to make the social habits of geese among the most interesting and complex in bird life: the slowness with which individuals become sexually mature and the resultant age stratification in the population (juveniles, yearlings, nonbreeding adults, and breeding adults); their high degree of gregariousness except during the breeding season; their strong sense of territory or "property rights" (Richdale, 1951); and the persistence and the strong cohesion of the family group from one breeding season to the beginning of the next.

In the course of field studies of Canada Geese (*Branta canadensis interior*) at Horseshoe Lake, Illinois, in 1944 and 1945, a number of observations was made on the social behavior of these geese, particularly of family groups. Some of these observations were based on banded birds of known age and sex, but no real problem was involved when unbanded birds were observed at close range, as it was seldom difficult to distinguish the members of a family group—the juveniles from older birds by their appearance and color of their plumage, body contour, size, and behavior; the adult males from the adult females by their stance, size, and behavior. The observations recorded here are not extensive, but they may offer a new insight into the relationships between goose families. The concept presented needs further testing and clarification, and it is hoped that other workers on geese will deem it worthy of further investigation with marked birds.

Probably under most conditions of nesting in the wild, Canada Goose families seen in the autumn and winter represent pairs and their young of the year, but as so often occurs in nature, important exceptions exist. In Utah and southern Idaho where Canada Geese nest under practically colonial conditions, the integrity of the families is often lost through the combining of several broods which are then cared for by one or two mated pairs (Cecil Williams, pers. comm.). In the Mississippi flyway, family groups of Canada Geese are believed to represent mated pairs together with the original young (Hanson and Smith, 1950). It is not likely that inter-mixing of broods occurs after the young are about a week or more old. While some intermixing of broods of Canada Geese may occur on their Mississippi flyway breeding grounds, the result is the same—small "families" of limited size (nine or less) whether the young belong to the adults or are adopted.

One who has had the opportunity of observing Canada Geese at close range on their wintering grounds will be impressed by the amount of "quarreling" that takes place among the various family groups.

This is particularly evident when there is competition for food—the number and intensity of contacts among families being proportional to the degree of crowding. For example, the artificial manner in which grain is fed on refuges undoubtedly stimulates the frequency and intensity of contacts between families and other groups. The word “contact” is used here as a general term for all frictional encounters between goose families and between families and other age and sex groups. These contacts may consist only of threatening postures by either the gander or the female or by the entire family.

TABLE 1

OBSERVATIONS ON DOMINANCE IN CANADA GESE IN CONTACTS BETWEEN FAMILY GROUPS OF DIFFERENT SIZE AT HORSESHOE LAKE, ILLINOIS

Size of inferior groups	Number of contacts won by dominant families of varying sizes								
	2	3	4	5	6	7	8	9	
1	1	2							
2		1		1					
3		1				1			
4					2	1			
5				1	1	2			
6				1		3	1		
7							1		
8									
9						1			

Posturing in itself by a dominant family may suffice to cow other birds or families away from their path or intended food; on other occasions when posturing alone fails, the ganders may engage in all-out combat which at times is decidedly vicious. When several pairs of ganders are involved in combat at one time, the picture presented is chaotic indeed, it being almost impossible to relate the combatants to their respective families.

For a time it was thought that the apparent body size of the ganders might have at least some influence on the outcome of either “threat contacts” or actual combats, as there is considerable variation in their weight (Elder, 1946) and size (Hanson, 1951); but this theory was found to have little basis in fact, and as Allee (1951: 141) has pointed out “There seems to be little if any correlation between greater weight and position in the peck order.” Instead, detailed observation suggested that the number of individuals in the contesting families constituted an important consideration, a large family generally dominating a family of lesser numbers (Table 1).

The psychic makeup of the ganders leading the family groups is of course important, but it does appear reasonable and certain that the number of members in the family group influences the responses of that

family toward other families. In brief, there appears to be "awareness" that in numbers there is strength, but a more concise interpretation of dominance in goose families might be that the presence of the brood acts as a generalized social releaser for the adults, which assures the continuation of the territory response in the parents through the winter period and that the strength of the stimulus for the territory response, as expressed by relative degrees of dominance, is roughly proportional to the size of the brood.

One striking example of this apparent relationship was observed repeatedly in 1946. A family of eight for several weeks frequented one of the traps; the two adults had been banded in previous years and several of the young just prior to recognition of the family as a whole. Later the remainder of the young were banded, and on one occasion the entire family was trapped. All received large numbered celluloid bands in addition to the regular aluminum bands; in the case of the young the bands were colored to denote they were birds of the year. On several occasions when part of the family was trapped in the evening, moved to another part of the refuge, held overnight, and released the next morning, these individuals would again be seen reunited with the remainder of the family the second evening at the original trapping site. They constituted the largest family frequenting the baited area about the trap, and wherever they moved all other geese gave ground without opposing them. A number of times they were observed 75 yards from the trap but definitely headed for it. On these occasions they were seen to make a hurried, direct, purposeful approach and several times when still 50 yards away the entire family came on at "dead run," all with open bills and outstretched necks, and the gander leading, the others stretched out on either side. Many yards before this formidable charging phalanx reached the baited area, the geese already there retreated without contesting the field. The large family seemed instinctively and unhesitatingly to realize its dominance over other families and miscellaneous aggregations; the latter in turn also appeared to recognize this dominance.

Jenkins (1944: 35) was the first to describe the moving and feeding territories so evident in goose flocks. As he has so appropriately pointed out, a "well-integrated family might be called a family supra-organism, since it performs the activities of a larger, more complex individual through coordination of its components. This results in the dominance of the family, which is survival value to its members . . ." When hunted by man, however, it has been shown (Hanson and Smith, 1950) that such intra-family dependence is not always of survival value.

There is much yet to be learned about the hierarchy among the families and other age and sex groups. Observations at hand indicate that the families are dominant to any other type of aggregation of these geese. For example, citing directly from field notes: "Nov. 13, a family of seven, four of which are banded, take possession of a small waterhole with a rush, scattering eight other geese. These appeared to be pairs and miscellaneous singles. Nov. 5, a family of three drives five other birds, but all of the latter appear to be yearlings or adults." Paired adults are probably next in the hierarchy to families; unmated adults (birds two and one half years and older) and yearlings (birds about 18 months old) may not differ greatly in their social position. Yearling birds sometimes appear to be almost as aggressive as many older single adults. A juvenile will threaten most other geese when it is a part of a family group; when alone or without their parents, juveniles appear to rank lowest of all age groups. According to Armstrong (1947) Lorenz found that in flocks of Grey-Lag Geese, *Anser anser*, the female attains the social rank of her mate and, indeed it may be added that in the case of Canada Goose pairs, so do the young of the year that accompany them.

Allee (1951: 152) has written, "The survival value of high position in the social hierarchy has not been demonstrated, but there are many reasons for suspecting that it may be felt in times of famine or during other periods of environmental stress." In the case of Canada Geese, it can hardly be doubted that the larger, more aggressive, dominant families are more secure when food is scarce and concentrated than are inferior groups. This would be particularly true in the case of the juveniles of dominant families; the adults, especially the ganders, spend much of their time and energy standing guard and vigorously chasing off the competing groups and individuals.

Noble (1939) has distinguished between sexual and social dominance, the former being a largely non-discriminatory emotional behavior, the latter being highly discriminatory and involving identification of actual individuals and relating them with their social status. Dominant behavior of goose families would appear to be related chiefly to "sexual dominance" rather than to social dominance, the aggressive behavior of the ganders with families being not discriminatory as to individuals, but directed toward all other groups of geese in general. Furthermore, in view of the important rôle psychic influences play in the reproductive cycles of birds, it would not be surprising if the "hormonal level" of the pairs with broods were to prove to be higher through the winter period than in the case of unmated geese or pairs without broods. This could very well be a result of the psychic stimulus received from the presence of their broods.

In conclusion, it should be emphasized that these general relationships appear to hold true for the autumn and winter period. At the onset of gonadal recrudescence in adults and the gradual attainment of sexual maturity in the young adults, a general realignment of the social structure in the population is to be expected. On warm days in late February and March, the geese at Horseshoe Lake exhibit an increased tendency to flock, and the large, unusually noisy assemblages of birds around the various ponds, relatively indifferent to food, are probably the outward manifestation of this realignment. Interest of the parents in their young of the year is diminishing by then and pairing by the newly sexually active adults is assumed to be taking place as well as the re-pairing of some of the older adults that have lost mates. There is considerable indirect evidence that pairing takes place chiefly on the wintering grounds or at least in the earlier stages of spring migration as the Indians on the breeding grounds state that the breeding birds are paired on arrival; this statement is also in accord with authorities who have witnessed the arrival of other species of geese on their breeding grounds. Also, the shortness of the breeding season in the far north would almost necessitate advance pairing.

The observations and conclusions reported here were discussed with Peter Scott in 1949. Since that time extensive studies involving thousands of observations of the social relationships of the white-fronted goose have been carried out by the staff of the Severn Wildfowl Trust. Scott (pers. comm., 1952) reports that their studies substantially confirm the concept advanced here.

SUMMARY

It was observed that a peck-order system exists among the Canada Goose families wintering at Horseshoe Lake, Illinois. The limited number of observations available have further indicated that the main factor influencing dominance among Canada Goose families containing different numbers of individuals is simple superiority of numbers.

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