

discussed here nor to the cases of *Campochaera sloetii* and *Coracina montana* discussed previously (Diamond and Terborgh, *ibid.*). Second, the occurrence and form of duetting in *Philemon novaeguineae* and in the previously discussed example of *Pitohui kirhocephalus* is subject to marked geographical variation. Finally, some bird families seem predisposed to the development of duetting, which has arisen in the southwest Pacific in at least two genera of campephagids (*Campochaera*, *Coracina*), three genera of rails (*Rallus*, *Amaurornis*, *Gallirallus*), and four or five genera of meliphagids (*Melidectes*, *Foulehaio*, *Gymnomyza*, *Philemon*, and possibly *Anthornis*).

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Birds nesting at the Kazan Falls.—While engaged in the Canadian Wildlife Service's study of the causes of mortality of barren-ground caribou calves we visited the Kazan Falls (63° 43' N, 95° 46' W), District of Keewatin, N.W.T. on 7, 8, and 14 July 1970 and recorded avian nesting activities at the falls. The river flows through a narrow rock-walled gorge for about 1 km dropping about 17 m. The walls rise vertically about 8 m to 12 m above the river. The rock surfaces of the surrounding cliffs are broken into angular blocks with most fractures occurring at 30- to 60-cm intervals. The surrounding area is one of low relief barren lands.

Five species of birds nested at the Kazan Falls during July 1970: Lesser Snow Goose (*Anser caerulescens*), 21 nests; Canada Goose (*Branta canadensis*), 1 nest; Peregrine Falcon (*Falco peregrinus*), 1 nest; Rough-legged Hawk (*Buteo lagopus*), 1 nest; and Herring Gull (*Larus argentatus*), 15 nests.

Lesser Snow Goose.—We were able to measure the nests' heights above the water and the shortest distance from their centers to the edge of the cliff (Table 1) on only eight nests. The other 13 nests were similarly located along the rimrock. Some nests were on sites vegetated by lichens or grasses and forbs, while several nests were on bare rock. The geese did not have to carry nesting materials for more than 2 m or 3 m to the rock depressions.

TABLE 1
LINEAR MEASUREMENTS FOR THE POSITIONS OF EIGHT LESSER
SNOW GOOSE NESTS ON THE KAZAN FALLS

Height of nest above water	Distance to edge of cliff from center of nest
9.61 m	1.20 m
8.55	0.44
8.35	0.85
8.00	0.98
7.87	1.35
7.71	0.66
7.50	0.70
7.30	0.44

TABLE 2
 LESSER SNOW GOOSE NESTING ACTIVITIES AT THE KAZAN FALLS,
 DISTRICT OF KEEWATIN, NORTHWEST TERRITORIES, JULY 1970

	Breeding pairs					
	White × white		White × blue		Blue × blue	
North side	2 ¹	(0) 2	4	(0) 0	5	(1) 0
	5	(2) 0	5	(3) 0	0	(0) 3
	2	(2) 1	5	(0) 0		
	4	(0) 0				
	3	(0) 0				
	4	(0) 0				
Subtotals	20	(4) 3	14	(3) 0	5	(1) 3
South side	4	(0) 0	0	(0) 4	0	(0) 0
	5	(1) 0	2	(0) 4		
	1	(0) 4	5	(0) 0		
	0	(0) 0				
	5	(0) 0				
	0	(0) 3				
Subtotals	15	(1) 7	7	(0) 8	0	(0) 0
TOTALS	35	(5) 10	21	(3) 8	5	(1) 3

¹The three columns show number of eggs, (number of eggs being pipped), and number of goslings in nest, respectively.

On 7 and 8 July the geese were nonrandomly distributed by numbers of breeding pairs and by color phases between the north and south sides of the falls (Table 2). There were 11 pairs of snow geese on the north side and 10 pairs of snow geese (1 pair of Canada Geese) on the south side. Nests were distributed as follows: 6 white × white, 3 white × blue, 2 blue × blue on the north side and 6 white × white, 3 white × blue, 1 blue × blue on the south side. As there were 30 white phase birds and only 12 blue phase birds, the color phase combinations of breeders supports the hypothesis that the choice of mates by color phase was also a nonrandom act (Cooch and Beardmore, *Nature*, 183: 1833, 1959). Cooke and Cooch (*Evolution*, 22: 289, 1968) suggest that assortative matings of snow geese are the result of some imprinting mechanism, males selecting mates with plumage patterns similar to those of one of their parents.

The 21 pairs of snow geese produced a total of 92 eggs. The production of the white × white and white × blue breeding pairs slightly exceeded their rate of occurrence, while production by the blue × blue pairs was two-fifths below their rate of occurrence at the falls. Average production was 4.6 eggs for a white breeding pair, 4.8 eggs for each mixed pair, and only 2.7 eggs for each blue pair. The most frequent clutch size was 5 eggs (8 out of 21). Assuming equal survival rates for the three types of breeding pairs, at the 1970 rate of egg production (55 eggs white × white, 29 eggs white × blue, and 8 eggs blue × blue) the proportion of blue phase birds (40 percent in 1970) could be maintained only if all the eggs of mixed pairs produced blue phase goslings. This is not likely, as the findings of Cooke and Cooch (1968) suggest that a maximum of about two-thirds blue morphs should be expected.

When we returned to the falls 14 July 1970, strong winds and driving rains hindered our movements on the cliffs. All the geese had hatched and had left the cliffs—we saw not a single goose, adult or young, in the area. The goose nests were greatly weathered and little evidence remained that geese had nested there that season.

Canada Goose.—The solitary nest was located on a rock prominence on the south side of the head of the falls. It contained three eggs and the shell remains of a fourth egg were lying beside the nest. The closest Lesser Snow nest was about 200 m downstream, and the Canada Goose nest was situated precariously close to the gull colony. We found isolated nesting Canada Geese scattered between the Kazan Falls and Chesterfield Inlet to the northeast. The geese often nested several centimeters above the water on rock ledges or on small hummocks in pothole lakes.

Peregrine Falcon.—The single nest was on the north side about 5 m above the water and 3 m below the rim of the cliff. On 7 July it contained the three downy young; on 14 July they were well fledged.

The only encounters noted between Peregrines and snow geese seemed to be caused by our presence. When we disturbed nesting geese and they flew on a direct line to the Peregrine nest the adult falcons dove at them. The geese responded by honking loudly and rapidly and accelerating their wing beats. Surprisingly the geese seldom veered from their line of flight, the Peregrines never made any obvious attempt to strike the geese, and we found no goose remains along the cliffs. The many ptarmigan (*Lagopus* sp.) sternums and feathers on the rims of the cliffs showed what food the falcons preferred.

Rough-legged Hawk.—A pair of Rough-legged Hawks patrolled the air over the upstream section of the gorge. Their nest was on the south side below overhanging rocks that hid its contents from view.

Herring Gull.—On the rock island at the head of the falls were 13 Herring Gull nests, and we counted 64 gulls present. One gull nest was on a rock outcrop in the fast water above the falls. The only nest on a nonisland site was on the north bank; it contained two eggs and one downy young.

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Bigamy in the Bewick's Wren?—Attempts to discern the evolutionary strategies of avian mating systems are limited by the inadequate information on the life histories of most species (Verner and Willson, *Ornithol. Monogr.*, 9:1-76, 1969). One such species is the Bewick's Wren (*Thryomanes bewickii*). Although Verner and Willson (op. cit.) consider this wren "normally monogamous," my studies indicate that polygyny may occur.

During the 1969 and 1970 breeding seasons, at least 9 of 38 territorial males (24 per cent) that I studied at the William L. Finley National Wildlife Refuge near Corvallis, Oregon, were unpaired. Further, most of these unpaired males occupied territories that appeared inferior to the territories of breeding males. This condition is found in many populations of polygynous passerines; for example, Kendeigh found that 28 to 35 per cent of the male House Wrens (*Troglodytes aedon*) he studied were unpaired (*Illinois Biol. Monogr.*, 18: 1-120, 1941). Unpaired males here also appeared to occupy marginal habitat. However, unmated males are also