WATERFOWL AT COLD BAY, ALASKA, WITH NOTES ON THE DISPLAY OF THE BLACK SCOTER

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IN 1958, it was my good fortune to spend April and May in the area of Cold Bay, near the tip of the Alaska Peninsula, studying waterfowl. For the waterfowl enthusiast, Alaska will always hold a special fascination. This is the home of the Emperor Goose (*Anser canagicus*), the Pacific Brant (*Branta bernicla orientalis*), the Spectacled Eider (*Somateria fischeri*) and Steller's Eider (*S. stelleri*)—birds which relatively few ornithologists have seen in the wild but which are familiar to many through the writings of Brandt (1943), Bailey (1948) and most recently Fisher and Peterson (1955).

The main object of this expedition was to investigate the spring behaviour of Steller's Eider and of the Pacific Eider (*Somateria mollissima v-nigra*), and if possible to see something of King Eider and Spectacled Eider as well. I was particularly interested in the hostile and sexual behaviour which occurs before breeding and for this reason a centre for wintering birds was chosen in the belief that much of the pair-formation and related activities would occur before the birds moved to their breeding places. Cold Bay proved to be an ideal headquarters for these studies and during April I was able to watch large numbers of wintering Steller's on Izembek Bay; in May I camped in the middle of a large colony of Pacific Eiders at Nelson Lagoon when breeding was about to begin. My observations on these two species are being incorporated in a detailed analysis of Eider displays, not yet completed. Here I provide a record of the waterfowl species seen and report in detail on the displays of the Black Scoter (*Melanitta nigra americana*).

Waterfowl at Cold Bay and Nelson Lagoon

I arrived at Cold Bay on March 31—a sunny, crisp day which came as a pleasant surprise after warnings about the most miserable climate on earth. However, it was not many days before I was convinced that everyone was right. Robert D. Jones, the U.S. Fish and Wildlife Service Refuge Manager for the Aleutians, met me at the plane and took me to the comfortable house which serves as Refuge Headquarters. During the next few weeks, Bob showed me the best places for finding the birds I wanted to watch, and with his guidance and help I was able to see much more than I would have done by exploring on my own.

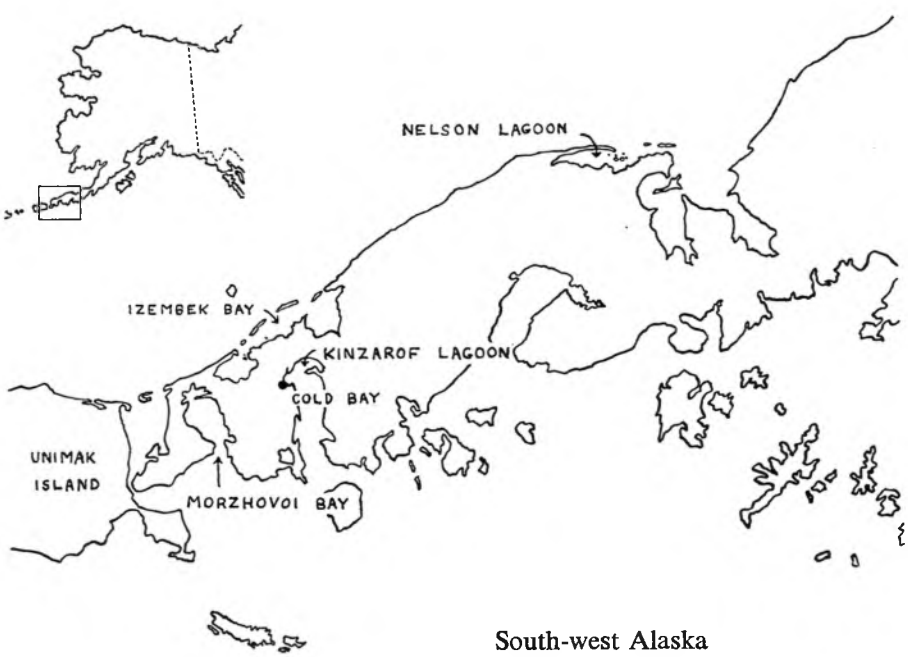
Cold Bay is undoubtedly one of the finest centres for seeing large numbers and great variety of wintering waterfowl. This is mainly due to the availability of several different types of habitat. The inlet of Cold Bay itself is on the south side of the Peninsula, providing a wild landscape of rocky shores and cliffs, rising steeply to volcanic peaks of 5,000 feet and more, which fringe the horizon to east and west. In early April, the deep waters off these shores were dotted with great flocks of Oldsquaw (*Clangula hyemalis*), Black Scoter and King Eider (*Someteria spectabilis*), and there were a few Surf Scoters (*Melanitta perspicillata*) and Pacific Eiders as well. By the end of April, almost all the Oldsquaws, White-winged Scoters (*Melanitta fusca dixoni*) and King Eiders had left the area but there were good numbers of

Red-breasted Merganser (*Mergus serrator*) and Black Scoter remaining. All around the rocky shores of Cold Bay, Harlequin Duck (*Histrionicus histrionicus pacificus*) were common, in pairs or in flocks of up to 40 birds.

At the north end of the bay, Kinzarof Lagoon provides a series of shallow, sheltered water areas which were favourite haunts of Whistling Swans (*Cygnus columbianus columbianus*), Greater Scaup (*Aythya marila mariloides*) and small numbers of dabbling ducks, including Mallard (*Anas platyrhynchos*), Pintail (*Anas acuta acuta*), Green-winged Teal (*Anas crecca carolinensis*), Gadwall (*Anas s. strepera*) and Shoveler (*Anas clypeata*). On April 29, Bob Jones and I watched a flock of 60 Whistling Swans on a small lake by the Lagoon. This probably represented a gathering of recently-arrived birds, as the flock dwindled during the next few days and pairs were seen flying out to the isolation of their breeding ranges widely scattered on the small lakes of the region.

The small tundra ponds and lakes of the northern side of the Peninsula itself provided breeding grounds for a few pairs of Mallard, Pintail, Black Scoters and Whistling Swans, but the commonest bird here was the Greater Scaup. Surprisingly, there were a few Bufflehead (*Bucephala albeola*) and I saw one American Goldeneye (*Bucephala clangula americana*) here too, though they must have been a long way from any suitable breeding grounds.

The main feature of the north coast of the Peninsula in this area is Izembek Bay—a shallow lagoon, 20 miles long and about 3 to 5 miles wide. At low tide the whole bay becomes transformed into a complex network of channels and exposed mudbars. Here is one of the great areas for Eelgrass (*Zostera*) and because of this it is perhaps the most important stopping place, mainly in April and September, for Pacific Brant on their migrations to and from the breeding grounds on the Alaska mainland. As Hansen and Nelson



South-west Alaska

(1957) have pointed out: "A unique opportunity, if weather ever permits, is available in September at Cold Bay to census a major portion of the Pacific Flyway Brant in one concentration by means of aerial photography."

Migrating Brant were seen on many days during April and the first week in May as they flew north up the inlet of Cold Bay and made the short land crossing to Izembek. Flocks of 20 to 100 birds were commonest, but I saw one group which included only 7 birds. As they made their way up Cold Bay, the Brant flew quite low—at most, a few hundred feet above the water. Occasionally flocks alighted at Kinzarof Lagoon, but mostly they continued on to Izembek. The strong tendency for these birds to keep over water was obvious from their behaviour when confronted with the land crossing of about 10 miles. One flock was seen to turn back several times, towering to a great height before finally going on. This aversion to flying over land was also noted by Littlejohn (quoted in Bent, 1925) who observed a similar northward flight up Morzhovoi Bay—the deep inlet west of Cold Bay. Presumably these birds were also on their way to Izembek Bay.

Izembek Bay is also a very important area for two other species—the Emperor Goose and Steller's Eider. Both species winter here in large numbers On April 10, in the course of a 30 mile boat trip, we saw about 15 large flocks of Steller's, varying in size from 1000 to several thousand birds. We estimated that there were at least 20,000 Steller's in Izembek.

I spent the period from March 31 to May 10 in these areas, concentrating most of the time on the Steller's Eiders in Izembek Bay. From May 10 to May 29, I lived at Nelson Lagoon, about 75 miles north-east of Cold Bay, on the Bering Sea coast. The main features of Nelson Lagoon are a long sandy spit which provides protection from the Bering Sea and a chain of small islands which are the nesting grounds for several thousand Pacific Eiders, as well as other sea birds. A few pairs of Gadwall were breeding on the islands, courting parties of Black Scoters were seen several times, and one pair of Red-breasted Mergansers and a few late Oldsquaws were noted also. Several thousand Steller's Eiders remained in the area in May. They were apparently non-breeders and the flocks were composed largely of brown, first-year birds with a sprinkling of males in adult plumage. The great flocks of Steller's had left Izembek Bay on April 29, and after this date only a few non-breeders remained there.

When I arrived at Nelson Lagoon, large numbers of Emperor Geese were still to be seen. By the 29th, they had almost all left. On May 18th, I was lucky to see a small group depart on their migration. The geese flew directly over me and I followed them with binoculars until they disappeared out over the Baring Sea to the north. As they flew away from me, it was obvious that the group was composed of several family parties and pairs. Some birds hesitated and circled as they passed over the north shore of the sand spit, but then they went on, rising steadily to a great height. If they continued on the same course, they would have reached the mainland of Alaska after a journey of about 200 miles across Bristol Bay.

As this observation shows, at least some Emperor Geese remain together in family parties until they set out in the spring migration to the breeding grounds. It was possible to pick out these units in all the flocks which were seen during April and May. Aggressive and sexual behaviour was also noted

to occur on the wintering grounds. On April 10, at Izembek Bay, I saw a prolonged fight between two Emperors as they stood breast to breast on a mud-bar among other geese, while on May 11 at Nelson Lagoon a pair was observed making pre-copulatory neck-dipping movements.

I did not have similar opportunities to observe the behaviour of Brant. These birds kept well off-shore and were very shy. However, one behaviour pattern was seen on many occasions from a distance, whenever a Bald Eagle (*Haliaetus leucocephalus*) or Gyrfalcon (*Falco rusticolus*) caused a flock to fly up and circle. Almost every time this happened, I noticed one or more groups of three geese involved in a chase. The chase appeared to consist of one bird pursuing another with a third bird following closely behind In one instance, four geese were involved. I can only guess that this chase is connected with the process of pair-formation. Superficially the chase resembles the well-known flights involving three birds which Hochbaum (1944) described as part of the territorial behaviour of the Mallard and other dabbling ducks on the breeding grounds. However, the Brant were flocked, on the wintering grounds, and there was no relationship of the flight to a specific area. Further study will be needed to determine the significance of these pursuits.

Black Scoter Display

One of the commonest waterfowl and one which I was able to watch both at Cold Bay and at Nelson Lagoon was the Black Scoter (*Melanitta nigra americana*). Since little has been written on the behaviour of this bird, I was glad to have several opportunities of watching the display, and at Nelson Lagoon I was fortunate to obtain movies of a courting party. Phillips (1926), in the section on display of the Black Scoter, quotes from accounts by Brewster and Brooks, and a number of the postures are briefly described. Gunn (1927) gave a fuller description for the European race (*M. n. nigra*), while most recently Humphrey (1957) has carefully described and figured certain displays of Alaskan birds. Since my notes add considerably to these accounts, I will give a digested summary of the behaviour which I saw and filmed, though this account must be considered preliminary and further study will be needed to complete a catalogue of the display postures and to achieve an understanding of their significance.

At the three places where I did most Scoter watching, there was a conspicuous preponderance of males. Pairs could be identified, but most birds were in small flocks which frequently resolved themslves into one or more courting parties. At times displays were seen when two males swam beside a female, but more often the group contained 5 to 8 males and one female.

Attention is drawn to courting parties from a considerable distance by the very frequent, mournful "*wheeuu*" *calls* given by the males. A bird giving these whistles may be seen to open the bill with a conspicuous drop of the lower mandible, and the bill remains open for several seconds.

While following the female, calling, and performing displays, the males adopt a very erect posture which involves a lowering of the rear part of the body and a raising of the tail. The intensity of this erect posture may vary, but in the most exaggerated form the tail is cocked up an angle of about 45°.

In courting parties I identified the following displays of the males:

Head-shaking. The male's most frequent movement. The lateral shaking of the head is very deliberate. Although this activity is common in displaying ducks of many species I have not watched any in which this display is so noticeable. There is a strong tendency for a head-shake to be given just after the bird calls. A shake is usually given at the end of a Low Rush (see below). In this case, the movement is probably functional in shaking water from the head. The female also head-shakes from time to time. I believe that this is associated with threatening movements towards males.

Low Rush. (The name used by Gunn; called by Humphrey " Forward Rush "). The bird suddenly begins to paddle vigorously, lowering the head as the body starts to move forward, and rushes over the surface of the water for a distance of 3 or 4 feet, churning up a great spray as it does so. At the peak of the rush, the head and neck are level with the surface. The bird comes to a halt abruptly amid a shower of spray, and usually head-shakes at the same moment. This display was very frequent, and it was seen on every occasion that a courting party was watched for any length of time. The position of the bird performing, in relation to the other birds, was variable. Sometimes it was done by a bird at the rear of the group apparently as a method of " catching up " with the female and the centre of display activity. At other times, it was performed alongside the female, and parallel to the direction in which she was swimming. It was also seen to be performed in front of the female and away from her. Only once did I see the Low Rush used as an overt attack by one male on another.

Shake. This movement, which appears identical with the comfort displaying males. The bird rises briefly on the water, the wings not opened, and a shaking movement passes over the body ending in a striking forward twitch of the head, which seems to be peculiar to scoters, as it is absent in the shake of most other wildfowl. Once a Shake was noted to follow a Low Rush.

Wing-flap. This common activity appears to be identical with the comfort movement of rising from the water, opening the wings, flapping them several times, and subsiding again on the water. As in the Shake, Scoters finish this movement with a striking forward twitch of the head, and this is given also by females. Gunn considered this to be " the most effective and curious display " and he named it " the Obeisance." I would rather consider the Wing-flap as a comfort movement which is used during display, and although it may well have signal function it does not appear to have been modified during the course of evolution to serve this end.

Preen. On seven occasions, a male was seen to give a Low Rush and immediately afterward he performed head movements which resembled preening. In most cases, the movement was so rapid and confused by flying spray that I could not be sure if it was indeed a preening movement. However, a film of one sequence clearly shows the bird nibbling at the feathers in the region of the shoulder or side of the breast. To summarize my notes on these seven sequences, I detected the following:

Low Rush followed by posture with head bent forward ...	3 times
Low Rush followed by probable preen on breast ...	twice
Low Rush followed by preen on back	once
Low Rush followed by preen on shoulder or side of breast	once

The occurrence of preening movements during display is well-known from the studies of Lorenz (1953) on Anatini, and I have found these movements to be widespread in Anatidae (McKinney, 1953). In this case, the preening does not appear to be constantly and rigidly directed toward the same part of the plumage as it is in many species of duck.

Short Flight. I saw about 20 Short Flights and this is undoubtedly a common display. The male takes off and flies about 4 to 8 feet; at the peak of the flight the bird is just clearing the surface of the water. At the moment of alighting, the feet are suddenly extended forward and the bird " puts on the brakes " very hard, at the same time pulling back the head, so that an upright posture is assumed as the first spray begins to fly. Immediately after the first contact with the water, the head goes forward again and the bird continues at a good speed in a Low Rush.

On one occasion, I filmed a " flight " in which the male used his wings but did not take off from the water. This resulted in a " flapping rush " resembling the dashing and diving which is well-known as an accompaniment to bathing in waterfowl. I do not know if this performance should be considered as an aberrant Short Flight or whether it is a distinct display which occurs rarely.

Most often Short Flights seem to be performed ahead of the main courting party. The flight carries the bird in front of the others or at least on a level with the leading birds. If the bird alights well ahead of the party he may turn round and swim back. Once I saw one male chase another repeatedly and the bird which was retreating did so by performing three Short Flights in succession. In most cases there was no obvious stimulus prompting a male to make a Short Flight. At times, two males would perform a flight almost simultaneously, but these were not instances of direct attack or escape.

Similar display flights are important elements in the performances of other waterfowl. The Short Flights of Bufflehead, American Goldeneye and Steller's Eider are quite similar and may well be homologous behaviour patterns.

Steaming. On examining the movie film of displaying Scoters, I detected a posture which seems to be separable as a distinct display component. After the " flapping rush " described above, the male involved and two nearby males adopted this posture briefly. The bird is half erect in the water, with the head held high and drawn back slightly; the breast is prominent in front. This may be what Gunn called the " High Rush " or it may be equivalent to the " chesty " attitude which he describes as being given by a male after the Short Flight as he swims back toward the female.

Tail-Snap. The sudden erection of the tail " over the back at a seemingly impossible angle " (Gunn) or " to the vertical . . . . or angled slightly over the back " (Humphrey) was seen clearly only three times. This may have been due to the difficulty of seeing the action when the birds were swimming in rough water. The one case on which my notes are most complete involved a male displaying beside a female with only another pair nearby. This male performed the sequence of calling with conspicuously open bill, suddenly erecting the tail, performing a Low Rush and then apparently preening on the breast immediately after completing the Rush. The Tail-snaps seen by Humphrey were given by a male displaying alone to a female.

Further observations will be needed to determine if this display is characteristic of the courting party situation or if it is more typical of the situation where a male displays alone beside a female.

Bowing. I saw very little of this activity, described by Humphrey. In one case it shows clearly in the movie, as a single forward and back movement of the head and neck, quite like an exaggerated swimming action and as Humphrey points out " very similar to that used by both sexes when disturbed or curious." In the movie, it was given by a male which was swimming quite close to the female, in the presence of another male.

Chasing. Overt aggression in the form of chasing and fighting was infrequent, as Gunn found when watching the European race. I saw a few chases where one male rushed across the water after another, but perhaps in this species, dominance relations among the males are settled without much direct contact. Often slight intention movements of chasing by one male were eonugh to make another male swim off a little way.

Behaviour of the female. The female is the focal point of the courting party and as she changes direction the males alter their course accordingly. She frequently makes threatening movements toward some of the males, turning her head toward the male in question and pointing the bill slightly upward. In more vigorous threat, the head is lowered to point directly across the water at the other bird. At times the female swims with the tail partly erect and she also gives head-shakes.

Copulation. I saw copulation only once, and I did not see the whole sequence of events which preceded mounting. The birds were noticed as the male performed a shake beside the female who had her head stretched forward above the water. He then mounted and copulation occurred. There cannot have been prolonged pre-copulatory display by the male in this case, as I had been watching the pair shortly before. After dismounting, the male adopted an erect posture and gave the whistling call several times.

Conclusions. These observations are not sufficiently detailed to provide much evidence on the motivation and function of the displays. They are presented mainly to provide a basis for comparison with other species so that attempts can be made to define homologous behaviour patterns.

Further studies are needed on the Black Scoter and on the related species which are grouped in the tribe *Mergini* (the other Scoters, Goldeneyes, Bufflehead, Oldsquaw, and Mergansers). The Eiders were formerly included in the *Mergini* (see Delacour and Mayr, 1945; Scott, 1949) but recently Humphrey (1958) has suggested that they are more closely related to *Anas* than to the *Mergini,* and Scott (1957) adopted this arrangement in the " Coloured Key to the Wildfowl of the World." I believe that the problem of the relationships of the Eiders, and of the *Mergini* group as a whole, remains to be settled and a comparison of displays will certainly throw light on this subject. Delacour and Mayr (1945) have shown how behaviour patterns can be used as taxonomic characters in the Anatidae, while Lorenz (1941, 1953) used displays to determine relationships within the *Anatini.*

A detailed discussion of the relationships of the *Mergini* based on the evidence from displays would be premature at this time. Knowledge of many species is fragmentary, though several studies are in progress in North

America which will help to fill some of the gaps. Until we know for sure which species have and which do not have the various displays, and until our background knowledge of the significance of the displays themselves is devoloped, it will be difficult to establish homologies with confidence. When accurate and detailed descriptions of displays are available for many species, then we will be in a better position to synthesize and generalize.

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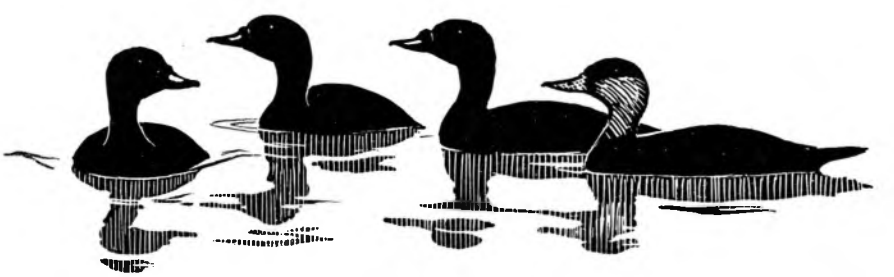

Black Scoters

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