

OBSERVATIONS ON DISPLAY AND OTHER FORMS  
OF BEHAVIOR OF CERTAIN ARCTIC BIRDS

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THE following observations are based on a stay of nearly three months, May 10 to July 29, 1953, in the Sach's Harbour area of Banks Island (72° N., 125° W.) in the western Canadian Arctic. Distributional and ecological observations made during this period have been published elsewhere (Manning, Höhn, and McPherson, 1956). Manning covered most of Banks Island in 1952 and 1953, but a few observations on behavior made by Manning on Banks Island are included here. Some notes based on my observations in the summer of 1949 in the Mackenzie Delta region are also included.

Although observations on behavior were one of the principal objectives of my stay on Banks Island, I saw disappointingly little bird display. Possible explanations were the unusually late spring and poor weather. There were few sunny days, and even they were very windy. Another possible adverse factor was that since I lived with an eskimo family except when away from Sach's Harbour on short trips, I was forced to adopt their daily routine, which meant staying up till 2:00 A.M. and sleeping till 10:00 A.M. In temperate regions it is well known that bird display is most marked in the early morning, a period which I usually missed. I attempted to make up for this by going out at 2:00 A.M. on June 10 at Cape Kellet and found Ruddy Turnstones still asleep at 2:30 A.M. and Lapland Longspurs not commencing their song till 3:00 A.M. In spite of the rather fragmentary nature of my observations they seem to add a fair amount of new material.

The locality of the observations recorded below is southeastern Banks Island and the year 1953; for observations made elsewhere locality and full date are given.

RED-THROATED LOON (*Gavia stellata*).—Distraction display: A striking form of distraction display was shown on July 26, 1949, by one member of a pair on a small pool on Richard's Island, Mackenzie Delta. While I was searching the shores for a nest, which was not found, both birds swam off stealthily towards the opposite side of the pool. One of them then flew up and making straight for me plunged under water from a height of about 6 feet when a few yards away. It surfaced near its mate and again flew towards me, but this time landed on the surface and swam off, keeping the wing towards me raised and half extended. The usual "ka ka ka kwaoo" call accompanied both these short flights.

BLACK BRANT (*Branta nigricans*).—Aggressive display: A brant, the nest of which was being robbed by a Glaucous Gull, approached the gull swimming with neck extended low along the surface of the water, June 13.

WHITE-FRONTED GOOSE (*Anser albifrons*).—Fear reaction: On August 1, 1949, when our float plane was about to land on one of the lakes at the mouth of the Anderson River where some hundreds of White-fronted Geese nest, one bird flying towards the plane suddenly plunged under water from a height of about 15 feet when it perceived the plane.

LESSER SNOW GOOSE (*Chen hyperborea*).—I saw no Snow Geese on Banks Island until May 18 and passage was not heavy till May 27, yet a visit to the large nesting colony about 36 miles northeast of Sach's Harbour revealed many nests with eggs (clutches up to 5) on May 31. It may be inferred that prenuptial display and mating took place mainly during the spring migration or even in the wintering grounds just before departure. No display was seen in many feeding flocks observed in the Sach's Harbour area. On a visit to the breeding colony May 31 to June 2, a certain amount of mutual display among the members of various pairs was seen, the birds facing one another and waving the raised head about with open bill. One coition or attempted coition was seen. It was conducted so vigorously on the part of the presumed male that at first I took it to be a fight. The (presumed) female lay prone with extended neck flat on the ground. The male repeatedly walked up to the female, grabbed her on the back of the neck with an apparently very violent blow and attempted to mount with flapping wings. After some seconds only he came off and repeated these maneuvers for 5 to 10 minutes. It seemed to me that coition was not achieved in any of his efforts. Other geese were all around at distances of only a few feet and made no attempts to interfere, nevertheless the mating male once chased off another goose.

OLD SQUAW (*Clangula hyemalis*).—The display call of the male has been rendered by various others. I would render it as "Ä äoonwoo" or "ä äoonwä"; the name given to the bird by the Dogrib Indians of Great Slave Lake "ä äonwa" is a good rendering of the call although they also use "a aonlik" as its name.

PACIFIC EIDER (*Somateria mollissima v-nigra*).—The courtship of this species does not seem to have been described. I observed a group in display on July 10 through a telescope. The gestures were as described for the American Eider in Bent (1925), owing to distance accompanying calls could not be made out.

KING EIDER (*Somateria spectabilis*).—Courtship display: W. S. Brooks quoted by Bent (1925) gives a very brief description of the display of this species. The mating call consists as described by Brooks of three not very distinct phrases rendered by him as “urrr urrr urrr” and by Soper (1946) as “how it who who,” and which I would render as “brooo rroo rrooo.” The note is soft and, as described by Soper (*op. cit.*), dove-like in quality; it is highly reminiscent of the rookooing of the Black Grouse (*Lyrurus tetrix*). I had close views of the display of a group of six males to one female all perched on the floe edge off Cape Kellet on June 10. The female merely repeatedly dipped her head and then flung it up or kept the nearest male off by stretching her head towards it with partly open beak. The males standing on the ice executed a rapid shaking of the whole body, throwing the head up vertically or raising the head more slowly till the bill pointed vertically upwards. At other times the head was rotated horizontally presenting each side view alternately to the female. Most often, with the creamy breast puffed up and the bill resting on it, a sort of gulping forward motion of the head was executed in which the bill was further retracted while the back of the head was raised and moved forward. The display was seen on the water on June 16; again several males were grouped about a single female, several such displaying groups being active simultaneously. Movements of the female were as described above. The males would stand up in the water raising the head then sink down rocking forward, i.e., lowering the breast and raising the tail vertically which brought the white patch at the side of the tail into prominence, the head was simultaneously lowered and brought forward, then retracted into the breast so that the bill was resting on the puffed out breast and the gulping movement above described then followed. In the rocking movement, the projecting point formed by the inner secondaries or tertiaries is at about the center of the rotary movement. This appeared to be the typical display as it was executed in exactly this sequence by all the birds in view. The soft “brooo roo roo” call was continuously heard from many birds throughout my period of observation, and its exact time in the display sequence could not be made out. A similar display was again seen on June 28, and this also included the horizontal rotation of the head. The male display thus appears to consist of at least two independent gestures. 1. The horizontal rotation of the head from side to side. 2. The rearing up of the body with the head thrown upward, followed by a rocking movement, breast down, tail up, and with head retracted onto the breast, and culminating in the gulping motion of the head. The

call is given during one of the phases of the second more complex display.

Behavior of incubating female: Whereas sitting Pacific Eider ducks always flushed when the observer was a few feet from the nest, incubating King Eiders sat very tight. One observed on July 18 actually allowed me to pick her off her 4 eggs.

WILLOW PTARMIGAN (*Lagopus lagopus*).—Aggressive behavior in defence of the young: On July 15, 1952, Manning and his companion came across a pair with young not over three days old. When the young were picked up, the female actually struck the observers with her wings. I made a similar observation on the closely related (considered by some conspecific) Red Grouse (*Lagopus scoticus*) in England, June 1, 1939. A female, when her young were approached by a young lady who was with me, ran up to the intruder's feet, with outspread tail and laterally extended wings, clucking and moving with extremely rapid short steps, giving the impression of rolling along rather than walking. The display was fully effective in inspiring fear in the disturber who ran to me shrieking for protection. It is probably equally effective against animal predators.

ROCK PTARMIGAN (*Lagopus mutus*).—A presumed male when flushed May 11 landed by another Rock Ptarmigan and walked toward it with tail erect and wings drooped, croaking as it did so. I collected the second, passive bird and found it to be a male. As the birds can probably distinguish the sex of others in the spring this observation suggests that as in some of the grouse, e.g., *Lyrurus tetrrix* (Höhn, 1953) the strutting display is directed both at rival males and females.

On May 31, when the female of a pair of Rock Ptarmigan was shot, the male, who was about ten yards away, approached the corpse, displaying with raised and fanned out tail and drooping wings.

On June 6, I was able to repeat this observation as a deliberate experiment shooting the female of a pair. As soon as the female fell prone the male ran up and displayed as described above and croaked. I then placed the corpse in a more life-like but prone position and retired, but the male bird showed no further interest. These two observations are, I think, readily explained by the surmise that the sudden assumption of a prone posture by the female, the position in which in most birds the female indicates a willingness to mate, acts as a releaser to prenuptial display and, if the female were alive, coition. A parallel is offered by the repeated mountings of stuffed prone females by male Black Grouse as described by Lack (1939).

An experiment of the above type with Willow Ptarmigan was

unsuccessful. On June 5, I flushed first a male then the female which I shot on the wing and finally had to run down as it was only wounded. I left the female's corpse lying down and watched the male from a distance. He approached the corpse but only to within thirty yards and did not display. The failure of this experiment was probably due to the fact that the female was shot on the wing, while the Rock Ptarmigan females were walking when shot and their collapse in death would look much more like a natural pronation of the bird.

LITTLE BROWN CRANE (*Grus canadensis*).—Features of courtship display were seen on several occasions. Of three cranes seen on May 15, one was standing behind another one and trumpeting with neck retracted over the back and with the head pointing up vertically. On May 27 one bird of a pair followed his mate in a series of hops and stood behind his partner with head and neck stretched forward and the wings kept extended. On June 2, I fired at one of a feeding pair with a 22 rifle. The bird was not hit but immediately leaped up, flew over to the other bird and landed behind it pointing the head forward and vertically downward. Then both birds alternately leaped up 3 to 4 feet with head raised several times, trumpeting the while. After this they resumed feeding, a second shot stimulated a second period of this alternate "flutter jumping."

SEMPALMATED PLOVER (*Charadrius semipalmatus*).—Display flight: This was seen on several occasions in June. The bird flew with abnormally slow, deep wing beats calling "too wät wät wät wät."

AMERICAN GOLDEN PLOVER (*Pluvialis dominica*).—Display flight: Wing motion was as noted above for the Semipalmated Plover. The song was "toojick toojick toojick," and is no doubt the basis of the Eskimo name "tulik."

Witherby et al., (1943) point out that the notes of this species on the breeding ground have not apparently been recorded, the note here recorded obviously differs from the "peer er wee" display flight note recorded by these authors for the conspecific Asiatic Golden Plover. Distraction display seen on July 11 consisted of crouching and waving both abducted wings while calling plaintively. The call accompanying this was recorded (1949, Mackenzie Delta) as "te tee duiee."

BLACK-BELLIED PLOVER (*Squatarola squatarola*).—A nest found on July 16 with 2 eggs, had three eggs on July 17, and four on July 18. There is only one published record of the incubation period, Brandt quoted by Bent (1929) who records it as 23 days. In the nest referred to above only one egg hatched 24 days from completion of the clutch. Only the more brightly colored bird of the pair, presumably the male,

was seen at the nest between the period of completion of clutch and hatching and appears to have been solely responsible for incubation, though from the observations of others it is clear that in most cases both sexes incubate.

Distraction display consisted of running with fanned and depressed tail and crouching with extended head and neck and waving of the wings, which were held arched over the back.

A number of experiments were made on the presumed male of the pair owning the above nest, the bird being observed through a very small hole in a tent set up as an observation blind. The results of these experiments may be summarized briefly as follows:

*Retrieving of eggs placed on rim of nest scrape.*—One egg so placed was apparently rolled into the nest by the bird, but on checking I found the egg had not actually been moved. When three eggs were placed on the rim, the bird rolled back two but left one on the rim and returned to incubate the rest. When two eggs were placed on the rim, only one was rolled back. Two eggs moved six inches from the center of the nest elicited attempts to roll them in with the bill, the bird rising partly on its legs to reach them, but it finally settled to incubate the remaining eggs without having actually moved those displaced. The imperfections of the egg retrieving reaction are obvious. It would be interesting to know how far eggs may be displaced from the nest and still elicit attempts to roll them back. Further experiments might also decide whether it is the sight of the diminished clutch or that of the displaced eggs which acts as the main stimulus to rolling-back attempts.

*When the eggs were lightly covered with grass* the bird on its return pecked at the grass once or twice but without removing any, then walked off, returned pecking in vain, again walked off, and repeated this for the ten minutes I allowed this experiment to run. The covered eggs clearly presented a problem the bird was unable to solve. This is in contrast with the Ringed Plover which succeeded in exposing eggs covered with sand (Laven, 1949). The difference in behavior of the two species in this test is possibly due to the fact that nests of Ringed Plovers on sand dunes are quite likely to be sand covered at times by wind action, whereas covering of the eggs as a natural accident is extremely unlikely in the Black-bellied Plover so that there is nothing to favor the evolution of a reaction to deal with this situation.

*Reactions to dead birds.*—I placed the corpse of a female Black-bellied Plover over the eggs in as life-like an imitation of an incubating bird as possible. The nest owner on his return first eyed the dead

bird from about two feet off then walked up and down beside it. Finally he touched the dead bird repeatedly with the bill between the wings and tail as if trying to get at the eggs. Being unsuccessful in this also, he settled down as if to brood in a nearby depression. Apparently the corpse was treated as though it were the bird's mate taking a share in incubation. After flushing the bird, the corpse was placed prone with outstretched neck on the ground one and one half feet from the nest to see whether it would elicit display or attempts at mating on the part of the male. The bird was slower than usual in returning to the nest but finally settled on the eggs paying no attention to the corpse.

Next day a dead Pomarine Jaeger was placed in an upright position with closed wings three feet from the nest. The Plover walked towards the Jaeger with wings drooped below the level of the tail and held close to the body, calling "pee pee" repeatedly it flew low over the Jaeger yelping but never actually touching it, at times it walked to within three feet of it. The Plover would obviously not incubate under these conditions and after 10 minutes the Jaeger was removed and the bird returned very promptly to the eggs. Next the Jaeger was laid on the ground on its side; now the Plover walked about peeping with wings drooped but never engaged in the mobbing flights seen before, at times it almost went to the eggs but always ran off again.

Next I replaced the Jaeger with my brown parka rolled into a bundle resembling the Jaeger and matching closely in color the dark plumaged areas of the Jaeger. The Plover returned, walked round three sides of the parka and within three minutes had settled on the eggs. The Jaeger even when laid on the ground was clearly distinguished from the parka.

*Experiments to elucidate components of the "nest complex" i.e., the releasing stimulus complex for incubation.* The clutch of eggs was moved one foot from the nest scrape and four roughly egg-shaped stones placed in the nest. On its return, the bird first stood over the scrape but then went to the eggs, settled down, and recommenced incubation. However, the result was quite different when the clutch was moved three feet from the nest scrape. On the first test (the scrape being left empty) the bird first returned to the scrape and stood over it making one or two pecking movements. Then it went to stand over the eggs and appeared to arrange them with its bill. Then it returned to the empty nest scrape, did some apparent arranging with its bill there and settled as if to incubate. However, as soon as I looked up again after recording this, the bird was seen

standing about ten feet off the nest. It returned, stood over the scrape, then over the eggs, but finally walked off calling at times and settled down to preen, ten feet away from the scrape. After allowing the bird a short spell of incubation with the eggs replaced in the scrape, the eggs were again placed three feet from the nest and four stones were laid in the scrape. The bird first preened for two to three minutes, then came to stand over the eggs but did not settle. It then went to the scrape, settled down, but almost immediately rose again and walked off, possibly disturbed by the calling of some Sabine Gulls. It stopped about ten feet from the nest, preening for about six minutes and finally appeared to go to sleep. Clearly in a displacement of the clutch by only one foot, the new position of the eggs is readily accepted, a three-foot displacement presented an apparently insoluble problem with the nest scrape exerting a greater pull than the sight of the eggs.

This suggested that the immediate surroundings of the scrape were an important component of the nest complex. Accordingly, two days later I altered the area surrounding the nest for a distance of about three feet all around by placing within this perimeter all at once diverse objects available nearby, such as a 5-inch length of caribou spine, a small board, three small rocks, a clump of purple saxifrage, a one and one half foot long pellet like object, some strips of bark and a torn-up creeping willow plant. This obviously effectively altered the immediate nest environment, but the bird returned and settled to stay on the eggs within five minutes. This suggested that the sight of the scrape was perhaps an important component of the situation. Accordingly, on disturbing the bird again, I covered the scrape completely with the moss-like basal clumps of a small flowering plant. The eggs were placed on top of this pad, the previously used surrounding objects were rearranged, and soil was added. The bird returned, did more than the usual arranging of the eggs with the bill while crouched over them, then settled to brood for two minutes, then stood up again, rearranged the eggs, sat down again and this time stayed.

It can be concluded from this that neither the sight of the nest scrape nor its immediate surroundings play an essential role. The eggs are obviously important as they are accepted one foot away from the nest, yet at a three foot displacement the nest site and the eggs each act as stimuli, the nest being apparently the stronger of the two. Since the scrape itself may be hidden and its immediate surroundings altered without disturbing the birds incubation response, it appears to me that the feature of the nest site which acts as a stimu-



lus is the view from it of objects in the middle or far distance. It would almost appear as though the bird had taken (of course unconsciously) certain bearings from the nest which are hardly changed by a one-foot displacement of the clutch but are changed by a displacement of three feet. Further experiments for which I had neither the time nor the facilities would be needed to test this experimentally. A comparison of these results with those of similar experiments carried out in the Herring Gull (Tinbergen, 1953) is interesting. Herring Gulls apparently sit down in the *empty* nest when the clutch is placed only one foot from it. Also, in nest site recognition, gulls nesting in a more or less featureless environment (sandy shore) do use landmarks such as boxes or barrels washed up by the waves, which were apparently (though this point is not clearly stated) in the near vicinity of the nest.

WHITE-RUMPED SANDPIPER (*Erolia fuscicollis*).—The flight song of this species is described by Soper (1946) who also described its nest-distraction behavior (1928); the ground display does not seem to have been described. On July 1, I saw what appears to have been a fragment of the ground display. A single bird was seen standing with one wing expanded and raised almost vertically, the lower surface being faced forwards. Mr. T. H. Manning informs me (*in litt.*) that he has fairly frequently seen birds of this species raise a wing.

BAIRD'S SANDPIPER (*Erolia bairdii*).—The ground display of this species has been described only by W. S. Brooks, (quoted in Bent, 1927). I observed a somewhat different form of it on June 17. One bird, presumably the female, was standing still; the other was running back and forth from the side to the front of the female in small semi-circles, holding the tail fanned out and depressed and one wing raised vertically. As the bird moved, it alternated the wing which was raised. My impression is that it was the wing on the side towards the female which was raised, but my notes made at the time do not mention this. This display was performed in silence. The display seen by Brooks followed after the male alighted, both wings were raised, and the primaries were slowly raised and lowered while the forearm remained perpendicular. It is probable that this display with both wings precedes the runs described above, which probably constitute the actual prenuptial display. On this occasion however, the male took wing and gave its flight song using a rapid but shallow flickering sort of wing beat and uttering a "purring" note, no doubt the same note as that described as a reeling trill suggestive of a cricket or cricket frog by Wynne-Edwards (1952).

The nest distraction behavior from nest or young is described

by Brooks (quoted in Bent, 1927) as "broken wing trick," and Wynne-Edwards (1952) as trembling with arched wings while screeching. I saw one of a pair on July 10, which, calling anxiously, would fly low with trailing legs, and at times when alighting did a typical "rodent run" with fanned out and depressed tail.

**SEMPALMATED SANDPIPER** (*Ereunetes pusillus*).—A number of descriptions of the flight song are given by Bent (1927); more recently Soper (1946) has also described it. A pair observed July 26, 1949, on Richard's Island, Mackenzie Delta, which already had at least one downy young, called "tree" and in flight uttered a swallow-like twittering which I rendered as "djü djü djü djü," etc., or, "wioo wioo wioo." This is no doubt the trill described by several other observers. One observed on July 29, 1949, however, used both a different song flight and call, whereas the wing beats in the above description and as observed by others were short and rapid, this bird used slow deep wing beats as are characteristic in the song flights of plovers and called "di jip di jip di jip," etc.

**BUFF-BREASTED SANDPIPER** (*Tryngites subruficollis*).—Rowan (1927) has described several display postures seen in spring migrants of this species in Alberta, consisting essentially of raising one wing (most frequently seen) or both. On Banks Island, I only saw these sandpipers on three occasions, and only the display with both wings extended was seen. On June 27, one bird of a party of eight would repeatedly stand very upright, back to the wind, with both wings extended and somewhat raised with the underside of the wing facing directly forward. No calls accompanied this display. There was also some "fighting" consisting of threat attacks with the bill and chasing on the ground. On June 1, the same display was seen again.

**SANDERLING** (*Crocethia alba*).—On June 10, at Cape Kellet a number of Sanderlings feeding on the ground were grouped in pairs. The apparent males (brighter and plumage with more pronounced breast coloration) of three pairs walked with fluffed-up plumage thus looking rather humpbacked as they went about busily pecking, followed by the females which were not fluffed up but uttered frequent high pitched squeaks. At times, the males flew up and, cruising about fairly low with very rapid wing beats, called "twa twa twa twa" also giving at times the rather low-pitched purr noted below. When the males alighted, the females generally ran up to them but were not apparently noticed by the males.

The song flight is described as being accompanied by a loud strident churring rendered "trr trrr trrr" by H. Walter and by C. T. Dalgety and J. H. McNeile (all quoted by Witherby *et al.*, 1943) as like a grasshopper's trill. I heard the same note on June 27 and described

it as a purring somewhat reminiscent of the ring of an alarm clock and changing in pitch at times. This was uttered while in flight about 60 yards above the ground (much higher than recorded by others), the bird using rapid, bat-like wing beats alternating with gliding and wheeling about.

The distraction display from the nest with eggs is described by Manniche quoted in Bent (1927). On July 23, I observed it in a bird which had two downy young, it ran in a skulking fashion calling "tcha tcha tcha" and carrying the tail spread and depressed. As there is some disagreement as to the participation of the two sexes in incubation, Manniche (*op. cit.*) stating that it is restricted to the female while other observers record males shot from eggs, it is worth recording that a male showing the above type of distraction behavior shot on July 15, had well-marked incubation patches.

SNOWY OWL (*Nyctea scandiaca*).—While this species is sometimes quite aggressive when the nesting area is disturbed (Sutton, 1932) the birds are at other times quite shy, withdrawing while people are about the nest as noted by Soper (1928). This was the case with the pair owning a nest with three eggs found on June 29. At other times a striking distraction display was put on by owls whose nests I was unable to find. Only one instance of this particular type of display seems to have been recorded previously (Sutton, 1932). My observations of it are: July 2, a Snowy Owl flew about calling "quä quä quä" then perched 40 yards from me lying flat on the ground facing me with the wings partly extended out from the side and occasionally waving one wing, on closer approach it took off without further display. The same crouching display was shown by one member of another pair on July 18, but on this occasion the bird waved both wings. When facing the observer in this crouch the owls present a curious resemblance to a baby seal. In Sutton's observation of this crouch the performing female gave a whining call, but in my observations the birds were silent. A similar display was seen by Mr. Manning in July further north on Banks Island.

GLAUCOUS GULL (*Larus hyperboreus*).—Witherby *et al.* (1943) state that no proper comparison of the notes of this with those of allied species has been made. It is therefore worth noting that I recorded the calls at a nesting colony (Richards Island, Mackenzie Delta, July 26, 1949) as exactly like those of the Herring Gull (*Larus argentatus*) the common call was "kiä kiä kiä," etc., but there was also "gah gah gah gah" apparently expressing anxiety at disturbance of the downy young, as in the Herring Gull. While Salomonsen (1950) records the calls of this species as indistinguishable from those of the Great Black-backed Gull (*Larus marinus*), Wynne-Edwards, 1952,

notes (without further details) that the voice and calls resemble those of the Herring Gull much more closely than those of the Great Black-backed Gull.

LAPLAND LONGSPUR (*Calcarius lapponicus*).—The breeding behavior of this species has recently been studied (Grinnell, 1944) but post-breeding season song does not appear to have been recorded. I noted it in several individuals, August 20, 1949, Richards Island, Mackenzie Delta, in the early morning, and again on August 2 and 6 at Holman Island, Victoria Island, in 1953. In all cases it was given not on the wing like the spring song but from a perch and was shorter and weaker. The spring song ceased in southeastern Banks Island about July 8.

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BIRD HABITATS ON MIYAKE JIMA, JAPAN. (Above) Habitat of the Island Grasshopper Warbler (*Locustella ochotensis pleskei*) at Ma Point, May, 1953. (Below) Nesting site of the Japanese Murrelet (*Synthliboramphus wumisazume*). Sanboudake Reef, May 26, 1953. Photographs by H. E. McClure.