

TWO PROBLEMS IN THE MIGRATION OF WATER FOWL.

BY JOHN C. PHILLIPS.

I. DO AMERICAN DUCKS REACH THE MARSHALL ISLANDS?

I HAVE recently run across an ornithological item of great interest, which as far as I know has not been brought to the attention of American ornithologists. This concerns the capture of three species of American ducks in the Marshall Isles, northeast of New Guinea. These islands lie on the parallel of 10° N. latitude and are over 2200 miles southwest of the Hawaiian Islands and obviously far off the known course of any American migrants.

In 1899, Reichenow, the well-known German ornithologist, reported (*Ornith. Monatsb.*, p. 41) that Herr Brandeis, Imperial Governor of the Marshalls, had written of a remarkable flight of birds. "Each year at the end of October, coming from the north, enormous wedge-shaped flocks of wild ducks come in continuous flight over Atoll Bikar, Uterick, Ailuk, Jemo, Likieb and Wotje. These flocks cover the sky for three or four days. Tired birds from these flights settle down on the islands and after they have recuperated, set out in small flocks in a *southerly direction* [*italics mine*] following the main flock. In May similar flocks appear again, flying north, which on this occasion take their way over Atoll Ailinglablab, and from there between Kwadjelin and Likieb and over Gasparico. The planter de Brum is going to obtain some specimens."

In the same Journal for 1901, p. 17, Herr Reichenow records the receipt of Marshall Island duck skins sent by Herr Dr. Bartels from Jaluit to the Zoölogical Museum at Berlin. The species were *Anas carolinensis*, *A. acuta americana* and *Nyroca valisneria*.

Reichenow adds that he thinks these ducks must come from Alaska, perhaps the valley of the Lower Yukon, and from there they may take their course along the Alaskan Peninsula to the Aleutian Islands and go south over the ocean. He asks where these ducks can winter, and adds that a further flight would take

them to the New Hebrides and New Zealand. Notwithstanding this, no such birds have ever been taken either there or in Australia, New Guinea or the Polynesia Isles. He thinks there must be some large shallow, quiet tracts in the Polynesian Ocean where sea-weed collects. Possibly they might find a feeding ground among the small coral islands between the Solomons and Australia.

The above facts excite no end of speculation but in view of the meagre data at hand and the extraordinary character of the information we must wait for further reports.

From the north Pacific coast to the Marshalls is roughly 5000 miles, a distance which is far greater than any trans-ocean flight yet known. Obviously until we know the predominating species among this body of ducks, it is almost impossible to guess at its origin. The farthest Pacific point which our migrants reach is the Hawaiian group. Here the Pintail and Shoveller are the only common ducks, and these are by no means in really large numbers, while the Baldpate, Mallard, Green-winged Teal, Buffle-head are extremely rare migrants (Henshaw, 1902). The Red-breasted Merganser is perhaps not quite so rare.

From this it does not seem likely that the mysterious Marshall Isle flight ever strikes the Hawaiian group.

As to the breeding ground of the three species mentioned by Reichenow we can at least say that it must be American, but the occurrence of the Canvas-back suggests a mid-continental origin, that is, provided the Canvas-back occurs in large numbers. This duck is so sparsely distributed on the north Pacific coast, and is so infrequent a breeder in Alaska that the Yukon Valley could hardly supply a great body of migrants.

Mr. Henshaw (Auk, 1900, p. 245) tells us of the 2000 mile flight of certain migrants from the Aleutians to the Hawaiian group, but remarkable as is this fact, it would be entirely eclipsed by the appearance of American birds 2000 miles further from our continent.

Mr. Bent (Smith. Mic. Collec., Vol. 56, No. 32) believes that the European Teal probably breeds on the whole Aleutian chain of islands, and that the American Green-winged Teal is confined to the mainland of Alaska. This makes the appearance of *N. carolinensis* in the Pacific still more mystifying.

The question of the winter distribution of these ducks is scarcely

worth guessing at until further data are available. It is not possible that they can ever reach the coast of Australia, as the avifauna there is so well known that even as stragglers they could not escape detection. The coast of New Guinea is also fairly well known, but the Solomon Islands are as yet only imperfectly explored, though American ducks along the coasts ought certainly to have been reported.

A brief investigation makes me very skeptical of the presence of an oceanic feeding place. There is no large windless area in the Polynesian Sea, at least not during the winter months, and it is almost beyond belief that Teal, or Canvas-backs either, could lead a really oceanic life for any length of time. Moreover, the ocean south of the Marshalls is very deep, and the borders of the coralline atolls offer a very unattractive vegetable supply. The surface flora of these seas is not rich, and there is no indication of a sargasso sea.

II. BEHAVIOR AND MAKEUP OF THE MIGRATING FLOCKS OF CANADA GEESE.

IN 'The Auk' for July, 1910, I called attention to a peculiar action of migrating Canada Geese, long familiar to those who have shot geese over live decoys. At that time I saw nothing significant in this behavior, but, looking at it in a different way, it seems at least worth recording again.

The facts referred to are the following. Canada geese (*Branta canadensis*) migrate in large and small flocks, and they are decoyed down to some of the Massachusetts ponds which happen to be situated on favorite flight lines, by the use of an elaborate system of live and wooden decoys. Many of the wild geese would not alight in the ponds at all, were it not for the irresistible attraction of the decoys. The nature of geese is, of course, exceedingly wild. They usually alight well out in the pond, and, after a varying period, swim towards the decoy geese on the shore. At such a time the slightest disturbance will alarm them. A distant boat, a gun shot, a person walking along the shore, or a noise from the shooting stand will result either in their taking to wing and continuing their flight, or in keeping them in the middle of the pond, suspicious of the surroundings.

Now if a successful shot is finally made into such a flock, and perhaps one half or three fourths of their number have been killed, the remainder, after a few turns in the air, or a short flight of five or ten minutes, will almost always return to the pond, where, if not actually disturbed, they will remain from several hours to a day or so. Sometimes they will decoy a second time.

Now the method employed in capturing such "left over" geese is to put out a boat, which manœuvre is seldom objected to, and to scull directly down upon them. A close shot is often obtained from the boat and an approach of from sixty to seventy-five yards is almost always possible. If disturbed, such geese nearly always come back to another part of the pond, when the same process is repeated, only the birds get a little wilder each time, as a rule. The more successful the first shot from the stand and the less geese there are "left over," the better is the chance of obtaining a close shot from a boat.

Now this curious "stupidity" is manifested by the same geese, which, in an organized migrating flock only a few minutes before, would have left the pond at the slightest indication of danger. Some mutual interrelation has become disorganized, and that this has been caused by something more than fright alone would seem probable, because on the winter feeding grounds geese do not show any such "stupidity," but simply depart post-haste after some or many of their numbers have fallen. Also in a Massachusetts decoy pond, if, through some error, a poor shot or total miss is made, the frightened flock simply holds on its way South, and is not seen again. Of course the presence of the live decoys has something to do with the puzzled behavior of the geese, but will it explain their disregard of an approaching boat.

It is to be remarked that the geese referred to are birds in full migration and thus under the impelling force of a peculiar "instinct."

That geese migrate in families and that autumn flocks at least are composed of parents and their young has always been inferred. This theory is strengthened by the actual count of large numbers of flocks of geese on the autumn migration in Massachusetts made by myself at Wenham and Oldham Ponds. When plotted out in a frequency curve, we get a marked rise in the curve running

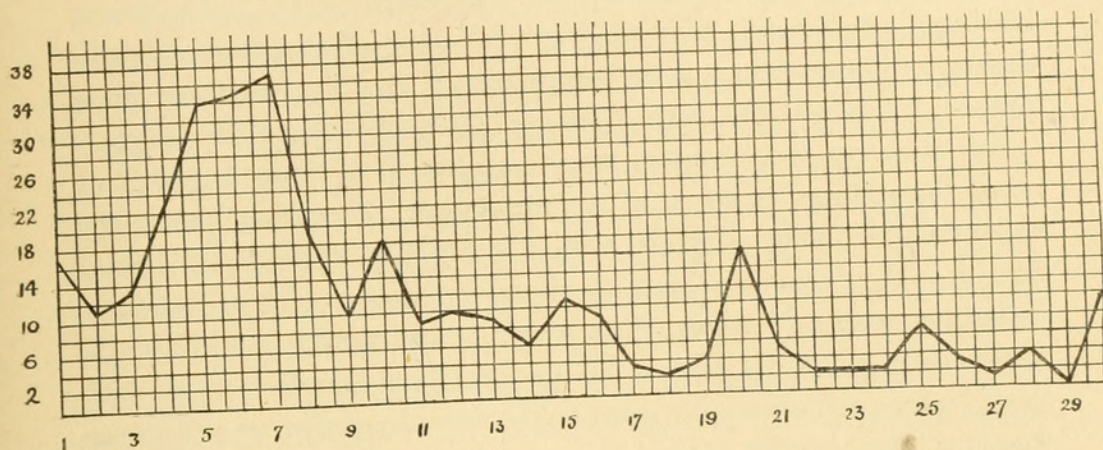
up from a flock of two to a flock of five, the apex being at the number seven. Then the curve falls to a right hand base at the number nine. Above this number there are small rises in the curve at various points, notably ten, fifteen and twenty, which may have some significance, but as we go up into the larger flocks, the numbers (number of flocks counted) are smaller, and the counts themselves perhaps not so accurate. The "small flock" frequency curve (flocks of one to fifteen in number) is composed of counts of 262 different flocks. It gives us the usual size as six or seven birds, the next commonest number being five. The scarcity of flocks of eight and nine is remarkable. Only ten flocks of nine each were observed, while there were thirty-seven flocks of seven each and thirty-five flocks of six each. The actual average size of a flock of autumn migrants in Massachusetts is not considered here. It is much larger, nearer thirty-five, because very large flocks of 100 to 300 are not rare. These large flocks need not concern us.

It is of interest to note that the small flocks, when they are captured entire, show from inspection of various external age characters — size, roughness of soles of feet, development of wing spurs, etc.— a pair of old birds and several young, two to five, or even six. It is especially easy to pick out the young birds from the old in early October flights, because the young have had less time to develop, but it is not always possible to do this with certainty. We are speaking, of course, of the fall migration only. Whether these facts, special behavior and individual make-up of the "small flock," hold for the vernal migration is unknown to me, and it would be harder to ascertain.

I give below a curve of frequency for flocks of geese of from one to thirty in number. The peaks of the curve at ten, fifteen and twenty may mean combinations of two, three, or four families: but as noted above the observations are hardly numerous enough for the larger flocks. The striking fact is the very sharp rise of the curve to six and seven. The frequency of ones and twos and even threes and fours is much too high, because I have had to include in the curve a number of geese undoubtedly left over from shot-up flocks. In the natural state of affairs there would probably be very few flocks below the number four. Flocks of eight are perhaps mostly one large family, while flocks of nine are composed of small families.

I plotted two separate curves in this way from observations made both at Wenham, Mass., and at Pembroke, Mass., and both curves were exactly alike, showing the same rises and falls which this combined curve shows, so that I feel sure that we are dealing with something significant.

It is hardly necessary to state that the apex of this curve, at six and seven, represents the average size of a family of Canada



Geese as demonstrated by wild nests and captive pairs, so that our flock counts are exactly what we would expect from single families.

In conclusion I may say that (I) The peculiar behavior of migrating geese when shot into over live decoys is not explainable on the basis of fright alone, but suggests the temporary breaking of a special form of interdependence, resulting in a curious lack of alertness in the individuals left behind. Is this due to parents seeking young, or to young with parental guidance removed, or to both causes. (II) Geese migrate in family parties and groups of families. The usual size of a family is six or seven, often it is five, and occasionally eight.



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