

VIII.—MIGRATION NOTES FROM NORTH HOLLAND.

By J. LEWIS BONHOTE, M.A.

DURING the last week of August, 1908, a short trip was undertaken to one of the islands of the North Sea off Holland for the purpose of observing the birds on migration; this autumn I visited the island again and spent a month closely observing the various birds as they passed through. The connection between the migration in Holland and on the corresponding coasts of Great Britain will be dealt with at a future time, when the report of the autumn migration is published by the B. O. C. Migration Committee, but in the following pages I propose to bring forward certain ideas and notes bearing on the general aspect of Migration. It should, however, be clearly understood that these observations will require considerable confirmation before they can be in any way considered as conclusively proved; but I think it desirable that they should be published, as being likely to stimulate further investigation on certain points, and thus lead to their confirmation or otherwise.

In order to gauge more accurately the movements of the various species, my observations were confined to a small stretch of shore covering an extent of about six square miles at low tide, and of rather less than half that extent at other times, except in the case of exceptionally high tides. The shore contained tracts of both sand and mud, and in many places large quantities of growing weed. Near the dyke and above the level of the high tides were stretches of grass and puzzle-weed intersected by deep muddy drains, and within the dyke were large grass-fields bounded by ditches. On the dyke itself large quantities of sea-lavender were to be found, and a few clumps of a very prickly bush which grew to a height of two or three feet.

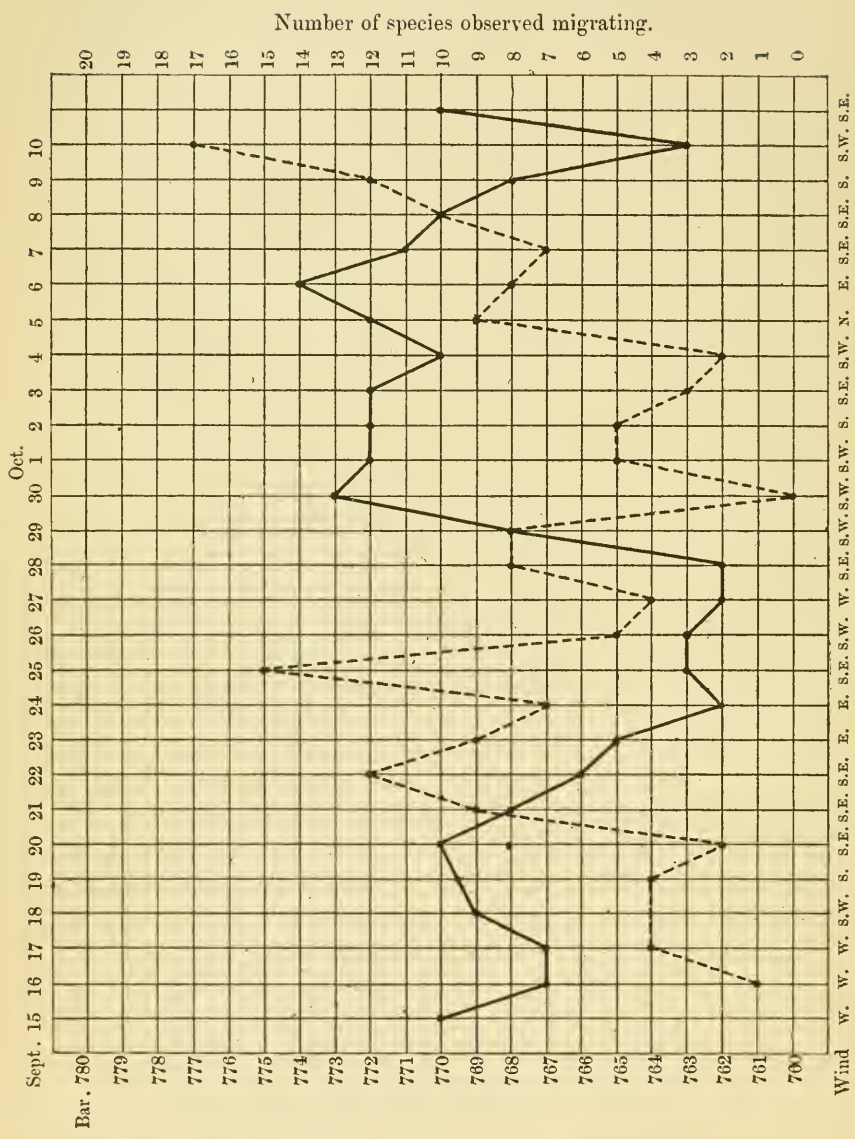
On both occasions Passeres, with few exceptions, were found to be very scarce; doubtless had I more carefully examined the few small woods which were to be found round the village, examples of many more species would have been seen, but, on

the other hand, whenever there was any considerable movement of small birds, such as Thrushes, Redstarts, Golderests, Chaffinches, &c., they were always met with on the ground examined, so that I do not think many movements of any size escaped my notice.

Probably owing to the invariable summer-like weather which characterised both my visits, nothing in the shape of great "rushes" was seen, and had not I been carefully on the look out, no special migratory movements would have brought themselves to my notice.

A glance, however, at the accompanying table shows a marked relation between the barometer and the number of species in which an increase or decrease was noted, or, in other words, in which some movement had taken place. When we consider this somewhat rough method of observation, for one would be certain to overlook small movements of common species, it is astonishing to find so close an agreement between the two curves, which seems to point unmistakably to the fact that *migration is most marked when the pressure is least*. For instance, we see that the fall of the barometer on the 16th was marked by a rise in the number migrating on the 17th. The steady fall of the glass between the 20th and 24th was followed by a rise in the number of species migrating until the 22nd, and a further large rise on the 25th. On the 30th, again, the top of another small barometric curve was marked by the entire absence of any noticeable migration, and the steady fall between the 6th and 10th October was again marked by an equally steady rise in the number of species on the move. The wind does not seem to have had any effect, but it should be remembered that during the whole period it never amounted to more than a light breeze. The connection between barometric pressure and migration has, I believe, been clearly demonstrated by Prof. Marek in the 'Ornithologisches Jahrbuch' for 1906, but I have not yet had an opportunity of carefully studying his doubtless most interesting paper.

One of the first facts that struck me was the enormous flocks of certain birds, e. g., *Limosa lapponica*, *Hematopus*, *Larus marinus*, &c., and the next fact in this connection was that, unless disturbed, they never rose and flew together, but small



parties of from 5 to 20 or more would break off from the main flock, and by these parties following one another in rapid succession to some chosen feeding-ground or resting-place the whole flock, numbering many thousands, would shift its ground without the casual observer being aware of the fact. Now as I found this to apply without exception to every species observed, whether belonging to the *Passeres*, *Limicolæ*, or *Laridæ*, and as all the flocks of birds seen coming in from the sea were in small parties, it seems to me probable that migration is usually undertaken in small flocks travelling in quick succession, and this will probably explain the fact that so little migration is generally seen. The enormous numbers recorded from light-houses and other places from time to time are easily accounted for by all the various parties stopping near the same spot, either from weariness after a sea-passage or owing to the attraction of the light due to stress of weather or some other cause.

As further confirmation that birds travel in small parties my notes on the Spoonbills are to the point. On the day of my arrival I was able to count a flock of 86 individuals, and as these birds always congregate together and are very conspicuous it is unlikely that there were any more on the island. Three days later this flock was reduced to 50, two days after that to 12, and the following day to 4, after which no more were observed with the exception of three stragglers a week or so later. We are therefore entitled to presume that the first flock of 86 individuals journeyed to the south in three or more small parties. I should, of course, mention that my point of observation was their summer feeding-ground.

In collecting and observing birds during their migration I had often been struck with the well-known fact that birds on their journey are usually exceedingly fat, so much so that it seems very doubtful to my mind whether they could live for any length of time in such a condition. On the other hand, I also found many birds, irrespective of age, sex, or species, with little or no fat as well as others in intermediate stages. To this subject I paid considerable attention and found almost invariably (though there were one or two exceptions, with which I will deal later) that when the birds first arrived they were thin, and that at such times they would be moderately tame and

easy to approach, though this would vary in degree according to the species, and they would spend their whole time feeding and sleeping.

At the end of a few days, generally about a week, they would have become exceedingly fat and again take their departure. I could give many concrete instances of this, but the following will perhaps be sufficient:—*Tringa alpina* and *T. canutus*: large arrivals on the 19th Sept.; birds shot on the 21st thin, very much fatter on the 26th, left on the 30th; new arrivals on 10th Oct. thin. Spotted Redshank (*Totanus fuscus*) just arrived, thin and gizzard empty. Greenshank (*Totanus caesescens*) extremely fat on 26th, large decrease of the species the following day. Rock-Pipits (*Anthus obscurus*) arrived thin on the 30th Sept., extremely fat on 8th Oct., large decrease on the 9th. Ring-Ouzel (*Turdus torquatus*) first seen on 24th Sept., thin, extremely fat on 5th, 6th, and 7th Oct., absent on the 8th Oct. Blackbirds (*Turdus merula*) very fat on 5th Oct., none seen on 6th and 7th; fresh arrivals on the 9th and 10th were thin*. Golden Plover (*Charadrius plumialis*) and Grey Plover (*Squaturoloa helvetica*) on arrival, Sept. 21st, were thin, the former fairly fat by the 3rd Oct.; and many further instances might be quoted, but the cases given above are sufficient to show that the matter is worthy of close attention. If my ideas be correct, we can at once tell on shooting a bird whether it is on migration and whether freshly arrived or not, and many other deductions will be possible from birds killed when actually on migration at lighthouses or when crossing the sea. To this "fat" question I found one exception, which however, can be, I think, easily explained. On the 10th of October I shot three Knots, apparently all fresh arrivals, of which two were thin, while the third was exceedingly fat. I presume, however, that this fat bird was one which had stayed behind when the former flocks departed on the 30th and had just joined the newly arrived birds; and as a study of migration always shows us that a few stragglers arrive before the main body and leave

* There is no doubt that these were fresh arrivals, as they appeared all over the fields, in the village gardens, and along the shore, where none had been seen previously. They were almost all young males; I only saw one female.

after it, there seems to me no great improbability in this view.

The question of fat leads us to another of the migration problems, namely, the length of journey undertaken at a stretch; and if, as seems probable, this large store of fat is used up before any prolonged rest or food is taken, the journey must be of no inconsiderable length.

I often watched migratory flocks pass over the island going due west, and supposing they held to their course it would necessitate a flight of at least 200 miles from coast to coast. I quote this distance not because I believe it to be excessive or anything approaching the maximum length of a single flight, but merely because my observations tended to show fairly conclusively that such flights were undertaken. Much, of course, depends on the rate of flight, a matter almost impossible to determine accurately; but from some very rough calculations based on individuals not migrating but passing along the shore, I found that over a short distance a rate equivalent to 90 miles an hour by no means unusual in the case of the Grey Plover.

Among the *Limicolæ* the flocks consisted almost entirely of young birds; on my previous visit in August old birds of certain species—*e. g.*, Golden and Grey Plover, Dunlin, Knot, Green-shank—were not uncommon, but on my last visit hardly any were to be seen. My notes of 1906, moreover, show that, with the exception of two species, the old birds outnumbered the young in August, so that it seems more than likely that they migrate first. The two cases in which the old birds did not outnumber the young were the Redshank (*Totanus calidris*) and the Dunlin (*Tringa alpina*), both of which have a more southerly breeding-range than many of the other species, while of the Ruffs (*Machetes*) and Black-tailed Godwits (*Limosa*) that breed on the island no adults were seen; so that the balance of evidence is certainly in favour of the adults travelling first, in spite of Herr Gätke's observations, which, in this instance, I find difficult to reconcile with my facts. At the same time it should be remembered that the adults seen in August may be birds that have spent the summer without going north as we know so many do. Whatever may be the reason, however, the fact remains that after the middle of September, at any rate,

adults of the northern migratory *Limicolæ* are absent, and by the middle of November (when, according to Herr Gätke, the adults are supposed to arrive) it would need a very skilled observer to distinguish them from birds of the year.

To sum up briefly, my observations tend to show: (1) that migration is usually undertaken in many small parties rather than in large flocks; (2) that the number of species migrating on any particular day varies inversely as the barometric pressure; (3) migratory birds are excessively fat on their departure, and thin on arrival, and in many cases their stay seemed to be merely for the purpose of acquiring a further store of fat, since as soon as they were again fat their journey was continued; (4) among the *Limicolæ* the balance of evidence is in favour of the adults migrating earlier than the bulk of the young.

Finally, it should be remembered that the above remarks are merely notes on observations made, and I have been led to publish them in the hope that it may stimulate further thought on those lines in order that by their proof or disproof a small step may have been made in our knowledge of migration.

I append a list of the movements of those species which were sufficiently definite to be determined. Notes on stragglers and resident species have not been included.

Turdus iliacus.—Arrived Oct. 3rd.

Turdus merula.—Sept. 25th and onwards arriving. Oct. 5th, very large decrease. Oct. 7th–9th, large arrivals of young males.

Turdus torquatus.—Arrived Sept. 25th and onwards. Absent Oct. 9th.

Saxicola ænanthe.—A few individuals of this species were seen almost daily until the beginning of October, after which only stragglers remained. There was a large influx on the 22nd Sept., followed by their departure on the following day. A further immigration took place on 24th Sept.

Ruticilla phænicurus.—A few seen almost daily during September. Large increase on the 24th.

Regulus regulus.—Noted on 25th Sept. and 6th and 7th Oct.

They apparently passed on at once.

Parus cæruleus.—A distinct immigration occurred on the 25th Sept. and again on the 8th and 9th Oct.

Sturnus vulgaris.—Fair numbers seen daily, gradually increasing. Large immigrations took place between the 20th and 22nd Sept., the 2nd and 4th Oct., and the 9th and 10th Oct. A decrease in numbers took place between the 5th and 7th Oct.

Corvus monedula.—One arrived in company with Hooded Crows on 9th Oct. The only one seen.

Corvus cornix.—First arrived on Oct. 6th, after which date it was seen daily.

Hirundo rustica.—All those seen seemed to be actually on migration and did not remain in the same spot. A few, if searched for, might probably have been seen daily. I only saw the species on the following dates: Sept. 15th, 17th, 18th, 23rd, 26th, 27th, 29th, and Oct. 3rd.

Chelidon urbica.—One individual only; seen on 26th and 27th Sept.

Cotile riparia.—Two seen on 27th Sept.

Passer domesticus.—After the beginning of October the numbers of this species seemed to increase, several large flocks being found along the dyke.

Fringilla cælebs.—Large immigrations took place on the 6th and 9th Oct., followed by an emigration on the 10th. The flocks were generally accompanied by a few Bramblings (*F. montifringilla*), the first of which was seen on the 27th, but there was a distinct increase of this latter species on the 9th of October.

Acanthis cannabina.—Present in small flocks, which were, I believe, passing through daily. Immigrations of some numbers were noted on the 20th and 29th Sept. and 10th Oct. and emigrations on the 1st and 6th Oct.

Motacilla alba.—Several were seen between the 18th and 22nd Sept., on the 25th Sept., and between the 3rd and 5th Oct.

Anthus pratensis.—Present daily in moderately large numbers. Special increases were noted on the 22nd Sept. and 5th

Oct., and decreases on the 23rd and 29th Sept. and on the 6th and 9th Oct., on the 10th there were very few left. Examples of both the large and small race were seen.

Anthus obscurus.—First seen on the 29th Sept. There was a large increase on the 6th Oct., followed by an equally large diminution on the 9th. A few fresh arrivals were seen on the 10th.

Alauda arvensis.—Present daily in large numbers, no special movement was noted, except a large decrease on the 9th and 10th Oct.

Phalacrocorax carbo.—Present daily, an increase was noted on the 29th Sept. and a decrease on the 8th and 10th Oct.

Ardea cinerea.—Present daily, several fresh flocks of from 4 to 12 individuals arrived on the 8th and 9th Oct.

Platalea leucorodia.—This species has already been referred to: 86 were seen on the 15th, 50 on the 19th, 12 on the 21st (the locality was not visited on the 20th), 4 on the 22nd, none between the 23rd and 25th, 2 on the 26th, after which no more were seen except for a solitary bird that only remained for about an hour on the 7th Oct.

Anser sp. ?—A few seen almost daily, the numbers gradually increasing. Special increases were noted on the 21st and 30th Sept., and on the 1st and 10th Oct.

Bernicla brenta.—First seen on the 1st Oct. Large increase on the 10th.

Tadorna cornuta.—Seen almost daily, no noticeable change in numbers.

Anas boschas, *Querquedula crecca*, *Mareca penelope*.—Seen daily. There was a very large influx of Duck on the 25th Sept., after which date their numbers were too large for movements to be noted; they seemed, however, to be steadily on the increase.

Mergus serrator.—First seen on the 28th Sept.; they had considerably increased by the 10th Oct., but as they kept well out to sea they were not often observed.

Charadrius phuriatis.—Present daily. Large immigrations

- took place between the 21st and 23rd Sept. and on the 10th Oct.
- Squatarola helvetica*.—Present daily ; increases were noted on 21st, 25th, and 28th Sept. and 10th Oct., and a marked emigration took place between the 5th and 9th Oct.
- Ægialitis hiaticola*.—Present daily. Seen to pass over on the 23rd Sept. There was a marked immigration on the 5th, followed by an emigration on the 8th Oct.
- Ægialitis cantianca*.—A few were seen between the 18th and 21st Sept.
- Vanellus vulgaris*.—Seen daily, its numbers gradually increasing.
- Hamatopus ostralegus*.—Incredible numbers of this bird were seen on the 15th Sept., a considerable portion of which passed on by the 17th, and from that date their numbers gradually dwindled. On Oct. 2nd there was a large immigration, followed by marked decreases on the 5th, 6th, and 10th.
- Streptopelia interpres*.—A few were seen between the 17th and 19th Sept. ; on the 21st and 22nd they were slowly decreasing ; single birds were seen up to the 28th, after which they were absent except for a solitary bird on the 5th Oct.
- Recurvirostra avocetta*.—The bulk of this species had already gone. I counted 16 on the 16th Sept. and about 8 the following day, after which, with the exception of a solitary straggler seen in another part of the island on the 3rd Oct., it was entirely absent.
- Gallinago gallinula*.—A few seen on the 25th and 26th Sept.
- Tringa subarquata*.—Both old and young birds of this species were met with in 1906 ; on this visit it was entirely absent.
- Tringa canutus*.—Large numbers arrived on the 19th and 25th Sept., but they all left on the 1st Oct., after which date none were seen till the 10th, with the exception of 3 stragglers on the 7th. These birds were feeding almost entirely on vegetable matter.
- Tringa alpina*.—Present daily, large increases taking place

on the 19th, 24th, 25th, 28th, and 29th Sept. ; emigration took place during the early part of October, being most marked on the 2nd, 5th, 6th, and 8th, while fresh arrivals were again seen on the 10th.

Totanus hypoleucus.—Two small parties seen on the 17th and 18th Sept.

Totanus calidris.—Although seen or heard almost daily, this species was distinctly scarce as compared with the numbers of other Waders. I noted an increase on the 22nd and a decrease on the 28th.

Totanus fuscus.—A scarce and wild species, which, unless looked for, would probably be overlooked. One or two were to be found almost daily in the neighbourhood of some cockle-beds, but it was too scarce for any definite movements to be noted.

Totanus canescens.—Seen in moderate numbers almost daily until the 28th Sept., after which only solitary stragglers were noted. Their food consists almost entirely of a very small species of fish.

Limosa lapponica.—Enormous numbers of these birds were present on the 15th and 16th Sept., but the large majority left on the 17th. They were noted as "passing" and "arriving" on the 24th and 25th, and there was a further increase on the 2nd Oct., but their numbers never reached one-tenth of those seen on the 16th Sept. Emigration took place between the 5th and 8th, and a few fresh arrivals were seen on the 9th.

Limosa belgica.—Two individuals were seen on the 25th August, 1906: the rest had all left. It breeds on the island in some numbers.

Numenius arquata.—Seen daily, no very definite movements noted.

Numenius phaeopus.—A pair seen on 15th and 16th Sept., and a solitary bird on the 1st Oct.

Sterna fluviatilis.—Only a few seen up to the 18th Sept.

Sterna cantiaca.—An immigration of these birds took place on the 18th Sept., after which it was seen daily until the 2nd Oct., when they all left. Two stragglers appeared on the 10th.

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Sterna minuta.—Present in some numbers on the 15th and 16th Sept. Solitary stragglers seen on the 21st, 23rd, and 24th.

Larus ridibundus, *L. canus*, *L. argentatus*.—Seen daily in large numbers, *L. canus* being the most numerous and *L. argentatus* the scarest. No definite movement was noted.

Larus marinus.—Incredible numbers, all adult, of this species were seen on the 15th Sept. ; they remained till the 21st, when there was a considerable decrease, but many were still left, and further small increases were noted on the 29th Sept. and 7th Oct.

Larus fuscus.—The entire absence of this species is perhaps worth noting.

Stercorarius crepidatus.—A few seen daily between the 24th Sept. and 1st Oct. They appear to have left with the Terns, on whom they were preying.

IX.—CONTRIBUTION À L'ÉTUDE DE LA DISTRIBUTION GÉOGRAPHIQUE DES TROCHILIDÉS DANS LE BRÉSIL CENTRAL ET ORIENTAL.

Par E. GOUNELLE.

LES séjours plus ou moins prolongés que j'ai faits en divers points du Brésil de 1884 à 1903 ont été presque exclusivement consacrés à des recherches entomologiques et c'est seulement au cours de mes derniers voyages que je me suis occupé un peu sérieusement de recueillir des Trochilidés. La liste des espèces que j'ai pu me procurer présente donc de très nombreuses et importantes lacunes. Si incomplète qu'elle soit, elle ne sera peut être pas dénuée de toute utilité, vu l'état assez peu avancé de nos connaissances actuelles en ce qui concerne la distribution des oiseaux-mouches dans l'immense empire Brésilien.

Mais avant de donner cette liste, une revue aussi brève que possible des principaux caractères climatiques et autres qui distinguent les diverses régions où j'ai effectué mes recherches me paraît nécessaire.

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