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Topographical Concentration of Flight-Lines

(Meddelanden från Falsterbo fågelstation. 2.)

TORSTEN MALMBERG
Zoological Institute, Lund, Sweden

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Zoological Institute, Lund, Sweden

During the last few years there has been a tendency to stress, in the study of bird migration, the method of direct observation of migrating birds; and I think this is very important, for it cannot be denied that at times scientists have been inclined to disregard and neglect the material, old or new, collected by direct observation. It is true that this material must be treated with great critical skill and that other and more experimental methods have led to very interesting and valuable results, but it is also true that we have to-day for many species a very good recovery map for winter-quarters and halting-places without knowing much about how the actual migration is performed or how we should explain the often contrary evidence about it. It must be emphasized that it will never be possible to get a clear picture of bird migration and its mechanics if the migration phenomena are not under direct continuous observation.

The topographical concentration of flight lines, the subject of this introduction, is one of the most striking features of this visible, directly observable migration, that especially in autumn leads to a spectacular crowding at certain places. I shall in what follows limit my comments on this interesting feature to a restricted area, the southernmost part of the Scandinavian peninsula. There is hardly anything new to be found in them, but I hope that they will nevertheless serve to start a discussion on a topic, well known from old times but astonishingly little treated even in the newest handbooks on bird migration.

It is now generally agreed that most birds from northern Europe migrate on a broad front towards SW in autumn, that is have a SW primary direction. This is the general principle, but the actual visible migration is the result of various factors which disturb this rather artificial scheme and make the lines converge. One of the chief factors is that most birds try to avoid, for as long as possible, flying over terrain that is strange to them. A consequence of this is the well-known effect of coastal lines, which often lead the flights in a direction deviating from the primary. The strength of attraction of these leading lines is the subject of the next speaker, but I hope that Dr. VAN DOBBEN will allow me to touch upon it shortly, as I find it nearly impossible to discuss the concentration effect without dealing with the attractive strength of the leading lines. In this connection I should like to propose, as a complement to "leading-line", the term "leading-point" (Leitpunkt according to GEYR VON SCHWEPPEBURG, 1933, 1949) for topographical phenomena like small islands as Heligoland or inland woods or mountains on a plain, without special extent or conducting effect in any direction but nevertheless leading the birds from vast regions to a concentration at the leading-point.

¹ Reports of the Falsterbo Bird Station No. 2.

It is quite clear that the sea serves as an effective barrier for most land-birds as does the land for sea-birds—I speak in the following of land-birds only—and that the successive narrowing of the Swedish main-land towards the south is the primary cause of the enormous concentration at the southwesternmost Swedish point, the Falsterbo peninsula, where every autumn between 1 and 2 millions of diurnal migrants pass out over the sea. SVÄRDSON (1953) recently argued as if the leading-lines had no or at least very little effect at night. Of course the effect must be less than by day, but if we assume that birds orientate themselves to a high degree with the help of their eyes even in the dark, it is no wonder if the concentration is quite clear, especially as the two categories of diurnal and nocturnal migrants are not always so well separated, as we have often seen at Falsterbo in the morning as well as in the evening.

Here we must remember that coast-lines do not always lead the flights, e.g. if their directions are too misleading. Further, there is no evidence that the southeastern Swedish coast normally serves as a leading line for SW-migrating or the southwestern for SE-migrating birds in autumn or correspondingly in spring. But there are a few such rare observations from both sides of the country, e.g. from Hälsingborg at the west coast, where I have seen in spring Skylarks (*Alauda arvensis*) and other species coming in to the coast from NW in misty weather and then, evidently disorientated, follow it for a while before they take up a normal NE-direction over land (MALMBERG, 1951, where there even is a map of the region under discussion). This has surely nothing to do with reversed migration as seen in the province of Skåne (Scania) every year early in spring in sudden cold, and still more normally in autumn nearly every day towards noon, when the warmth comes. Then the direction of the migrating Chaffinches (*Fringilla coelebs*) and other passerines radically changes, whereupon flock after flock disappears in the north.

The concentrating effect of the leading-lines is of course also different at different times. In spring the effect is evidently much less than in autumn—the diminished number of birds not forgotten—and this may be attributed to the very strong migratory urge at that time, a consequence of the phase of the sexual cycle, and the great height of flight in comparison with the autumnal conditions. Both factors are known to diminish the effect of the leading-lines. In my opinion it seems even reasonable to suppose that there is a less pronounced aversion to flying over strange biotopes in spring than in autumn, when the majority of individuals in the flights are young inexperienced birds.

Normally the leading effect of the southern and western Swedish coast-lines is very strong, even at the most narrow part of Öresund (The Sound), at Hälsingborg, where most land-birds follow the coast towards SSE instead of crossing the sea to Denmark at only a few kilometres distance. Waders, ducks and some raptors go out, however, without hesitation, and others can be induced to follow them as I reported in a short communication at the Uppsala Congress (op. cit.). On special, very rare occasions, when the birds fly high with a favourable wind or when the migratory urge is much strengthened by meteorological conditions, there can even be a typical broad-front migration over Öresund as for the north and south as one can see from the town. In spite of the named leading effect it is not probable that many of the birds passing along the Scanian west-coast ever come to Falsterbo, because there are promontories more to the south which without doubt lead the birds out over the sea.

The concentrating effect of the wind cannot be neglected in this connection. The birds passing over southern Sweden – not only raptors – are driven to such an extent that after some days of hard eastern or southeastern winds there are hardly any more birds to be seen at Falsterbo but a very good concentration at Hälsingborg and on northeastern Sjaelland (Zealand). Conversely, the prevailing western winds are of great importance for the Falsterbo concentration, and the Scanian southern coast with the broad Östersjön (Baltic) behind is the main leading-line. These phenomena were repeated several times when RUDEBECK (1950) observed the migration at Falsterbo and the author at the same time at Hälsingborg.

The effect of the coast-lines is easily exaggerated, however, if one does not recognize the principal aversion the birds have to fly over strange biotopes. An examination of the detailed topography of the inland is necessary in order to disclose the actual concentrating factors. There is, for instance, no doubt that over the land in the province of Småland north of Skåne – mostly wooded area of a uniform nature – there is a nearly ideal broad-front migration. But already in the middle of Skåne, where the cultivated plains begin, a concentration of birds of prey and many other species over all tree-covered areas will follow. This concentration is very obvious and can be followed in detail, e.g. on the Falsterbo-peninsula, where the flocks of Chaffinches and other passerines and even birds of prey often make several right angles in their flight in order to be able to follow as long as possible the known and protecting biotopes.

Surely the bird-rich wooded area west of the mountain Romeleåsen attracts a great part of at least the birds of prey passing over southwestern Skåne, and from its southwesternmost part the primary direction carries them straight to Falsterbo. I mean that it can in this case as well be the mountain and the woods and their direction that bring about the concentration of birds of prey as the coastal leading-lines. One can easily imagine a southwestern peninsula or another suitable place where the concentration is very meagre, while the inland topography leads the birds out at another point where also sea-crossing is easy, as for instance is the case with the birds of prey at Kulla-Gunnarstorp in NW Skåne. Relatively few such birds pass actually at the narrowest part of Öresund compared with the promontory of Kulla-Gunnarstorp a little more to the north.

When the birds finally arrive at the coast, its leading and concentrating effect thus depends upon various factors, partly already named: species, age, time of year, time of day, meteorological conditions, direction of the coast, height of flight, sociability, etc. It seems quite evident that the stronger the migratory urge is, the less is the leading and concentrating effect of the coast as well as of other deviating factors.

How strong is now the concentration of migrating birds at Falsterbo, where RUDEBECK more than ten years ago began his migration studies and where since then nearly continuous observations have been made in autumn? Of course it is very difficult to answer such a question, even for a single species. Falsterbo is known above all for its very high numbers of passing birds of prey, corvines, pigeons and various passerines. Only in the case of the Common Kite (*Milvus milvus*) has it been possible to determine the degree of concentration. The Kite's Scandinavian breeding-area is restricted to southern Sweden; it breeds nowhere towards the north-east from there, and the total Swedish population hardly surpasses 50 pairs a year, that is not more than 200 and probably only 150 indi-

viduals in autumn. The number of passing Kites at Falsterbo is very constantly about 60 every year and the concentration degree is thus very high. Of the same magnitude is surely the concentration of another soarer, the Common Buzzard (*Buteo buteo*), of which about 30·000 individuals pass in a year. Still more difficult is it to get an idea of the concentration of, let us say, the commonest of all Falsterbo-migrants, the Chaffinch, of which about half a million may pass in a year. The Chaffinch has a very wide and even distribution in northern Scandinavia, and perhaps we can refer to population studies like that of MERIKALLIO (1946) in Finland, whose figures may be reliable for such a common species. We then get the very, very roughly approximate result that about 50 millions of Chaffinches every year pass over southern Sweden, of which thus only about 1% or something like that leave at Falsterbo, a rather small concentration for a woodland bird.

Perhaps in the future it will be possible by means of intensified censuses and more recoveries of birds ringed at Falsterbo at the breeding-places in the north, to disclose the recruiting area of the most common species which pass at Falsterbo and to estimate the populations and population fluctuations on it. So the normal concentration degree for the species may be obtained and thereby a measure of the effect of the various leading and deviating phenomena. Falsterbo Fågelstation, the bird observatory at Falsterbo, which this year finally is ready to take up its activities, has many tasks, above all in the field of the study of the topographical concentration of flight-lines.

REFERENCES

- GEYR VON SCHWEPPEBURG, H. (1933): *Zur Theorie der Leitlinie*. Ardea 22: 83-92.
 - (1949): *Zur Theorie der Zugrichtung*. Ardea 36: 219-257.
 MALMBERG, T. (1951): *Bird Migration in NW Scania*. Proc. 10th Int. Orn. Congr.: 330-334.
 MERIKALLIO, E. (1946): *Über regionale Verbreitung und Anzahl der Landvögel in Süd- und Mittelfinnland, besonders in deren östlichen Teilen, im Lichte von quantitativen Untersuchungen*, 1-2. Ann. zool. Soc. Zool. Bot. Fennicae Vanamo 12, No. 1, 2.
 RUDEBECK, G. (1950): *Studies on Bird Migration, Based on Field Studies in Southern Sweden*. Vår Fågelvärld, Suppl. 1.
 SVÄRDSON, G. (1953): *Visible Migration within Fenno-Scandia*. Ibis 95: 181-211.