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# The Ottenby Bird Station

Ottenby Bird Station Report No. 8

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[This is an abstract of a report that was planned for the Congress but had to be cancelled due to the enforced absence of the author. In my place a report was given at the Congress by Mr. Viking Olsson. Originally, I wrote my report to suit a set of colour slides, which cannot be included here, and so I have preferred to revise it considerably, centering on a few points that make up the "individuality" of Ottenby as compared with similar institutions abroad, and leaving additional space for the presentation of some data from our work in recent years to show what kind of material is accumulated here for the benefit of future research.]

After some years of tentative banding and observation, the south point of the island of Öland was chosen as the site of a bird station—the first one in Sweden—for which funds were granted to the SOF (Sveriges Ornitologiska Förening) by seven private donors in the spring of 1945. This is classical ground for ornithological research, having been visited by Linné on his voyage to Öland in 1741 and known later for the important studies by Gustaf Kolthoff on sex and age differences in migration habits among the waders. It is notoriously rich in birds, with a species-list totalling 335 for the nearest 20 square kms. (perhaps the highest number recorded in Scandinavia for such a small piece of land). And more especially, its passage-migrant fauna includes a large element moving in NW—SE direction which makes it a valuable and rather contrasting complement to the observation point at Falsterbo, in SW Sweden, where the SOF also carries out migration studies.

In the summer of 1946, the Station building was ready: a wooden bungalow 8 × 14 m., containing a living-room, a laboratory, three bedrooms with a total of eight beds, a kitchen, and ample cellar space. Its surroundings are seen in fig. 1, with the lighthouse immediately to the south, open

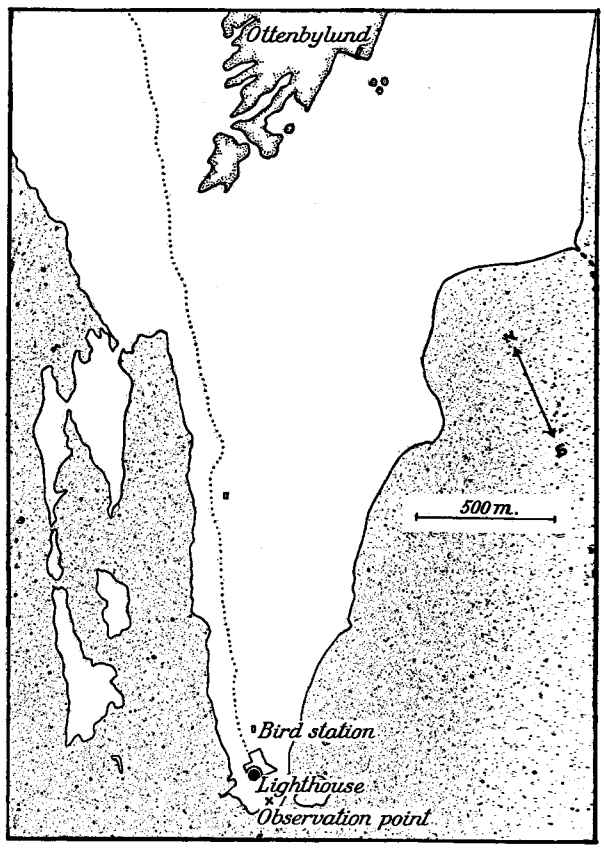


Fig. 1. Map showing the flat pasture-grounds of the south point of Öland, with the observation point, the lighthouse and its staff buildings, the Bird Station and, in the upper margin, the edge of the forest of Ottenbylund, where many birds take a rest before leaving the island. The path goes to the little village of Ottenby, situated by the main road 1 500 m. farther to the north.

ground to the east and west leaving a free view of the shores, and vast pasture-grounds north of it as far as the forest of Ottenbylund and the little village of Ottenby. The lighthouse tower, built in 1785, is the tallest in Scandinavia (125 ft.) and has a double 1 500 000 normal-light's electrical beam that turns around twice in a minute. It exerts a considerable attraction on birds passing by night in hazy weather, but deaths are not very numerous, thanks partly to the illumination of the tower by small lamps (as devised by Prof. Hugo Weigold, of the Vogelwarte Helgoland). The meteorological equipment of the lighthouse allows a continuous automatic registration of temperature, atmospheric pressure, and wind direction

and intensity, invaluable for the analysis of the dependence of migration upon weather. Rainfall and cloudiness is also recorded regularly.

Since 1947, the activity of the Station has been generously supported by the State Research Council of Sweden. Although it might have been possible with this support and other money available to carry out ornithological work on a small scale throughout the year, we considered it more promising to concentrate upon one single phase of the migration. Following this plan, the Station has been manned during the last few years from about June 1st to October 31st, a period covering the southward movement almost from its beginning and to a time when there is already a large component of "Winterflüchtlinge" among the birds passing. The staff consists of three or four persons: one field observer, and 2–3 banders of whom the senior one should be able to relieve the observer when necessary. Because of the very trying kind of work, this staff is changed each month as a rule—a procedure that may appear disadvantageous at first sight but that has proved very satisfactory in educating a generation of competent migration students, who can return here or take up their own work at other places in the country. This last point is not without importance; indeed, it appears highly desirable to get regular information on a small scale—*e.g.*, by whole-day observation once a week—from some scattered places in addition to the large body of data accumulated at the chief points of migration study in Sweden: Ottenby and Falsterbo. Such activity would complete our picture of the general course of bird migration over our country, and it has already proved valuable for the registration of the irregular "irruptions" of certain species as well as for the study of local modifications in migration behaviour. The recent work of Tore Andersson and Dag Hannerz at Väddö (Uppland) (Rospiggens Grisslehamnsnummer, 1949, p. 27) and of Folke Hanström at Karlshamn in Blekinge (Blekingeboken, **24**: 124, 1946) is a promising example of this kind.

The problems tackled at Ottenby are the same as those facing migration students in many other places. Rather than reviewing them here—which would largely mean a repetition of points already stressed in this volume—I shall try to give an idea of the general character of the field work carried out at the Station and of the kind of material that is put at the disposal of the SOF through its recent activity.

Banding is carried out with the aid of a "Helgoland trap" on open ground in the station garden, other big passerine traps in the lighthouse gardens, a few "hawk traps," 15–20 wire cages on the wrack-beds of the shore, and some experimental traps of other kinds. Among these devices, the wire cages attract major interest due to their very specialized

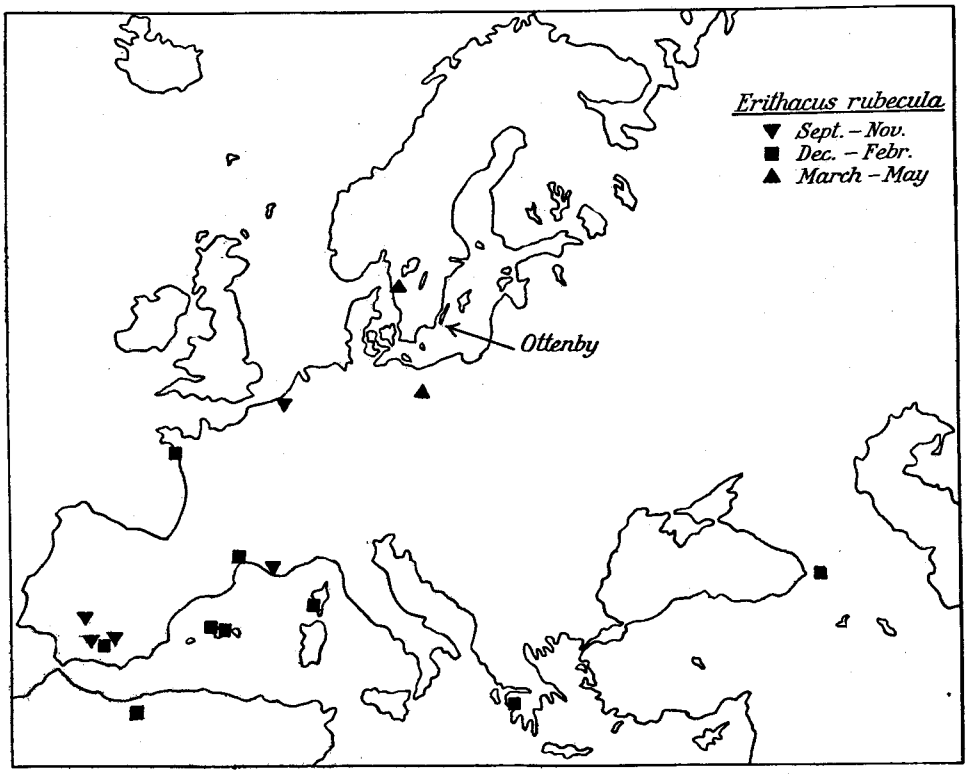


Fig. 2. Recoveries up to Dec. 1, 1950, of robins (*Erithacus rubecula*) trapped and banded on autumn passage at Ottenby 1937–49. The recoveries were made within 30 days—30 months from the date of marking, the mean being 10 months. It seems probable from this figure that some recoveries still remain to be made at least from the '49 markings, so that the rate of returns (now 16/3177 = 0.5 per cent) will finally amount to about 0.7 per cent.

operation and the large number of individuals of a few species that will be caught in them when conditions are favourable (the position of the level of the water is of special importance). For instance, we owe to these cages the banding in 1948 of 71 *Arenaria interpres*, 64 *Calidris minuta*, and 76 *C. temminckii*; in 1949 of 325 *Anthus pratensis*, 80 *A. cervinus*, 527 *A. spinoletta*, 1 348 *Motacilla alba*, 119 *Calidris canutus*, 3 552 *C. alpina*, and 169 *C. ferruginea*; and in 1950 of 164 *Philomachus pugnax*, 535 *Tringa glareola*, and 268 *T. totanus*. It may be seen that these are partly such species, which are otherwise only rarely banded and for which the speed of migration and the details of destination are thus largely unknown (*cf.* fig. 3). For *Calidris alpina*, it has indeed been possible to establish, through

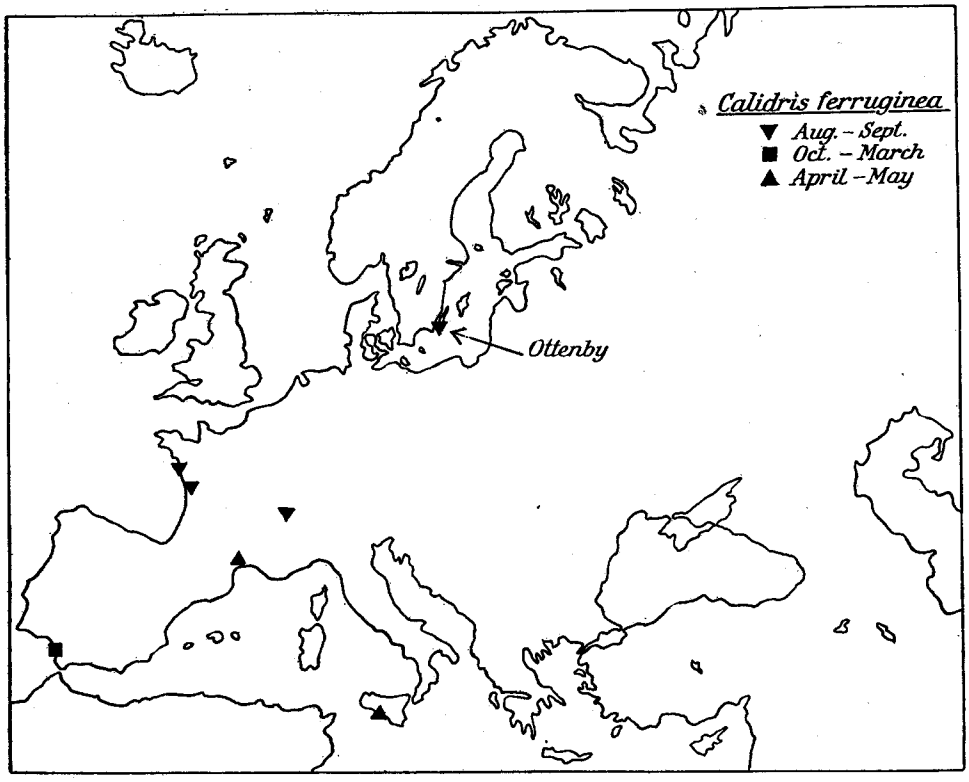


Fig. 3. Recoveries up to Dec. 1, 1950, of curlew-sandpipers (*Calidris ferruginea*) trapped and banded on autumn passage at Ottenby 1937–49. A considerable speed of passage from the Baltic to France is indicated by the recovery of 3 individuals in the latter country after 7, 12, and 14 days, respectively; but still the average time within which the returns were reported amounts to 12 months, due to the others coming considerably later (for instance, the control at Ottenby was made after 35 months). The final recovery rate is estimated at about 2 per cent for this species under present conditions, which would require one or two additional returns from the good catches in 1949, but clearly this figure cannot be relied upon very much with such a limited material as 424 markings.

recoveries at Ottenby, 19 separate cases of an individual keeping to the same migration route at least for two different years. This is interesting not only because of the general scarcity of such records for any species but also in view of the remote origin of these birds, presumably the N. Russian tundra. The catches also allow a quantitative estimate of the passage of each species that will often be more real than the figures obtained by direct observation of the migration. This is especially the case for the rarer *Calidris* species which are difficult to pick out from the ra-

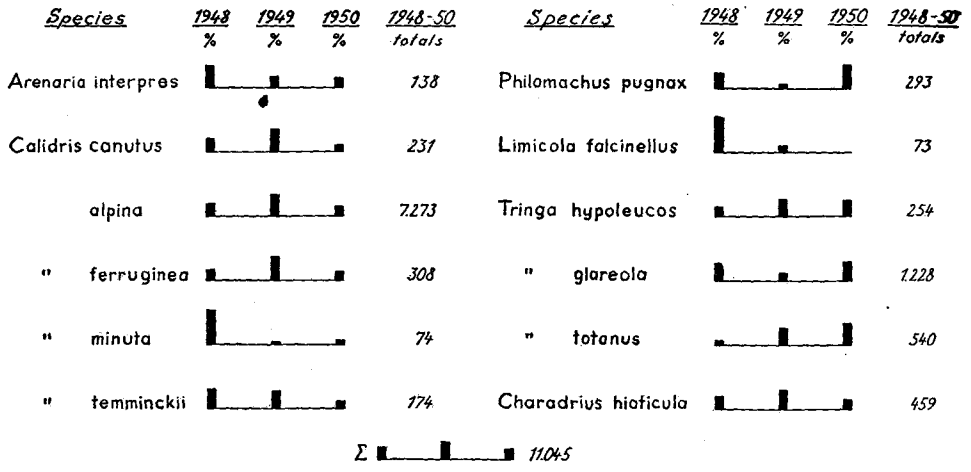


Fig. 4. Bar diagrams to show fluctuations in the autumn-passage of waders over Ottenby 1948–50 as indicated by the yearly differences in wire-cage catches. (From a material of more than 11 000 birds.) All species of which over 70 individuals were caught in the 3-year period have been included. The bars show the catch in each year reduced to per cent of the total catch of the species 1948–50 (absolute figures for the latter are given to the right). The diagram at bottom, showing the pooled percentage for all species and thus measuring the approximate efficiency of trapping in each year, may be used for reference; but the reader is reminded that these values are somewhat unduly influenced by one single species (*Calidris alpina*), so that if this species were excluded the pooled diagram would appear almost perfectly balanced.—It may be seen that while the values for some species (*e.g.*, *Tringa hypoleucos* and *Charadrius hiaticula*) are fairly stable, there are in other cases striking trends which, however, do not exhibit any interspecific conformity. Surely such fluctuations are sometimes spurious: an abnormal level of the water during the peak of passage may have influenced the catches of a certain species; or weather conditions may have caused the birds to remain at Ottenby longer than usual resp. to pass in numbers without resting. But when an influx of a certain species is noted over great parts of W. Europe, as often happens, other explanations are called for. An occasional large-scale change of migration route or a real change of population would reasonably be involved in these cases; but the lack of continuous observations in E. Europe and particularly in S. Russia leaves us uncertain about the state of things.

pidly passing flocks of *C. alpina* and *Charadrius hiaticula*, and for those species which leave chiefly by night. Finally, some of the birds caught in the autumn of 1950 were subjected to physiological and parasitological investigations by visiting scientists from abroad.

Much less attention has been paid to the banding of nestlings around the Station, in spite of the unusual richness of the local breeding fauna. About 90 per cent of the figures for banded nestlings is assignable to the nearby colonies of *Delichon urbica*, *Larus ridibundus*, and *Larus canus*, and to certain species of duck to which Notini's method of wing-marking

(*cf.* Vår Fågelvärld **6**: 28, 1947) has been successfully applied. Only this intentional disregard of the resident birds has made it possible to carry out a program for intensive migration research with such limited means as have been hitherto available. It is important in this connection that we have also been free from the task of organizing banding activity in other parts of the country, with the time-consuming office work that follows such a task. On the contrary, rings were put at our disposal and the correspondence regarding the recoveries was handled by the Vertebrate Department of Riksmuseum (Stockholm).[1] This has been a great help to the Station Committee[2] in reducing office work to a minimum.

Since the establishment of the Station, great emphasis has been placed upon the field observations. It was soon realized that only regular whole-day observations could provide a reasonably adequate material for a study of the diurnal migration in its different aspects: the number of individuals and species of birds passing by, with its fluctuation from day to day and from year to year; the diurnal rhythm of each species and its dependence on light and weather conditions; flight direction and flight technique; social behaviour, etc. Thus, from 1947, the observation point 300 m. to the south of the Station (*cf.* fig. 1) has been manned, with few exceptions, from about half an hour before sunrise to half an hour after sunset during the whole working season. This program, laborious though it is, has well repaid the work spent on it. It is evident from the data assembled that observations restricted to the migration maximum in the morning hours and the secondary maximum in the evening, although fairly representative as far as the relative number of migrants between different days is concerned, will give quite a misleading picture of the migration of those species which have a less pronounced diurnal rhythm, or of those which will respond to certain weather situations by passing by in great numbers without regard to the hour. There are even some species showing a maximum about noon (*Apus apus*) or in the afternoon before the general evening migration (*e.g.*, some waders).

In order that the material of observations should be easily accessible for research work, the body of data for each year has been reduced to tables giving comprehensive information on the main course of migration at Ottenby from June to October. For the purpose of this paper, I have condensed some of these tables still further and shall conclude by presenting

[1] Through the courtesy of its director, Prof. Hialmar Rendahl, and Miss Greta Westergren.

[2] The Ottenby Bird Station Committee was appointed by the SOF Committee in 1945 and consists of four persons, responsible for the activity of the Station: Gustaf Danielsson (practical management), Dr. Gunnar Svärdson (scientific planning), Bertil Haglund, and the author.

them here together with some brief explanations. They generally concern the "autumn" seasons of 1948–50, with an observation period of resp. June 2–Oct. 30, June 1–Oct. 31, and May 29–Oct. 31. As far as a column for 1947 has also been included, it should be noted that this year is not strictly comparable with the other ones on account of a difference in observation period (June 15–Nov. 14). However, this is not likely to influence appreciably the trends which these tables are intended to illustrate.

Tab. 1.

| Banded | 1937–47 | 1948 | 1949 | 1950 | M 1948–50 |
|---|---|---|---|---|---|
| Banded after trapping.... | 7 285 | 7 472 | 13 009 | 10 577 | 10 353 |
| Banded when young ..... | 524 | 1 799 | 1 050 | 985 | 1 278 |
| S | 7 809 | 9 271 | 14 059 | 11 562 | 11 631 |

Table to show the banding activity at Ottenby. The material from each year has been divided into two groups, one including those birds which have been banded after trapping and which will with few exceptions be passage-migrants, the other including those banded when young. The result of the tentative marking in 1937, 1938, 1946, and 1947 has been added together in one column; from 1948, when the trapping devices were put up to their present state, the results are given separately, and the mean values for these years have been calculated to the right. From records published, it seems that the yearly totals, as well as the separate figures for banded passage-migrants, are the highest ones attained so far by any bird-trapping station. As to the recovery percentages, a pooled value would be of little interest, but some specific figures may be mentioned. Thus, among species of which three or more recoveries have been reported, the highest percentage is attained by *Capella gallinago* (3 returns up to Dec. 1, 1950, from 13 markings in 1937–50 = 23 %—certainly an unreliable figure, but perhaps not far from reality because of the intensive hunting of this bird) and by *Accipiter nisus* (5 returns up to Dec. 1, 1950, from 44 markings in 1937–49 = 11 %). Second among the waders, apart from some definitely unreliable figures for *Numenius*, *Limosa*, and *Recurvirostra*, ranks *Tringa totanus* with 3 % (18 returns up to Dec. 1, 1950, from 607 markings in 1937–50). Considering the bottom values, the most disappointing case is perhaps the lack of recoveries from the 628 markings of *Lanius collurio* in 1937–50; and the happiest manifestation of chance is the recovery in Spain of one out of 7 *Muscicapa parva* banded in 1937–49.

Tab. 2.

| Order/Suborder | 1937–47 | 1948 | 1949 | 1950 | M 1948–50 |
|---|---|---|---|---|---|
| Passeriformes | 59 | 57 | 68 | 62 | 62 |
| Apodiformes | 1 | 1 | 1 | 1 | 1 |
| Piciformes | 1 | 3 | 3 | 2 | 3 |
| Falconiformes | 4 | 2 | 4 | 3 | 3 |
| Anseriformes | 9 | 8 | 4 | 7 | 6 |
| Charadrii | 19 | 19 | 21 | 23 | 21 |
| Lares | 6 | 5 | 3 | 6 | 5 |
| Galliformes | 1 | 1 | 1 | 1 | 1 |
| Other groups | 4 | 5 | 5 | 6 | 5 |
| S | 104 | 101 | 110 | 111 | 107 |

In this table is shown the number of species banded at Ottenby in different years and their systematic distribution. Groups usually represented by less than three species have only been tabled separately if the annual catch exceeds 10 individuals on the average.—Comparing with tab. 5 a, we can see that nearly as many species of waders are banded each year as are seen on diurnal migration. In fact, among the waders listed as diurnal migrants during one or more of the autumn seasons 1947–50 only six species have failed to go into the wire-cages at least once, and of these, two could be added to the ringing-list by marking young birds of the local population (*Numenius arquata*, *Recurvirostra*), while the other four have not yet been banded (*Limosa limosa*, *Tringa nebularia*, *Pluvialis apricaria*, *P. squatarola*). On the other hand, two species which have never been recorded on daylight passage because of a preference for nocturnal migration or because of their scarcity, have been occasionally trapped and banded (*Lymnocryptes*, *Xenus*). Turning to the passerine birds, an equally close relationship is found between banding and daylight passage. Only four species recorded on diurnal migration have not yet been trapped at the Station: *Corvus frugilegus*, *Plectrophenax*, *Lullula*, and *Riparia*. In their place, a number of exclusively nocturnal migrants are regularly banded, so that there are still more species of Passeriformes listed in this table than in tab. 5 a. For other groups, such as the Falconiformes and Anseriformes, there is a marked discrepancy in the other direction between the present table and tab. 5 a. The figures for the ducks and gulls would be still lower, were it not for the regular banding of the young of several resident species.

Tab. 3.

| Order/Suborder | 1937–47 | 1948 | 1949 | 1950 | M 1948–50 |
|---|---|---|---|---|---|
| Passeriformes | 4 973 | 5 256 | 8 924 | 8 017 | 7 399 |
| Apodiformes | 423 | 102 | 45 | 52 | 66 |
| Piciformes | 3 | 7 | 61 | 9 | 26 |
| Falconiformes | 20 | 7 | 30 | 57 | 31 |
| Anseriformes | 180 | 159 | 99 | 138 | 132 |
| Charadrii | 1 893 | 3 457 | 4 793 | 3 016 | 3 755 |
| Lares | 254 | 263 | 87 | 225 | 192 |
| Galliformes | 56 | 9 | 8 | 17 | 11 |
| Other groups | 7 | 10 | 12 | 31 | 17 |
| S | 7 809 | 9 270 | 14 059 | 11 562 | 11 630 |

Table giving the quantities of birds banded at Ottenby since 1937 and their systematic di tribution. Space has not allowed a separation in this table of individuals banded after trappin and those banded as young birds, but the latter group is negligible except for the Passeriforme Anseriformes, and Lares. The abrupt rise of the woodpecker curve in 1949 was due to an irrup tion of *Dendrocopos major*.—A partial specification of the figures given here for the Charadr may be found in fig. 4. As regards the 1950 figure for Passeriformes, the reader is referred t the comments in Table 4 on the banding of spring migrants during this year.

Tab. 4.

| Species | 1937–47 | 1948 | 1949 | 1950 | M 1948–50 |
|---|---|---|---|---|---|
| *Sturnus vulgaris* | 36 | 189 | 441 | 956 | 529 |
| *Carduelis spinus* | 4 | 6 | 519 | 19 | 181 |
| *Anthus spinoletta* | 95 | 84 | 527 | 159 | 257 |
| *Motacilla alba* | 747 | 328 | 1 348 | 1 260 | 979 |
| *Phylloscopus trochilus* | 175 | 76 | 584 | 1 059 | 573 |
| *Phoenicurus phoenicurus* | 362 | 266 | 446 | 541 | 418 |
| *Erithacus rubecula* | 1 175 | 1 137 | 865 | 772 | 925 |
| *Delichon urbica* | 19 | 1 276 | 789 | 583 | 883 |
| *Calidris alpina* | 1 080 | 2 141 | 3 552 | 1 580 | 2 424 |
| *Tringa glareola* | 230 | 476 | 217 | 535 | 409 |
| S | 3 923 | 5 979 | 9 288 | 7 464 | 7 577 |

In this table are listed those 10 species of which a total of more than 500 individuals w banded during one or more of the years 1948–50. Many of these species are regularly found amo those topping the ringing records; others, like *Carduelis spinus*, are represented here only b cause they have been trapped on an exceptional scale during a single irruption year. The hi

figures for *Delichon* are almost exclusively due to the banding of residents (mostly nestlings), whereas for the other species this has been of no importance. The 1950 values for *Phylloscopus trochilus* and *Phoenicurus phoenicurus* are largely due to the extension of ringing activity during this year to the spring migration period in May; to the quantity of other species tabled, spring banding added little or nothing.—A daily figure of more than 500 for a single species has only been attained once: on Aug. 1st, 1949, 654 birds were banded among which were 604 *Calidris alpina*.

Tab. 5 a.

| Order/Suborder | 1947 | 1948 | 1949 | 1950 | M |
|---|---|---|---|---|---|
| Passeriformes | 32 | 38 | 38 | 36 | 36 |
| Apodiformes | 1 | 1 | 1 | 1 | 1 |
| Falconiformes | 17 | 13 | 16 | 15 | 15 |
| Anseriformes | 22 | 20 | 20 | 22 | 21 |
| Colymbiformes | 2 | 2 | 2 | 2 | 2 |
| Columbiformes | 4 | 3 | 3 | 3 | 3 |
| Charadrii | 25 | 26 | 27 | 27 | 26 |
| Grues | 1 | 1 | 1 | 1 | 1 |
| Lares | 14 | 13 | 14 | 13 | 14 |
| Other groups | 3 | 4 | 7 | 6 | 5 |
| S | 121 | 121 | 129 | 126 | 124 |

Table showing the species-distribution of passage-migrants at Ottenby in autumn, as indicated by daylight observations of birds disappearing over the sea in E—S—W direction. The arithmetical means are given in the outer right column, the totals at bottom. Groups represented by but one or a few species have been separately tabled only if they are usually present in a fairly great number of individuals (*cf.* tab. 6 a).—Clearly, the total number of species observed each year at Ottenby is much higher than that given here, due particularly to the presence of numerous species of exclusively nocturnal migrants resting in the neighbourhood.

Tab. 5 b.

| Order/Suborder | 1947 | 1948 | 1949 | 1950 | M |
|---|---|---|---|---|---|
| Passeriformes (mostly *Hirundo, Delichon, Riparia*) | 3 | 4 | 2 | 6 | 4 |
| Apodiformes (*Apus*) | 1 | 1 | 1 | 1 | 1 |
| Falconiformes (mostly *Falco, Accipiter*) | 3 | — | 3 | 5 | 3 |
| Other groups | — | 1 | 1 | 12 | 4 |
| S | 7 | 6 | 7 | 24 | 11 |

Table showing the species-distribution of passage-migrants recorded on reversed migration at Ottenby in autumn, as indicated by daylight observations of birds appearing over the sea from E—S—W and moving in over land in W—N—E (usually rather straight N) direc-

tion. This phenomenon is usually connected with winds from the north, which is a rather rare event on Öland; and it is illuminating from an aerodynamical point of view that the birds involved are mostly swallows, martins, swifts, and birds of prey, which are all characterized by a gliding or soaring flight. The immediate origin of these north-going migrants is rarely quite clear. Often it seems that they have really tried to leave Öland in a normal direction although at altitudes out of field-glass range from the observation point, and later lost height and been forced to return along the sea level. However, the Swift—and to some extent also the Swallow and the Martins—seem generally inclined to move against the wind and will thus continue to fly northwards even over great land areas if the northerly wind remains steady for some time. Under such circumstances, the birds observed on reversed migration at Ottenby might be of a more distant origin.—All of the species indicated here were also observed on normal southward migration.

**Tab. 6 a.**

| Order/Suborder | 1947 | 1948 | 1949 | 1950 | M |
|---|---|---|---|---|---|
| Passeriformes | 110 900 | 176 300 | 196 300 | 260 400 | 186 000 |
| Apodiformes | 137 500 | 97 900 | 57 700 | 119 000 | 103 000 |
| Falconiformes | 870 | 570 | 1 250 | 1 360 | 1 010 |
| Anseriformes | 48 100 | 40 300 | 68 700 | 51 300 | 52 100 |
| Colymbiformes | 260 | 40 | 790 | 670 | 440 |
| Columbiformes | 3 450 | 3 560 | 5 440 | 7 880 | 5 080 |
| Charadrii | 30 400 | 28 200 | 52 100 | 47 700 | 39 600 |
| Grues | 1 900 | 1 260 | 3 420 | 2 210 | 2 200 |
| Lares | 10 600 | 11 000 | 29 100 | 15 600 | 16 600 |
| Other groups | 20 | 10 | 70 | 30 | 30 |
| S | 344 000 | 359 100 | 414 900 | 506 200 | 406 100 |

Table to show the numbers of south-bound passage-migrants at Ottenby in autumn, as indicated by daylight observations (*cf.* text of tab. 5 a). All figures (also means and totals) have been rounded off: below 10 000, to the nearest 10; above 10 000, to the nearest 100. —It is easily seen that the total quantity is not comparable with that reported from Rossitten or Falsterbo; but as the specific composition is largely different, individual figures will still be higher than at these places (as compared with Falsterbo, esp. *Motacilla alba* and *Apus apus*).

**Tab. 6 b.**

| Order/Suborder | 1947 | 1948 | 1949 | 1950 | M |
|---|---|---|---|---|---|
| Passeriformes (mostly *Hirundo, Delichon, Riparia*) | 8 820 | 750 | 230 | 930 | 2 680 |
| Apodiformes (*Apus*) | 1 500 | 2 390 | 4 500 | 5 810 | 3 550 |
| Falconiformes (mostly *Falco, Accipiter*) | 40 | — | 20 | 20 | 20 |
| Other groups | — | — | 120 | 280 | 100 |
| S | 10 360 | 3 140 | 4 870 | 7 040 | 6 350 |

Table 6 b shows the numbers of north-bound passage-migrants at Ottenby in autumn, as indicated by daylight observations (*cf.* text of tab. 5 b).—Only for one species and in one year did the number of individuals moving to the north exceed the number of those seen moving in the normal direction (*Delichon urbica*, 1947: + 2 840, — 8 160). On their final migration in that autumn the House Martins would have avoided a passage over Ottenby, or moved south at heights where they could not be seen by the observer.

Tab. 7.

| Species | 1947 | 1948 | 1949 | 1950 | M |
|---|---|---|---|---|---|
| *Sturnus vulgaris* | 56 300 | 33 700 | 59 200 | 105 400 | 63 700 |
| *Chloris chloris* | 70 | 3 000 | 11 600 | 1 430 | 4 030 |
| *Carduelis cannabina* | 7 470 | 22 500 | 30 200 | 20 500 | 20 200 |
| *Fringilla coelebs* | 4 100 | 18 600 | 3 530 | 20 500 | 11 700 |
| *F. montifringilla* | 5 450 | 12 700 | 8 920 | 1 890 | 7 240 |
| *Alauda arvensis* | 2 100 | 1 970 | 10 100 | 3 790 | 4 490 |
| *Motacilla alba* | 17 000 | 22 200 | 34 500 | 36 400 | 27 500 |
| *Hirundo rustica* | 3 580 | 3 850 | 3 850 | 11 700 | 5 750 |
| *Delichon urbica* | 2 840 | 9 400 | 7 120 | 18 400 | 9 440 |
| *Riparia riparia* | 2 270 | 3 930 | 1 000 | 15 800 | 5 750 |
| *Apus apus* | 137 500 | 97 900 | 57 700 | 119 000 | 103 000 |
| *Anas penelope* | 5 000 | 9 950 | 12 400 | 17 600 | 11 240 |
| *Calidris alpina* | 8 000 | 8 630 | 23 300 | 20 200 | 15 000 |
| *Larus ridibundus* | 6 350 | 5 010 | 13 100 | 8 500 | 8 240 |

This table includes 14 species which during one or more of the observation years 1947–50 reached a yearly total of more than 10 000 individuals counted on diurnal migration to the south. (Figures rounded as in tab. 6.) The list is not quite complete: some species of diving duck, which have—or may have—reached similar figures, had to be disregarded because a large proportion of the individuals of this group could not be specifically determined on account of their great distance from the observer; and this in turn means that the totals noted for each of these species are, to a varying degree, too low and are not suitable for comparison with those of other species. (In principle, this reasoning also applies to the swallows and to *Anas penelope*; but the error introduced here is of little significance.)—When comparing the yearly totals for all birds, given at the bottom of tab. 6 a, it is seen that, on the average, more than half the number of autumn-migrants counted at Ottenby represent four single species: *Apus apus*, *Sturnus vulgaris*, *Motacilla alba*, and *Carduelis cannabina*. But it is also evident that the 14 species of this table are not all among the 14 most common migrants at Ottenby. Some of them (*Chloris*, *Alauda Hirundo*, *Riparia*) are represented here only because their number has risen abruptly in a single year from a normal level of 3 000–4 000 or less. The possible causes of such incidents are discussed in the text of fig. 4.

Tab. 8.

| Species | 1947 | 1948 | 1949 | 1950 | M |
|---|---|---|---|---|---|
| *Sturnus vulgaris* ..... | — | — | — | 2 | < 1 |
| *Fringilla coelebs*..... | — | — | — | 1 | < 1 |
| *Riparia riparia* ..... | — | 3 | — | 1 | < 1 |
| *Apus apus* ..... | 4 | 3 | — | 5 | 3 |
| S | 4 | 3 | — | 9 | 4 |

Table to show how many times an individual species has been recorded as passing over Ottenby in more than 10 000 specimens in one day of its autumn migration. It is seen from a comparison with tab. 7 that those two species, which top the list of yearly totals, are also ahead of the others with regard to the number of days in which a large-scale passage takes place (*Apus*, *Sturnus*). On the other hand, *Fringilla coelebs* only ranks sixth on the list of yearly totals, and *Riparia* comes still lower. Their presence in this table is due to the well-known, but not well-explained fact that many species, although extending their migration over a considerable period, tend to concentrate numerically to one or a few days in the season. This behaviour —fittingly called "lavinfenomenet," or the avalanche phenomenon, by Svärdson (1950 b)— is shown to a varying degree by representatives of most bird groups. However, in some groups (*e.g.*, gulls and terns) it is quite rare and may even be reversed; that is, the more or less moderate hump that usually occurs at the centre of any migration curve, where the dates are plotted on the abscissa, is subnormally low or even absent. Such birds will appear in the observer's record on a relatively larger number of days than the typical "avalanche species", although the actual length of the migration period, as counted from the first to the last day of observation, will not necessarily differ between the two groups.

Tab. 9.

| | | | | | |
|---|---|---|---|---|---|
| *Sturnus vulgaris* | 92 | *Anas platyrhynchos* | 53 | *Charadrius hiaticula* | 63 |
| *Hirundo rustica* | 62 | *A. penelope* | 57 | *Haematopus ostralegus* | 61 |
| *Apus apus* | 84 | *A. acuta* | 70 | *Larus ridibundus* | 85 |
| *Accipiter nisus* | 60 | *Numenius arquata* | 84 | *L. canus* | 75 |
| *Tadorna tadorna* | 63 | *Calidris alpina* | 80 | *L. fuscus* | 63 |

In this table are listed those species which were seen performing migration movements during more than one third of the number of observation days in 1950 (May 29–Oct. 31: 156 days). Only 5 out of these 15 species were recorded on passage more than half the number of days. Comparing with tab. 7, it is seen that the two quantitatively dominating birds of this year (*Apus*, *Sturnus*) are among those topping the list; this is primarily due to certain characteristics of their migration, involving irregular weather-movements and a regular "Zwischenzug," respectively. We also observe that 5 out of the 10 most common species are not present here. In their place, we find some species which did not reach a yearly total of more than 1 000–4 000, in one case (*Accipiter nisus*) 660 migrants. This should be seen in the light of what is said in the text of tab. 8 on the irregularity of the relationship between high daily figures, high seasonal figures, and the length of the migration period.

## References

Only the papers mentioned below are exclusively—or almost exclusively—related to the bird migration at Ottenby (short notes and some older reports of limited interest excluded). For details about banding and observations, and for photographs of the trapping devices, the reader is especially referred to the annual reports of the Station.


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