# The Distribution of Birds and the Recent Climatic Change in the North Atlantic Area.

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(Med et Dansk Resume: Fuglenes Udbredelse og Klimaforandringen i det nordatlantiske Omraade.)

It is a well-known fact that a climatic change is taking place in the North Atlantic area, causing an amelioration of the life-conditions of many animals and plants. The climatic change is observable from Greenland and Spitsbergen in the North to Central Europe in the South. The influence of this change on both the marine and the terrestrial organisms has been enormous, and a copious literature has grown up on this subject. On account of the far reaching economic importance attached to the problem of the influence of the climatic change on the distribution of marine animals, the "Conseil permanent International pour l'Exploration de la Mer" at a meeting of the North-Western Area Commitee on Oct. 22nd 1947 pointed out that it was of the utmost interest to collect all possible relevant information regarding this problem. Requests should be sent to suitable bodies for information, and a leaflet distributed by the Bureau also asked for "short abstracts of information on terrestrial animals and plants". This is the background for the preparation of the following brief description of the recent changes in the distribution and occurrence of birds in the area from Greenland to Denmark which are correlated with the climatic change in the same period.

From a faunistic point of view it is necessary to separate the *Nidiates* (populations which breed regularly, annually in the area in question) and the *Accidates* (birds which occur only irregularly in the area, single individuals or flocks being recorded at intervals of several years). The third faunistic category, the *Annuates*, play only a minor rôle in this respect, as they — so far we know — have only undergone small and quite insignificant changes in recent years.[1])

[1]) A definition of these faunistic categories have been given by SALOMONSEN (1946, p. 42).

The including of the accidates in the present study may seem somewhat peculiar or even quite superfluous. The accidates, however, are much more important in the arctic countries with their small number of nidiates than in the temperate zones, and besides the annuates show as marked a correlation to the climatic factors in their occurrence as do the nidiates. One example will suffice to show this fact. The Fieldfare (*Turdus pilaris*) was hitherto unknown north and east of Iceland, and was a very rare visitor to this latter country. However, during the recent mild period the following records have been published which considerably widen the area of its distribution to the North and West:

*Canada:* One shot at Foxe Bassin east of Baffin Land in 1940 (TAVERNER 1940, p. 119).

*West Greenland:* One shot at Fiskenæs 1925, two at Sydprøven 1937, one at Lichtenau in 1937 and one at Nanortalik in 1937 (HØRRING & SALOMONSEN 1941, p. 73). Has bred at Narssak in Julianehaab District in 1944.

*East Greenland*: One shot at Angmagssalik 1936 (HØRRING & SALOMONSEN 1941, p. 74), one at Myggebugt 1937 (BIRD & BIRD 1941, p. 118).

*Iceland:* Prior to 1900 only 3 records known, until 1912 6-7 new records, later it has become a "rather frequent winter-visitor" (SÆMUNDSSON 1934, p. 29).

It must be pointed out that there are previous periods known with higher temperatures and a simultaneous increase in the occurrence of southern species in Arctic countries.

**1. Greenland (primarily Western).**

Previous mild periods are known to have occurred in W. Greenland in the years about 1820-30, 1840-50 and 1870-80, but none of these were so pronounced and so extended in time as the recent one which commenced about 1900, but did not reach its extreme until after 1920.

The occurrence of Cod (*Gadus callarias*) in the Greenland waters is closely correlated with the temperature of the water, and an abundance of Cod along the coast is usually given as evidence of a mild climatic period. According to H. RINK Cod were present in enormous numbers in S.W. Greenland in the years round 1820. It then disappeared but was found again

very abundantly from about 1840 to 1850. It then did not occur again (or, at least, was not recorded) until the present mild period, in which the number of Cod especially increased in the years 1916-30 (A. JENSEN 1939, p. 7 & p. 12). In the intervening colder periods the Cod occurred only locally and in very small numbers in W. Greenland, and it is to be noted that we have no evidence of its occurrence during the mild period of 1870-80. According to verbal information by Prof. A. JENSEN the temperature-increase during this period was very slight.

In the present mild period especially the winter temperatures have increased in the Arctic. At Jakobshavn, W. Greenland (at 69° n. lat.) the winter-temperature from 1883 to 1922 gradually increased and had advanced almost 2° C. when it suddenly increased in the years 1923-32 being more than 5° C. higher than fifty years ago. The same development took place at Spitsbergen, where it was even more pronounced. The mean-temperature of the winters 1911-20 was — 17.6°, in 1921-1930 — 13.2° and in 1931-35 — 8.6° *i. e.* 9° C. higher than before 1920. In the same period the annual mean was in Jakobshavn only 2.5° C. and in Spitsbergen only 1.7° C. above the normal (A. JENSEN 1939, p. 35 & 54). In recent years the temperature has continued to increase in the arctic region, reaching an extreme at Spitsbergen during 1937-39 when the winter mean-temperature was no less than 16-17° C. above the normal (A. JENSEN 1944, p. 7).

*Nidiates:* No comprehensive faunistic work has been carried out in recent years, but judging from local investigations only minor changes have taken place. Some sea-birds have more or less decreased in number, but this is no doubt primarily due to persecution by man and not to climatic factors. Changes in distribution are not known, with the exception of the White-fronted Goose (*Anser albifrons*), a southern species, the northern limit of whose breeding-area is on about 72° n. lat., which has considerably increased in number in the northernmost parts of its breeding-territory. Several species winter in greater number in North Greenland than in former times, *e. g.* Mallard (*Anas platyrhynchos*), Long-tailed Duck (*Clangula hyemalis*) and others, and some species stay in their breeding-territory before moving to the South for a longer time than recorded in previous

periods, *e. g.* Kittiwake (*Rissa tridactyla*); (cf. H. FENCKER 1947, p. 166).

*Accidates:* The only examples of southern species having bred in Greenland in the recent mild period as breeding-visitors[1]) are the following:

Long-billed March Wren (*Telmatodytes palustris*) bred in Godthaabsfjord 1943. This is the only known breeding-record of this species in Greenland.

Fieldfare (*Turdus pilaris*) bred at Narssak in Julianehaab District in 1944. This is the only known breeding-record of this species in Greenland.

Canada Goose (*Branta canadensis*) has bred in 1945, 1946 and 1947 at Sarqaq in Jakobshavn District. Said to have bred 1863 and 1864 (when a specimen was shot) at Disko, but evidence not sufficient.

These breeding-records must no doubt be due to the recent amelioration of the climate. A similar instance was the occurrence and supposed breeding of the Whitecrowned Sparrow (*Zonotrichia leucophrys*) in the Godthaab District in 1824, during another period with higher temperatures.

The number of casual visitors, recorded, has considerably increased in recent years, especially since 1920. A number of new species, hitherto never observed in the country, have been met with. Lists of records have been published by SALOMONSEN 1935 and by HØRRING & SALOMONSEN 1941. Since this latter year the number of new species recorded, has still increased, but the records have not yet been published.[2]) The accidates which occur are for the greater part American species of boreal origin, many have come from Iceland, but only a few from the European mainland.

A statistic treatment of accidates is difficult, as the number of records is dependent on the intensity of the ornithological investigation during the period in question. When discussing

[1]) For the expression "breeding-visitor" cf. SALOMONSEN 1946, p. 46.

[2]) Among the species new to Greenland, recorded sinse 1941 but not yet mentioned in the literature are the following: Blue-winged Teal (*Anas discors*), Little Blue Heron (*Florida caerulea*), Belted Kingfisher (*Ceryle alcyon*), Tree Swallow (*Iridoprocne bicolor*), Canada Warbler (*Wilsonia canadensis*).

the material given below, it must be kept in mind that in the period 1880-1920 a very intense activity took place in West Greenland, far larger than in any period prior or subsequent to that. Nevertheless, in the period 1920-41 the following species new to Western Greenland were recorded: American Velvet Scoter (*Melanitta fusca deglandi*), Red-necked Grebe (*Podiceps g. griseigena*), Greater Yellow-leg (*Tringa melanoleuca*) (in 1917), American Avocet (*Recurvirostra americana*), Little Gull (*Larus minutus*), Great Blue Heron (*Ardea h. herodias*) (in 1918), Spoonbill (*Platalea leucorodia*), Black-browed Albatros (*Diomedea melanophrys*), Gannet (*Morus bassanus*) (also occurred once during the warm period 1842), Northern Cliff Swallow (*Petrochelidon albifrons*), Oven-bird (*Seiurus aurocapillus*), Iceland Redwing (*Turdus musicus coburni*) (already from 1916, and two records from the mild period in 1845), Fieldfare (*Turdus pilaris*), American Pine Grosbeak (*Pinicola enucleator leucura*) (in 1919), Common Crossbill (*Loxia c. curvirostra*), Waxwing (*Bombycilla g. garrulus*), Baltimore Oriole (*Icterus galbula*), Siberian Golden Plover (*Charadrius dominicus fulvus*), besides many species new to East Greenland, where the conditions, however, differ so much that they cannot be compared with those in West Greenland. The great bulk of the species enumerated above, are southern ones. Some species show a marked correlation between the mild periods and their occurrence in Greenland, *e. g.* the Myrtle Warbler (*Dendroica coronata*). The following records are known: 1841, 1847 (in the warm period 1840-50), 1878, 1880 (in the warm period 1870-80), and finally 1931, 1937 in the recent warm period. Cf. also *Turdus musicus* and *Morus bassanus*, mentioned above, the earlier records of which fall in the mild period 1840-50.

The high-arctic accidates show to the contrary the largest number of records in the more cool periods, and have all decreased in number in recent years. Some instances shall follow: Grey Plover (*Squatarola squatarola*) in the cool period 1830-40 5 records, 1850-70 3, 1880-1920 14, after 1920 5 records. In the warm periods 1820-30, 1840-50 and 1870-80 no records. The same is the case with the other high-arctic species: Pectoral Sandpiper (*Calidris melanotus*): 1850-70 3 records, 1880-1920 9 records. Whiterumped Sandpiper (*C. fuscicollis*) 1830-40

2 records, 1880-1920 12 records, after 1920 1 record. Wedge-tailed Gull (*Rhodostethia rosea*) 1850-70 4 records, 1880-1920 8 records, after 1920 1 record. Northern Horned Lark (*Eremophila a. alpetris*) 1830-40 1 record, 1880-1920 11, after 1920 1. Thus, there is no doubt about the fact that the movements of the birds in the Greenland area are to a considerable extent dependent on the air-temperature.

**2. Iceland.**

*Nidiates:* A small number of southern species has immigrated to the southern parts of Iceland during this century. They are now rather commonly met with, and are either regular or exceptional breeding-birds. They are the following: Lesser Black-backed Gull (*Larus fuscus graellsi*) (first regular occurrence 1905), Herring Gull (*L. a. argentatus*) (since 1927; cf. TÅNING 1928, p. 90), Black-headed Gull (*L. r. ridibundus*) (since 1927 besides an older breeding-record from 1911), Swallow (*Hirundo r. rustica*) (only occasional breeder), Short-eared Owl (*Asio f. flammeus*) (since 1928), and perhaps Starling (*Sturnus vulgaris*), but no proof.

Of the ordinary breeding birds only the Redwing (*Turdus musicus coburni*) appears to have increased in recent years. Another bird has considerably increased, *viz.* the Fulmar (*Fulmarus glacialis*), but this increase has probably nothing to do with the climate as the Fulmar has steadily grown in number and extended its breeding-area in the North Atlantic zone for more than 100 years (*i. e.* it has immigrated to the Faroes, enormously increased in Great Britain, and immigrated to Norway).

*Accidates:* A number of boreal, Scandinavian or British species which previously were irregular and occasional visitors to Iceland have increased considerably in number since about 1900 and many have now become regular winter-visitors to the country. This significant change has particularly been studied by the late Dr. SÆMUNDSSON; his most comprehensive paper was published in 1934; cf. also his handbook 1936. The most important species in this regard are: Blackbird (*Turdus m. merula*), Fieldfare (*T. pilaris*), Waxwing (*Bombycilla garrulus*), Starling (*Sturnus vulgaris*), Long-eared Owl (*Asio o. otus*), Cur-

lew (*Numenius a. arquata*), Coot (*Fulica a. atra*), Heron (*Ardea c. cinerea*), and Common Gull (*Larus canus*).

In recent years (after 1935) a number of southern species, boreal and even subtropical, have appeared as rare visitors in Iceland, originating from America as well as Europe. According to the papers by F. GUDMUNDSSON (1938-1945) the most important are the following: From America Kildeer (*Charadrius vociferus*), Solitary Sandpiper (*Tringa solitaria*); from the Old World White's Thrush (*Turdus dauma aureus*), Short-toed Lark (*Calandrella b. brachydactyla*), Scarlet Grosbeak (*Carpodacus erythrina*), Siberian Ruby-throat (*Luscinia calliope*), Land-Rail (*Crex crex*), Siskin (*Carduelis spinus*), Ortolan Bunting (*Emberiza hortulana*), Yellow Bunting (*E. c. citrinella*), Wood-Warbler (*Phylloscopus sibilatrix*), Blackcap (*Sylvia a. atricapilla*), Jack Snipe (*Lymnocryptes minimus*), Sky-Lark (*Alauda a. arvensis*), Honey-Buzzard (*Pernis a. apivorus*), Great Crested Grebe (*Podiceps c. cristatus*), Rock-Pipit (*Anthus spinoletta* subsp.), and Song-Thrush (*Turdus ericetorum* subsp.).

The avifaunal change in Iceland is in satisfactory accordance with developments in central and North-eastern Europe as recently analyzed by O. KALELA (1946, p. 77). Since about 1870 the winter-temperatures have steadily increased and a number of birds have increased in number or moved to the North. All these birds are residents or very early arriving summer-residents, which are capable of taking advantage of the climatic amelioration in winter and early spring. Similarly, all species which have immigrated to Iceland since about 1900 or have increased as winter-visitors belong to the same categories. In recent years (after 1930) the summer-temperatures have also increased and southern species more susceptible to the cold have moved to the North. Similarly in Iceland a number of southern species have appeared as rare accidates in this period.

**3. Faroes.**

*Nidiates:* During the last hundred years some species have decreased in numbers or have been exterminated, but this is due to human agency; so also is the increase or immigration of a few species, *e. g.* The Redwing (*Turdus musicus coburni*), which bred in the plantations of Thorshavn in 1869, 1900 and

regularly since 1928. In this not very important case, however, the climate may also be involved.

Only three species have immigrated as a result of a climatic change, *viz.* the Common Gull (*Larus c. canus*), which has established itself as a breeding-bird since 1890; the Black-headed Gull (*Larus r. ridibundus*) which has bred since 1869 (apart from a single breeding-record in 1848); and Leach's Fork-tailed Petrel (*Oceanodroma l. leucorrhoa*) which was not known as a breeding-bird until 1934 (but had probably immigrated some years earlier) and has now increased considerably. The avifaunal change has been described by SALOMONSEN 1935a, p. 241—252.

In recent years (after 1935) a few southern species have immigrated to the Faroes (cf. the recent occurrence of southern species in Iceland, mentioned above) *viz.* Twite (*Carduelis f. flavirostris*) (since 1938), House-Sparrow (*Passer d. domesticus*) (since 1935), Grey Lag-Goose (*Anser anser*) (since 1939; had bred previously but was exterminated prior to 1832), Common Redshank (*Tringa totanus*) (since 1944) and Lap-wing (*Vanellus vanellus*), which is now fairly widespread. Some other species have increased considerably: Red-necked Phalarope (*Phalaropus lobatus*) and Manx Shearwater (*Puffinus p. puffinus*) (cf. K. WILLIAMSON 1945a, p. 550—558). From recent Faroe literature it also appears that some passage- and winter-visitors have increased and spend a longer time on the islands than in previous periods.

*Accidates:* The Faroes are situated on the northern border of the temperate region and the occurrence of accidates of southern origin is therefore not of the same significance as in the arctic countries. Nevertheless, a correlation with the climatic conditions is noticeable. In the newest hand-list of Faroe birds (K. WILLIAMSON 1948, p. 311) 216 species and subspecies are enumerated. In 1862 only 125 forms were known, *i. e.* the number has increased by almost a hundred in this period, and by far the majority consists of accidates. The number of species new to the islands has steadily increased, the increase being especially large during the last decades of the 19th century owing to intense ornithological activity in the islands at that time. Still in most recent years, during the world war II new species have been found, the records being published by

Mr. WILLIAMSON. Among the latest novelties are such markedly southern species as White's Thrush (*Turdus dauma aureus*), Little Tern (*Sterna a. albifrons*), and White-winged Black Tern (*Chlidonias leucopterus*) (WILLIAMSON 1945, p. 25).

The bird-life in the Faroes is so well-known and the reports on occurrences of rare birds so numerous that it is impossible to go into details; the general notes above must suffice. It is suggestive that several species which were unknown in the Faroes a few years before 1900, *e. g.* Yellow Bunting (*Emberiza citrinella*) (first record 1897), Redstart (*Phoenicurus ph. phoenicurus*) (first record 1897) and Black-cap (*Sylvia a. atricapilla*) (first record 1895) are now almost regular — although very infrequent — visitors to the islands.

**4. Denmark.**

*Nidiates*: Considerable changes have taken place in the Danish avifauna during the last 50 years. This is partly due to the human activities. The increasing cultivation of the soil, the drainage of moors, the drying up of lakes, the afforrestation of the deciduous woods etc. have led to extermination or enormous decrease of several species. On the other hand some species have immigrated to the country owing to the plantation of coniferous forrests, started in the middle of the 19th century. All these changes are not dealt with here.

Apart from this, however, the climatic change has influenced the bird-life at a large scale. This is primarily due to the amelioration of the climate, with increasing temperatures in summer and winter, but also to the gradual drying up of the lakes in Eastern Europe and Western Asia, which has forced several fresh-water birds to immigrate to Western Europe (cf. O. KALELA 1940, p. 41).

In the first part of the period in question (up to 1930)[1]) the winter-temperature gradually increased, but the summer-temperature was slightly lower and the climate moister than previously. These facts have probably caused the decrease in the number of the Stork (*Ciconia c. ciconia*) and the Black Stork (*C. nigra*) and the extermination of the Roller (*Coracias g. gar-*

[1]) The change in the Danish bird-life until 1930 has been described by SALOMONSEN (1930, p. 26—45).

*rulus*) and the Hoopoe (*Upupa e. epops*). During the same period the following species have immigrated from the South owing to climatic factors (not human activity): The Bullfinch (*Pyrrhula pyrrhula minor*), Chiffchaff (*Phylloscopus c. collybita*), Firecrested Wren (*Regulus i. ignicapillus*), Short-toed Tree-Creeper (*Certhia brachydactyla*), Grey Wagtail (*Motacilla c. cinerea*), Black Redstart (*Phoenicurus ochruros gibraltariensis*), Crested Lark (*Galerida c. cristata*)[1]), Turtle-Dove (*Streptopelia t. turtur*), Grasshopper-Warbler (*Locustella n. naevia*), Red-breasted Flycatcher (*Muscicapa p. parva*), Great Grey Shrike (*Lanius e. excubitor*), Stonechat (*Saxicola torquata rubecula*), Great Reed-Warbler (*Acrocephalus a. arundinaceus*), Black-necked Grebe (*Podiceps n. nigricollis*), Tufted Duck (*Aythya fuligula*), Montagu's Harrier (*Circus pygargus*), and Little Gull (*Larus minutus*).

Some of the species mentioned did not invade Denmark until after 1930, but they had for a long time been moving northwards in Slesvig and Holstein, and are therefore included here. The immigration and increase of the Serin (*Serinus canaria serinus*) and the Pochard (*Aythya f. ferina*) has probably nothing to do with the climatic change as they had been increasing for more than 100 years. The immigration of the Crested Tit (*Parus cristatus mitratus*) is due to coniferous plantations.

Besides, a number of species reaching their northern limit as breeding-birds in Denmark have increased considerably in number and have at the same time immigrated northwards to Sweden, where they were hitherto unknown as breeding-birds (cf. however foot-note 2 below). The most important are the following: Black-tailed Godwit (*Limosa l. limosa*), Golden Oriole (*Oriolus o. oriolus*), Sandwich Tern (*Sterna sandvicensis*), and Avocet (*Recurvirostra avosetta*)[2]).

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[1]) The northward extension of the breeding-area of the Crested Lark is partly also due to ecological reasons, *i. e.* the alteration of the landscape by human agency.

[2]) The Avocet had bred irregularly and in very small numbers during previous mild periods in southern Sweden prior to 1880. The Black-tailed Godwit had survived during the colder period although in small numbers on Öland but had disappeared from Gotland about 1880. In 1933 it settled on Gotland again and already in 1922 it immigrated to Skåne. The Sandwich Tern immigrated to South Sweden in 1911, the Oriole in 1932 (there is a doubtful record of its breeding in about 1912).

Other species, which have always been very common in Denmark, have become still more abundant and have occupied other ecological niches, *e. g.* have immigrated to the cities. The most important are: Black-headed Gull (*Larus r. ridibundus*), Blackbird (*Turdus m. merula*), Song-Thrush (*T. ericetorum philomelos*), Moor-Hen (*Gallinula c. chloropus*), Coot (*Fulica a. atra*) and Ring-Dove (*Columba p. palumbus*). Finally, a number of nidiates and annuates have changed their habits in this period and have to an increasing extent become residents or winter-visitors instead of summer-residents or passage-migrants. This is the case of the Black-headed Gull, Teal (*Anas c. crecca*), Curlew, Starling and many others.

In most recent years (after 1930) the summer-temperatures tures have slightly increased in Northern and Central Europe, and new changes have taken place in the bird-fauna. Continental species like the Stork and Black Stork have slightly increased in number (certainly not very much), the Roller[1]) and the Hoopoe are more regularly observed than prior to 1930 and have increased as breeding-birds in the surrounding countries. The majority of species which immigrated to Denmark before 1930, as mentioned above, have increased further in numbers, and new ones are occurring. The most important of these are: Southern Cormorant (*Phalacrocorax carbo sinensis*) (since 1938), Razorbill (*Alca torda*) (since 1925), Guillemot (*Uria aalge intermedia*) (since 1929), Spoonbill (*Platalea leucorodia*) (irregularly since 1928), Red-crested Pochard (*Netta rufina*) (since 1940), Curlew (*Numenius a. arquata*) (since about 1930). Great Black-backed Gull (*Larus marinus*) (since 1930), Norwegian Lesser Black-backed Gull (*Larus fuscus intermedius*) (since about 1930), Kittiwake (*Rissa tridactyla*) (since 1941). More detailed information about these immigrants are to be found in recent papers by P. JESPERSEN (1946) and B. LØPPENTHIN (1948). For the sake of completeness it has to be mentioned that the immigration and increase of the Razorbill and the Guillemot may be due to the strict protection of these species on their Swedish breeding places, which had the effect of increasing their numbers enor-

[1]) In a noteworthy paper S. DURANGO (1947, p. 145) recently has shown the marked correlation between the distribution of the Roller in Scandinavia and the summer-temperature and rainfall.

mously. The surplus may then have settled down on the near-by Danish breeding-places.

*Accidates:* In the arctic countries, dealt with above, the amelioration of the climate has pushed a number of southern, boreal species to the North as rare visitors. In Denmark proper, there are only small chances that southern species (originating in this case from the mediterranean, subtropical fauna) should visit the country owing to the climatic change. Besides, Denmark is surrounded by large land-masses with a varied bird-life, and so the greater part of the species which could be expected here as more or less rare visitors have already occurred long ago. Furthermore, the chances of obtaining records of rare birds from abroad are much smaller here than in isolated areas like Iceland, Greenland etc. Nevertheless, the Danish bird-list has been added to by about 15 species in recent years, but from a faunistical point of view these records are not especially interesting, although most of them are strictly southern. A detailed analysis would probably show that the number of rare visitors has increased in the last 25 years, but such an analysis has not been carried out, and the number of records is — and must be — so insignificant compared with those in Iceland, Greenland etc. that it is not worth while discussing it further.

## DANSK RESUME

### Fuglenes Udbredelse og Klimaforandringen i det nordatlantiske Omraade.

I de senere Aar har en paafaldende Ændring i Klimaet fundet Sted i det nordatlantiske Omraade, fra de arktiske Egne helt ned til Mellemeuropa. Klimaforandringen har ikke sat ind paa samme Tid og med samme Styrke i de forskellige Dele af dette meget store Omraade, men overalt har Forandringerne givet sig Udslag i en Stigning af Vintertemperaturen, i de arktiske Egne desuden i en mindre Forøgelse af Sommertemperaturen. I de allersidste Aar (efter ca. 1930) er ogsaa Sommertemperaturen steget i de boreale Egne, samtidigt med at Temperaturforøgelsen i de arktiske Egne er blevet endnu større.

Denne Klimaforandring har haft meget stor Indvirkning paa Dyrelivet, idet en Række Former har udvidet deres Udbre-

delsesomraade mod Nord. I Artiklen gives en kortfattet Oversigt over Forskydningen i Fuglelivet i Omraadet fra Grønland over Island-Færøerne til Danmark. Der skelnes overalt mellem Nidiaterne og Accidaterne, mens Annuaterne ikke viser særlige Ændringer. (Om disse Udtryk se SALOMONSEN 1946.)

**Grønland:** *Nidiater*: Ingen paafaldende Forandringer, ingen nyindvandrede Arter. *Accidater:* Tre Eksempler kendes paa Ynglegæster: Sjagger (ynglet i 1944), Langnæbet Mosegærdesmutte (*Telmatodytes palustris*) (i 1943) og Kanadagaas (i 1945-47). Som tilfældige Gæster har en lang Række Arter vist sig i Perioden 1920-41, som ikke hidtil var kendt fra Grønland. De er opregnet p. 89, og nogle andre nye Arter fra 1941-47 er nævnt i Fodnoten p. 88. Der gøres opmærksom paa, at Accidaternes Forekomst viser en god Korrelation til Temperaturforholdene, idet de sydlige Arter fortrinsvis optræder i Varmeperioderne (1820-30, 1840-50, 1870-80 og efter 1920) mens de nordlige (højarktiske) Arter omvendt forekommer i de mellemliggende koldere Perioder. De omtalte Forhold tager kun Sigte paa Vestgrønland, idet Østgrønland er for lidt kendt til, at der kan drages generelle Slutninger.

**Island:** *Nidiater:* Enkelte sydlige Arter har i dette Aarhundrede indvandret til Island, nemlig Sildemaage, Sølvmaage, Hættemaage og Mosehornugle, mens Landsvale kun ruger uregelmæssigt, og Stærens Ynglen ikke med Sikkerhed er bevist. *Accidater*: Et Antal Fugle, der tidligere blot var kendt som mere eller mindre sjældne Gæster, er efter Aar 1900 taget betydeligt til i Tal og er nu praktisk talt regelmæssige Vintergæster. Det gælder Solsort, Sjagger, Silkehale, Stær, Mosehornugle, Stor Regnspove, Blishøne, Fiskehejre og Stormmaage. I de seneste Aar (efter 1935), efter at Sommertemperaturen yderligere er steget, har en Række som oftest sydlige Arter vist sig som sjældne Gæster paa Island, hvorfra de ikke tidligere var kendt. De paagældende Arter er opregnet p. 91.

**Færøerne:** *Nidiater:* Enkelte sydlige Arter er indvandret som Ynglefugle, nemlig Hættemaage og Stormmaage. Hertil slutter sig den oceaniske Stor Stormsvale. I de seneste Aar (efter 1935) er, som ventet, yderligere en Række sydlige Arter indvandret, nemlig Bjergirisk, Graaspurv, Graa-

gaas, Rødben og Vibe, ligesom enkelte i Forvejen kendte Ynglefugle er blevet almideligere. *Accidater:* Da Færøerne ligger relativt langt mod Syd, kan ikke ventes særlig stor Forøgelse af sydlige Arter, men Tallet af nye Arter forøges dog stadigt og Listen er i de sidste Aar forøget med saa udprægede sydlige Arter som Dværgterne, Hvidvinget Terne og Gulddrossel. Det er endvidere symptomatisk, at en Del Arter, der var ukendt paa Øerne før 1900, nu er næsten regelmæssige — endskønt meget faatallige — Vintergæster; det gælder Gulspurv, Rødstjert og Munk.

**Danmark:** *Nidiater:* Mere end for de ovenfor omtalte Omraaders Vedkommende har i Danmark Menneskets Aktivitet været medvirkende til at ændre Fuglefaunaen. Dette er i det følgende ikke behandlet. Derimod har Klimaændringen været Skyld i, at en Række Fuglearter fra Syd er indvandret til Landet. Før 1930 indvandrede de p. 94 opregnede Arter til Danmark eller Slesvig-Holsten. I samme Periode tiltog andre Arter i Tal, dels saadanne som her havde deres Nordgrænse, og som nu indvandrede til Sverige (Pirol, Klyde, Stor Kobbersneppe, Splitterne), dels ganske almindelige Arter, som ændrede deres Biologi, indvandrede til Byerne, delvis fra Trækfugle blev Standfugle, o. s. v. (Hættemaage, Solsort, Sangdrossel, Ringdue, o. s. v). I samme Periode, under hvilken Sommertemperaturen endog var lidt lavere end før og Somrene lidt fugtigere, gik Stork og Sort Stork tilbage i Tal og Hærfugl og Ellekrage forsvandt. Efter 1930 steg Sommertemperaturen atter, Storken og Sort Stork tiltog (ganske vist ikke meget) og Hærfugl og Ellekrage tiltog i de omliggende Lande, ligesom nye Arter indvandrede (opregnet p. 95). *Accidater:* Endnu mere end for Færøerne gælder det i Danmark, at man ikke kan vente, at sydlige tilfældige Gæsters Forekomst skal vise nogen Korrelation til den nuværende Klimaændring. Henved 15 nye Arter har vist sig i de senere Aar, de fleste af dem udpræget sydlige, og selvom meget tyder paa, at deres Forekomst her i Landet staar i Forbindelse med Klimaændringen, er der ikke gaaet nærmere ind derpaa, da de sydlige Accidaters Optræden i Danmark ikke er af nær den Betydning som i de arktiske Omraader.

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