Considerations on Avifaunal Connections Across the North Atlantic

by
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(Med et dansk resumé: Betragtninger over fuglenes udbredelse over Nordatlanten til Grønland).

During a study of the geographical distribution of the family Laridae (NØRREVANG, in press) the problem of the North American Herring Gull, *Larus argentatus smithsonianus* Coues, was touched upon. Evidence was clearly in favour of an affinity to the European form, *Larus a. argentatus* Pont., not to the North Pacific form, *Larus argentatus vegae* Palmén.

Now it was found necessary to decide, whether the American form had been derived from the European form or vice versa. The evidence used in this decision was a comparison to the other instances of trans-atlantic distribution, in other words to those bird species that show a distribution on both sides of the North Atlantic and in which species it is possible to deduce, from which side the spread took place.

It was found convenient not to present the evidence in the main study, but to publish it separately in the present form.

The geographical distribution of the species in question was outlined by means of handbooks and handlists. Two kinds of evidence was used. First, species which are distributed on either side of the North Atlantic and which are not circumpolar in their range, and second, species that migrate regularly across the North Atlantic, a spread along the migration route being taken as evident.

OCEANIC BIRDS

Some real oceanic birds — mostly belonging to the family Alcidae — are distributed on both coast of the Atlantic North.

Several species e. g. *Alca torda, Uria aalge, Fratercula arctica, Oceanodroma leucorrhoa, Sula bassana, Phalacrocorax carbo,* and *Rissa tridactyla* are distri buted towards south to approximately the same boundary. It may very well be caused by the sea, even if these species are not plankton-feeding, except *Oceanodroma leucorrhoa* and to a less degree, *Rissa tridactyla.* In the other species, their food items may be dependent on the plancton production.

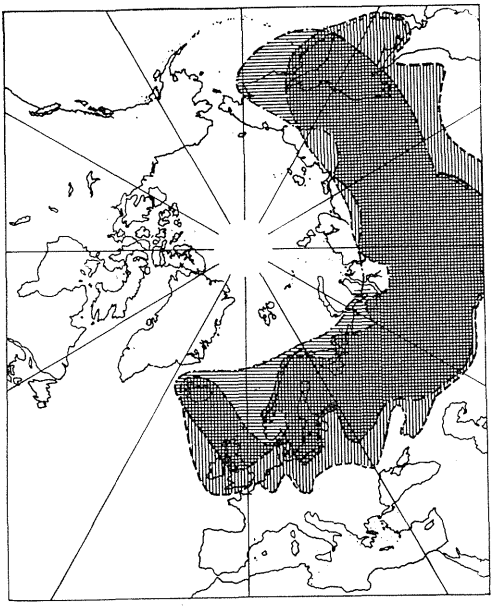
The northern limits of the mentioned species are highly different.

These species are so closely bound to the ocean, where they spend all their time off the breeding season, that their recent distribution does not give any clue as to their place of origin.

WATERFOWL, GULLS ETC.

Ducks, geese, swans, gulls, terns and a few other bird groups may for their ability to spread across greater water expanses be regarded as intermediate between oceanic birds and true land birds. In fact they are able to rest on the sea, while land birds are nearly always deemed to death if they are forced to alight on the water. Of course these birds are usually not able to feed on the sea as are the real oceanic birds, and this condition puts them into the intermediate group.

Several species of ducks have spread from the European continent as far as Iceland. This applies to *Anas crecca*, *Anas penelope*, *Anas strepera*, *Anas acuta*, *Aythya fuligula*, *Aythya ferina* and *Aythya marila*. (Map 1). Of these species *Anas crecca* is of rather regular occurrence in the southern parts of Greenland (see also *Pluvialis apricaria*, *Numenius* phaeopus, p. 102 and map 3). The occurrence in Greenland of this species is divided into two peaks, one in spring consisting of adult birds, that have obviously been on their way to the breeding grounds in Iceland and were wind-drifted to Greenland. In autumn young birds are met with, which origin from the Iceland population, too. Most of these birds were recorded from the west coast of southern Greenland (the same thing applies to Numenius phaeopus and Pluvialis apricaria, see p. 102) but as man is distributed abundantly on the west coast and only sparsely on the east coast, this fact does not tell anything about the real numbers of birds occurring in the respective areas. It must be assumed that by far most of the birds reaching Greenland will turn up on the east coast, only they are not observed, because nobody is present to do so, except at a few places as Scoresbysund and Angmagssalik, from where, indeed, comparatively many individuals were reported.



Map 1.
The breeding areas of Wigeon (Anas penelope) *horizontal hatch and of Tufted Duck* (Aythya fuligula) *vertical hatch.*

Fig. 1.
Yngleudbredelse af Pibeand (*Anas penelope*) vandret skravering og af Troldand (*Aythya fuligula*) lodret skravering.

Thus it seems justified to assume, that the abundance on the east coast of the mentioned species by far exceeds that on the west coast.

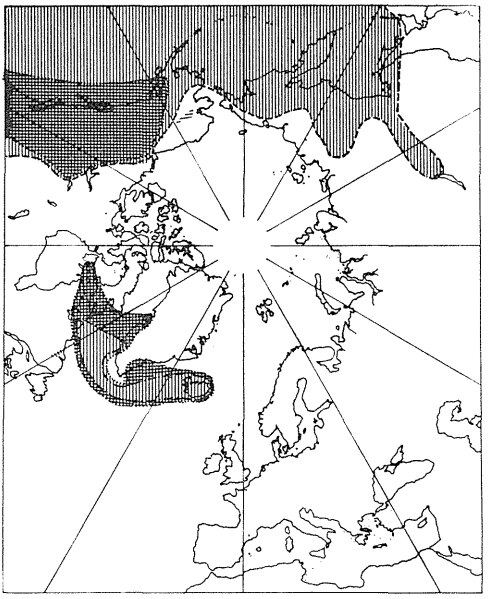
Anas platyrhynchos conboschas is distributed as a common breeding bird in southern Greenland, on the east coast north to Angmagssalik and on the west coast to Disko. Possibly the Greenland subspecies can be regarded as a derivative of the west palaearctic population, as the Iceland form, which was formerly recognized as a separate subspecies, *A. p. subboschas* Brehm is in all respects intermediate between the European and the Greenland populations. The Greenland Mallards are migratory birds, but they do not wander farther than the south of

Greenland, so that the migration does not give any clue as to the origin of this subspecies.

In some species of geese, however, the migration clearly shows that the populations of Iceland and/or Greenland were derived from European populations. This applies to *Cygnus cygnus*, which breeds in Iceland, and was formerly found breeding in southern Greenland, too. Apparently these populations winter in England, especially at the Outer Hebrides. *Anser fabalis brachyrhynchus* breeds in Iceland, and in Greenland from Scoresbysund to Hochstetter Forland, it winters in Ireland. *Anser albifrons flavirostris* is endemic to Greenland and is found breeding on the west coast only, from Godthåb to Upernavik. It winters in the British Isles, mainly in Ireland. Apparently the birds cross the ice-cap or migrate along its border in the interior of the coast land. *Branta leucopsis* breeds in NE Greenland from Scoresbysund to Germania Land, and evidently it winters in the British Isles, chiefly on the Outer Hebrides, as shown by ringing results. *Branta bernicla rhota* breeds in the northern parts of Greenland and in Ellesmere Land, Axel Heibergs Island, Prince Patrick Island, and in several other places in the Canadian Arctic Archipelago and on the north coast of Mainland Canada, too. (SNYDER 1957). The evidence on the migration of this species is highly complicated, one part wintering in the British Isles and migrating via Iceland and across the ice-cap somewhere between Angmagssalik, Scoresbysund and Godhavn and thence north along the west coast of Greenland. Some individuals or populations probably migrate north along the east coast, too, as the species is found breeding, although scarce, in NE Greenland. Some of the Greenland birds are told by SALOMONSEN (1950) to winter on the east coast of North America and they are supposed to cross the Baffin Bay between Ungava Bay and Holsteinsborg-Egedesminde.

Most of the duck species of Iceland migrate to western Europe, especially the British Isles, but there is one exeption. Several specimens of *Clangula hyemalis*, ringed in Iceland, have been found wintering in the southern parts of Greenland, where the Greenland populations winter, too. Further *Histrionicus histrionicus* and *Bucephala islandica* are clearly of American origin, as both these species are distributed in part of North America and in Iceland, but not in the Palaeartic region. (Map. 2).

Among the gulls, *Larus marinus* in Greenland is evidently of European origin, as no subspecies were described, and the main distribution is in Europe. *L. marinus* is in Greenland a non-migratory bird, but another larid, which breeds



Map 2.
The breeding areas of Barrow's Goldeneye (Bucephala islandica) *horizontal hatch, and of Harlequin Duck* (Histrionicus histrionicus) *vertical hatch.*

Fig. 2.
Yngleudbredelse af Islandsk Hvinand (*Bucephala islandica*) vandret skravering, og af Strømand (*Histrionicus histrionicus*) lodret skravering.

commonly in Greenland is highly migratory, namely *Sterna paradisaea*. Ringing results show that the eastern North American populations cross the Atlantic, to Ireland or further south on the west coast of Europe, from where they proceed south along the west coast of the Old World. This indicates, that these populations may have been derived from the European ones. Recently it was shown by MANNING *et al.* (1956) that there is a significant difference in bill length between theoretical east- and west-migrating populations of *Sterna paradisaea* in North America.

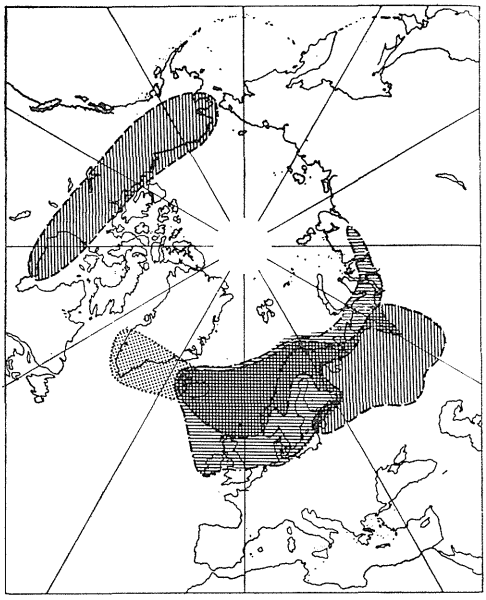
Several other instances could be mentioned of species, that have reached Iceland from Europe, but on the whole it can safely be concluded that the Icelandic bird fauna is either holartic or palaeartic, except for two or three species that are nearctic. It therefore seems unnecessary to mention all the species involved, and, moreover, some of them are going to be discussed under the heading: Recent changes.

WADERS

Passerines, most waders, and birds belonging to several other groups have the feature in common that they have to cross water expanses in non-stop flight. This naturally puts a certain limit to the distance which can be crossed by migration over sea. Obviously the distance from Greenland to the British Isles — in some, if not most, cases via Iceland — does not mean a serious obstacle to the spread and migration of several species of the above mentioned groups. The migration of the Alaskan population of *Pluvialis dominica*, which migrates to Hawaii or even farther into Polynesia, may be brought in mind in this connection. See also WILLIAMSON (1958).

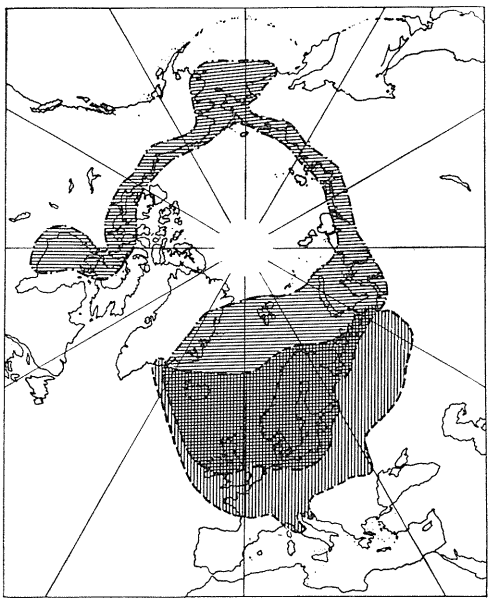
Several species of waders have reached Iceland from Europe, e. g. *Haematopus ostralegus*, *Pluvialis apricaria* (Map 3), *Numenius phaeopus* (Map 3), *Limosa limosa*, *Tringa totanus* and *Gallinago gallinago*. All the species mentioned have their northwestern limit in Iceland, and many of them are confined to the climatically more favourable areas in the southern part of Iceland. Their recent spread in Iceland will be touched upon later.

As mentioned their breeding ranges do not extend into Greenland, but some of them, e. g. *Numenius phaeopus* and *Pluvialis apricaria* are of regular occurrence in the southern parts of Greenland each year (Map 3.). Obviously the birds oc-



Map 3.
The breeding areas of Golden Plover (Pluvialis apricaria) *horizontal hatch, and of Whimbrel* (Numenius phaeopus) *vertical hatch.*

Fig. 3.
Yngleudbredelsen af Hjejle (*Pluvialis apricaria*) vandret skravering, og af Småspove (*Numenius phaeopus*) lodret skravering.

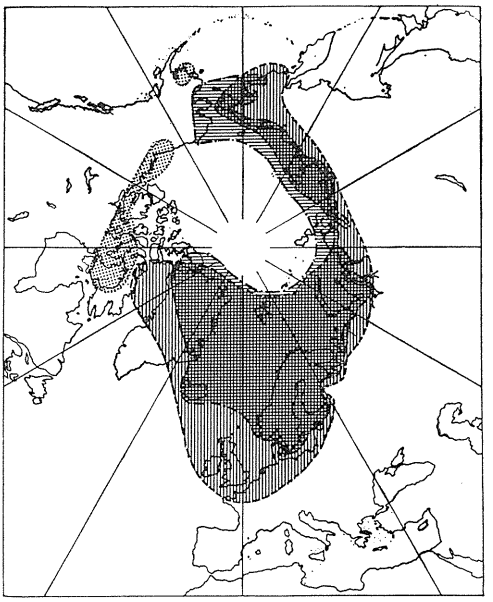


Map 4.
The breeding areas of Dunlin (Calidris alpina) *horizontal hatch, and of Meadow Pipit* (Anthus pratensis) *vertical hatch.*

Fig. 4.
Yngleudbredelse af Ryle (*Calidris alpina*) vandret skravering, og af Engpiber (*Anthus pratensis*) lodret skravering.

curring in Greenland are birds, that did not strike upon Iceland in their migration. Breeding was never stated, however.

This constitutes a transition to the condition shown by the distribution of some other waders as *Calidris alpina* (Map 4), *Calidris maritima*, *Charadrius hiaticula* (Map 5), and *Arenaria interpres* (Map 5). *Calidris alpina* shows a most interesting distribution, as two subspecies are recognized. The real Greenland form is *C. a. arctica* and it is distributed from Scoresbysund to Germania Land. It is rather paler and larger and has a shorter bill than the southern form, C. *a. schinzii*, that breeds occasionally or at last very locally in the Angmagssalik district. Obviously we here deal with two independent invasions of Greenland. C. *a. arctica* must be assumed to be a comparatively old element in the Greenland fauna, as it has evolved into an endemic subspecies, while C. *a. schinzii* must be regarded as a rather recent invader of Greenland, but this problem will be discussed at some length later (p. 107). *Calidris maritima* is distributed all over the southern parts of Greenland, and it occupies the southern parts of the high arctic zone as well north to Thule and Germania Land, but it gradually becomes rarer towards north. Is is only slightly migratory, and many individuals winter in the southern parts of Greenland, the native populations of which are non-migratory. The populations of the east coast of Greenland are said to winter in Iceland, (Timmermann 1938—49, Salomonsen 1951) and a bird ringed in Iceland was



Map 5.
The breeding areas of Turnstone (Arenaria i. interpres) *horizontal hatch, of the American subspecies of Turnstone* (Arenaria i. morinella) *dotted, and of Ringed Plover* (Charadrius hiaticula) *vertical hatch.*

Fig. 5.
Yngleudbredelse af Stenvender (*Arenaria i. interpres*) vandret skravering, af Amerikansk Stenvender (*Arenaria i. morinella*), og af Stor Præstekrave (*Charadrius hiaticula*) lodret skravering.

recovered on Baffin Island (cf. NØRREVANG 1959). The distribution which extends into the eastern part of the Canadian Arctic clearly indicates, that C. *maritima* is of palaeartic origin, and this is confirmed by the above mentioned migrational data.

Charadrius hiaticula and *Arenaria interpres* are both widely distributed in Greenland, but only in the high arctic parts, and both extend their breeding ranges into the Canadian Arctic, map 5. C. *maritima*, *Ch. hiaticula* and *A. interpres* are all considered to be the same subspecies in Greenland and part of the eastern Canadian Arctic as in the western parts of the palaearctic region. *Arenaria interpres* has an American subspecies as well, *A. i. morinella*, and *Charadrius hiaticula hiaticula* is so closely related to the North American *Charadrius semipalmatus*, that they were until recently considered to be conspecific.

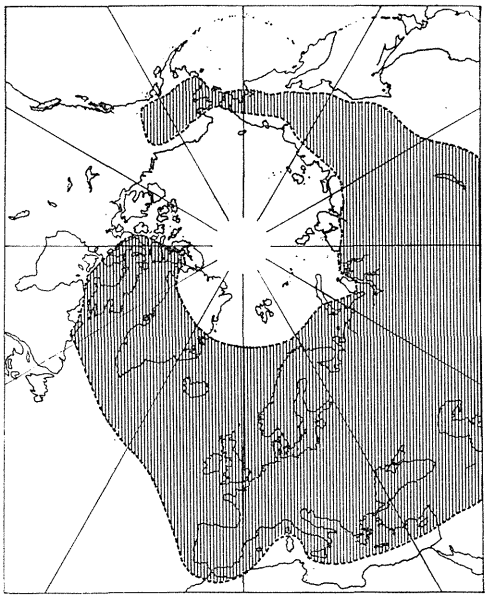
The migration patterns stress this evidence for European derivation of these species. *Arenaria interpres* migrates from Ellesmereland to Western Europe (NØRREVANG 1959). Further a rather strong migration of *Charadrius hiaticula* is stated in Iceland, and these migrators obviously come from Greenland.

Ringing results (NØRREVANG 1959) and field observations show, that the Greenland populations of *Crocethia alba* and *Calidris canutus* probably winter in western Europe, while the northern Palaearctic populations migrate further south to West Africa, this applies to *Arenaria interpres* as well.

The probable explanations for these curious distributional data will be discussed later.

PASSERINES

Several passerine species have spread from Europe to Iceland and four of them have reached Greenland, viz. *Anthus pratensis*, *Motacilla alba*, *Oenanthe oenanthe* (Map 6) and *Plectrophenax nivalis*. *Anthus pratensis**) and *Motacilla alba* have established themselves as local breeding birds in the Angmagssalik District, and they obviously constitute outposts of the Icelandic populations. *Oenanthe oenanthe* is a Palaearctic species which has invaded North America buth from the east and from the west. The Greenland and eastern Canadian Arctic subspecies *Oe. oe. leucorrhoa* hos been stated in winter or on migration in various parts of Europe, and as it occurs only seldomly in America outside the breeding season, it seems quite safe to conclude that practically all individuals of this subspecies winter in the western Palaearctic and Ethiopian regions.



Map 6.
The breeding area of the Wheatear (Oenanthe oenanthe).

Fig. 6.
Yngleudbredelsen af Stenpikker (*Oenanthe oenanthe*).

*) *A. pratensis* was recently found in the Scoresbysund District, too.

Plectrophenax nivalis has a circumpolar distribution, its systematics are very difficult, and in certain plumages the subspecies can only with the utmost difficulty be told apart. Therefore it is most fortunate, that the ringing results from the Greenland bird ringing scheme give excellent clues to the origin of the Greenland populations by showing their migration routes. The West Greenland birds migrate to the interior of North America near the Great Lakes (SALOMONSEN 1956). Most astonishingly, however, SALOMONSEN recently (1957, 1959, and 1961) showed that the East Greenland populations must winter somewhere in the interior of Russia, as no less than 5 individuals have been recorded in spring in the northern parts of European Russia. This means that this species migrates from the northwesternmost parts of Europe straight to East Greenland. There are no autumn recoveries, but probably the North Atlantic is crossed north of Iceland in autumn, too, as observations of Snow Buntings southeast of Greenland are rare. (SALOMONSEN 1959). Indeed, this means that if the migration routes be accepted as the immigration route of the populations in question, the East Greenland populations are of European and the West Greenland population of American origin. This invites to a reconsideration of the subspecies problem in the Greenland populations, which may result in the revival of the East Greenland subspecies "P. n. subnivalis".

Recently *Turdus pilaris* invaded Greenland by chance, and it is now established as a non-migratory bird in the subarctic districts in the southernmost parts of Greenland (SALOMONSEN 1951). It is said that the East Greenland populations of the Redpoll, *Carduelis flammea rostrata*, migrate to Iceland and the British Isles.

RECENT CHANGES

The recent changes in the distribution of several species of birds in the North Atlantic area have received much attention. Changes referring to our problems are particularly mentioned by SALOMONSEN (1948), GUDMONDSSON (1951) and NØRREVANG (1955). It was shown that several species have recently invaded or increased in the Faroes, Iceland and Greenland as breeding birds. As immigrants to Iceland within the last 50—60 years are mentioned *Sturnus vulgaris*, *Asio flammeus*, *Anas clypeata*, *Aythya fuligula*, *Larus ridibundus*, *Larus argentatus* and *Larus fuscus*. All of these species have invaded from Europe. Many species have spread and increased e. g. several waders as mentioned previously.

In Greenland changes have also taken place. Several species have extended their breeding area northwards, especially the lowarctic species as e. g. *Oenanthe oenanthe*, *Carduelis flammea rostrata*, and *Calcarius lapponicus*, and several other instances might be mentioned (see SALOMONSEN 1951). Further it is stated (1. c.) that *Numenius phaeopus* and *Pluvialis apricaria* are now much more commonly met with in the southern parts of Greenland than 50 years ago (cf. p. 102 and map 3). This indicates, that these species may be on their way towards Greenland.

In fact the change of the bird fauna in the North Atlantic area seems to show that the main spread takes place from the British Isles towards northwest. This agrees well with the distributional data that have been mentioned already for those species occurring in Greenland that are supposed to be of European origin.

It is generally agreed upon that we live at present in an interglacial, in which the climax of temperature has by far not been reached yet. This means that the changes

observable now must have had their equal in the other interglacials — and in certain periods of the postglacial period. This again means that Greenland — and North America, too — were invaded from Europe more than once. It is certain that temperature in the maxima of the interglacials were considerably higher than nowadays, and accordingly it must be assumed that more species reached Greenland than have done so now, and further that their breeding distributions in northern areas were more extensive than now.

The occurrence of several glacial epochs has a distinct bearing on the problems of speciation or subspeciation. If a species has established itself over part of North America so that the advancing ice of a new ice age may separate part of the breeding area from the main area (Europe) this may cause subspeciation or even speciation. However, it must be brought in mind that also the long oversea migration may have a strong isolating effect between the populations of Europe and Greenland (WILLIAMSON 1958).

CONCLUSION

In this study it is stated that many species are distributed in the western Palaearctic region and in the northeastern parts of the Nearctic region, and that the populations in Greenland and adjacent areas are identical with or very closely related to the European populations. Further, attention is drawn to the fact that many of these species migrate from Greenland to parts of the Old World, and consequently this migration crosses the North Atlantic.

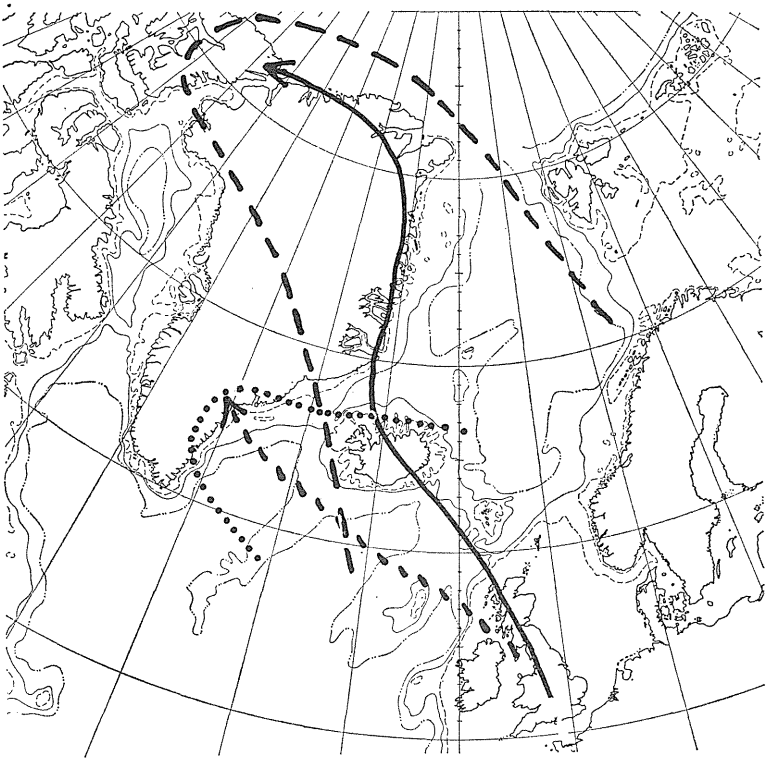
It is shown that the recent changes, which are due to the general amelioration of the climate in the North Atlantic area, have caused a spread of several species from Europe to Iceland and a northward spread in Greenland in species that have already invaded this area.

Only few species have spread from eastern North America towards east, and none of these species ever reached any farther than Iceland.

Thus it can safely be concluded that spread across the North Atlantic almost exclusively took place from Europe towards northwest, and not from America to Europe.

The invasion of Greenland led to several distributional types (see maps). Thus it is very remarkable that *Charadrius hiaticula* and *Arenaria interpres* (map 5) are both distributed in the eastern parts from Scoresbysund northwards and in the northern parts and Ellesmereland, and not in the southern and western parts of Greenland. This obviously must be regarded as a joint effect of invasion path and migration route. The invasion seems to have been caused by prolonged migration of the Iceland population, the Greenland birds migrating back along the invasion route. The populations in question are able to spread north along the coast of East and North Greenland, as the direction of these coasts does not deviate more from the migration direction than that they may have the effect of leading lines ("Leitlinien"). On the other hand the species have not been able to spread to South Greenland. The reason for this may be the fact that birds arriving by northwest migration to the Scoresbysund area are not likely to turn more than 90° in order to follow the coast towards SSW, and it seems highly probable that a migration from the British Isles to South Greenland is far too prolonged to be of common use in these species. This situation is roughly indicated by map 7.

Some birds as *Calidris alpina schinzii*, *Anthus pratensis* (map 4) and *Motacilla*



Map 7. Diagrammatic representation of two distributional types of Greenland birds as mentioned in the text, p. 106—7.

Fig. 7. Skematisk fremstilling af de to udbredelsestyper blandt grønlandske fugle, som den er omtalt i teksten, side 106—7.

alba have invaded East Greenland, too, but farther south than the above mentioned species namely in the Angmagssalik area. They, too, are naturally derivatives of the Iceland population, but as their breeding in Greenland seems very local and even sporadic, their presence in Greenland may have another cause than in the above mentioned species. Birds migrating to Iceland from Europe, most likely from the British Isles, may drift westwards almost regularly, this being confirmed by the presence in Greenland of individuals of *Numenius phaeopus* and *Pluvialis apricaria* almost every year (map 3). Such populations are most likely to settle down in the Angmagssalik area. It might be argued, that easterly wind are of scarce occurrence in the area in question, but as a matter of fact, the migration of birds from the British Isles to Iceland may be directed more westerly than directions indicated by a map, because westerly winds are predominant in these altitudes, thus demanding a compensatory mechanism. If then the westerly winds cease or even turn north, the birds will pass west of Iceland and then turn up in the Angmagssalik area. This wind drift effect may be the reason for the identity of the populations in question on one hand and for the sporadic occurrence in Greenland of the species in question on the other hand.

Thus the fundamental difference between the mentioned distributional patterns seems to be whether the migration is prolonged towards northwest or the migrating birds are drifted towards west. In the first case the populations can be regarded as true inhabitants of the areas in question while in the latter case it is highly probable that individuals which breed in Greenland really belong to the Iceland population, and have arrived there by accident. (See diagram 1).

DANSK RESUMÉ

Betragtninger over fuglenes udbredelse over Nordatlanten til Grønland.

Under udarbejdelsen af en oversigt over Mågefamiliens (*Laridae*: kjover, måger, terner, saksnæb) udbredelsesforhold berørtes spørgsmålet om slægtskabsforholdene mellem den amerikanske Sølvmåge (*Larus argentatus smithsonianus*) og den europæiske form af samme art (*L. a. argentatus*), idet disse to former ligner hinanden overmåde meget og derfor må formodes at være meget nært beslægtede. Spørgsmålet rejste sig da, om den amerikanske havde bredt sig til Europa, som andre forskere har antaget, eller om den eventuelt havde bredt sig fra Europa til Amerika.

Da samtlige andre fugle, der er udbredt på begge sider af Nordatlanten, og som ikke er cirkumpolære, synes at stamme fra Europa og derfra have bredt sig mod nordvest, blev det fundet nyttigt at fremlægge de vundne resultater i en selvstændig artikel.

De fleste oceaniske fugle, d. v. s. fugle, der er knyttet til havet udenfor yngletiden, har en udbredelse, der er bestemt af hydrografiske forhold. Disse betinger grænserne i planktonproduktionen, der som bekendt er grundlaget for disse fugles eksistens, idet de direkte eller indirekte lever af plankton. Det gælder f. eks. alkefuglene, stormsvaler, Sule, skarver og Riden. Disse fugle er derfor uden værdi i denne forbindelse, selvom de opfylder betingelserne for udbredelse.

Andefugle og mågefugle kan betragtes som mellemformer mellem egentlige landfugle og oceaniske fugle. De er i stand til at sætte sig på vandet og er derfor i stand til uden besvær at krydse store havstrækninger, selvom de ikke kan optage føde på havet (dog undtagen måger). Adskillige fugle hørende til denne gruppe har spredt sig til Grønland. Den grønlandske Gråand (*Anas platyrhynchos conboschas*) står nærmest den islandske form, og stammer således uden tvivl ligesom denne fra Europa. Adskillige gåsearter har deres yngleområder i det nordlige Grønland, og selv om de i visse tilfælde er cirkumpolare i deres udbredelse, så røber deres trækveje dog, at de er af europæisk oprindelse. De trækker nemlig alle til Vesteuropa. Det gælder Kortnæbbet Gås (*Anser fabalis brachyrhynchus*) (der også findes på Island), Blisgås (*Anser albifrons flavirostris*), Bramgås (*Branta leucopsis*) og Knortegås (*Brante bernicla rhota*), omend en del af bestandene af den sidste art synes at trække til Nordamerika. En hel del andearter, der findes på Island som ynglefugle, trækker til Vesteuropa om vinteren, en undtagelse er dog Havlitten (*Clangula hyemalis*), der for en dels vedkommende trækker til Sydgrønland. Alt dette tyder på europæisk oprindelse af de pågældende arter, medens to andre arter, Strømanden (*Histrionicus histrionicus*) og Islandsk Hvinand (*Bucephala islandica*), må være af amerikansk oprindelse, idet de foruden på Island er udbredt i østlige dele af Nordamerika.

Blandt mågerne er Svartbagen (*Larus marinus*) europæisk i sin udbredelse og desuden findes den i Sydgrønland. Havternerne (*Sterna paradisaea*) fra Grønland og de østlige dele af Nordamerika trækker over Atlanten til Irland, hvorefter de følger Vesteuropas og Vestafrikas kyster mod syd. Når man, som overalt i denne afhandling betragter trækvejen som indikation for indvandringsvejen, tyder dette på europæisk oprindelse af Havternens østnearktiske bestande.

En hel del vadefugle, f. eks. Strandskade (*Haematopus ostralegus*), Hjejle (*Pluvialis apricaria*), Småspove (*Numenius phaeopus*), Stor Kobbersneppe (*Limosa limosa*), Rødben (*Tringa totanus*) og Dobbeltbekkasin (*Gallinago gallinago*) har deres nordvestlige udbredelsesgrænse i Island, men Hjejle og Småspove træffes forholdsvis almindeligt i Grønland; imidlertid er ynglen aldrig blevet påvist.

Andre vadefugle som Almindelig Ryle (*Calidris alpina*), Sortgrå Ryle (*Calidris maritima*), Præstekrave (*Charadrius hiaticula*) og Stenvender (*Arenaria interpres*) er i Grønland udbredt fra Scoresbysund-området nordover i Nordøstgrønland, og Stenvender og Præstekrave endog helt ind i de arktiske dele af det kanadiske archipel. Alm. Ryle danner en undtagelse, idet der foruden den nordøstgrønlandske form (*C. a. arctica*) findes en bestand af Sydlig Ryle (*C. a. schinzii*) i Angmagssalik-området. Det er mest sandsynligt at denne bestand er en direkte aflægger af den islandske.

To spurvefuglearter, nemlig Engpiberen (*Anthus pratensis*) og Hvid Vipstjert (*Motacilla alba*) forekommer i samme område og på samme ret sporadiske måde som Sydlig Ryle, og deres oprindelse er uden tvivl af tilsvarende art, altså fugle, der fra trækket mod Island mere eller mindre regelmæssig forslås til Grønland. For Stenpikkeren (*Oenanthe oenanthe leucorrhoa*) gælder det, at de grønlandske bestande i ganske overvejende grad trækker til Europa, medens forholdene hos Snespurven (*Plectrophenax nivalis*) er betydeligt mere komplicerede. Her trækker de vestgrønlandske bestande til egnene omkring de store søer i det mellemste Nordamerika,

medens i hvert fald en del nordøstgrønlandske bestande trækker til europæisk område, idet de under forårstrækket er truffet i nordlige egne af Rusland. Hvorledes Sjaggeren (*Turdus pilaris*) kom til Grønland har SALOMONSEN gjort rede for (1951).

De ændringer i fuglefaunaen i det nordatlantiske område, der er behandlet af SALOMONSEN (1948), GUDMUNDSSON (1951) og NØRREVANG (1955), har alle medført, at europæiske fugle har forlænget deres udbredelsesområde mod nordvest. Eftersom vi i øjeblikket efter alt at dømme befinder os i en mellemistid, hvor temperaturmaksimum endnu ikke er nået, vil man kunne forvente, at adskillige af de fugle, der nu har nået Island, i fremtiden vil brede sig til Grønland også, således som det antydes af det forhold, at Småspove og Hjejle som nævnt ret ofte og ret regelmæssigt optræder på Grønland.

Det fremlagte materiale tyder med de nævnte to undtagelser (Strømand og Islandsk Hvinand) på, at al krydsning af Atlanterhavet i dets nordlige dele er foregået fra Europa mod Grønland, noget der står i god relation til de teorier, man har om fugles udbredelse videre fremefter i trækretningen, og den fordeling af landområder, man har i Nordatlanten.

Endelig behandles de to udbredelsestyper, man har i Grønland af visse fugle. Nogle fugle er udbredt fra Europas tempererede områder over Island og fra Scoresbysundområdet mod nord i Grønland, hvilket vil sige de højarktiske områder. Dette viser, at fuglene, efter at have bredt sig til Grønland, evt. ved forlænget træk, ikke har kunnet dreje de mere end 90°, som det ville være nødvendigt for at de skulle kunne brede sig ned over Sydgrønland også. Som eksempler nævnes Stenvender og Præstekrave.

Den anden type på udbredelse er de fugle, der kun findes i Sydøstgrønland. Det er sandsynligt, at disse fugle er kommet til Grønland ved under forårstrækket at være blevet vinddrevet mod vest. Der kan således i en vis henseende siges at være en virkelig forskel mellem disse to udbredelsesformer, den ene forlænget træk, den anden afdrift.

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