

MEDDELELSER OM GRØNLAND

UDGIVNE AF

KOMMISSIONEN FOR VIDENSKABELIGE UNDERSØGELSER I GRØNLAND

Bd. 191 • Nr. 9

ORNITHOLOGICAL OBSERVATIONS
IN
NORTHEAST GREENLAND
BETWEEN 76°00' AND 78°00' N. LAT. 1969-71

BY

HANS MELTOFTE

WITH 10 FIGURES AND 4 TABLES

KØBENHAVN

C. A. REITZELS FORLAG

BIANCO LUNOS BOGTRYKKERI A/S

1975

Abstract

The present paper is a report of observations made during a two-year stay at the weather station at Danmarks Havn 1969–71. An avifaunistic status of the area is given, and the results are compared with the few earlier reports. Several changes are demonstrated, and relations to climatic conditions are discussed. Special information is given on the colonies of *Branta leucopsis* and on two moulting areas of *Anser fabalis brachyrhynchus*, two species in which significant changes can be traced. 1970 was an especially unfavourable 'late' year, and the breeding cycle of some species was considerably delayed. Further, the results of a simple population-census, especially of breeding waders are given.

HANS MELTOFTE
Møllegade 23, 3, tv.
DK-2200 Copenhagen N
Denmark

Danish manuscript received May 17th, 1973.

Revised English manuscript received January 29th, 1975.

ISBN 87 421 0115 8

CONTENTS

	Page
Introduction	5
General Part	7
Earlier Investigations	7
Description of the Area	7
Climatological Conditions	15
Activities	21
Special Part	23
Red-throated Diver (<i>Gavia stellata</i>)	23
Fulmar (<i>Fulmarus g. glacialis</i>)	23
Long-tailed Duck (<i>Clangula hyemalis</i>)	24
Arctic Eider (<i>Somateria mollissima borealis</i>)	25
King Eider (<i>Somateria spectabilis</i>)	26
Pink-footed Goose (<i>Anser fabalis brachyrhynchus</i>)	28
Barnacle Goose (<i>Branta leucopsis</i>)	30
Greenland Falcon (<i>Falco rusticolus candicans</i>)	36
Greenland Rock-Ptarmigan (<i>Lagopus mutus captus</i>)	37
Lapwing (<i>Vanellus vanellus</i>)	39
Ringed Plover (<i>Charadrius h. hiaticula</i>)	39
Golden Plover (<i>Pluvialis apricaria altifrons</i>)	40
Turnstone (<i>Arenaria i. interpres</i>)	40
Knot (<i>Calidris c. canutus</i>)	41
Purple Sandpiper (<i>Calidris m. maritima</i>)	43
Schiøler's Dunlin (<i>Calidris alpina arctica</i>)	43
Sanderling (<i>Calidris alba</i>)	44
Grey Phalarope (<i>Phalaropus fulicarius</i>)	46
American Long-tailed Skua (<i>Stercorarius longicaudus pallescens</i>)	47
Ivory Gull (<i>Pagophila eburnea</i>)	48
Great Black-backed Gull (<i>Larus marinus</i>)	48
Glaucous Gull (<i>Larus h. hyperboreus</i>)	48
Black-headed Gull (<i>Larus ridibundus</i>)	50
Sabine's Gull (<i>Xema sabini</i>)	50
Arctic Tern (<i>Sterna paradisaea</i>)	51
Black Guillemot (<i>Cepphus grylle mandtii</i>)	52
Snowy Owl (<i>Nyctea scandiaca</i>)	52
Northern Raven (<i>Corvus corax principalis</i>)	53
Fieldfare (<i>Turdus pilaris</i>)	53
Greenland Wheatear (<i>Oenanthe oenanthe leucorrhoa</i>)	53
Hornemann's Redpoll (<i>Carduelis flammea hornemanni</i>)	54
Lapland Bunting (<i>Calcarius l. lapponicus</i>)	55
Snow Bunting (<i>Plectrophenax n. nivalis</i>)	55

Completive List of Birds in the Area	58
Great Northern Diver (<i>Gavia immer</i>).....	58
Pale-breasted Brent Goose (<i>Branta bernicla hrota</i>)	58
Scaup (<i>Aythya m. marila</i>)	59
Red-breasted Merganser (<i>Mergus serrator</i>)	59
Iceland Gull (<i>Larus g. glaucoides</i>).....	59
Brünnich's Guillemot (<i>Uria l. lomvia</i>).....	59
Ringing.....	59
List of Present Recoveries.....	60
Discussion and Summary	62
Climatological Conditions	62
Faunistics	63
Arrival	66
Time of Breeding	69
Immatures	69
Observations of Migration.....	70
Literature.....	71

INTRODUCTION

The author of this paper was employed at Danmarkshavn Vejrstation (76°46' N, 18°46' W) in Germania Land for two years, from 22 April 1969 to 23 April 1971.

The weather station, which is staffed by twelve men, is the only inhabited place between Daneborg Vejrstation, 300 km to the south, and Station Nord, 550 km to the north.

The distribution of my duties at the weather station gave me ample opportunity to deal with the ornithological conditions in the vicinity of the station, as well as beyond it by means of longer trips by dog sledge, boat, and on foot.

I am grateful to those of my colleagues at the weather station and members of the Sirius Sledge Patrol who supplemented my observations in many significant ways. I am especially thankful to my colleague, VIGGO BLOCH, for his many observations and assistance, not least for continuing the ringing after my departure and his reports of conditions and observations in the summer of 1971, which are included in this paper. Some observations made in 1972 and -73 are also included here.

I am further indebted to the Meteorological and Geodetic Institutes in Copenhagen for providing meteorological information, maps, and aerial photos, and for permitting me to publish these. I am thankful to NIELS ROSENBERG, THOMAS KLØRBOE, and HENNING NOER for assistance in preparing the manuscript, and to Dr. phil. FINN SALOMONSEN for criticising it.

The manuscript was translated from the Danish by Mrs. KARIN FENNOW.

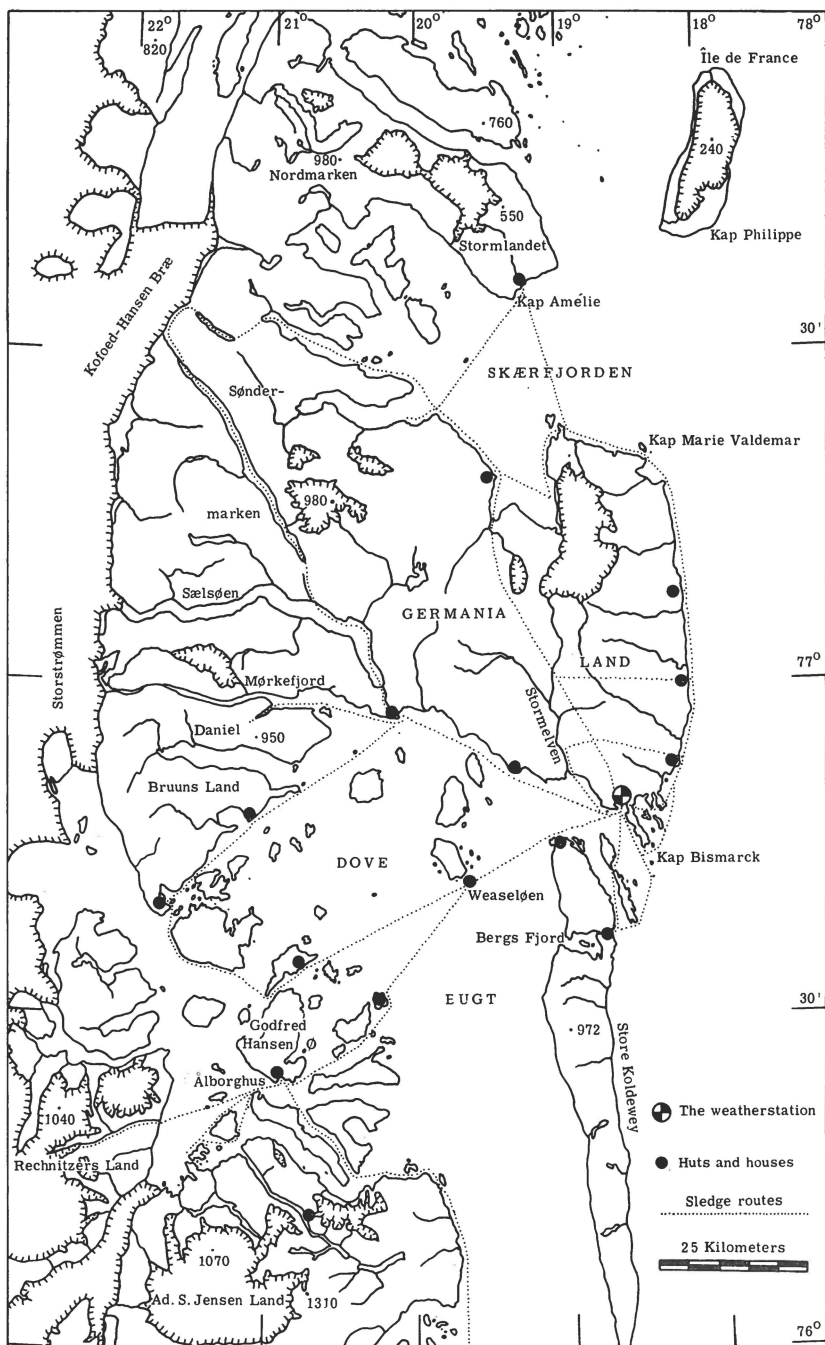


Fig. 1. Map of the area of investigation in Northeast Greenland between 76° and 78° N. Lat., with the most important sledge trips indicated. Heights in metres.

GENERAL PART

Earlier Investigations

The first Europeans visited Germania Land in April 1870; they were the German Captain KOLDEWEY, and a few members of his crew, who here had to abandon their efforts to reach the North Pole. In 1906–08 MYLIUS ERIKSEN's Denmark Expedition mapped the final thousand kilometres of the Northeastern coast of Greenland, and, in particular, scientifically investigated the area around the wintering site known as Danmarks Havn. The work done by A. V. L. MANNICHE (1910), the expedition's ornithologist, added a great deal to our knowledge of bird life in Northeast Greenland. ALWIN PEDERSEN (1942) spent a year at Hvalrosodden, ca 45 km west of Danmarks Havn, in connection with the Danish Northeast Greenland Expedition of 1938–39. PALLE JOHNSEN (1953) records some observations made in 1948–49, and J. G. JENNOV (1963) deals with the occurrence of the Barnacle Goose (*Branta leucopsis*).

The territory south of the area covered in this paper has been sporadically investigated (ROSENBERG *et al.*, 1970), but ornithologists have never visited the area to the north, between Germania Land and Peary Land, in the summer months.

Description of the area

The approximately 80 km wide and 220 km long area between 76° N and 78° N (fig. 1) dealt with here consists almost exclusively of gneiss. This appears as bedrock, boulder fields, moraines, raised sea floor, and polygenous and creeping soil areas. The area is naturally made up of several types of landscapes: about 800 m high plateaus, covered in many places by firs and glaciers, frequently bounded by steep mountain bluffs, and intersected by fjords, valleys, and lakes. This type comprises Ad. S. Jensen Land, the southeastern islands in Dove Bugt, Store Koldewey south of Bergs Fjord, Rechnitzers Land, the northern part of Daniel Bruuns Land, Søndermarken, Nordmarken, Stormlandet, and Île de France.

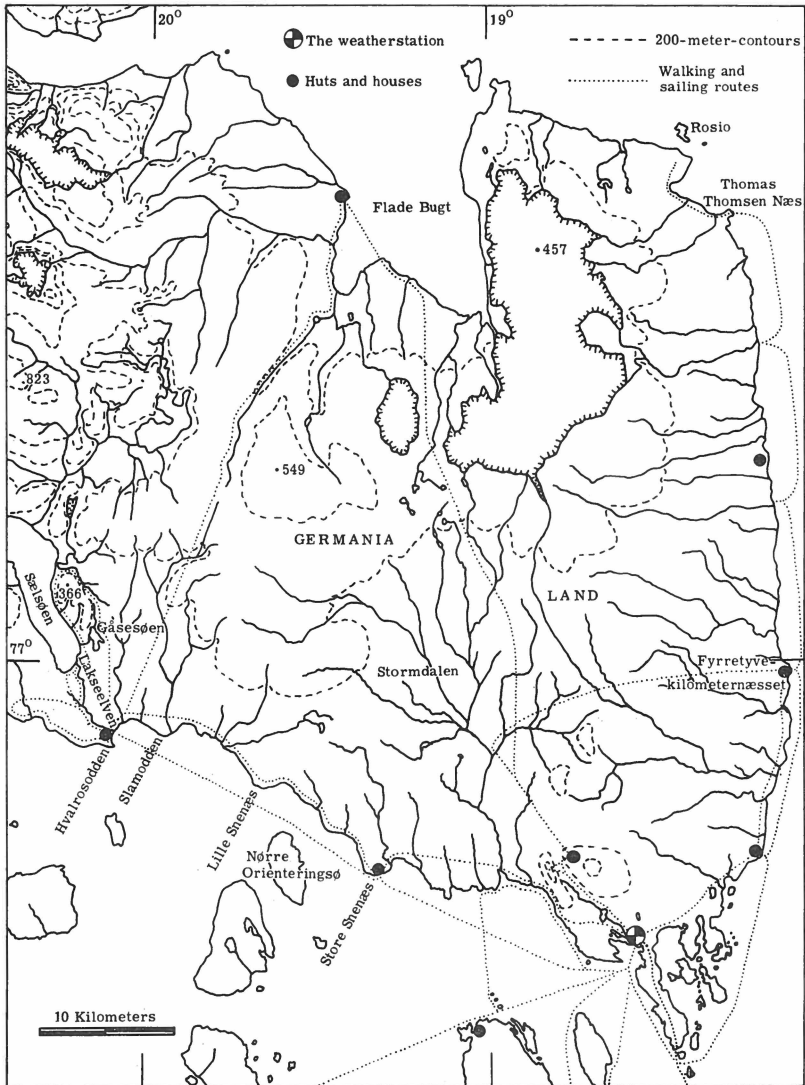


Fig. 2. Map of Germania Land showing trips on foot and by boat. Heights in metres.

I have never visited any of these highland plateaus, but from a distance they look particularly barren; the snow thaws late, and there is often a cover of new snow during the summer. There is arctic heath vegetation in some of the valleys (see detailed descriptions of the biotopes, below); other valleys are barren moraines.

In the southern part of Daniel Bruuns Land the mountains are lower, and arctic heaths and meadows are more extensive.

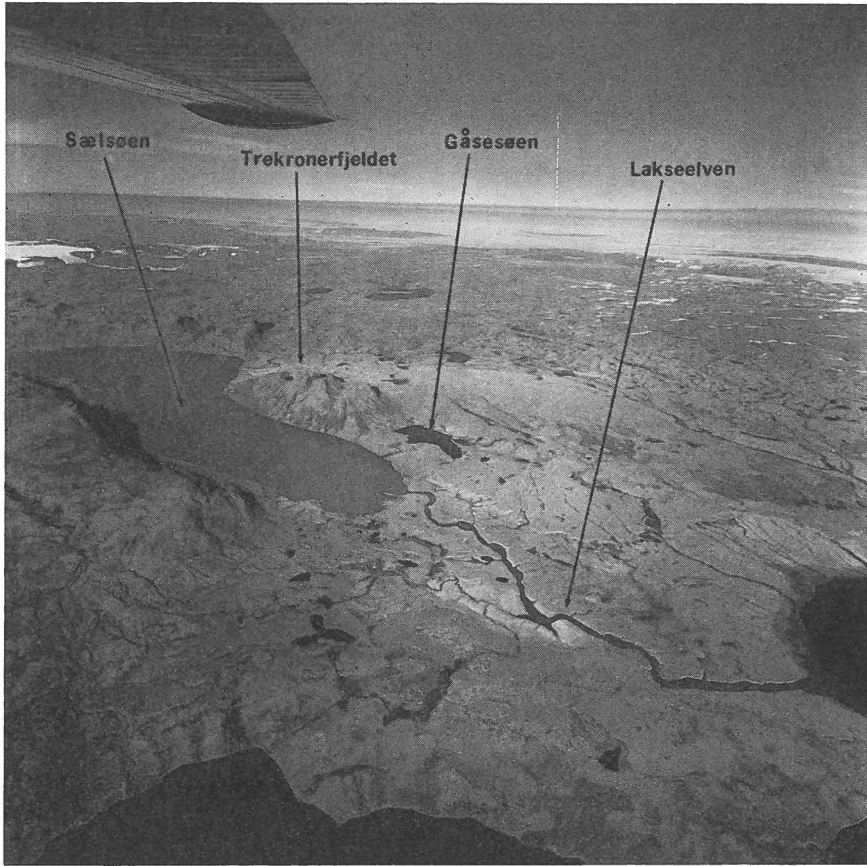


Fig. 3. Aerial photo of the western part of Germania Land seen from SW, taken from a height of 4,000 m. The areas around Hvalrosodden are seen in the foreground. Taken 5 August 1950 and reproduced with the permission (A.238/72) of the Geodetic Institute of Copenhagen.

The rest of the islands in Dove Bugt and Store Koldewey north of Bergs Fjord consist of rounded bedrock; vegetated, gravelly slopes only occur in a few places.

Germania Land (fig. 2) is the most thoroughly investigated area dealt with in this paper. The highest parts consist of bedrock and boulder fields, besides the two large firs in the northeastern part. On the lower parts there are very varied biotopes. The northern coast towards Skærfjorden mainly consists of barren gravel slopes; the only vegetation of any significance grows along the big river in the southwestern corner of Flade Bugt, and there is some arctic heath vegetation on favoured places.

The outer coast is especially barren and stony, yet there is some arctic heath vegetation, as well as moister areas at some distance from the coast.

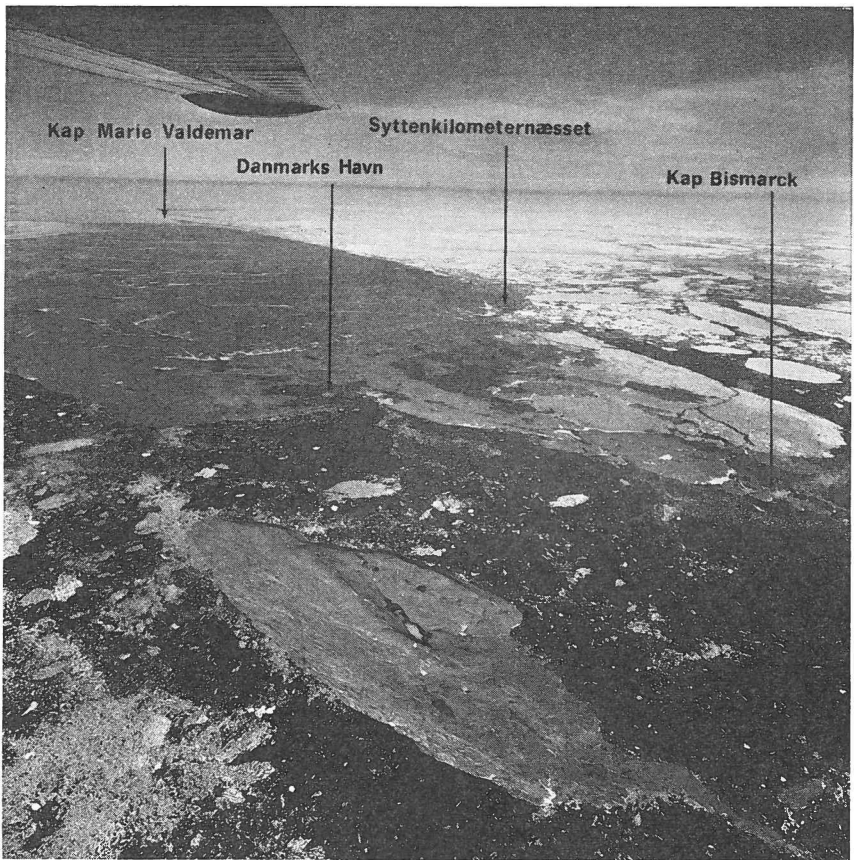


Fig. 4. Aerial photo of the eastern part of Germania Land seen from SW, taken at a height of 4,000 m. The northern part of Lille Koldewey can be seen in the foreground. Note the polar ice at the outer coast and the amount of drift ice in the sounds. Taken 5 August 1950 and reproduced with the permission (A.238/72) of the Geodetic Institute of Copenhagen.

Stormdalen, a large, comparatively flat area, surrounded by low mountains and boulder fields, is a sizeable, continuous stretch of arctic heath, without lakes, but traversed by Stormelven's numerous ramifications. When I visited the area shortly before mid-July 1970, with the exception of its southernmost part it was still covered by a thick layer of snow.

In addition to the very big lakes, which almost resemble fjords (e.g., Sælsøen), a number of small lakes are scattered over most of Germania Land; the majority of them thaw so late or are so barren, however, that they are unsuitable as breeding sites for any birds. The most fertile and earliest ice-free lakes are found along the southern coast of Germania Land.

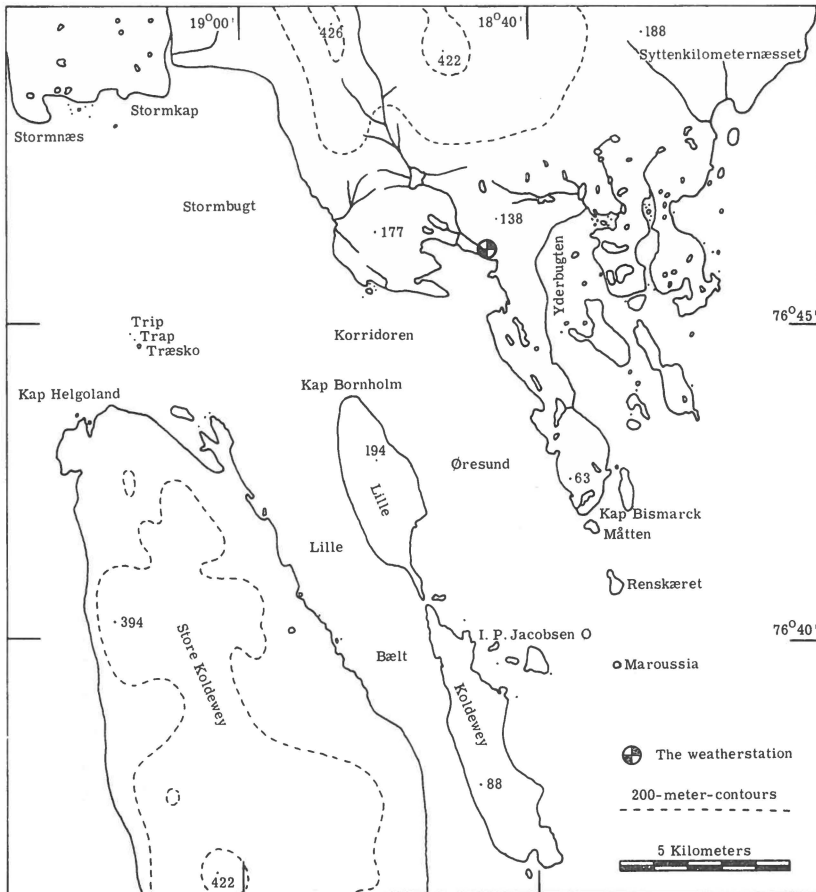


Fig. 5. Map of the northern outlet of Dove Bugt. Heights in metres. (After Koch, 1916).

The area around Hvalrosodden and Slamodden is situated farthest west on the southern coast. It consists of a five to ten km wide gravel desert of moraines and raised sea floor which separates the 60 km long Sælsøen from Dove Bugt. The area is traversed by several rivers, first and foremost Lakseelven, a relatively large river, which drains Sælsøen (fig. 3). Between Hvalrosodden and Sælsøen there are numerous small lakes and ponds that have a narrow fringe of vegetation along their banks; the river, its estuary, and these small lakes are among the best sites in the area. Arctic heaths grow at the slopes towards Rypefjeldet and the northeast.

There are several more fertile areas along the coast between Lille Snenæs and Yderbugten, and, as mentioned above, numerous favourable, small lakes. In particular, MANNICHE's area of investigation in 1906-08

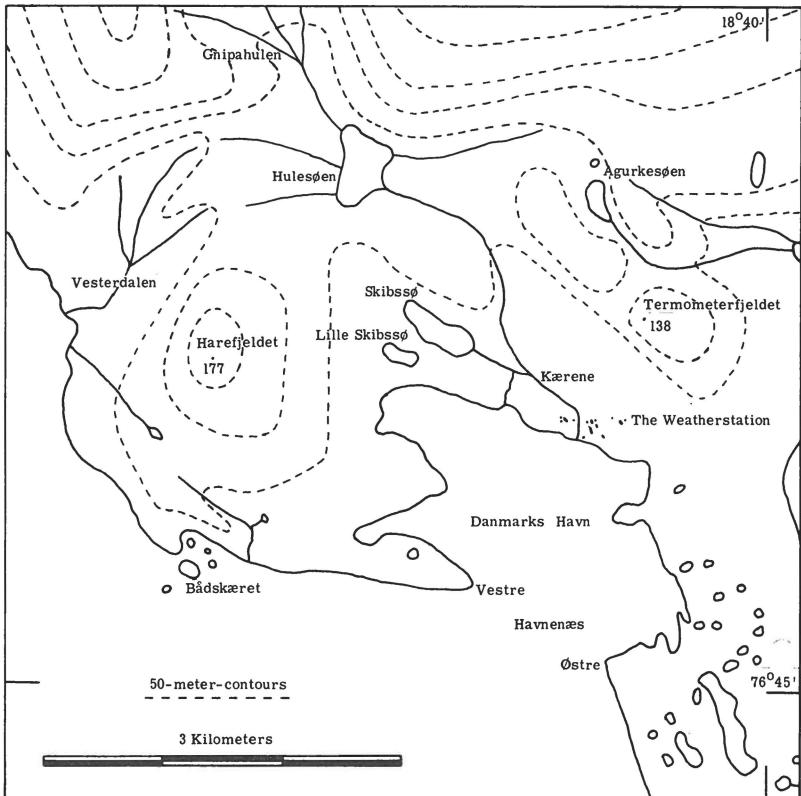


Fig. 6. Map of the area around Danmarkshavn Vejrstation. Height in metres. (After KOCH, 1916).

is quite fertile, with many small lakes and marsh areas (see map, MANNICHE, 1910). It would have been best if I could have made my observations in this area, but unfortunately it was too far away from the weather station. Nevertheless, I did visit the area on some occasions.

My census area around Danmarks Havn (figs 6–7) is doubtless one of the most favourable areas in the entire territory dealt with here, surrounded as it is by mountains towards the west, north, and east, it thawed earlier in the spring than the adjacent areas. In particular, the marshes are comparatively more extensive and luxuriant than any others found in the areas we visited. The various biotopes are shown on the map (fig. 7).

I: "Swampy" meadows or marshes with a dense vegetation of *Bryophytae*, *Gramineae*, *Carex*, *Luzula*, *Eriophorum*, *Salix arctica*, and *Ranunculus*. This biotope occurs in two distinct types:

- a. About 20–40 cm deep marshes with ponds and running water.
- b. Slopes irrigated by meltwater throughout the summer. (In years when

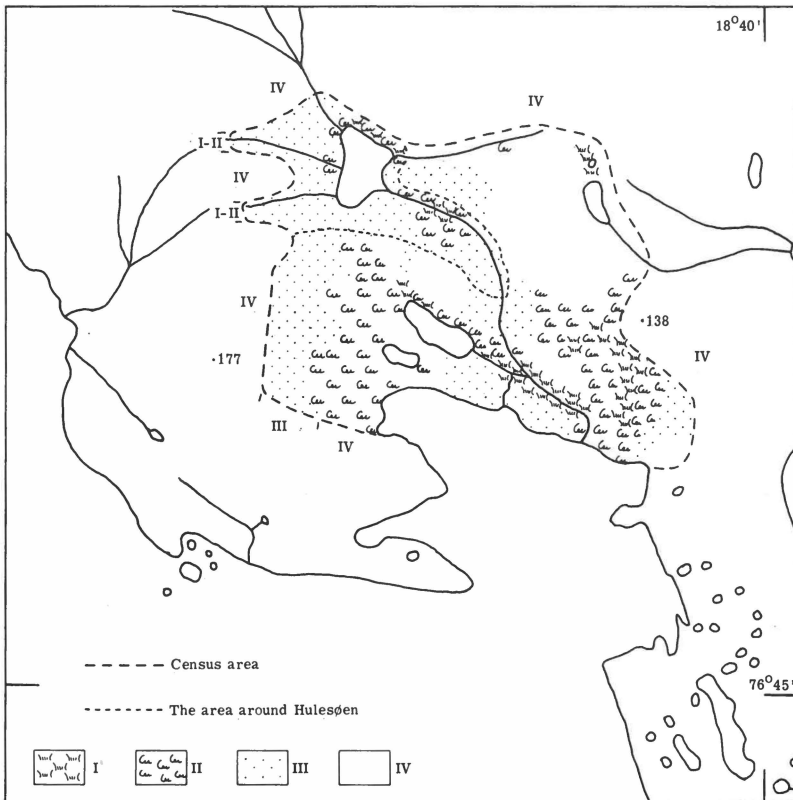


Fig. 7. Map of the census area at Danmarks Havn showing the biotopes. Heights in metres. Drawn in the summer of 1970.

there is a dearth of snow, e.g. 1969, large parts of this biotope resemble biotope II).

In addition, the biotope occurs in a narrow fringe along many lakes and streams.

II: More or less stony slopes of clay and gravel, with a comparatively dense vegetation of *Lichinaceae*, *Gramineae*, *Cyperacea*, *Salix arctica*, *Dryas*, *Cassiope tetragona*, *Saxifraga oppositifolia*, and *Papaver radicatum*, (Arctic heath).

III: More or less stony slopes of clay and gravel, predominantly barren, but with *Lichinaceae*, *Salix arctica*, *Saxifraga oppositifolia*, and *Cassiope tetragona* growing sporadically, (Fell field).

IV: Cliffs and barren stone and boulder fields, with sporadic vegetation of *Dryas*, tussocks of grass, *Cassiope tetragona*, *Salix arctica*, *Saxifraga*, and other flowers. South-facing slopes, with meltwater throughout the summer, can be quite fertile.

The surrounding biotopes are indicated on the map, and it can be seen that type IV dominates almost everywhere; towards the west, however, north of Harefjeldet, there is a connection through two "passages" to the fertile Vesterdalen.

There are four lakes in the census area, representing the most common types of small lakes. Skibssø, the largest one, is 600 m long and 200 m wide. Part of it is ca 4 m deep; consequently it never freezes to the bottom. It has some bottom vegetation, and a population of Mountain Trout (*Salvelinus alpinus*) which attain a length of no more than ca 25 cm. Its banks are fertile almost all the way around, and toward the east it passes into the marsh area through which the numerous ramifications of the river flow and where there are smaller areas of open water. Lille Skibssø is ca 200 m long and 125 m wide and no more than 0.5 m deep; it has no bottom vegetation, but there is a very ample fauna of *Entomostraca*. The banks are very fertile. Hulesøen, which is situated 54 m a.s.l., is 500 m long, 300 m wide, and about one m deep. The bottom, which closely resembles that of Lille Skibssø, consists of gravel and clay with no vegetation, but the fauna is not as abundant as in the latter lake. Agurkesøen is a deep mountain lake almost surrounded by cliffs. It thaws very late, and is of no significance to the waterfowls.

Towards the southeast Germania Land breaks up into a number of small islands around the long peninsula of Kap Bismarck (figs 4 & 5). The majority of these islands is quite barren and rocky, and ice-bound during most of the summer. Renskæret and Maroussia, two small islands situated farthest out in Øresund, are most important to the birds. There is some vegetation on small parts of these islands, but the greater part is made up of barren rocks and broken stones. The ice surrounding them normally breaks up at the turn of the months June-July. The islands I. P. Jacobsen Ø at Lille Koldewey, Bådskæret west of Danmarks Havn, and Træske north of Store Koldewey are also good breeding sites. The reason why all of these islands provide favourable conditions for birds is their location in the northern outlet of Dove Bugt, where as a result of the tidal currents the ice breaks up much earlier than elsewhere.

Dove Bugt and Skærfjorden, the two large fjord complexes in the area, are considerably different. Dove Bugt is well-known for its numerous icebergs; two large glaciers flow into the bay, and densely packed icebergs fill a whole sound and many shoals. The ice in the bay reaches a depth of about two metres; in most years it breaks up about the middle of August, but in some years, e.g. 1970, it stays solid throughout the summer. No glaciers discharge into Skærfjorden, and presumably the ice rarely breaks up completely. Parts of the outer coast of Germania Land are also frequently blocked by a kilometre-wide belt of polar ice connected with the mainland, even when the sea is open.

Climatological Conditions

Discussions of whether the years of investigation were "good" or "poor" constantly recur in the zoological reports from these regions. Conditions are extraordinarily complicated here. Furthermore, information provided by the meteorological stations can be used to but a limited extent in this connection. Temperature recordings, even though amazingly local in character, are useable to some degree. Recordings of precipitation, or, more precisely, of the amount of snowfall in the winters concerned, are, however, practically impossible to register, since the snowstorms constantly move the already fallen snow around, blow the snow off large stretches of land, and fill up other ones.

Since the above-mentioned earlier papers dealing with these regions only contain a minimum of exact information about climatological conditions, comparisons are difficult. In this report, which to a large extent consists of comparisons of my two (three) years of observation with one another, and with the two earlier periods of investigation I have found that more comprehensive descriptions of the climate are necessary.

Many factors determine the thawing of the land. The air temperature (when the thaw sets in), the thickness and distribution of the snow cover, the number of sunlit hours and the humidity (formation of fog) are among the most important factors. In regard to the fjord ice, the thickness of the ice, the temperature of the water, the tides, the inflow of meltwater from the rivers, storms when the ice is breaking up, and the movements of the polar ice along the outer coast are determinant factors.

Polar Ice (The East Greenland Ice)

In describing the very varying climatological conditions which were characteristic of the two summers of 1969 and -70, the vast difference between the movements of the polar ice is obviously most significant (VIBE, 1967).

About 1 May 1969 a kilometre-wide lead opened in the polar ice off the outer coast of Germania Land. As a result, there was almost constant fog in the coastal area throughout the early summer. This lead stayed open during the whole summer and autumn; the polar ice frequently lay so far out to sea that it could not be seen from the coast. In 1970 the situation was completely reversed; the polar ice was dense all summer, and although it sometimes broke up comparatively extensively, there was never open water on the 1969 scale. Ice reconnaissance by aeroplane in early July of the two years confirmed the conditions mentioned.

Winter Precipitation 1969 and -70

The amount of snow in the winter of 1968-69 was unusually small; after my arrival on 22 April there were almost no snowfalls. In 1970 there were snowstorms of 20 m/sec in the second half of April, and snowstorms were frequent until the last days of May.

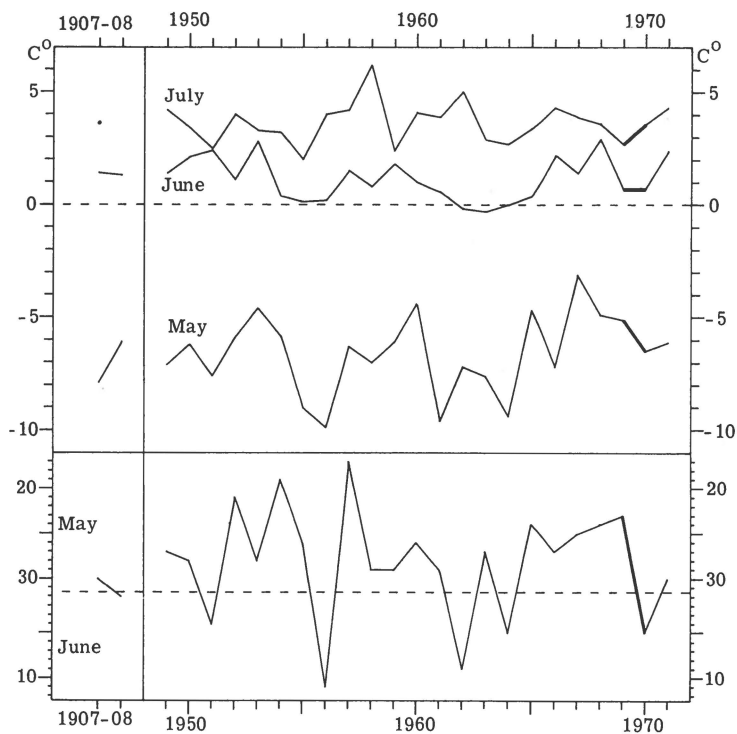


Fig. 8. Graph showing the mean temperatures at Danmarks Havn in May, June, and July 1907-08 (MANNICHE, 1910) and 1949-71 (upper part), and the dates of thawing at Danmarks Havn in 1907-08 (WEGENER, 1911) and 1949-71 (bottom). (See also the text.)

Table 1. *Monthly mean temperature in 1906-08 (MANNICHE, 1910), 1969-71, and the mean for all years from 1949 to 1971 at Danmarks Havn.*

	1906	1907	1908	1949-71	1969	1970	1971
January		-23.0	-20.7	-23.4	-24.1	-22.8	-27.2
February		-25.9	-28.8	-24.0	-26.3	-28.7	-20.5
March		-23.4	-20.9	-23.4	-25.2	-21.9	-26.1
April		-19.0	-19.2	-17.2	-21.5	-17.4	-16.3
May		- 7.9	- 6.1	- 6.6	- 5.1	- 6.5	- 6.1
June		1.4	1.3	1.1	0.7	0.7	2.4
July		3.6		3.6	2.7	3.6	4.3
August		2.6		2.3	3.5	1.7	1.9
September	- 3.3	- 4.0		- 4.2	- 4.1	- 2.8	- 5.6
October	-14.0	-14.3		-13.4	-12.0	-10.4	-15.8
November	-21.2	-19.6		-19.2	-18.5	-20.6	-24.0
December	-24.5	-17.1		-21.4	-20.9	-20.8	-20.9

Thawing 1969 and -70

In table 1 the monthly mean temperatures recorded in 1969-70-71 are compared with the mean temperatures in the period 1949-71. The monthly mean temperatures recorded in May, June, and July in the same years are shown on the uppermost part of fig. 8. As can be seen, May 1970 was somewhat colder than May 1969, but in both years the temperature was above average. Considering, however, the lower part of fig. 8, the picture is different. Here the beginning of thawing is indicated for the same sequence of years. Although the determination of the beginning of thawing is somewhat subjective, as in 1969 and -70 a very well-defined start of thawing can be determined for most of the years (see fig. 9). The following criteria have been used: the first day in a lengthier period having a daily maximum temperature above 0° C, whereupon only a few days with a maximum below zero are found (see fig. 9). In some years, for example 1970, as shown on fig. 9 there was a thawing period in early May, but each time these periods were followed by lengthier periods of frost all day. It can be seen that thawing set in 13 days later in 1970 than in 1969, namely, on 23 May 1969 and on 5 June 1970, i.e., among the latest dates in the past 22 years. In my opinion this significantly supplements the analysis of the climatic conditions of each year in question; yet as fig. 8 shows, to some extent there is a correlation between mean temperature and thawing, which is of course to be expected. Note the two periods in the mid-fifties and the first half of the sixties, when conditions were unfavourable.

It should be mentioned that the temperatures near the ground, or the microclimate, differ considerably from those described here; thus, melting snow is observable for more than a month before positive temperatures are recorded. This, along with strong evaporation, can uncover the ground before thawing begins, at sites where the snow cover is sparse.

The very favourable local conditions prevailing in the lowland around Danmarks Havn, as well as the considerable difference in thawing during the two years concerned, will be dealt with below in a more detailed description of the thawing process. On 22 May 1969, i.e., before the thawing set in, 30 % of the area around the weather station was snow-free. On 29 May 75 % was snow-free. On 10 June it was ascertained that the central part of Germania Land was still wintry, with a snow cover of more than 70 %. Around the last days of May the ice on the lakes at Danmarks Havn began to melt along the banks; on 10 June the shallow parts of the lakes were ice-free and 80 % of the area was snow-free. As in 1970, warm weather set in immediately after mid-June (see fig. 9), whereupon the rivers began to run rapidly. The river at Danmarks Havn had begun to run about 5 June. Before the end of June the melt was over almost all over the territory, and due to the small amount of snow most of the rivers between Lille Snenæs and Hvalrosodden had already dried up in early July. On 13 July 25 % of Skibssø was still ice-covered; Hulesøen was ice-free.

In 1970 80-90 % of the lowland around Danmarks Havn was snow-covered on 2 June; on 5 June 75 % was covered. On 6 June 90 % of central Germania Land was snow-covered; it was very wintry here and no meltwater could be seen. By 7 June the lakes at Danmarks Havn began to thaw along their banks and ca 50 % of the area was snow-free. On 18 June the shallow parts of the lakes were ice-free and the rivers began to run rapidly. On 21 June 75 % of the area at Danmarks Havn was snow-free, and a few rivers in the rest of Germania Land were beginning to flow. Otherwise, the land was still very wintry. Hulesøen was ice-free on 3 July, Skibssøen 50 % covered by ice. More than 50 % of central Germania Land was still covered by snow in early July, and all the rivers ran rapidly. Shortly after the middle of the

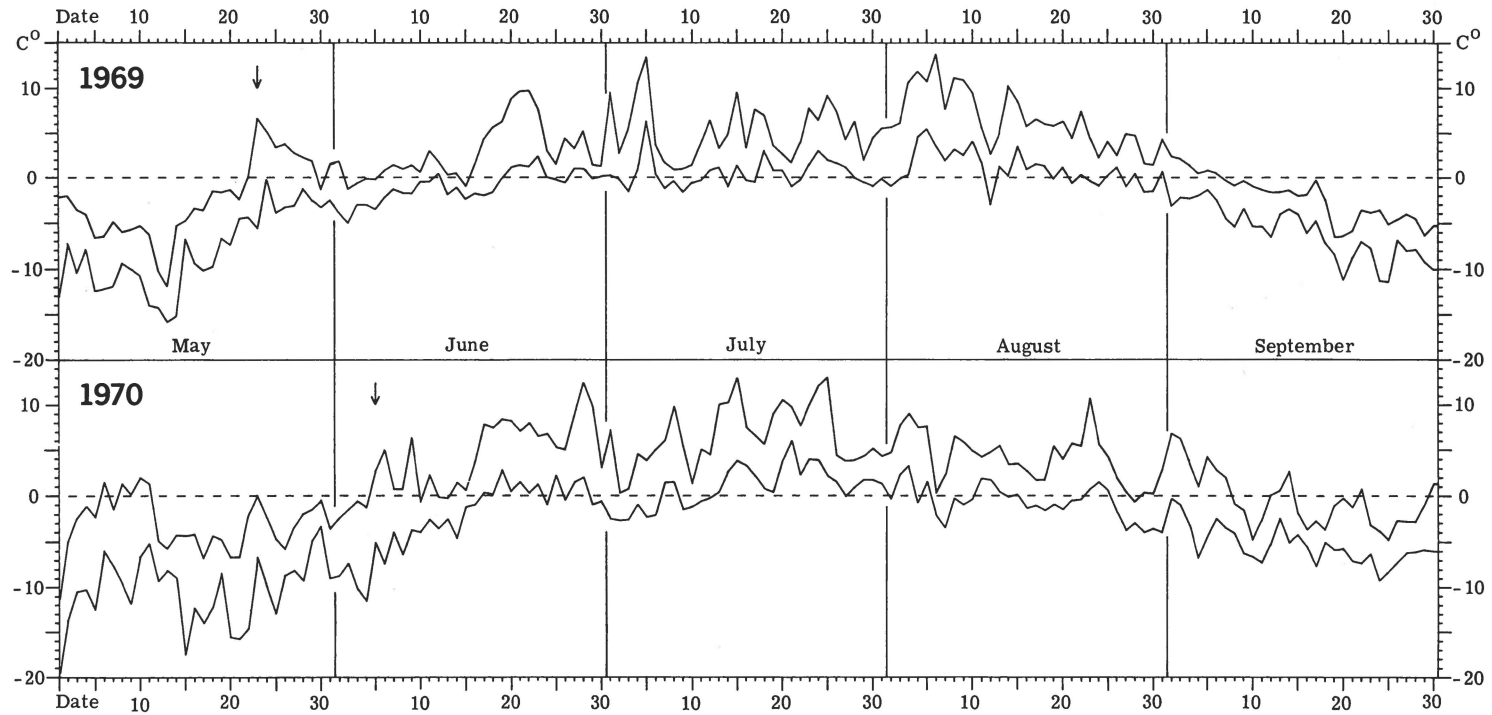


Fig. 9. Daily max. and min. temperatures at Danmarkshavn Vejrstation in the months May–September 1969 and –70. The arrows indicate the dates of thawing. Note that there were no lengthy frost-free periods during either of the summers.

month most of the snow was gone, but compared to 1969, larger masses of snow stayed there throughout the summer. The last ice on the lakes at Danmarks Havn had disappeared before mid-July; thus, as a result of the larger number of sunlit hours (less fog) which were characteristic of 1970, on about 1 July the melting process here "caught up with" 1969 conditions. In this connection the difference in the daily temperature fluctuations should be noted (fig. 9): 1969 more maritime (smaller temperature fluctuations), 1970 more continental (larger temperature fluctuations).

Many rivers and small lakes dried up during the summer of 1969; in 1970, because of the far greater snow masses, the rivers ran so rapidly throughout the summer that there was a considerable amount of water in the lakes, and as a result of the larger influx of meltwater the vegetation was a great deal more fertile throughout the summer.

The Fjord Ice 1969 and -70

The thawing of the fjord ice, i.e., the ice in Dove Bugt, the adjacent fjords, bays, and sounds, was delayed ca three weeks in 1970 as compared to 1969. Dove Bugt did not break up at all in 1970.

The first openings in the fjord ice along the icebergs in Korridoren were observed on 5 June 1969; before the middle of the month there was meltwater all over the surface of the ice, and the tidewater cracks near land had become wide channels, so-called landwater. On 18 June large openings could be seen where there were currents. By 28 June the ice was broken up—"gone"—in inward arches between the islands outside Kap Bismarck, and there were large openings in the ice outside all river mouths. In mid-July the ice began to break up in Korridoren and Øresund. On the 21st all of these areas were open; as of 3 August the ice had gone to a line between Kap Helgoland and Stormnæs. Dove Bugt broke up in the days around 17 August, which is normal.

In 1970 the openings began to develop in Korridoren after 20 June, and the first significant meltwater appeared on the ice during the last days of the month. On 1 July, the same date on which we had to jump from one ice floe to another in order to reach Rensskæret in 1969, it was possible to approach this island by dog sledge; the only openings of any significance were in the ice along the "land break" and outside the rivers. Larger openings first appeared in the days around 20 July, at a time when this ice "went" the year before. On 16 July we were able to drive through Korridoren and Stormbugt by dog sledge! In contrast to 1969, when the ice in Øresund, Korridoren, and Stormbugt broke up from outside, in 1970 it began to melt away almost gradually in these areas. As long as until the end of August there was a kilometre-wide belt of solid winter ice bounding the islands from Kap Bismarck to Lille Koldewey, thus blocking the northern outlet of Dove Bugt. This year the breaking up of the ice reached no farther than the line between Kap Helgoland and Stormnæs; Dove Bugt remained icebound, but the ice melted in some areas in fjords, sounds, and along the coast.

The Autumns 1969 and -70

As early as mid-August bays and inlets can be covered by new-ice, and new-snow can remain on land for several days, especially in the mountains. On 7 September 1969 practically all fresh water was frozen, and on the 20th Øresund and Korridoren were frozen for the first time; the entire area within the fjords, with the exception of places where there were currents, was nevertheless not frozen solid until 5 October. Currents were open until late October.

The autumn of 1970 was somewhat milder than that of the previous year (table 1), but a considerable amount of snow fell in late September, i.e., several weeks earlier than in 1969. Practically all fresh water was frozen solid on 9 September, but since storms kept on breaking up the new-ice, Korridoren was not solid until late October.

1971

Approximately the same amount of snow fell during the winter of 1970-71 as in 1969-70. In 1971 thawing set in on 30 May, and by 1 June 25 % of the lowland around Danmarks Havn was snow-free. The rivers began to run rapidly on 5 June. On the 10th there were large openings in the ice outside Kap Bornholm. Because of the high temperatures in June (table 1), Hulesøen was already ice-free in the middle of the month, and so was 2/3 of Lille Skibssø. As early as the beginning of July large parts of Øresund, Korridoren, and Stormbugt were ice-free. In mid-July only 10-20 % of central Germania Land was snow-covered. In mid-August the ice in Dove Bugt broke up completely. Thus, as far as ice conditions are concerned, this year was even somewhat more favourable than 1969. On the other hand, the autumn was very cold; most of the fresh water froze, as in other years, in the first half of September. As early as late August, however, there was a permanent cover of new-snow on the ground.

1938-39

ALWIN PEDERSEN stayed in the territory from August 1938 to August 1939. The climatic conditions during his stay were extremely poor. Although the summer of 1938 was very dry, the year was apparently good for most species of birds. The fjords froze over early, but in the beginning of November 1938 torrential squalls and total icing up of the land set in, about the worst thing that can happen in these regions. The spring of 1939 was extremely delayed; as late as in the second half of June the character of the land was markedly wintry, and there was only a small amount of open fresh water. It was as late as mid-July before most of the ice in the small lakes had melted, and noticeable openings had formed in the fjord ice. No information is given concerning temperature conditions (PEDERSEN, 1942).

1906-08

A. L. V. MANNICHE (1910) spent the period mid-August 1906 to mid-July 1908 with the Denmark Expedition in the area. He provides but a few precise observations of his own regarding the climatological conditions in the territories concerned. FRITS JOHANSEN (1911) and, in particular, ANDR. LUNDAGER (1912) give more detailed information.

Apparently, the summer of 1906 was favourable for most bird species. The following winter did not begin especially early, but the first part of it was very cold, with little precipitation. In 1907 the thaw set in on 30 May. Even though May 1908 was milder than May of the previous year (table 1), the thaw was slightly delayed by bad weather during the last days of the month, and began 1 June (WEGENER, 1911). The mean temperature for June was almost equal in both years. Before mid-June 1908 more than 50 % of the area was covered by snow; from the middle of the month meltwater streamed everywhere, and there was open water along the banks of the lakes. The rivers at Danmarks Havn broke up on 20 June 1907 and on 18 June 1908, respectively. The lakes here were almost ice-free in mid-June 1908, but it took

longer for the marshes to thaw in 1908 than in 1907. From the latter part of June 1908 there were large openings in the ice outside the river estuaries, and in the beginning of July the fjord ice was in the process of breaking up, and almost all of the lakes were ice-free. On 18 July the ice was gone from Øresund (*cp.* 1969 and 1971). The situation in regard to the fjord ice was another matter in 1907, when Dove Bugt remained icebound throughout the summer. In mid-July the ice around the islands outside Kap Bismarck and all over Øresund was quite solid; there was only a small amount of open water in the tidewater cracks and outside the estuaries of the rivers (*cp.* 1970).

At the time of the Denmark Expedition the climate was presumably more maritime, generally speaking, than at present; consequently there were larger masses of snow and more fertile vegetation (VIBE, 1967). After studying the illustrative material from the Denmark Expedition and reports from many areas, it struck me that the same areas appeared to be considerably more fertile than they were during my stay in the territory. Similarly, firns and glaciers are less extensive now.

The Sun

At Danmarks Havn there is midnight sun from 25 April to 17 August, and the polar night lasts from 29 October to 13 February. Accordingly, periods of alternating day and night only occur for at little more than two months during spring and autumn.

Lemming (*Dicrostonyx groenlandicus*)

The Lemming's occurrence should also be mentioned here. We saw little of these small mammals during any of the years, but tracks, holes, and winter nests attested to their presence. There were very few of them in 1969, but in 1970 and, in particular, in 1971, they seem to have been more common, although far less numerous than described in earlier reports (e.g., PEDERSEN, 1942).

1906 apparently was a very big Lemming year, whereas hardly any were present in 1907. In 1908 there were some again (MANNICHE, 1910). In 1938-39 there were very few Lemmings (PEDERSEN, 1942).

Activities

The most important trips by dog sledge, boat, and on foot are shown on the maps (figs 1 and 2), with the exception of the Sirius Sledge Patrol's routes. Although most of the trips by dog sledge primarily acquainted us with the geography of the area, all of them provided information about ornithological conditions. This is particularly true of the trips which took place in late spring. Special mention should be made of a trip to Ålborg-hus, etc., 19 May to 2 June 1970 (the author), and one to Skærfjorden 11-22 June 1970 (VIGGO BLOCH). In regard to trips by boat, the following should be mentioned: one along the outer coast to Thomas Thomsen Næs 20-22 August 1969 with disembarcations at several places, and further on foot to Kap Marie Valdemar, as well as one to Hvalrosodden 28 August to 1 September 1969 (both by the author). In 1970 ice con-

ditions prevented lengthier trips by boat. As for trips on foot, the following can be mentioned: one to Hvalrosodden 1–8 July 1969, and one to Stormdalen and the outer coast 11–14 July 1970 (both by the author), and one to Flade Bugt and Hvalrosodden 19–30 July 1970 (VIGGO BLOCH).

The area around Danmarks Havn (fig. 6) was regularly traversed during the two years concerned. The most common route was Skibssø — Lille Skibssø — Hulesøen, but at intervals Vesterdalen and the area west and south of Harefjeldet, the area north of Yderbugten and Termometerfjeldet were also visited. In addition, a number of trips took place to other nearby areas, islands and waters.

In 1969 I visited the lakes at Danmarks Havn daily or every other day from 22 May to 22 June, thereafter less regularly, a total of 36 times until 27 September. In 1970, because of a lengthier trip by sledge, it was unfortunately impossible to start the trips before 2 June, whereupon I regularly went out every second or third day until 7 July, and later less regularly; a total of 34 trips up to 23 September. Most of the trips took place in the afternoon, but on a few occasions trips were made at all hours of the day and night.

Due to lack of time, search for nests and young was inadequate to some extent; consequently information about breeding depends considerably on observations of various forms of breeding behaviour.

The special counts of breeding waders in the area around Danmarks Havn (7.6 km², exclusive of lakes, fig. 7) took place in 1969 on 20, 22, and 26 June, when part of the area was examined each time. As a result of the delayed spring in 1970 counting took place on 5 July and only in the area around Hulesøen (1.36 km²). The areas were examined in routes in a density of 100–200 m, and the pairs who seemed to be breeding were indicated on detailed maps. Accordingly, the figures are based on one count in each area only.*

The figures given from trips on foot in the territory show how many breeding pairs I believe passed at the indicated stretches, in other words a sort of line survey.

* In the summer of 1975 the census was repeated by the author. The results, which differ considerably, will be published in *Dansk ornithologisk Forenings Tidsskrift*.

SPECIAL PART

Red-throated Diver (*Gavia s. stellata* (PONTOPPIDAN)).

Common along the southcoast of Germania Land and in the northern part of Store Koldewey. In addition, one bird was seen in the big river in the southwestern corner of Flade Bugt on 21 July 1970. The arrival dates in 1969 and 1970 were rather late. On 19 June 1969 one pair was observed in the lakes north of Yderbugten, and on 18 June 1970 one bird was seen in the lakes at Danmarks Havn. These initial observations took place 7–11 days later than in 1907–08 (MANNICHE, 1910) and are most closely equivalent to those made in Peary Land in 1964, 1966, and 1968 (see table 1).

No nests were found, but on 25 August 1970 a pair with one pull was observed in a small lake on the eastern side of Store Koldewey at Bergs Fjord. On 13 September three birds lay in a small bay outside the breeding lake; these were the last ones seen.

A few pairs were observed in the lakes north of Yderbugten and in the lakes at Stormkap. In contrast to 1908, no divers bred in the lakes at Danmarks Havn in 1969–70, but up to two pairs were frequently observed until mid-August, especially in Skibssø. Groups of as many as six birds were seen along the coasts, mainly outside the estuaries of the rivers. Up to 20 birds were observed in Lakseelven and its estuary in early July 1969, and in late August as many as 15 were seen here.

In 1969–70 an estimated total of 20 pairs, including non-breeding birds, was found in Germania Land; in addition there were some pairs on Store Koldewey north of Bergs Fjord.

MANNICHE (1910) describes the species as “very common”, but he does not give any figures.

Fulmar (*Fulmarus g. glacialis* (LINNAEUS)).

The nearest breeding sites of this species are the very large colonies on Mallemukfjeld and at Ingolf Fjord ca 400 km north of Danmarks Havn.

Due to varying ice conditions the occurrences of the species differed considerably between the two years concerned. In 1969 the first two

birds (dark) were observed on 4 June above the outermost islands in Øresund, ca 5 km away from open water. Hereafter none appeared until August, when up to ten were seen during boat trips around Kap Bismarck. Along the outer coast between Kap Bismarck and Thomas Thomsen Næs 40–50 individuals were seen during a boat trip on the 20th. A few of these were somewhat paler. After the ice broke up in Dove Bugt in late August 1969 a few individuals were seen farther inside the bay; some of them were light. The last observation was made on 5 September, when three to four light birds were seen. In 1970 only one individual was observed; it flew through Bergs Fjord on 25 August and then disappeared over the polar ice. The number of birds seen in 1969 was the largest observed in this area to date.

Long-tailed Duck (*Clangula hyemalis* (LINNAEUS)).

Common along the southern coast of Germania Land, usually breeding at the small lakes in this area, and a few breeding on small islands in Øresund. Small groups (max ten) were observed along the outer coast north of Syttenkilometernæsset. Two pairs were seen in a lake behind Fyrretyvekilometernæsset on 21 June 1970. On 21 July 1970 a few individuals were observed in the southwestern corner of Flade Bugt.

The initial observations were as follows: one pair, Skibssø, 9 June 1969; three pairs, Lille Skibssø 16 June 1970; and three on Lille Skibssø, 11 June 1971. In addition three were seen at Shannon, 24 May 1971.

A few pairs were observed in the lakes north of Yderbugten, in the lakes at Stormkap, and in the lakes at Hvalrosodden. Two females with pull. were seen in a small lake between Lille and Store Snenæs on 29 July 1970; on 14 July 1970 one female was brooding six eggs on Bådskæret, and on 3 August one female with five pull. was seen at the same place.

In 1969 one or two pairs were observed in the lakes at Danmarks Havn in June, and from mid-July to mid-August there were one or two females here. In 1970 up to 20 pairs were seen in June (the 21st) in Hulesøen and Lille Skibssø. In early July a few pairs and a single male were observed in Lille Skibssø and in the land water outside the rivers at Danmarks Havn.

Between 26 and 28 July 1970 four broods, with a total of nineteen pull. were hatched at Lille Skibssø. As early as the 27th the first four pull. lay in the land water at the coast outside the lakes, but on 4 August a brood of five still lay in the lake. In addition, one or two single females lay in the lake. On 19 August a female with two comparatively small pull. lay in Lille Skibssø, i.e. the fifth brood. Single individuals were observed in the lake until 6 September.

In early July 1969 18 males and three females lay in the estuary of Lakseelven. From 29 August to 1 September up to 150 males, females, and juveniles were seen in the river, in its estuary, and in the bay outside; only ca ten were unfledged. At the end of July 1970 ca 20 individuals lay in Lakseelvens estuary, and at the turn of the months of August-September there were ca 100, some of which were pull. On 6-9 September the figure was 160-170 at the same place. On 12 September 55 were observed in Stormbugt; 41 of them lay in Stormelven's estuary and ca ten were flightless. Of the rest four were large pull. On 21 September 16 lay at the same place; three were flightless, but by this time all the males were gone. In the days 16-18 October four to eight individuals were observed in open water areas in the vicinity of Danmarks Havn; this is a month later than both MANNICHE'S (1910) and PEDERSEN'S (1942) last observations.

Altogether, I estimate that there were 40-50 breeding pairs in Germania Land. MANNICHE (1910) describes this species as "very common", but otherwise his figures are not much larger than mine.

Arctic Eider (*Somateria mollissima borealis* (BREHM)).

Common breeding bird on the islands in the northern outlet of Dove Bugt. Occasionally observed farther inside Dove Bugt, along the outer coast, and on Île de France; the latter as the northernmost place on the eastcoast of Greenland where this species has been observed to date.

The earliest observations coincided with the appearance of the first small openings in the fjord ice in the breeding area (Øresund). On 8 June 1969 12 birds were observed displaying in Korridoren. In 1970 nine (five males and four females) were seen at Bådsøkæret on 19 June, and in 1971 20-30 were observed in Korridoren on 10 June. Further, 8 + 50 individuals were seen at Kap Philippe on Île de France on 11 May 1970, where, at this time there was a wide lead in the polar ice.

A total of ca 100 birds (males and females) was observed in Yderbugten, at Kap Bismarck, Rensøkæret, Bådsøkæret, and in Stormbugt, from mid-June to early July of 1969, 1970, and 1971. The majority of the males left in mid-July, but on 7 August 1970 six to eight males were still seen, together with 30-40 non-breeding females, at Kap Bismarck. Up to 30 (males and females) were seen in mid-July at the outer coast, and on 12 July 1970 12 (including ca eight males) were observed migrating south here. Arctic Eiders were rarely seen inside Stormbugt; a single male was seen farthest inside the bay in the land water at Lille Snæs on 6 July 1969.

During a brief visit on Maroussia on 5 August 1969 ca ten nests containing one to five eggs (one nest with two eggs and three pull.) were



found together with 30–40 non-breeding females. On the 7th there were ca 10 females with one to five eggs and 3 + 3 pull., and 15–20 non-breeders. At Renskæret three females with 4 + 4 pull. and five non-breeders were seen on 7 August 1969. On 6 August one female with ca five pull., and eight non-breeders were observed in the northeastern corner of Yderbugten. On 18 August 1969 six females with a total of 28 pull. lay in the shallow water area between I. P. Jacobsen Ø and Lille Koldewey, to which a large number of Arctic Eiders apparently lead their young. In the same area there were 20 non-breeding females.

On 20 July 1970 two nests containing 3 and 4 eggs were found on Båds-kæret; on 4 August there were four eggs in both nests, and on 9, 18, and 21 September a female with two pull. was observed at the island. In the small strait between Kap Bismarck and Måtten three females with 13 several days old pull. and two females with eight to nine pull., at the most a few days old, were seen on 22 August 1970. In addition, there were three to six non-breeding females. On 7 September there were 13 females with a total of 44 "medium sized" pull. in the area between I. P. Jacobsen Ø and Lille Koldewey, as well as a bit north of this area. On 27 September, when the area was almost frozen over, nine unfledged birds were observed, and across the new-ice there were tracks of an additional 20–30 en route south around I. P. Jacobsen Ø. On 12 September several old nests were found on Træsko, and one female with two pull. which were only half as big as those of the King Eiders (*Somateria spectabilis*) was found at the northeastern corner of Store Koldewey.

A total of ca 20 pairs of Arctic Eiders bred at the northern outlet of Dove Bugt. MANNICHE (1910) reports that there were 20–30 pairs on Maroussia and Renskæret alone (cited by SALOMONSEN (1950) as ca 25 pairs on each island). In 1970 the breeding cycle was ca 14 days late in comparison to 1969, the latter agrees with MANNICHE's reports (1910). About 50 non-breeding females stayed at the breeding sites during both years; these birds had disappeared around mid-August. All observed males were adults.

King Eider (*Somateria spectabilis* (LINNAEUS)).

Common breeding bird at the lakes at the southcoast of Germania Land and on the eastern side of Store Koldewey's northern part. Outside this area only three birds were observed in a small meltwater lake a few kilometres from the outer coast at Fyrretyvekilometernættet on 21 June 1970. On 12 July a single male was seen in the land water at the same place.

The initial observations are as follows: in 1969 one pair was seen in Skibssø on 7 June; in 1970 two males and three females were observed in Lille Skibssø on 14 June, and an additional three pairs arrived in the afternoon of the same day. In 1971 eight pairs were seen in Lille Skibssø on 11 June. During the rest of June 1969 one to three pairs lay in the lakes at Danmarks Havn; between Stormnæs and Store Snenæs there were six pairs on 17 June, and on 1 July two males and eight females were observed in the lakes at Stormnæs. In early July 1969 there were 20–40 King Eiders, with a slight surplus of males, outside the estuary of Lakseelven. In 1969 the last males were observed on 8 July, when six lay in the land water at Stormnæs.

One female with one egg was found on a nest at Store Snenæs on 18 June 1969; on the following day the nest was abandoned. On 22 June a female with one egg was found on a nest ca 150 m west of Hulesøen; the nest lay on the edge of a fertile, irrigated area on a gravelly slope. This was also abandoned. On 2 and 5 August there were four females with seven pull. in Hulesøen; on the 13th there were only two females with the seven pull., and now they had gone down into Skibssø (ca 900 m across land), where they still lay on the 24th, but with only one adult female present. On 8 August two females with ca five pull. were observed at the coast of Store Koldewey at Lillebælt. On the last days of August there were as many as 40 birds (ca seven broods with adult females) at the estuary of Lakseelven; most were fledged. Two flocks of five to six young birds lay at Vestre Havnenæs on 11 September.

In mid-June 1970 five to nine pairs lay in the lakes at Danmarks Havn (Lille Skibssø and Hulesøen). After the last days of the month only single males remained; the last one was observed on 15 July. From mid-July to early August five to six non-breeding females stayed in the lakes and in the harbour.

On 26 July two broods (2 + 4) had hatched at Lille Skibssø; on the 28th the small brood had gone out into the harbour, and by 4 August the other one had gone. On this date two females with five pull. lay in Hulesøen; on the 13th a single female remained with the young, and on the 19th all of them had gone out. They stayed in the outer part of the harbour until the first part of September, whereupon they lay at Bådskæret until after the middle of the month, when they gradually disappeared. A total of six females with 22–24 pull. lay in Lillebælt at the coast of Store Koldewey on 25 August. On 12 September 47 birds, ca nine broods, lay in Stormbugt. Only a few were fledged. Apparently the adult females had abandoned most of the broods. On 21 September, or two weeks later than reported earlier, the last ones, i.e., 18 juveniles (5 + 6 + 7) were observed laying in Stormbugt.

Altogether, I estimate that 30–40 pairs of King Eiders bred in the southern part of Germania Land and on Store Koldewey north of Bergs Fjord. MANNICHE (1910) reports 20 pairs breeding at the lakes at Stormkap alone. There may have been a slight delay of the breeding cycle in 1970 in comparison to 1969. The number of non-breeding females observed was relatively smaller than that of the Arctic Eiders, and they occurred in small groups or singly, along with the breeding females and their young. They left during August, and the breeding birds were gone before mid-September, thus, before the young were fledged in 1970. All males observed were adults.

Pink-footed Goose (*Anser fabalis brachyrhynchus* BAILLON)

The observations of this species were the most surprising during my stay. Previously the species has only been found commonly northwards up to Hochstetter Forland (ROSENBERG *et al.*, 1970). The first information on Pink-footed Geese in Germania Land to appear in the literature refers to a flock of six birds in the outer part of Mørkefjord in August 1933 (PEDERSEN, 1942) MANNICHE (1910) does not report any observations of the species in 1906–08, and it was not seen in 1938–39 (PEDERSEN, 1942). JOHNSEN (1953) gives some information from the Dove Bugt area: "Some breeding in river estuary in Stormbugt (IB POULSEN). During 2 world war rather many breeding in Hellefjord (POULSEN)." Major IB POULSEN (in litt.) reports that the observations in Hellefjord (the large fjord south of Mørkefjord) were made on a sledge trip in June 1941, and that they concerned adult birds, not nests or young. The reports from Stormbugt must be from 1948–49, but are not verifiable now, so long afterwards. BERTEL MØHL, who was at Danmarks Havn in 1955–57, saw one bird in the marsh behind the station in July 1956 (pers. comm.), but in 1961–64 many Pink-footed Geese were observed at Danmarks Havn; flocks were also seen migrating north (KNUD NIELSEN, pers. comm.).

My observations can be divided into two groups: a limited number of occurrences from late May and in June, and thereupon a northward migration around the turn of the months of June–July; in this connection there were hundreds in moulting flocks at specific locations in July and August.

The first two birds were observed at Hvalrosodden on 29 May 1969. Then from one to three birds were seen at Danmarks Havn until the moult migration began on 22 June. In 1970 from one to ten birds were regularly observed at Danmarks Havn in June; 6 + 6 + 3 were seen in Skærfjorden 17–18 June, farthest north at Kap Amélie.

The moult migration of young, non-breeding birds from the large Icelandic population to Northeast Greenland has been reported earlier by CHRISTENSEN (1967) and ROSENBERG *et al.* (1970). The northward migrating flocks observed at Danmarks Havn in 1969 were: 13 + 8 individuals on 22 June, 22 + 36 on 28 June, and in 1970 7 + 2 + 24 on 27 June, and 18 on 3 July. Compared with the counts from Daneborg (5–800 per year), the number here, 300 km farther north, was modest.

The moulting areas found are shown on the map (fig. 10). On 2 July 1969 I found the moulting area at Hvalrosodden, and I stayed there until the 6th. A total of 400 moulting geese was observed at Slamodden, Lakseelven and its estuary, west of Hvalrosodden, and in Gåsesøen and Sælsøen. (fig. 3). They kept together in flocks of 10–150, and were very shy; at a long distance they fled out across the ice, dove into the river, or hid behind large rocks on land. More than half to almost all of the birds in the flocks were flightless. While trying to fly up some of the birds lost some flight feathers, and a few of the birds that could still fly lacked several flight feathers. In addition to the moulting flocks a total of ca 125 flying birds was observed in flocks of 5–30 along the coast from Stormelven to Slamodden, and a smaller number of moulting birds was distributed along this stretch of the coast.

On 22–23 July 1970 ca 200 flightless birds were observed at smaller lakes east of Trekronerfjeldet and at Hvalrosodden. Lakseelven, Sælsøen, and Gåsesøen were not visited at this time. In 1971 ca 300 birds were observed under similar circumstances around Hvalrosodden from 16–21 July.

In 1970 BLOCH found the moulting area at the estuary of the big river in the southwestern corner of Flade Bugt in Skærfjorden. On 20–21 July 12 + 300 + 100 flightless geese were observed in the land water and in the river. Although the migrating birds at Danmarks Havn possibly were en route to this place, the direction and the location may indicate another and more northerly goal.

It is remarkable that the moulting areas described here are located at the largest lake and two of the biggest rivers in Germania Land, thus, at the places where the most extensive open water forms when the geese moult. At Hvalrosodden the vegetation is extremely sparse, whereas the river estuary at Flade Bugt is among the more fertile in this area. In this connection the difference between the haunts of the Pink-footed Geese and the Barnacle Geese (*Branta leucopsis*) is worth mentioning. The Pink-footed Geese were found in the land water (coast), in the big rivers and in sizeable lakes, whereas the Barnacle Geese stayed with their young at the smaller lakes (ponds) where there was vegetation along the banks; the moulting non-breeding Barnacle Geese were observed at localities more like those where the Pink-footed Geese

stayed, but generally on smaller lakes (see also MARRIS & WEBBE, 1969).

The Pink-footed Geese were first seen again at Danmarks Havn when the autumn migration began, i.e., 29 on the 13th, and 37 on the 24th of August 1969; the last observed this year was a flock of 30 migrating southeast across Hvalrosodden on 30 August. In 1970 ten birds rested at the weather station on 1 September.

It must be concluded that about 1,000 Pink-footed Geese moulted north of Dove Bugt, and that a few birds, presumably non-breeding examples of the Greenland population, rambled around north of the species' breeding area from late May, even though it cannot be excluded that the species breeds in these areas.

Barnacle Goose (*Branta leucopsis* (BECHSTEIN)).

Common breeding bird in the entire territory dealt with in this paper. Breeds in small and larger colonies on bluffs proper, and less frequently on steeper slopes. The individual breeding sites are described below.

In 1969 and 1970 the first birds were observed on 22 May. In 1969 there was one pair at Danmarks Havn, and in 1970 three birds were seen here, and seven were seen at Ålborghus on this date. In 1971 three birds were observed in the southern part of Dove Bugt on 20 May. I found the following initial records of earlier years in the journal of Ålborghus: 18 May 1964, 22 May 1966, 24 May 1967, and 19 May 1968. Observations of migrating flocks are indicated on the map (fig. 10); it can be seen that the main migration presumably follows the outer coast from the south, whereupon it breaks up to the breeding sites. In 1969 the migration apparently was completed a few days after the first flocks arrived; on 24 May there were 17 birds at Danmarks Havn and ca 50 at Ålborghus. From 27–31 May ca 20 were observed at Hvalrosodden, six at Store Snenæs, and two to nine per day at Danmarks Havn. From 9–22 June flocks of 3–31 non-breeders were seen at Danmarks Havn, max. number 42 in total. In the beginning of July flocks of 8–40 were seen, mostly in the lakes between Stormelven and Hvalrosodden, altogether ca 130 individuals, 90 of which were at Lakseelven. Seemingly, none was yet flightless.

As can be seen on the map, the migration was well under way by 22–23 May 1970, but winds and heavy snowfalls almost stopped it on 25–29 May. Not until the 30th the first 20 birds were seen at Gåsefjeldet at Ålborghus, and the migration continued in small flocks 1–2 June. On 1 June several hundred birds were observed in a valley at Penthièvre Fjord (see below), and at Danmarks Havn the numbers rose from 15–20 on 2 June to 60–75 on 5–7 June. Subsequently up to 27 June 10–30

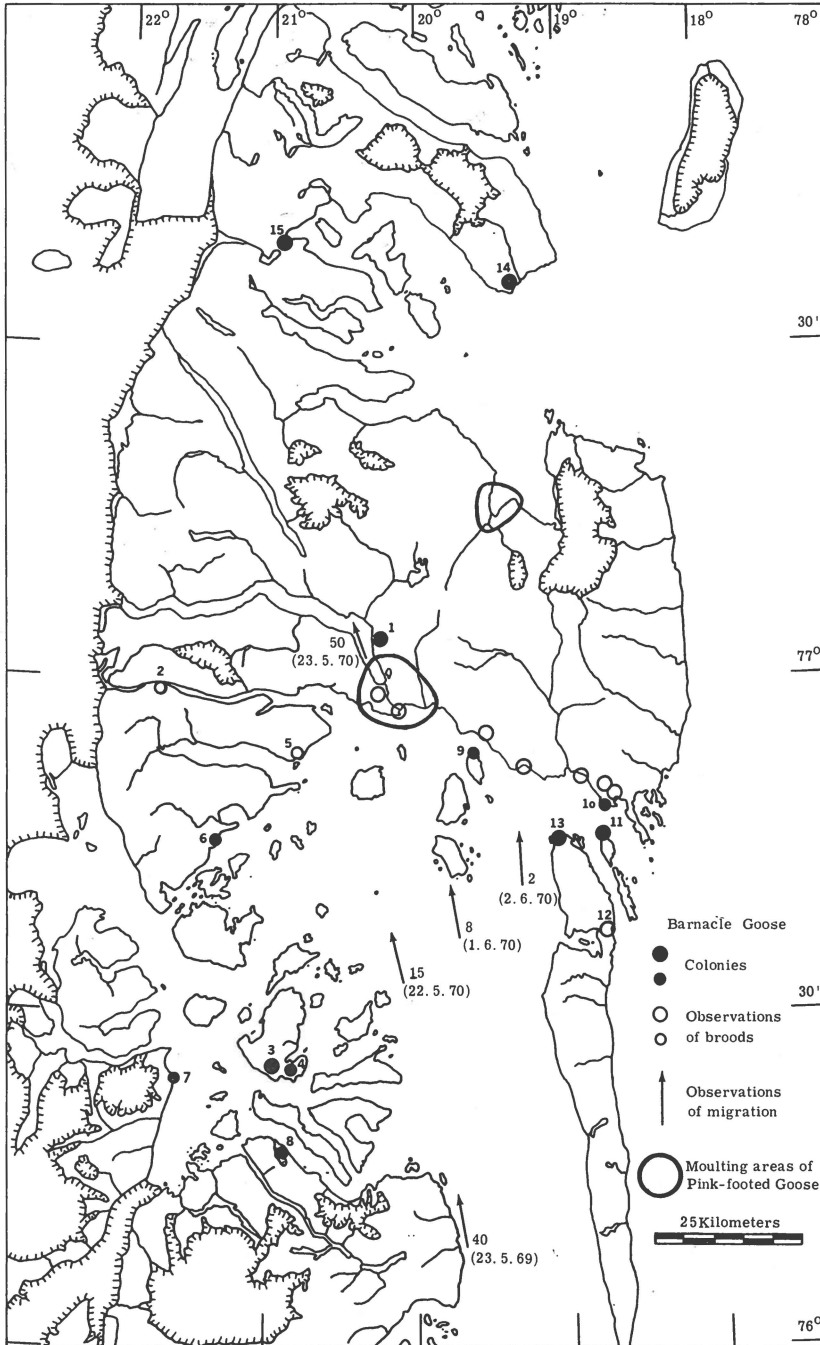


Fig. 10. Map showing colonies and observations of broods of Barnacle Geese (*Branta leucopsis*). Large sign. indicate my observations, small sign. earlier ones. The numbers refer to the text, circles without numbers are described under the nearest colony. In addition, observations of migrating Barnacle Geese are indicated, showing number and date, as well as the two main mouling areas of Pink-footed Geese (*Anser fabalis brachyrhynchus*).

presumably non-breeding birds were counted. When flushed, the young birds behave somewhat differently than the adults; they are less shy, fly up later, and frequently turn around and fly back across one's head several times, in contrast to the old ones, who fly away immediately. In regard to the biotope for the moulting flocks of Barnacle Geese, see under Pink-footed Goose (*Anser fabalis brachyrhynchus*).

In 1971 up to 83 Barnacle Geese were seen at Danmarks Havn in mid-June, 50 between Stormelven and Store Snenæs in mid-July, and 40–50 flightless birds in Gåsesøen on 22 July.

The Colonies

In addition to MANNICHE (1910) and PEDERSEN (1942), JENNOV (1963) has published some reports on the Barnacle Geese, i.a. in Dove Bugt. His information derives from KNUD NIELSEN, who was a trapper at Ålborghus 1950–52, and head of Danmarkshavn Vejrstation 1961–64. KNUD NIELSEN probably knew more about geese than anyone in the Dove Bugt area at that time, but the number of pairs stated are the number of pairs actually seen in the colonies, and thus included non-breeding birds (NIELSEN, pers. comm.). Presumably, at least half of the spring population of Barnacle Geese consists of non-breeding immature birds, which to a large extent stay in the colonies during the first part of the incubation period (ROSENBERG *et al.*, 1970). The list of the colonies has been corrected in consideration of this circumstance. The individual colonies are shown on the map (fig. 10), and the numbers refer to the text. If nothing else is mentioned, the colonies are situated directly out to the coast.

Trekronerfjeldet (1). This colony, which is situated on the steep NNE bluff of Trekronerfjeldet at a distance of 1–2 km from Sælsøen and ca 13 km from the coast, is probably the most well-known Barnacle Goose colony in Northeast Greenland. It has often been mentioned as an example of a colony situated at a large inland lake, but Sælsøen is more like a fjord (60 km long and 4 km wide, very deep, almost at sea level, and only separated from the sea by a ca 5 km wide gravelly plain), and is solely important to the Barnacle Geese as a route for leading their young out to the small lakes at Lakseelven and to the coast (fig. 3). MANNICHE (1910) describes the colony as situated more than 200 m over the terrain; in my opinion the bluff is not much higher than 100 m. This was the only colony MANNICHE found, and in 1908 he observed ca 150 birds. ROSENBERG *et al.* (1970) estimated that this figure corresponds to ca 40 pairs. The colony has been mentioned as an example of the ability of the Barnacle Geese to breed in colonies of 100–150 pairs.

PEDERSEN (1942) estimated that there were ca 30 pairs in the colony in 1939, and reported that ca 100 non-breeding birds stayed in the

vicinity. 1939 was a very poor year climatically; the geese arrived ca 10 days later than normally, and egg-laying correspondingly began a little late. SALOMONSEN (1950) believes that 1939 was a partially non-breeding year, and states that more than 100 pairs did not breed! The 100 non-breeding birds PEDERSEN observed are not many more than can be expected from a colony of this size.

When I visited the site on 5 July 1969 the majority of the geese had already left the colony together with their young; only one pair remained. From the foot of the bluff to Sælsøen I found tracks of one pair of geese with three pull. At this time there was a fringe of open water several metres wide along the shore down toward Lakseelven. In the small lakes at Lakseelven there was a total of six pairs with 1 + 1 + 1 + 2 + 4 + 4 pull. on 4 July. In late July 1970 a total of seven adults with ten pull. was observed at Hvalrosodden, and in 1971 six adults with seven to eight pull. were seen at the same place on 16 July. The distance from Trekronerfjeldet is 8–13 km.

Even though the possibility that the geese can lead their young to places other than the lakes at Lakseelven and Hvalrosodden cannot be excluded, in my opinion this colony did not consist of more than ten pairs.

The territory between Mørkefjord and Hellefjord (2). According to PEDERSEN (1942) there must have been a large colony in this area in 1938–39. Although no further information is given, the presumption probably stems from an observation of a flock of Barnacle Geese in the inner part of Mørkefjord on 4 August 1939 (KNUTH, 1940). I was unable to visit this area during the breeding period.

Gåsefjeldet and Sylen on Godfred Hansen Ø (3 and 4). PEDERSEN (1942) believed that there must have been a large colony in this area. KNUD NIELSEN (JENNOV, 1963) reports that the colony on Gåsefjeldet consisted of ca 50 pairs, which exclusive of immatures should amount to less than 20 breeding pairs, in 1950–52. Ten pairs were observed on Sylen, the adjacent mountain, yet neither eggs nor young were seen here (NIELSEN, pers. comm.).

The colony on Gåsefjeldet is situated on the ca 200–300 m high, almost vertical southside of the mountain, ca 1 km from the coast, but a couple of km away from the lakes to the east, where, according to KNUD NIELSEN, the geese lead their young.

In 1969 ca 50 birds were seen at the colony on May 24, and in 1970 ca 20 were observed on 30 May.

Vædderen (5). On 12 July 1939 one pair of geese with five pull. was observed at this steep, ca 800 m high mountain (PEDERSEN, 1942). I did not visit the site during the breeding period.

Mågefjeldet at Port Arthur (6). PEDERSEN (1942) reports that a few pairs bred here, but gives no further information. The site is a 50

m high ESE facing bluff. I did not visit it during the breeding period.

Kap Niels (7). According to KNUD NIELSEN (JENNOV, 1963), there must be brooding sites here, an opinion he bases on observations of geese in the vicinity in 1950–52 (NIELSEN, pers. comm.).

The south side of Trangsund (8). JENNOV (1963): "Klipperne mellem 17 maj Fjorden og Kap Peschel". In KNUD NIELSEN's opinion, there is "a very important brooding site" here. His opinion is based on the fact that he in June 1951 or 1952 from some distance saw a large flock of geese flushed from the mountain bluff by a stone slide (NIELSEN, pers. comm.). I have not visited the site.

The north point of Nørre Orienteringsø (9). JENNOV (1963): "Trekanten." KNUD NIELSEN (JENNOV, 1963) reported that he had observed 20–30 pairs. The count stems from 1951–52, and immatures excluded, this amounts to ca ten pairs (NIELSEN, pers. comm.). This colony, which is situated on the ca 20 m high steep bluff on the north side of the mountain surely is of more recent date, as neither MANNICHE (1910) nor PEDERSEN (1942) could have avoided discovering it.

Unfortunately, I was unable to visit the place during the incubation period, but geese were observed in the vicinity in both 1969 and 1970. In late July 1969 two to three pairs with 3 + 5 pull. were seen in small lakes between Lille and Store Snenæs, i.e., directly opposite and ca 3 km distant from the locality. On 8 July one pair with two pull. lay in a small lake near the bay east of Store Snenæs, but since the distance between this lake and the mountain is ca 10 km, there may have been another breeding place.

"The area above Gnipahulen". KNUD NIELSEN (JENNOV, 1963) reports a few pairs here. This report is based on observations of some birds flying around north of Hulesøen (NIELSEN, pers. comm.). There are no suitable nesting sites here.

The cliff behind Båds-kæret (10). Reported by KNUD NIELSEN (JENNOV, 1963) as having four pairs of breeding Barnacle Geese. The number is based on observations of nests and eggs in 1961–64 (NIELSEN, pers. comm.). This locality, which is a ca 40 m high SW-facing bluff, was not occupied in 1969–70, but on 8 June 1969 a pair of Barnacle Geese was observed sitting on the cliffs.

Kap Bornholm (11). This colony cannot have been present at the time of the Denmark Expedition, as it could not possibly have escaped notice. HANS EGEDE JACOBSEN (JENNOV, 1963) reports that there were 10–12 pairs, but the year of observation is not mentioned.

The site is a ca 80 m high bluff facing NE towards Korridoren. On 4 June 1969 there were 13 pairs in the colony; on the 6th there apparently were ten pairs with nests and two to three pairs without nests, but only five nests could be seen from above. Two of these contained two eggs

each, and one only one egg; the contents of the others could not be seen. The nests were partly distributed on small ledges on the vertical cliff, partly on ledges of the upper edge of the bluff, where they lay on many years' rubbish of Glaucous Gulls (*Larus hyperboreus*). There were two Glaucous Gulls' nests a few metres distant from the goose nests. These nests were approachable, although with some risk. On the 8th there were 17 birds in the colony, eight of which seemed to be sitting on nests.

On 13–14 July 1969 three pairs with 2 + 3–4 pull. lay in Hulesøen, and two pairs with seven pull. lay in the land water slightly west of Bådsøkæret. On 24 July three pairs with ca six pull. were still laying in Hulesøen, but they were gone before the beginning of August.

When I visited the locality on 18 June 1970 there were ca 20 pairs in the colony, and two eggs could be seen in one nest. It was impossible to determine the number of breeding pairs, but on 1 July there were only five pairs in the colony. On 12 July at ca 3 p.m. one pair with four pull. was observed walking across the ice towards Bådsøkæret, and on the 15th three pairs with 2 + 4 + 4 pull. lay in Hulesøen. They were still there on the 19th, and at ca 3 p.m. on the 20th yet another pair with four pull. was observed crossing the ice from the colony to the land water at Bådsøkæret. At the end of July the geese in Hulesøen were gone, but one pair with two tiny pull. lay in Lille Skibssø on the 28th. This last brood, which may have been the result of a second egg-laying, following my visit to the colony on 18th June (Glaucous Gulls' plundering of the eggs), stayed in "Skibssøerne" from 24 August onwards with a pair with four somewhat larger pull. (those from Bådsøkæret 20 July) until all of them, not yet fledged, were observed on 6 September on the slopes inside Vestre Havnenæs. On 30 July one adult with five to six pull. was observed in the land water at the inner part of Stormbugt. On 13 August the broods again lay in Hulesøen, this time 13 adults with ca 17 pull. of varying size (five to six broods); on the 19th all of them were fledged.

Accordingly, the geese from Kap Bornholm lead their goslings across Korridoren (4 km), partly to go up through Vesterdalen to Hulesøen (4 km more), and partly farther, into Stormbugt. Furthermore, the young apparently are led here from Hulesøen when they are ca 14 days old; they do not appear in the lakes again until just before they are fledged. In 1969 there were five broods, in 1970 five to six. In this connection it should be noted that up to 20 pairs were observed in the colony.

Small lakes between Lillebælt and the NE corner of Bergs Fjord (12). On 8 August 1969 three pairs with nine pull. were observed here. In 1970 none was seen during a visit on 25 August. I do not know the site of the colony, but there are suitable mountains in several parts of the area.

Kap Helgoland (13). On 8 June 1970 three pairs of Barnacle Geese and two nests, one containing three eggs and one empty, were seen here on a ca 15 m high SW facing mountainside; both were fairly accessible. A few days later four pairs were observed at the site.

Kap Amélie (14). 14 Barnacle Geese were observed foraging at a small lake in the valley east of the cape on 17 June 1970. When flushed, some of them flew towards a smaller bluff slightly to the west.

The big valley between Penthièvre Fjord and Kofoed-Hansen Bræ (15). A sledge party which visited this valley on 1 June 1970 reported having seen "three to five hundreds" of Barnacle Geese in flocks in the eastern part of the valley. One flock was observed alighting on a bluff in the south side of the valley. The vegetation in the valley was described as comparatively fertile. Even though one may have certain reservations about these numbers, a considerable amount nevertheless remains. Note, moreover, the number of northward migrating flocks in Sælsøen, a total of ca 50 birds on 23 May 1970 (fig. 10). The observations of Barnacle Geese at Kap Amélie and Penthièvre Fjord are the northernmost made in Greenland to date.

The number of pull. in the observed broods was between one and five. The average of 14–15 broods in 1969 was 2.5, and of 12–13 broods in 1970 3.3. The average of all the years concerned, including three broods from 1971, was 2.8 for 30 broods. Apparently there was no delay in the breeding cycle in the "late" year 1970; in both years egg-laying commenced about 1 June. Nor was there any apparent difference between the number of breeding pairs.

From about 10 August the newly moulted, non-breeding birds again began to appear at Danmarks Havn; thus, there were 80 at Hulesøen on this date in 1969. Flocks of 10–50 old and young birds were observed thereafter until the end of the month. The last two birds, possibly not yet fledged juveniles, were seen in Lakseelven on 30 August. In 1970 flocks of 20–75 were observed from mid-August to 1 September. The last ones seen in 1970 were five at Store Snenæs on 9 September, and in 1971 there was a single bird at Danmarks Havn on 10 September.

The estimated numbers from the colonies familiar to me add up to ca 60 pairs. In addition, there is the presumed colony at Penthièvre Fjord. Since it is my impression that besides those reported there must be a number of colonies around, I believe that it is realistic to count on more than twice the number of breeding pairs of Barnacle Geese in the areas around Dove Bugt and Skærfjorden.

Greenland Falcon (*Falco rusticolus candicans* GMELIN).

Scarce and scattered breeding bird. Observed singly in several places, and commonly at Danmarks Havn during the autumn migration.

In both years falcons were observed singly from the beginning of May until the end of June; a total of eight observations.

On 5 July 1969 I visited the falcons' breeding site in the Barnacle Goose colony on the north side of Trekronerfjeldet which MANNICHE (1910) and PEDERSEN (1942) had found before. There was one pair at the place, and I saw two or three limed sites. Possible eggs or young could not be seen, but one of the ledges was especially preferred, and when one of the birds alighted here, possibly carrying prey, a lengthy shrieking call could be heard.

There was also a nesting site in the Barnacle Goose colony on the south side of Gåsefjeldet at Ålborghus. One pair was observed here on 22–23 May 1970; the presumed nesting site was not especially limed. The site was not occupied in 1950–52, but was presumably used in 1961–64 (KNUD NIELSEN, pers. comm.).

The breeding site on the northern point of Nørre Orienteringsø (MANNICHE, 1910) was not used in 1969–70. I was unable to visit the two or three remaining breeding sites reported by MANNICHE and the one reported by PEDERSEN.

On 25 August 1970 I saw from a distance of 4–5 km on the steep southcoast of Bergs Fjord a strip of lime which I presumed was a falcon's nest.

From 12–19 September 1969 and from 28 August to 27 September 1970 one to three falcons were observed almost daily in the aerial masts at the weather station. In 1969 there were five to ten different birds, and in 1970 ca 15. In comparison, in the autumn of 1906 up to four or five were seen simultaneously at Danmarks Havn, and 17 were shot here, in addition to 23 elsewhere; an estimated total of 200 birds was observed (MANNICHE, 1910).

At Danmarks Havn the falcons were seen chasing flocks of Snow Buntings (*Plectrophenax nivalis*) and waders, as well as, apparently for the sake of amusement, the sledge dogs, young Glaucous Gulls (*Larus hyperboreus*), and one another among the numerous stretched wires of the aerial masts. The majority of the birds on autumn migration seemingly consisted of juveniles of both sexes.

An estimated five to ten pairs bred within the area of investigation.

Greenland Rock-Ptarmigan (*Lagopus mutus captus* PETERS).

This species was commonly observed at all the localities I visited; apparently it bred commonly in the entire area of investigation, even though breeding was only found in Germania Land.

In 1969 the first ptarmigans were observed on 25 January at Danmarks Havn; in 1970 two were seen west of Hvalrosodden on 27 January,

and in 1971 three were observed on Harefjeldet on 11 February, the latter despite persistent attempts to find them earlier. The observations from 1969 and 1970 are somewhat earlier than previously reported: 31 January to 8 February (MANNICHE, 1910; PEDERSEN, 1942, and JOHNSEN, 1953).

Only a few ptarmigans (one to four) were observed until mid-March in 1970 and 1971; all those whose sex could be determined were males. Subsequently more birds, including females and displaying males, were observed. In both years the migration culminated around the turn of the months March–April, but there still was a surplus of males. In 1970 up to 10–15 were observed at Danmarks Havn, and in 1971 36 were seen on 26 March, 29 on 27 March, and ca 50 on 2 April, all around Termometerfjeldet, and distributed on one to two windblown, vegetated areas. Later only a few (one to two) were seen, fervently displaying. From mid-May females were observed beginning to shift to summer plumage, and after early June they were in full summer plumage. One male seen on 28 June was still white, but very dingy; at the beginning of June most of the males nevertheless had brown spots on their heads, and in early August they had shed almost all of their winter plumage.

In 1969 and 1970 there were four to five pairs in the areas around Danmarks Havn, but only one to two pairs inside the census area (fig. 7). On 15 July 1969 one female with six pull. was observed in Stormdalen, and on 21 July 1970 one female with eight pull. was seen on Termometerfjeldet. On 29 June 1971 a nest containing 11 eggs was found at Danmarks Havn, and on 4 July the first pull. was seen. On 15 July of the same year one female with seven pull. was observed at Slamodden. Around the turn of the months of August–September 1969 and 1970 flocks of 9–30 were observed along the south coast of Germania Land. On 1 September 1969 25 + 6 flew SW across Hvalrosodden at 1 a.m. at a height of ca 20 m.

As late as 24 September 1970 a flock of nine birds was observed slightly north of Syttenkilometernæsset, and there were many tracks in the new snow on the islands off Kap Bismarck. Thereupon no observations were made until 23 October 1969, when three were seen at Kap Bornholm, and 4 November 1969, when one flew south across the ice at Kap Bismarck. On 15 November 1970 five ptarmigans were seen migrating south off the coast at Haystack, slightly south of the area of investigation.

An observation of a ptarmigan "seat" on Godfred Hansen Ø in November (JENNOV, 1945) cannot, in my opinion, be considered wintering, but simply denotes a late occurrence.

In common with 1906–08 (MANNICHE, 1910) and 1948–49 (JOHNSEN, 1953), 1969–71 were good ptarmigan years in Germania Land, whereas in 1938–39 somewhat fewer birds of this species were observed (PEDERSEN, 1942).

Lapwing (*Vanellus vanellus* LINNAEUS).

One individual was observed in the marsh at Danmarks Havn on 20–21 and 26 June 1969. Until 1967 there were 18 occurrences in Greenland, only one of these on the eastcoast, namely, in Angmagssalik District (SALOMONSEN, 1967).

Ringed Plover (*Charadrius h. hiaticula* LINNAEUS).

The most common wader in the territory, but very irregularly distributed. Very common along the southcoast of Germania Land, more scarce in the interior and on the outer coast.

In 1969 five Ringed Plovers were observed at Danmarks Havn on 23 May, one of them in courtship flight; this date is five days earlier than the earliest observation by MANNICHE (1910). The number had quadrupled in five days, and most of the birds appeared in pairs. In 1970 I was on a sledge trip when the Ringed Plovers arrived, but the species apparently was somewhat delayed; the first birds were heard migrating at Weaseløen on 1 June. There were five to eight at Danmarks Havn on 2 June, and on 7 June the number had risen to 40. In mid-June the birds had scattered to the breeding sites in the rest of the territory. The large difference in the number of birds in early June at Danmarks Havn in the two years must be due to the above-mentioned snow conditions. When the birds arrived in 1969 considerable parts of the territory were already snowfree, and the birds could occupy their sites at once. In 1970 the territory was almost totally covered by snow until mid-June, and many individuals of most species awaited the thawing of the rest of the land in the "oasis" at Danmarks Havn.

Pull. were seen at Danmarks Havn on 13 July 1969, and in 1970 about 19 July.

In the census area at Danmarks Havn (7.6 km² exclusive of lakes, fig. 7) a total of 60 pairs (7.9 pairs per km²) was found in 1969. In the area around Hulesøen (1.36 km²) 18 pairs were found in 1969 and 22 pairs in 1970. PEDERSEN (1934) reports ten pairs per km² for Hochstetter Forland, and in 1964 ROSENBERG *et al.* (1970) found six pairs per km² in their census area at Daneborg (ca 3 km²). Yet it should be emphasized that my figures only derive from one count per area of estimated territory claiming pairs (see p. 22). My area should cover the major part of the area for which MANNICHE (1910) reports at least 100 pairs in 1908 (presumably estimated).

Some estimates of the number of pairs passed (see p. 22) were made on trips on foot in Germania land. Thus, in early July 1969 scarcely one

pair per km was found along the southcoast between Stormelven and Hvalrosodden and around Lakseelven. In Stormdalen and between it and Fyrretyvekilometernæsset only one pair for each 3–4 km was found in mid-July 1970, and along the outer coast the pairs were still fewer. These differences apparently only reflect the varied distribution of the species' breeding biotope, and have nothing to do with the distance from the coast. ROSENBERG *et al.* (1970) found one to two pairs per km along the southcoast of Wollaston Forland.

Type II (see p. 13) was the species' preferred breeding biotope at Danmarks Havn, and, to a lesser degree, type III. Most of the pairs were found where smaller, more arid areas alternated with more fertile, irrigated spots.

In 1969 the last adults were seen on 13 August, in 1970 on 19 August. These adults were observed among flocks of juveniles which gathered in the marshes and along the coast in mid-August. The first flock of juveniles, which numbered ten birds, was observed on 3 August 1969. The last young birds were seen on 17 September 1969, and in 1970 on the 9th; the latter date coincides with MANNICHE'S (1910) last observation.

Golden Plover (*Pluvialis apricaria altifrons* (BREHM)).

One juvenile, which was in good condition and weighed 140 gr was shot at the weather station on 5 September 1969. The occurrence is the northernmost in Greenland to date (SALOMONSEN, 1967).

Turnstone (*Arenaria i. interpres* (LINNAEUS)).

Common breeding bird in most of Germania Land, particularly very common along the southcoast. In both 1969 and 1970 it arrived on 23 May, when 14 were observed at Danmarks Havn and three at Hvalrosodden, respectively. These arrival dates are five to ten days earlier than MANNICHE'S (1910). In 1969 5–20 birds were observed daily during the rest of May in the Danmarks Havn area, and mating and courting were observed a few days after arrival. In 1970 25–30 birds were seen daily at Hvalrosodden and in the terrain at Danmarks Havn from shortly after arrival until after mid-June. Furthermore 20–30 birds stayed at the weather station throughout the first half of June; they sought food among our 30 sledge dogs, where masses of insects and some remains of the dogs' meals were found. After mid-June these birds spread out

over the territory along with other waders which here had waited for the land to thaw. On 10 June there were still some not fully moulted birds, and mating and courting were first observed in mid-June this year.

According to the counts at Danmarks Havn there were 14 pairs (1.8 pairs per km²) in the entire census area in 1969. In 1969 and 1970, respectively, there were one and two to three pairs around Hulesøen. In early July 1969 ca 0.5 pairs per km were observed during a trip on foot between Stormelven and Hvalrosodden, and at least one pair per km on the plain between Hvalrosodden and Sælsøen. In mid-July 1970 one pair per 3 km was found in Stormdalen and between this valley and the outer coast. When comparing the figures to the other species of waders observed on trips on foot, consideration should be given to the Turnstone's noisier and more hostile behaviour, as well as its attraction of other individuals from a larger area when disturbed. In 1907 and 1908 MANNICHE (1910) counted 40 breeding pairs in his 23 km² large area of investigation west of Stormelven, which gives a density quite like that in my area at Danmarks Havn in 1969. Yet it is most remarkable that the species did not breed at Danmarks Havn in 1907-08; PEDERSEN (1934) reports five pairs per km² in Hochstetter Forland. The species' preferred biotope was type II with cliffs and boulders (type IV). In both 1969 and 1970 fledged juveniles were observed on 17 July.

During the first half of July in both years flocks of five to ten birds were observed together with other waders at the lakes west of Stormelven and at Danmarks Havn. In 1969 the last adult was seen at the coast on 5 August, in 1970 on 13 August. Flocks of up to 10-20 juveniles were observed along the coasts throughout August; as many as ten birds stayed at the weather station among the dogs and at the meat rack, where they fed on dried shark meat and seal blubber, among other things. In 1969 the last juveniles were observed on 5 September, but in 1970 there still were about 25 at Danmarks Havn on the same date. At the weather station the number decreased from ten on the 12th to one on 27 September, which was the final observation. A few individuals were seen elsewhere until 23 September. Two migrated south at Hvalrosodden on the evening on 29 August 1969.

Knot (*Calidris c. canutus* (LINNAEUS)).

Common, but scattered breeding bird on the arctic heaths in Germania Land, mostly observed along the southcoast. Neither eggs nor pull were found. In 1969 three Knots were seen at Danmarks Havn on 25

May, and apart from a few breaks one to five birds were observed here until 13 June. They appeared singly, or two to three together, often singing. In 1970, possibly because of my absence, the first ones were not observed until 31 May (three at Danmarks Havn). A flock of 14 migrated north at Weaseløen on 1 June. The birds first really began singing in mid-June, and on the 10th there still were not fully-moulted individuals. In 1971 six were observed at Mønstedhus on the northern part of Hochstetter Forland on 27 May.

In 1939 the species arrived in flocks ca one week late (5 June); the flocks first paired off in the second half of June (PEDERSEN, 1942). Nothing in PEDERSEN's (1942) description indicates that 1939 was a non-breeding year, as cited by ROSENBERG *et al.* (1970). In 1969 the birds arrived three to eight days earlier than in 1907–08 (MANNICHE, 1910).

As in 1907–08, the species did not breed at Danmarks Havn. In early July 1969 ca 20 birds were observed between Stormelven and Hvalrosodden; nine were singing. They were seen singly and in flocks of two to four. According to PARMELEE & MACDONALD (1960) these groups consists of the non-brooding (off duty) birds which straggle above the breeding sites. Thus, the 20 birds seen should theoretically represent 20 pairs on this 37 km long stretch. On the somewhat smaller stretch between Stormelven and Store Snenæs, MANNICHE (1910) found ca 30 pairs by visiting the area daily, but neither nests nor young were found. I saw 10–11 birds here. In mid-July 1970 an average of one bird per 2–3 km was observed in Stormdalen. A few birds were also seen along the outer coast and north and northeast of Yderbugten during the breeding period. In June and July in both years up to three birds were heard singing on the ca 400 m high plateau 10 km north of Danmarks Havn. A few individuals were also observed in the northern and western part of Germania Land during the breeding period.

The species' favourite biotopes were extensive arctic heaths on plain or slightly undulating ground. The extent of the arctic heath areas at Danmarks Havn apparently was too limited. On Ellesmere Island the breeding biotope was well-vegetated tundra, and the nests primarily lay on hummocky ground at a height of up to 400 m, with a distance of several kilometres between the nests (PARMELEE & MACDONALD, 1960).

In 1969 flocks of 13 + 30 + 20 Knots were observed together with Turnstones (*Arenaria interpres*), Dunlins (*Calidris alpina*), and Sanderlings (*Calidris alba*) at the lakes west of Stormelven on 8 July, and one was seen in a flock of Sanderlings at Hulesøen on the 13th. These flocks clearly differed from the breeding groups by associating with other species, and by being fairly stationary at the good foraging sites, in contrast to the breeding groups, which flew singing everywhere, and often alighted close to me when I passed through the terrain.

No adults were observed in the autumns, with the exception of two, together with two juveniles, seen on 6 September 1970 at Danmarks Havn, which is the latest observation of adults in Greenland (SALOMONSEN, 1950). One juvenile was seen at Bådsøkæret as early as 24 July 1969; otherwise, only 12–20 juveniles were observed at Hvalrosodden on 28–30 August in this year. In 1970 up to nine juveniles were seen around Danmarks Havn in early September, the last one at Bådsøkæret on the 9th.

Purple Sandpiper (*Calidris m. maritima* (BRÜNNICH)).

On a boat trip along the outer coast of Germania Land on 21 August 1969, when we went ashore between Thomas Thomsen Næs and Kap Marie Valdemar and somewhat farther south, we saw a total of five Purple Sandpipers; apparently all were juveniles, one still with a downy head. We saw them both at the coast and on the arctic heath slopes somewhat farther inland. In 1970 one was observed in the marsh at Danmarks Havn on 3 and 5 June, and on 12 July one was seen in a stony delta at the outer coast.

The observation of a juvenile with a downy head indicates that this species probably bred in Germania Land in 1969. The species breeds in the inner part of Scoresby Sund (SALOMONSEN, 1950), and has presumably bred on Clavering Ø and on Hochstetter Forland (PEDERSEN, 1942), as well as on Sabine Ø in 1919 (LØPPENTHIN, 1932). Apart from these, there have only been scattered observations, i.e. in Germania Land, three west of Stormelven and at Danmarks Havn in mid-June 1908 (MANNICHE, 1910), and two juveniles at Hvalrosodden on 28 August 1938 (PEDERSEN, 1942).

Schiøler's Dunlin (*Calidris alpina arctica* (SCHIØLER)).

Very common breeding bird in the marsh areas in the southern part of Germania Land; the species was not observed at the outer coast. In 1969 the first observation was made on 23 May, when a singing bird was seen at Danmarks Havn. In a few days the number rose to 15–20, mostly in pairs. In 1970 two were seen at Danmarks Havn on 31 May; on 2 June there were three to five, one of them singing. But on the following day the number had increased to 40; on the 7th there were 40–50, 20 of them in flocks. Not all had fully moulted, and almost no song was heard. From 10 June onwards 20–30 birds, mostly in pairs and many singing, were observed. After the 18th the number was normalised; most of them appeared in pairs, and many sang. In 1969 arrival took place 5 days earlier than previously observed (MANNICHE, 1910). In 1939 the species was first observed on 12 June; eggs were not found until 11 July,

and fledglings were first observed on 12 August (PEDERSEN, 1942). In 1969 the first nest (four eggs) was found on 16 June and fledglings appeared on 16 July. An almost fledged juvenile attended by two adults was seen on 26 July 1970; several pull. (broods) were observed attended by only one adult.

In 1969 23 pairs were found at Danmarks Havn, which gives 3.0 pairs per km², but this figure is not particularly representative, since the species' favoured biotope (type I) comprises less than 10 % of the census area. Two pairs per km² were found at Daneborg under the same conditions in 1964 (ROSENBERG *et al.*, 1970). In 1969 and 1970, respectively, there were seven and five to six pairs around Hulesøen. When hiking between Stormelven and Hvalrosodden in early July 1969 I found seven to ten pairs, or one pair per 4–5 km. ROSENBERG *et al.* (1970) found one pair per km in suitable terrain in the southern part of Wollaston Forland. The species was also commonly found in the valley north of Hulesøen and in Vesterdalen. There were a few pairs in Stormdalen, and some were found east of this valley and north and northeast of Yderbugten. The marshes at Danmarks Havn were absolutely the best site in Germania Land for this species; MANNICHE (1910) estimated that in 1907–08 the population here amounted to ca 50 pairs, and in his area west of Stormelven ca 30 pairs.

In 1969 Dunlins were seen in flocks of failed and/or non-breeding waders from 8 to 24 July, and in 1970 five to eight were observed together with Turnstones (*Arenaria interpres*) and Sanderlings (*Calidris alba*) at Hulesøen on 3 and 5 July; on the 15th there were only one to two, but on the 26th there were 15 in a "pure" flock at the same place. A few adults were observed in the terrain at Danmarks Havn in the first half of August 1969, the last one on the 24th. Some flocks of five to ten birds of undetermined age were observed at Kap Bismarck and in Stormbugt migrating south at "night" on 7–8–9 August 1969. In 1970 adult birds were only seen until the beginning of August. Old birds were never observed along the coasts, but in contrast to earlier observations, I saw flocks of 10–12 juveniles along the coasts from mid-August on. Yet they were also observed in the marshes. In general, however, only a few Dunlins were seen after mid-August; in 1969 the last one was observed on 15 September, and in 1970 there were 10–12 at Danmarks Havn on 6 September.

Sanderling (*Calidris alba* (PALLAS)).

Very common breeding bird in the visited parts of Germania Land, especially the area along the southcoast. In 1969 the first birds (one pair) were seen on 24 May, four days earlier than the first previously recorded observation (MANNICHE, 1910). By the 28th the number had

risen to 10–12, mostly in pairs. From 24 May on birds were heard singing. In the evening of 7 June 10 migrated north at Danmarks Havn. Since I was absent, the date of the birds' arrival in 1970 could not be determined; possibly the species was seen on 26 May, but it was not definitely observed until the 31st. On 1 June one pair was seen courting on Weaseløen, and at noon a flock of 45 migrated north. There were ca 15 at Danmarks Havn on 2 June, and on 3 June 25 were observed in this terrain; in the afternoon a flock of 50 migrated NNW. The birds first paired off in mid-June and courting was observed, but 10–20 stayed in small flocks at the weather station until 18 June, whereupon the last resting birds also left the terrain at Danmarks Havn.

The counts in 1969 resulted in 14 pairs, corresponding to 1.8 pairs per km². ROSENBERG *et al.* (1970) calculated that in an area of 60 km² on Wollaston Forland (Storsletten) where no other wader species were found, there was a density of three to six pairs per km², and similarly, one to two pairs per km² along Young Sund. PEDERSEN (1934) reports ten pairs per km² for Hochstetter Forland. On hikes one pair per two km was observed between Stormelven and Hvalrosodden in early July 1969, and the same in Stormdalen in mid-July 1970. Towards the outer coast and along it the species was considerably more scarce. In comparing these figures to those applying to other waders, the more quiet behaviour of the species must be taken into consideration. In 1969 and 1970, respectively, one to four and two to four pairs were found at Hulesøen.

After I made my counts, significant new information about the Sanderling's breeding biology has turned up. PARMELEE (1970) found that on Bathurst Island in the Canadian high Arctic the pair-bond broke when incubation began, and that it was up to one bird only (male or female) to hatch and attend the young. PARMELEE & PAYNE (1973) also showed that the Sanderling female can lay two clutches of eggs, one immediately after the other, and they presume that the male incubates one clutch and the female the other. These investigations completely change the basis of my population counts, as they took place during the incubation period, and as a large part of the registered pairs were only represented by a single "performing" bird. Accordingly, my figures ought to be too high, but in view of the poor opportunities of registering this species, this is hardly the case. Although it might seem reasonable entirely to omit the count results for this species, I have chosen to include them, as they give an impression of the number registerable in this way, and can be compared with corresponding earlier counts.

In 1970 eggs (four in a nest) were found on 27 June and four pull. were found on 19 July. All broods seen (four) were only attended by one adult. Juveniles were seen from early August on in both years. In 1907–08 incubated eggs were found on 28 June and pull. on 11 July (MANNICHE,

1910); in 1939 mating first took place in early July, and the first nest was found on the 8th (PEDERSEN, 1942). The favourite biotope of the species was type II, and to a lesser extent type III, and in common with the other waders, mostly near moist places to which the birds frequently led their young.

Flocks presumably consisting of non-breeding birds and failed breeders were observed from 3 to 24 July. In 1969 flocks of up to 25 birds were observed at Hulesøen, at the lakes west of Stormelven, and at Hvalrosodden, together with Turnstones (*Arenaria interpres*), Knots (*Calidris canutus*), and Dunlins (*Calidris alpina*). In 1970 there were up to 40–50 at Hulesøen. The largest flock observed included 25 Sanderlings.

In both years the last adult birds were observed before mid-August. Juveniles were seen at the coasts and to a lesser degree inland in August and September, culminating with 50 at Danmarks Havn in 1969 on 19 August; the last one was observed on 12 September. In 1970 25 remained at Danmarks Havn on 6 September, and the two last ones were observed in Stormbugt on the 21st.

Grey Phalarope (*Phalaropus fulicarius* (LINNAEUS)).

Scarce breeding bird in the southern part of Germania Land. In 1969 the species was neither seen arriving nor at a breeding site. In 1970 one pair was observed in the ponds east of Skibssø from 10 to 16 June; thereafter only the male was seen at the same place until the 21st. From this date to mid-July the species was not seen. One male, whose behaviour indicated the presence of young, was observed northwest of Skibssø on 19 July; on the 20th one only few days old pull. was seen on a fertile irrigated slope ca 30 m away from the lake.

Remarkably, the male in question kept completely out of sight during the incubation period, whereas when it had young it behaved very conspicuously; in some instances it flew towards me from a distance of no less than 6–700 m. This quiet behaviour during the incubation period can explain why I did not find the species during my visits to the area west of Stormelven in early July 1969. In 1907–08 at least ten pairs of Grey Phalaropes bred in this 23 km² area and the species also bred at Danmarks Havn at that time (MANNICHE, 1910).

In 1939 the first Grey Phalaropes were observed on 28 June; the birds did not appear at their breeding sites until 8 July, and the first eggs were found on the 10th. Nevertheless, the species apparently bred to a normal extent in this extremely unfavourable year (PEDERSEN, 1942).

In both years a few post-breeding males were observed in the ponds at the weather station, and, in particular, at Lille Skibssø, from mid-July

to early August. In 1969 one was seen on 17 July; two were observed on 2 August and one was seen on 5 August. In 1970 one was observed on 26 and 28 July and one, with many white patches on its breast, on 4 August. As for juveniles, only one fledged bird was seen at the small island, Træsko, on 8 September 1970.

American Long-tailed Skua (*Stercorarius longicaudus pallescens*
LØPPENTHIN).

Common breeding bird all over Germania Land, and very regularly distributed. In 1969 and 1970, respectively, the first birds were observed on 7 and 4 June at Danmarks Havn; on 9 June 1969 four migrated north here, and on 5 June 1970 one migrated north at the same place. During and after arrival the birds were observed singly or in flocks of up to four in the entire territory.

In 1969 one to three birds were constantly seen at Danmarks Havn from the time of their arrival until mid-July, when up to six were often observed at the cracks in the ice of the harbour. Ca 40 individuals in small groups were observed in the terrain during hikes to and around Hvalrosodden in early July, but there were no signs of breeding anywhere. The birds left the territory at the end of July; the last one was seen north of Yderbugten on 6 August. But four were observed in the polar ice at the outer coast on 21 August.

In 1970 up to five birds were seen at Danmarks Havn in mid-June, and on the 25th a nest with two eggs was found east of Hulesøen. Five pairs bred in the area around Danmarks Havn. On 24 July one adult with one pipped egg was observed east of Termometerfjeldet; two pull. were found southeast of Harefjeldet on 20 July, and in Vesterdalen and south of Termometerfjeldet aggressive pairs were observed throughout the breeding period, but it was impossible to find the broods. More than 25 pairs, some with pull., were found on a hiking trip across Germania Land in mid-July. MANNICHE (1910) reports 40 pairs for the terrain west of Stormelven alone.

On 15 July there were one pull. and one egg in the nest east of Hulesøen; on the 19th the egg had gone and one young had moved ca 150 m away from the nest. It was full-fledged by 13 August, and remained at Hulesøen as late as the 27th, but now there was only one adult. In 1970 birds were also seen foraging on the ice in the harbour, and apparently there was some traffic between the breeding sites and the ice. In contrast to earlier observations (SALOMONSEN, 1950), besides behaving aggressively towards enemies at the breeding grounds, the birds displayed distraction behaviour with squealing voices and spread wings directed at dogs and men.

Some non-breeding birds were also seen in 1970, mainly at the coast and on the ice in July and August, but in both years all the birds I saw were seemingly more than two years old. Reports on the date of the birds' departure in non-breeding years vary. In 1907 they left as early as before the beginning of July (MANNICHE, 1910); in 1939, as in 1969, they left in the second half of July (PEDERSEN, 1942). The Long-tailed Skuas also bred commonly in 1971, and their occurrence in these three years was correlated with the occurrence of the Lemming (*Dicrostonyx groenlandicus*) (see p. 21).

Ivory Gull (*Pagophila eburnea* (PHIPPS)).

Probably breeding on smaller islands in the area. The species was observed regularly, but despite searching, no breeding was found. In August 1969 three to four birds were seen at the islands south of Kap Bismarck; they frequently alighted on the ice floes and were vigorously mobbed by Arctic Terns (*Sterna paradisaea*). Five to eight birds were observed on a boat trip along the outer coast of Germania Land on 20–21 August. In 1970 the first ones were seen at the weather station on 24 May, whereupon two to three were regularly observed here until mid-June, and three to five in Skærfjorden on 17–18 June. At the weather station they foraged on rubbish together with Glaucous Gulls (*Larus hyperboreus*). In August 1970 only a few of these birds were observed at Kap Bismarck and at the weather station, but as late as 13 and 14 October one remained at the station beside the sledge dogs. All the birds seen were adults.

In 1908 seven nests were found on Renskæret (MANNICHE, 1910), and presumably the species also bred on Rosio. Unfortunately, I did not reach this island in 1969, but the species was observed at Thomas Thomsen Næs.

Great Black-backed Gull (*Larus marinus* LINNAEUS).

On 18 June 1970 one adult was observed at Danmarks Havn together with Glaucous Gulls (*Larus hyperboreus*). Until this date the northernmost observation on the eastcoast was at Kejser Franz Josephs Fjord (SALOMONSEN, 1967).

Glaucous Gull (*Larus h. hyperboreus* GUNNERUS).

Common breeding bird on mountain bluffs, coasts, and small islands in Dove Bugt and its surroundings, presumably also in Skærfjorden. In addition to breeding near saltwater, the species bred at large lakes and on islets in lakes.

The dates of arrival in the three years for which I have records were ca 20 days earlier than previously reported for the area (table 4). In 1969 one adult bird was observed at Danmarks Havn on 8 May. On my arrival at Hvalrosodden on 12 May tracks of large gulls could be seen in the snow around the trapping station, and a single bird was sitting on the bluff on the northern point of Nørre Orienteringsø on the 15th (more about the colonies below). At the weather station the number of birds rose from three on 16 May to ca 125 on the 22nd; all were adults. During the afternoon, most of these birds migrated west. On 23 May 40 stayed at the station, and ten headed west. From then on the number varied from 30 to 70 until the first week of June. The birds mainly stayed at the weather station's rubbish dump. On 31 May the first immature, apparently two years old, was observed. During June and July up to 15 birds were seen regularly at Danmarks Havn, especially at the river estuaries; these included two or three immature birds.

In 1970 the first bird was observed at Danmarks Havn on 6 May, whereupon the number here rose to 30 on 11 May. I was on a sledge trip during the rest of May, but on my return in early June there were 20 birds. Even until after 20 June there were 15 to 40 birds, but thereupon there were only about five adults and a few immatures.

The species was usually observed singly or in colonies all along the coasts and on the islands in the Dove Bugt area; a few were seen in Skærfjorden and on Île de France. Some aggressive pairs were found around Yderbugten, on Kap Bismarck peninsula and along the coast of Germania Land between Danmarks Havn and Hvalrosodden at intervals of 3–5 km, but no nests were found here. In both years a pair of Glaucous Gulls bred on an islet ($2 \times 0.5 \text{ m}^2$) in Lille Skibssø. In 1969 the pair bred very late; there were two eggs in the nest in mid-July. On 2 August there were two young, and as late as 7 September a still unfledged young lay on the lake, which at that time was almost frozen over. In 1970 there were one egg in the nest on 17 June, when only ca half of the ice on the lake had melted, and on 15 July there were pull. in the nest. On 13 August the pair and one pull. were still on the lake, but by the 19th they had left.

In 1969 ca five pairs of Glaucous Gulls bred in the Barnacle Goose colony at Kap Bornholm, and three pairs in 1970. On 4 June 1969 there were two pairs in the colony; on the 6th there was only an empty nest and one nest with one egg, and on the 8th there were five pairs with at least three to four nests, some of which were in the process of being built. On 7 August there were five to seven pairs in the colony. On 19 June 1970 there were three pairs in the colony, and one nest containing three eggs could be seen. On 1 July there were still three pairs in the colony. On the northern point of Nørre Orienteringsø, where Barnacle Geese (*Branta*

leucopsis) presumably also bred, in early July 1969 I estimated from Lille Snenæs that 15–20 pairs were breeding. On the bluff at the west-coast of Sælsøen's southernmost part, where MANNICHE (1910) also reports a colony, I estimated in early July 1969 from the opposite side of the lake that a maximum of ten pairs were breeding. At the end of August 1970 I observed from a distance of more than 5 km on the ca 500 m high southcoast of Bergs Fjord a colony which I estimated consisted of 15–25 pairs. MANNICHE (1910) moreover mentions a colony at Teufelkap (on one of the islands in the southern part of Dove Bugt) and ALWIN PEDERSEN (1942) reports that in addition to Sælsøen there was a colony on Mågefjeldet at Port Arthur which he estimated consisted of ca 40 pairs; he states, however, that not all of the Glaucous Gulls bred in 1939. In 1969 and 1970, respectively, the first fledged juveniles were observed at Danmarks Havn on 22 and 24 August. In 1969 there were 40 adults and 15 juveniles at Hvalrosodden on 1 September; in addition, up to eight adults and three to five juveniles were observed at Danmarks Havn until mid-September, and the last bird, an adult, was seen here on the 16th. In 1970 up to 30 adults and 10–15 juveniles were observed at Danmarks Havn and in Stormbugt in the first half of September. There were still five adults and five juveniles in Stormbugt on the 21st, and as late as 2 October there were six adults at Danmarks Havn. MANNICHE (1910) observed 100 Glaucous Gulls at Hvalrosodden at the end of August 1906; in 1907 fewer birds were observed in general and there were only a few juveniles and no immatures.

Black-headed Gull (*Larus ridibundus* LINNAEUS).

An adult Black-headed Gull was observed at the estuary of Lakselven on 3 and 5 July 1969. The species has been seen once in Scoresbysund, the northernmost observation on the eastcoast to date (SALOMONSEN, 1967).

Sabine's Gull (*Xema sabini* (SABINE)).

Presumably a scarce breeding bird in the area. In 1969 I visited the islands south of Kap Bismarck on 5, 7, and 18 August. All three times there was a pair of Sabine's Gulls on Maroussia. Despite several hours of spying and searching, I found no nests nor young, but since the birds were very stationary and remained at the same spot on the island all the time, I believe that the species at least tried to breed on the island this year. The birds were frequently attacked by Arctic Terns (*Sterna paradisaea*). In 1970 I visited Renskæret on 7 August, but in

this year Arctic Terns did not breed here or on Maroussia, and no Sabine's Gulls could be seen. When I again visited the islands on 22 August two Sabine's Gulls were foraging around Renskæret and two around Måtten and Kap Bismarck, all adults. There were no signs of breeding.

On 18 July 1908 MANNICHE (1910) found two nests and three birds with brooding patches on Renskæret. In 1907, a non-breeding year for Arctic Terns, no Sabine's Gulls were seen.

Arctic Tern (*Sterna paradisaea* (PONTOPPIDAN)).

Common breeding bird on small islands in Dove Bugt and presumably also in Skærfjorden. Possibly a few pairs, as well, bred on points on the mainland and on islands in lakes.

The first dates of observation agree with the earlier reports from Germania Land (table 4). On 15 June 1969 two were observed at Store Snenæs; in 1970 several were seen at Danmarks Havn, and 14 at some islands in the middle of Skærfjorden on 17 June. In 1972 four to five were observed at Bådskæret on the same date. The species was seen all along the coasts; in addition, some were observed in Sælsøen, Gåsesøen, and Skibssø. On 19 June 1969 there were ca 20 terns on a small rocky island in a lake immediately north of Yderbugten, but no nests were seen on the island later; 15–20 pairs were observed in early August on the islands in Yderbugten, just outside the lake.

When I visited Renskæret on 28 June 1969 the ice was beginning to break around the island and there was much open water. Only 10–15 terns could be seen near the island, and at the island there were no signs of breeding at this time. On 24 July ca 50 were present around Bådskæret; no nests were found, but some pairs were apparently breeding on the island, as birds carrying fish were seen alighting there. In 1969 the number of breeding pairs was estimated (in August) to several hundred on Maroussia, 20–30 on Renskæret, and ca five on Måtten. On 5 August many newly hatched pull. were found on Maroussia. This is more than two weeks later than reported for this island in 1908 (MANNICHE, 1910). When I visited the island again on 18 August only six pull. could be found, and a large number of the adult birds had left. A bit-off wing of a young tern and several feather-filled excrements of a Polar Bear explained the tragedy. In addition, terns were observed at the small islands at I. P. Jacobsen Ø and at Stormkap. At the turn of the months August–September up to 200 terns, 10 % of them juveniles, were observed at Hvalrosodden; this year the last one was seen on 5 September at Kap Helgoland.

I visited Renskæret on 1 July 1970; the islands were then completely surrounded by unbroken ice, and only six terns could be seen at the

islands. On 20 July there were ca 20 terns at Bådsøkæret, and one bird was observed carrying a fish. On 4 August there were ca 50 birds at the island, but no young could be found and the birds were only slightly aggressive. On 7 August 50–70 terns were staying at Måtten and Rensøkæret; on the 22nd there were 50–100 birds at the islands, but no breeding could be proved. On 6 September 25–30 adults and five to eight juveniles, one just fledged, were observed at Vestre Havnenæs; on the following day there were 15–20 adults and two to three juveniles at Måtten and Lille Koldewey. On 8 September I visited Trip-Trap-Træsko; on the largest of these islands there were 10–20 adults, plus two living pull. and five dead ones. One of the two living ones was still downy, the other partly feathered. On the 12th there were three to four adults and three to four juveniles on the islands. One of the juveniles was just fledged, and the others were not much older. In addition, one adult and one juvenile were seen in Stormbugt on the same day; these were the last observations this year.

At Danmarks Havn up to 25 foraging terns were observed in both summers, and one, presumably one year old bird with white forehead was seen on 1 August 1969.

The significant differences between the breeding situations in 1969 and 1970 are clearly correlated with the ice conditions (see p. 19). Most remarkable in this connection are the extremely late date on which the few breeding birds bred and their late departure in 1970. In 1907 the terns did not breed (MANNICHE, 1910), nor did they breed in 1939 (PEDERSEN, 1942).

Black Guillemot (*Cephus grylle mandtii* (MANDT)).

During my stay at Danmarks Havn I saw only a few individuals of this species. On 13 July 1969 I observed one adult in a newly formed crack in the ice between Vestre and Østre Havnenæs. On 4, 7, and 20 August one adult appeared each date along the Kap Bismarck peninsula; there were no signs of breeding. None were observed in 1970.

On 18 July 1908 MANNICHE (1910) found five to six breeding females and a few other adult birds on Maroussia. In the Danish version of the same paper he writes "brooding females" (rugende hunner), but gives no information about eggs or nests. SALOMONSEN (1950) does not include this otherwise northernmost observation of breeding. The species was not seen in 1907.

Snowy Owl (*Nyctea scandiaca* (LINNAEUS)).

Presumably a scarce breeding bird in the regions described here. None were seen in 1969. On 4 and 5 April 1970 an almost pure white

Snowy Owl was seen at the large lake in Nordmarken. On 22 July 1970 one adult was observed a few kilometres southwest of Flade Bugt. The bird attacked a sledge dog. On both 28 February and 27 March 1971 one immature was seen at Danmarks Havn, and one was observed at the same place on 27 August.

These few observations are in contrast to those made in 1906–08 (MANNICHE, 1910). The species was then described as common; as many as ca 60 birds were observed, and on one “night” at the end of August up to seven were seen. But no breeding was found. In 1938–39 only three Snowy Owls were observed (PEDERSEN, 1942).

In addition, it can be mentioned that a pair of Snowy Owls had five young in Kuppelpasset on Wollaston Forland in 1970.

Northern Raven (*Corvus corax principalis* RIDGWAY).

Scarce visitor. During my stay at Danmarks Havn no Ravens were observed within the area of investigation. On 15 May 1968 two Ravens accompanied a sledge party in the southwestern part of Jøkelbugten, i.e., north of 78° N. Lat. On 14 November 1970 one was seen beside a shot Musk Ox on the northern part of Hochstetter Forland, i.e., south of the area of investigation. One was observed at Kap Bornholm on 3 August 1972.

The species was common, but not numerous everywhere, in 1906–08. Up to ten were seen beside shot animals (MANNICHE, 1910). He observed fledged young, and shot one female with brood patches, but although he thought the species bred in these regions, he did not find any nests. Nests have not been found north of Kong Oskars Fjord, and according to SALOMONSEN (1950 & 1967) all of these northern observations can be attributed to stragglers. A few were seen in 1938–39, and the species was described as rare (PEDERSEN, 1942).

Fieldfare (*Turdus pilaris* LINNAEUS).

From 3 to 14 October 1970 a Fieldfare stayed at the weather station's meat rack, where it mainly fed on seal blubber. The ground was then covered by snow, and there were several snowstorms. The observation is the northernmost in Greenland to date (SALOMONSEN, 1967).

Greenland Wheatear (*Oenanthe oenanthe leucorrhoa* (GMELIN)).

Possibly irregular breeding bird in Germania Land. My observations can be divided into two categories:

- 1) some individuals in May, often starving and dying, and
- 2) some pairs in the summer months, and juveniles later in the year.

One female was seen at the weather station on 22 May 1969, and on 30 June one dead female was found at the same place (wing length: 104 mm). In 1970 one was observed at Danmarks Havn on 8 May, and on the same day one was seen at Kap Kofoed on Norske øer in Jøkelbugten (north of the area of investigation) in heavy snowdrift. The bird was so exhausted that it alighted on a man's boot. On 11 May there was one beside the hut at Kap Amélie; a few days later it was found dead. On the 14th one was seen in the western part of Skærfjorden, on the 16th two dead males were found at Danmarks Havn (wing lengths: 102 and 104 mm), and on the 26th one dying male was also found at the weather station (wing length: 102 mm). These early occurrences, all of which took place when the land was still snow-covered, may be due to winddrift during the spring migration from Western Europe (see SALOMONSEN, 1967). The difference between the number of birds in 1969 (one to two birds) and 1970 (seven birds) must surely be viewed in relation to the weather conditions in the two springs concerned. In 1969 the weather was calm in May, whereas in 1970 the same month was very stormy (see p. 15).

On 22 June 1969 there was a pair on a rocky knoll east of Hulesøen, but it was not seen later. On 6 July in the same year one pair was observed at Store Snenæs; the male sang, but the birds did not appear particularly stationary. No pairs were seen in the summer of 1970, but as late as 1 and 9 September one juvenile was observed each day on Termometerfjeldet and in Vesterdalen, respectively. At that time all fresh-water was frozen over. The bird on the 9th still had a downy neck. I believe that the fact that this bird was still downy-necked and the late dates indicate breeding in Germania Land in 1970. Presumably the species has expanded towards north in Northeast Greenland in recent decades (SALOMONSEN, 1950; ROSENBERG *et al.*, 1970; and MELTOFTE, 1972) in accordance with conditions on the westcoast.

MANNICHE (1910) saw two females at Stormkap on 31 May 1908 (one of them had a wing length of only 94.5 mm!). PEDERSEN (1942) observed one male at Hvalrosodden on 29 May 1939.

Hornemann's Redpoll (*Carduelis flammea hornemanni* (HOLBØLL)).

Probably scattered breeding bird in the area, yet breeding has only been recorded once. In 1968 a nest was found on a transverse bar ca 0.5 m above ground in one of the weather station's aerial masts, where it was placed behind a reel of nylon rope. The staff present at the time decided that the birds were Hornemann's Redpolls, which I could confirm with the aid of photographs of the brooding bird and its nest and eggs. There have been no earlier records of breeding north of 72° N. Lat. on the

eastcoast to date, but SALOMONSEN (1967) states on the basis of observations (of i. a. family flocks) that the species is breeding as far North as Independence Fjord. ROSENBERG *et al.* (1970) doubt about these reports of northern breeding, and point out that this can be a matter of straggling individuals and family flocks, and that the Dwarf Birch (*Betula nana*) does not grow north of 74° N. Lat. Meanwhile, the species breeds in both Thule District (VIBE, *in* SALOMONSEN, 1950) and on Ellesmere Island (PARMELEE & MACDONALD, 1960), accordingly, far north of the area of distribution of the Dwarf Birch (BØCHER *et al.*, 1966).

In 1969 the first Redpolls were heard at Danmarks Havn on 23 May; thereupon the birds were observed singly and in pairs until 18 June. On 5 June I saw five, two of them singing, on Harefjeldet; on 6 June one sang on Kap Bornholm, on the 17th one sang at Danmarks Havn, and on the 30th one again sang here. Pairs and singles were seen 4, 8, 9, 14, 16 and 18 June. One was heard singing at Store Snenæs on 2 July, whereupon the species was no longer seen in 1969. In 1970 one pair was observed on Harefjeldet on 8 May, one at Danmarks Havn on the 10th; one sang at Gåsefjeldet on Godfred Hansen Ø on 23 May and one at the same place on the 30th. After this no observations until 27 July, when one very dark juvenile foraged at the weather station; on 9 September a flock of eight to ten individuals foraged in Vesterdalen.

MANNICHE (1910) observed no more than five individuals in 1906–08, apart from a few observations made by other members of the expedition. PEDERSEN (1942) observed a total of four in 1938–39. These observations may indicate that the species has become more numerous in the area in recent years.

Lapland Bunting (*Calcarius l. lapponicus* (LINNAEUS)).

Scarce visitor. 5–9 May 1969 one female stayed at the fodder site at the weather station together with Snow Buntings (*Plectrophenax nivalis*), and on 6 June one male was observed here. One male was also seen at the weather station on 11 June 1970.

On 17 June 1907 one male was seen together with some Snow Buntings on Lille Koldewey (MANNICHE, 1910), and on 20 July 1939 two pairs were observed at Hvalrosodden (PEDDERSEN, 1942).

Snow Bunting (*Plectrophenax n. nivalis* (LINNAEUS)).

Very common breeding bird in all of the areas visited, although varying in density. On my arrival at Danmarks Havn on 22 April 1969 there were already 100 Snow Buntings at the station; according to the members of the staff, the first birds were observed about the 13th of the month. 22–29 April the number stayed at about 100; from the 30th on

the number was somewhat smaller, but from 4 May on it had increased to 100–150 and many birds were seen in the terrain. By mid-May the flocks had broken up and the birds had paired off.

Snow Buntings were heard at the hut in Flade Bugt on 5 April 1970, and one was seen at Kap Amélie the next day. At Danmarks Havn the first ones (three males) were observed on 7 April; then their number rapidly increased to 50–100 on the 11th. This number was constant until about 7 May, yet the birds were more numerous on 21–22 April and 7 May, whereupon many were seen in the terrain.

A total of 333 Snow Buntings were ringed at Danmarks Havn during the spring migration in 1970. The first females (2) were captured on 22 April, but not until 1 May did more females arrive, yet even then only a few until 6 May. On 6 May 30 % were females; the next day 50 % were females. Because of snowfalls ca 200 Snow Buntings again gathered at the station on 12–13 May; more than 1/3 carrying rings. The weather cleared up on the 14th, but ca 75 birds remained at the station until after the 18th. A total of 25 % of the ringed birds from the entire period were recaptured during the following days, most of them only a few days later, but some more than ten days later. From 7 May on one to two thirds of the captured birds were recaptures, but I believe that the number of captured and recaptured birds is too affected by the individual bird's reaction to the traps (steelwire traps in which oatmeal, among other things, was used for bait) to permit deriving much from these results.

On our sledge trips in Germania Land in late April 1970 only a few birds, at the most five to ten, were observed in small straggling flocks. During snowstorms many birds sought shelter beside houses and huts, and many got themselves nearly under cover in the snow just behind the top edge of the drifts at the weather station.

In 1971 the first Snow Buntings (two to five) were observed at Danmarks Havn as late as 18 April, and when I left on the 22nd there were only five to ten birds. In 1972 the first Snow Buntings were seen at Danmarks Havn on 7 April. In 1907–08 the first Snow Buntings were observed in both years on 5 April (MANNICHE, 1910). In 1939 the species was considerably delayed; the first birds were seen on 2 May, and on 28 June the first nest was found, containing a still incomplete clutch of four eggs (PEDERSEN, 1942).

In 1969 the first nest, which contained seven eggs, was found on 9 June; on the 20th there were young in the nest. Fledged young were seen on 5 July 1969 (three to four poorly flying and one fully fledged). In 1970 the first fledged juveniles were observed as late as 17 July, i.e., almost two weeks later than in 1969.

The Snow Buntings' favoured breeding biotope at Danmarks Havn was type IV, and since this biotope made up most of the borders of the

census area, I did not attempt to count the birds. Many Snow Buntings took advantage of the abundance of insects around the weather station while feeding their young and also when they flew around with their fledged juveniles. In early July 1969, when I hiked along the southcoast of Germania Land, I saw ca one pair per kilometre.

In August the Snow Buntings began to gather, at first in small flocks, but from the end of the month up to 50–75 together. In mid-September flocks of 2–300 birds were observed foraging in the terrain. At the weather station the number in 1969 decreased from 150 in mid-September to five to ten at the end of the month. On 9 October only two remained; thereafter only one bird was seen until the 31st. In 1970 there were ca ten at the weather station until mid-October; the last one was seen on the 23rd.

ROSENBERG *et al.* (1970) found that breeding was surprisingly unsuccessful at Daneborg in 1964, and attributed this to predation by Ermines (*Mustella arctica*). At Danmarks Havn only one Ermine and a few tracks in the snow were seen in 1969–71, and the Snow Buntings bred successfully.

COMPLETIVE LIST OF BIRDS IN THE AREA

This list comprises species previously observed in the region, but not observed in 1969–71 (and 1972).

Great Northern Diver (*Gavia immer* (BRÜNNICH)).

Five adults were observed at Hvalrosodden from 20 August to 2 September 1906 (MANNICHE, 1910).

Pale-breasted Brent Goose (*Branta bernicla hrota* MÜLLER).

Seven birds were observed during heavy snowfalls on Store Koldewey's eastcoast on 8 June 1907, and a few small flocks were seen in the marsh at Danmarks Havn in early June 1908 (MANNICHE, 1910). PEDERSEN (1942) saw six at Trekronerfjeldet on 4 June 1939; furthermore, he reports observations of several flocks of five to ten individuals on the eastcoast of Store Koldewey and Germania Land, as well as in Skærfjorden, all in early June.

It is remarkable that in the first half of this century the species was seen regularly during the spring migration, and bred sparsely in the southern parts of Northeast Greenland (SALOMONSEN, 1950), whereas the only reliable observation recorded after World War II was that of a flightless adult in a flock of Barnacle Geese (*Branta leucopsis*) on Wollaston Forland in 1966 (MARRIS & WEBBE, 1969). The change that has taken place farther north is still more pronounced. In the first half of June 1907 many Pale-breasted Brent Geese were observed between 79° and 81° N. Lat., at least 100 at Mallemukfjeld alone, and, according to BRØNLUND's posthumous diary, "many" were seen in Danmark Fjord in the summer of 1907 (MANNICHE, 1910). KNUD RASMUSSEN and PETER FREUCHEN saw many at Independence Fjord in June 1912, and so did LAUGE KOCH in June 1921 almost all of them migrating west (JOHNSEN, 1953). No geese were observed at Danmark Fjord in the summers of 1953 and 1954 (COWIE & MARRIS, 1968), nor were any Brent Geese observed at Jørgen Brønlund Fjord in 1947–50 (MØHL-HANSEN, 1949, and JOHNSEN, 1953), or in 1964 (RØEN, 1965), or in 1966 (JUST, 1967). The only recent

observation made here is that of a solitary Pale-breasted Brent Goose on 7 July 1968 (ANDERSEN, 1970).

The species' breeding area in Northeast Greenland reportedly includes the areas around Independence Fjord and Danmark Fjord, even though breeding has never been found (SALOMONSEN, 1950). This distribution can no longer be valid, just as the migration along the coast of Northeast Greenland seems to have ceased. A correspondingly northward shift of the species' distribution has taken place on Svalbard (NORDERHAUG, 1970).

Scaup (*Aythya m. marila* (LINNAEUS)).

One pair stayed in a small lake at Stormnæs from 21 June to 2 July 1907, where the male was shot (MANNICHE, 1910).

Red-breasted Merganser (*Mergus serrator* LINNAEUS).

One possibly breeding adult female was observed at Rensskæret on 21 July 1908 (MANNICHE, 1910).

Iceland Gull (*Larus g. glaucoides* MEYER).

SALOMONSEN (1950) rejects several observations by MANNICHE (1910) as having been confusions with Glaucous Gulls (*Larus hyperboreus*).

Brünnich's Guillemot (*Uria l. lomvia* (LINNAEUS)).

Two adult males were shot at Danmarks Havn on 14 July 1908 (MANNICHE, 1910).

In 1972 two Snow Geese (*Anser caerulescens* (LINNAEUS)) were seen at Danmarks Havn on 2 August (BLOCH, in litt.).

RINGING

The numbers of ringed birds are given in table 2. The divers were unintentionally caught in fishnets ult. July in the estuary of Lakseelven. All were adults. The Eiders were brooding birds, which were handcaught on Maroussia. The waders were partly pull., partly adults and juveniles caught in walk-in cage traps in the marshes at the weather station in the second half of July. The Long-tailed Skuas were pull., and the Glaucous Gulls partly pull., partly adults caught in nylon loops on a floating wood plate in the estuary at the weather station. Margarine was used as bait.

The Arctic Terns were pull., and with the exception of a few pull., the Snow Buntings were adults caught in walk-in cage traps at the weather station in April and May; some juveniles were caught in the same way in September. The bait was seed, millet, and oatmeal.

Table 2. *Number of ringed birds 1969-72.*

	1969	1970	1971	1972
<i>Gavia stellata</i>	3	1	1	
<i>Somateria mollissima</i>	2			
<i>Arenaria interpres</i>	2			
<i>Calidris canutus</i>		1		
<i>Calidris alpina</i>	15	6		
<i>Calidris alba</i>		2		
<i>Phalaropus fulicarius</i>		1		
<i>Stercorarius longicaudus</i>		3		
<i>Larus hyperboreus</i>	4			
<i>Sterna paradisaea</i>	3			
<i>Calcarius lapponicus</i>	1			
<i>Plectrophenax nivalis</i>	54	333	105	96

List of Present Recoveries

Red-throated Diver (*Gavia stellata*).

One bird (Copenhagen 275502), ringed 29 July 1969, was found dead on 15 February 1972 at Burghead (57°42' N, 03°30' W), Morayshire, Scotland. This is the fifth Greenland bird recovered in the winter quarter in West Europe (SALOMONSEN, 1967 and 1971).

Barnacle Goose (*Branta leucopsis*).

On 4 July 1969 a Barnacle Goose marked with a red plastic ring around its neck was observed in one of the small lakes at Lakseelven. It lay in a little group of adult birds with goslings, and must thus be assumed to have been a breeding bird. It was ringed as an adult in Ørsteds Dal, Jameson Land, in July 1963 (MARRIS, in litt.). The site of the observation is ca 600 km north of Jameson Land.

Schiøler's Dunlin (*Calidris alpina arctica*).

A juvenile (Copenhagen 812802) ringed on 17 July 1969 at Danmarks Havn, was shot on 24 August the same year at Rochefort-sur-Mer (45°56' N, 00°59' W), Charente Maritime, France. One adult (Copenhagen 812812), ringed at Danmarks Havn 27 July 1969, was found dead at the same place in mid-June 1971 (possibly dead the year before). On

11 June 1970 I shot one (Copenhagen 812813), ringed as adult 27 July 1969 at the same place. On 16 July 1969 I shot one adult (London BH 55204), ringed 15 May the same year at Point of Air (53°21' N, 03°19' W), Wales, Great Britain (SALOMONSEN, 1971a). At Danmarks Havn on 7 June 1970 I shot one adult (London BN 09085), ringed 22 May the same year at Hoylske (53°23' N, 03°11' W), Wirral, Cheshire, England. Four Dunlins, ringed in Northeast Greenland, had been recovered earlier at the Atlantic coast of France (SALOMONSEN, 1967), but my finds of two Dunlins ringed in Great Britain the same spring are the first as far as this race's spring migration is concerned (Wader Study Group, 1972).

Sanderling (*Calidris alba*).

On 11 June 1970 at Danmarks Havn I shot a Sanderling (Stavanger 888370), ringed 8 September 1969 at Revtangen (58°45' N, 05°30' E), Rogaland, Norway. This is the third finding of a Sanderling in Northeast Greenland ringed in Southwest Norway during the autumn migration (SALOMONSEN, 1967), and once more confirms that a part of the Greenlandic Sanderlings pass Southwest Norway and the westcoast of Jutland on the autumn migration (FERDINAND, 1953), just like the Knot (*Calidris canutus*) (NETTERSTRØM, 1970).

Glaucous Gull (*Larus hyperboreus*).

Two adults (Copenhagen 358759 and 358760), ringed 13 July 1969 at Danmarks Havn, were shot at the same place on 22 and 27 May 1972, respectively.

Snow Bunting (*Plectrophenax nivalis*).

One adult male (Copenhagen 813115), ringed 4 May 1970 at Danmarks Havn, was found dead in December 1970 at Bogatøe (53°04' N, 51°22' E), Kuibyshev, Soviet Union. There are six earlier recoveries of Northeast Greenland Snow Buntings, mainly from the Archangelsk area, which indicate that this population winters in Russia (SALOMONSEN, 1967), but this recovery is the first one from the wintering area proper. One adult male (Copenhagen 811584), ringed 10 May 1969 at Danmarks Havn, was found dead on 3 August 1972 at the same place. One adult (Copenhagen 813252), ringed 7 May 1972 at Danmarks Havn, was found dead 21 April 1973 at Gibostad (69°28' N, 18°10' E), Troms, Norway.

DISCUSSION AND SUMMARY

The author was employed at Danmarkshavn Vejrstation (weather-station) in Germania Land during a two-year period from April 1969 to April 1971. Many trips by dog sledge, boat, and on foot were made in most of the territory between 76° and 78° N. Lat., but only Germania Land, and, in particular, its southernmost part, can be considered representatively covered. The areas around Danmarks Havn (figs 4 & 5) are by far the best investigated. Presumably Germania Land's southern part, between Danmarks Havn and Hvalrosodden, is the most significant area from an ornithological point of view. These areas are among the first to thaw in spring, and they contain the most fertile sites: marshes, small lakes, and ponds. Yet J. P. Коч (1913) describes a some 30 km² meadow area in the western part of Daniel Bruuns Land, but no ornithological observations are available from this area. No heights above 400 m were visited during the summer months.

The material presented primarily concerns the local avifauna, and emphasis is placed on making it comparable with later investigations. Yet it seems natural, here, to compare my results with the earlier observations made in the territory. Because of the very small number of years of observation it is, however, difficult to draw general conclusions; but a few very pronounced changes nevertheless are found. In addition to these more long-termed changes it is possible to show the reaction of the individual species to the climatological conditions in the years concerned. While in the previous chapters emphasis is placed on describing the occurrence of the individual species of birds and the climatological conditions separately, in this chapter I shall try to combine the various conditions.

Climatological Conditions

It is very difficult to determine climatic changes in Northeast Greenland. The only available information concerning Danmarks Havn

derives from the Denmark Expedition in 1906–08 and from the weather station's measurements from 1949 to date. As table 1 and fig. 8 indicate the temperature and thawing conditions in 1906–08 were very similar to the average for the years 1949–71, but on the basis of information and photographs from the Denmark Expedition it appears that at that time the climate was moister and more precipitous, and that the vegetation was more fertile, which is in accordance with VIBE's (1967) statements. Also, the fjord ice may generally break later now, than in the first half of the century (see also ROSENBERG *et al.*, 1970, regarding conditions at Sandøen in Young Sund).

As we know, the climatological conditions vary considerably from year to year, but it is inadequate to generalize into "good" or "poor" years. The prevailing conditions can be very complicated, depending on the winters' amount of snow, the time when thawing sets in, wind conditions, the amount of polar ice, and the consequently more or less maritime character of the climate. In 1907 the ice in Dove Bugt did not break up; some species of birds associated with the fjord areas did not breed, but conditions on land were favourable for most species. Yet the Lemming (*Dicrostonyx groenlandicus*) population was minimal. 1970 was also an unfavourable year for the coastal birds; the fjord ice did not break up, but some individuals bred, although they were considerably delayed. The land birds were hampered by late thawing, whereas the species dependent on Lemmings had a good year.

1939 was an extremely unfavourable year; thawing began several weeks late, but the ice in Dove Bugt nevertheless broke up in mid-August. 1908, 1969, and 1971 were more favourable for most groups of birds; there was little snow in the winter of 1968–69, and since thawing began early, the land was quickly dried up. In 1969 there were almost no Lemmings, whereas 1908 and 1971 were well-supplied in this respect.

Faunistics

Since the material is limited and exact figures are lacking, in most cases it is difficult to prove faunistical changes in Germania Land since the time of the Denmark Expedition. The considerable moult migration of Pink-footed Geese (*Anser fabalis brachyrhynchus*), which originates in Iceland, is among the most remarkable of the changes. Thus, ca 1,000 moulting birds were observed in Germania Land in July, together with some straggling individuals from late May, presumably part of the Greenland population. The species was not observed in 1906–08 (MANNICHE, 1910); the first birds were seen in 1933 (PEDERSEN, 1942), and

until 1960 only a few observations were made. The presence of the Pink-footed Geese in Germania Land must surely be viewed in connection with the considerable increase of the Iceland population, accordingly, more than a doubling of the whole population and a tripling of the number of immatures from 1950 to 1968 (BOYD & OGILVIE, 1969).

In 1906–08 MANNICHE (1910) found only one colony of Barnacle Geese (*Branta leucopsis*): ca 40 pairs on Trekronerfjeldet. Now many small colonies are distributed throughout the territory. Several were found in 1938–39, but others appeared later. A similar expansion has taken place on Svalbard, where Barnacle Geese now also breed on level ground (NORDERHAUG, 1970a). See also Brent Goose (*Branta bernicla*) p. 58.

In 1906–08 the Raven (*Corvus corax*), Snowy Owl (*Nyctea scandiaca*) and Greenland Falcon (*Falco rusticolus*) were far more common than observed since. There must be a connection between the decline of these species and a general decline in the Lemming population; moreover, this corresponds to a decline in the percentage of Blue Fox in the Polar Fox population from 40 % in 1906–08 to 10 % about 1930 and thereafter. The occurrence of this fox is related to the more maritime climate that was characteristic at the turn of the century (VIBE, 1967). Since Ravens destroyed the dead foxes in the traps, they caused the fur trappers a great deal of trouble during the first half of this century.

Apart from the fact that Turnstones (*Arenaria interpres*) did not breed at Danmarks Havn in 1906–08, it is impossible to establish any significant changes in the number of other waterfowls and waders. It is difficult to determine whether the drying up of the land that has taken place here has had a negative influence on the wader population, as this presumably is counteracted by earlier thawing of the land, i.e. earlier uncovering of the species' favourite biotopes. Assumably, the climatic changes "rearrange" the suitable biotopes, in this case dry up the biotopes in the interior of the country, and favourize the areas closer to the outer coast. Note in this connection, the difference in the amount of snow-patches in the western and the eastern parts of Germania Land (figs 3 & 4).

Germania Land is designated in the literature as the northern limit for several species of birds in Northeast Greenland, including the Eider (*Somateria mollissima*), the Barnacle Goose (*Branta leucopsis*), the Dunlin (*Calidris alpina*), and the Grey Phalarope (*Phalaropus fulicarius*) (SALOMONSEN, 1967). Since no ornithological information is really available from the 600 km long stretch northwards to Peary Land, these designations are obviously of a speculative nature and scarcely valid. See also MELTOFTE (1976).

Table 3. *Number of breeding pairs in the census area at Danmarks Havn 1969 and 1970. Respectively, in the entire area (7.6 km²) and in the area around Hulesøen (1.36 km²). “-”, means not counted.*

	Entire area 1969	Area around Hulesøen 1969	Entire area 1970	Area around Hulesøen 1970
<i>Clangula hyemalis</i>			5	
<i>Somateria spectabilis</i>	2	2	3	2
<i>Lagopus mutus</i>	-		-	
<i>Charadrius hiaticula</i>	60	18	-	22
<i>Arenaria interpres</i>	14	1	-	2-3
<i>Calidris alpina</i>	23	7	-	5-6
<i>Calidris alba</i>	14	1-4	-	2-4
<i>Phalaropus fulicarius</i>			1	
<i>Stercorarius longicaudus</i>			2	1
<i>Larus hyperboreus</i>	1		1	
<i>Plectrophenax nivalis</i>	-	-	-	-

In 1969 and 1970 counts of breeding birds were carried out around Danmarks Havn (fig. 7); the results are given in table 3. Comparing the results from the comparatively favourable year 1969 with those from the unfavourable year 1970, it can be seen that there were no significant differences as far as the waders are concerned. It should be emphasized that the counts of breeding waders were one-time counts of each area (see p. 22), and that consequently some precautions should be taken with respect to the results. In regard to the special conditions applying to the Sanderling (*Calidris alba*) see p. 45. As for waterfowls, there were more in the unfavourable year 1970 than in 1969. 1907 and 1939 were almost non-breeding years for these species in Germania Land (MANNICHE, 1910, and PEDERSEN, 1942). Non-breeding years have not been proved for any of the wader species in Germania Land; even in 1939 the waders bred extensively (PEDERSEN, 1942).

Comparing the count results from Danmarks Havn with similar counts at Daneborg in 1964 (ROSENBERG *et al.*, 1970), a good accordance between the pair densities is found for the individual species. Counts in Jameson Land (HALL & WADDINGHAM, 1966) and Scoresby Land (HALL, 1966) gave far smaller densities, but only records of nests or young were registered. Moreover, the counts were as late as the turn of the months of July–August, and thus cannot be compared with the first-mentioned counts. It should be emphasized that the census area at

Danmarks Havn was undoubtedly the most favourable in the whole territory, and that the pair densities depend to a great extent on how the census area is selected; for example, the biotope of the Dunlins covered less than 10 % of the census area at Danmarks Havn.

In addition to the breeding birds indicated in the table, the area was occupied during the breeding period by five or six broods of Barnacle Geese and a number of post-breeding waders, as well as some non-breeding Red-throated Divers, Long-tailed Ducks, and King Eiders.

The distribution of the waterfowls within the census area varied somewhat. The Red-throated Divers stayed mainly in the trout-rich Skibssø as soon as it was sufficiently ice-free, whereas the Long-tailed Ducks and the King Eiders preferred Lille Skibssø and Hulesøen; *Entomostraca* were abundant in Lille Skibssø, in particular. The Barnacle Geese preferred Hulesøen, where they foraged on the banks together with their goslings.

Concerning the differences in breeding success in the individual years among the species outside the census area, the island-breeding species are the most noticeable. Arctic Eiders and Arctic Terns (*Sterna paradisaea*) had a very delayed breeding cycle in 1970; both species tried breeding to some extent, but many of the young Arctic Terns did not manage to fledge. Although nothing similar could be proved with respect to the Arctic Eider, it seems likely, for as late as mid-September the young were poorly developed. Yet the very mild autumn of 1970 was beneficial to the young of these two species. As Renskæret and Maroussia, the two best bird islands, were "frozen solid" until the end of August, no Arctic Terns bred here in 1970. The Arctic Terns did not breed in either 1907 or 1939, and the Eiders did not breed in 1907 nor presumably in 1939 (MANNICHE, 1910, and PEDERSEN, 1942).

No differences in the breeding success of the Barnacle Geese or the Glaucous Gulls (*Larus hyperboreus*) between 1969 and 1970 could be found. In general, fewer Glaucous Gulls were seen in 1907, an unfavourable year, and only a few fledged juveniles were observed (MANNICHE, 1910). In 1939 the species also bred to but a limited extent (PEDERSEN, 1942). The Long-tailed Skua (*Stercorarius longicaudus*) was not found breeding in 1969, while 1970 and 1971 were favourable years for this species.

Arrival

Table 4 shows the initial dates of observation from all the years of observation in Germania Land, and for comparison a series of data from Peary Land and Daneborg is included. Some species, Long-tailed Duck,

Table 4. Initial dates of observation for a number of years and localities in Northeast and North Greenland.

Species	Germania Land			Peary Land				Dane- borg	Germania Land		
	1907 ¹	1908 ¹	1939 ²	1949 ³	1964 ⁴	1966 ⁵	1968 ⁶	1964 ⁷	1969	1970	1971
<i>Gavia stellata</i>	8.6	11.6	26.6	11.6	19.6	17.6	21.6	11.6	19.6	18.6	
<i>Clangula hyemalis</i>	15.6	11.6	22.6	5.6	3.6	12.6		8.6	9.6	16.6	11.6
<i>Somateria mollissima</i>	10.6	17.6	27.6					8.6	8.6	19.6	10.6
<i>Somateria spectabilis</i>	10.6	16.6	25.6	8.6	8.6	10.6		8.6	7.6	14.6	11.6
<i>Branta leucopsis</i>	23.5		3.6					17.5	22.5	22.5	20.5
<i>Lagopus mutus</i>	4.2	8.2	4.2	22.2					25.1	27.1	11.2
<i>Charadrius hiaticula</i>	2.6	28.5	6.6	2.6	28.5	30.5	22.5	19.5	23.5		
<i>Arenaria interpres</i>	2.6	28.5		3.6	25.5	26.5	28.5	18.5	23.5	23.5	
<i>Calidris canutus</i>	2.6	28.5	5.6		28.5		30.5	26.5	25.5		
<i>Calidris alpina</i>	2.6	28.5	12.6					19.5	23.5		
<i>Calidris alba</i>	2.6	28.5		2.6	4.6	30.5	28.5	20.5	24.5		
<i>Phalaropus fulicarius</i>	13.6	9.6	28.6					12.6		12.6	
<i>Stercorarius longicaudus</i>	5.6	28.5	6.6	4.6	8.6	4.6	2.6	31.5	7.6	4.6	6.6
<i>Larus hyperboreus</i>	Ult.	May	20.5	27.5	27.5	21.5		2.5	8.5	6.5	2.5
<i>Sterna paradisaea</i>	14.6	16.6	20.6	13.6	14.6	28.6	30.6	3.6	15.6	17.6	
<i>Plectrophenax nivalis</i>	5.4	5.4	2.5	26.4				11.4	13.4	5.4	18.4

¹) MANNICHE, 1910. ²) PEDERSEN, 1942. ³) JOHNSEN, 1953. ⁴) RØEN, 1965. ⁵) JUST, 1967. ⁶) ANDERSEN, 1970.

⁷) ROSENBERG *et al.*, 1970.

Arctic Eider, and King Eider, whose winter quarters are situated comparatively close to the breeding areas, follow the formation of openings in the coastal ice to the north in the spring, and can be seen at the outer coasts as early as in the beginning of May; for example, 58 Arctic Eiders were observed at Île de France on 11 May 1970, and a similar number of Arctic Eiders and King Eiders were observed at Hvalrosø northeast of Wollaston Forland 2–6 May 1964 (ROSENBERG *et al.*, 1970). These species are not seen at the breeding sites until early June, when openings have formed in the lakes and in the fjord ice; accordingly, their arrival at these sites simply reflects the formation of open water. As table 4 shows, no significant changes in these species' emergence at the breeding sites can be determined from the beginning of the century to the present, but considerable annual variations are noted in accordance with the occurrence of open water in the individual years. In amazing contrast to this, it can be seen that the arrival of the Glaucous Gulls at Danmarks Havn took place ca 20 days earlier during my stay than in the first years of the century. In 1973 the first Glaucous Gull was seen at Danmarks Havn on 18 April!

In accordance with conditions at Daneborg (ROSENBERG *et al.*, 1970) a number of species of waders arrived five to ten days earlier than in 1907–08. This earlier arrival could only be determined for 1969, as I was not at Danmarks Havn during the arrival period in 1970; presumably, however, arrival was somewhat delayed as a result of the unfavourable conditions in this spring, just as was true in 1939. The change concerns the Ringed Plover (*Charadrius hiaticula*), the Turnstone (*Arenaria interpres*), the Knot (*Calidris canutus*), the Dunlin (*Calidris alpina*), and the Sanderling (*Calidris alba*).

The earlier arrival in recent years is obviously correlated to the lesser amounts of snow per annum and the resulting earlier uncovering of the land; furthermore, it is clear that arrival in the individual years is affected by the annual climatological variations.

Upon arrival, a large number of species gathered at particularly favourable sites, where they awaited thawing of the rest of the territory. The "kettle" around Danmarks Havn was an especially favourable site, for not only did it thaw sooner than the rest of the territory, but it also had a more fertile vegetation and an abundance of insects which thrived around the weather station. For example, several hundred ducks, geese, and waders rested here in the beginning of June 1970, while during a sledge trip in the rest of Germania Land only five to ten individuals of these species were observed daily. In 1969 these species were scattered at the breeding sites almost immediately after arrival, due to the small amounts of snow this year, and the consequent rapid uncovering of the land. In both years from one to two hundred Snow Buntings

(*Plectrophenax nivalis*) stayed around the weather station in a similar way.

If conditions at Danmarks Havn are compared with those at Daneborg and Peary Land, it can be seen that there is good accordance with Daneborg, and that some species, e.g., the Long-tailed Duck and the King Eider, amazingly enough arrive simultaneously, or even earlier, in Peary Land.

Time of Breeding

No significant changes could be found with respect to the dates when most species accomplished breeding in comparison to earlier years, but the material is extremely limited. Only the Arctic Tern differed considerably in this respect, as even in the favourable year 1969 the breeding cycle was completed more than two weeks later at the same site than in 1908. In 1907 the terns did not breed at all, and in 1970 a small part of the population bred so late that the majority of the young died.

When comparing breeding dates with reference to the climatological conditions in the individual years, it is likewise impossible to show more than a few differences. In 1970 the Arctic Eiders bred two weeks later than in 1969, but as far as the Long-tailed Duck and the King Eider are concerned, only brief delays may come into question. As for the waders, it may also be a matter of slight delays.

Immatures

As for waterfowls, there were considerable numbers of young non-breeding birds at the breeding sites. The majority stayed in small groups or in flocks in lakes and river estuaries; this is discussed in detail in the comments on the various species. It was characteristic of both eider species that the non-breeding flocks consisted exclusively of females, and that all the males were adults. The immature males must stay farther south during summer moulting, as well-known for King Eiders in West Greenland and Canada; we have, however, little knowledge of the situation in East Greenland (SALOMONSEN, 1967).

All the Fulmars (*Fulmarus glacialis*) and Pink-footed Geese observed presumably were non-breeding immatures. As for waders, the presence of significant numbers of non-breeding birds could not be proved, but in addition to failed breeders, the flocks of waders observed in July may have consisted of non-breeders. Immature Long-tailed Skuas could not be identified in either of the years, but in both years some non-breeding

birds, possibly two or three years old, were seen in mid-July. This northbound "summer migration" of the species (ROSENBERG *et al.*, 1970, etc.) must be considered as a phenomenon parallel to the so-called "zwischenzug" which is well-known for many other species of birds (e.g. SCHÜZ, 1971), and presumably also includes adult birds in non-breeding years. Each year a few immature Glaucous Gulls were seen at the weather station, where they arrived one to two months later than the breeding birds. In addition, one probably one-year-old Arctic Tern was observed.

Observations of Migration

Observations of migrating Pink-footed Geese and Barnacle Geese are described in detail in the discussion of the different species. Some earlier observations indicate that the spring migration of waders mainly takes place at "night" (MANNICHE, 1910, and others). My few observations were made throughout all hours of the day and night.

During the first half of July many waders gathered in mixed flocks at the lakes. These birds, which have lost their brood or have not bred at all, leave the area around mid-July, while the remaining adults leave less noticeably at the end of July and in the beginning of August. The juveniles gather in flocks along the coasts during the second half of this month and in the beginning of September. Only in a few instances, autumn migration of waders was observed. All of them took place in the evening or night hours, which begin to grow dark in August.

A few northward-bound Long-tailed Skuas were observed migrating across the territory in June. When the Glaucous Gulls arrived in May large flocks gathered at the weather station's rubbish dump; from here they disappeared in large flocks toward West into Dove Bugt.

Literature

- ANDERSEN, O. G. N., 1970: Ornithological Observations on the 5th Pearyland Expedition in the Summer of 1968. With a Review. (Danish, with English Summary). – *Dansk orn. Foren. Tidsskr.* **64**: 104–112.
- BIRD, C. G. & E. G. BIRD, 1940: Some Remarks on Non-breeding in the Arctic, especially in North-east Greenland. – *Ibis* **4**: 671–678.
- 1941: The Birds of North-east Greenland. – *Ibis* **5**: 118–161.
- BOYD, H. & M. A. OGILVIE, 1969: Changes in the British-wintering population of the Pink-footed Goose from 1950 to 1975. – *Wildfowl* **20**: 33–45.
- BØCHER, T. W., K. HOLMEN & K. JACOBSEN, 1966: *Grønlands Flora*. – København.
- CHRISTENSEN, N. H., 1967: Moulting Migration of Pinkfooted Goose (*Anser fabalis brachyrhynchus* BAILLON) from Iceland to Greenland. – *Dansk orn. Foren. Tidsskr.* **61**: 56–66.
- COWIE, J. W. & R. MARRIS, 1968: Gæs i Østgrønland på 74° N. br. – *Dansk orn. Foren. Tidsskr.* **62**: 141–142.
- DANMARK-EKSPEDITIONEN til Grønlands Nordøstkyst 1906–08 under ledelse af L. MYLIUS-ERIKSEN. – *Meddr Grønland*, Bd. **41–46**.
- FERDINAND, L., 1953: The Migration of the Sanderling (*Crocethia alba* (PALL.)) in Northern Europe. (Danish, with English Summary). – *Dansk orn. Foren. Tidsskr.* **47**: 69–95.
- HALL, A. B., 1966: The Breeding Birds of an East Greenland Valley, 1962. – *Dansk orn. Foren. Tidsskr.* **60**: 175–185.
- & R. N. WADDINGHAM, 1966: The Breeding Birds of Ørsteds Dal, East Greenland, 1963. – *Dansk orn. Foren. Tidsskr.* **60**: 186–197.
- JENNOV, J. G., 1945: Moskusoksebestanden i Nordøstgrønland og nogle spredte Iagttagelser og Betragtninger vedrørende Dyrelivet i Nordøstgrønland. – København.
- 1963: Bemærkninger om antallet af Bramgæs (*Branta leucopsis* (BECHST.)). – *Dansk orn. Foren. Tidsskr.* **57**: 221–228.
- JOHANSEN, F., 1911: Freshwater life in North-east Greenland. – *Meddr Grønland*, Bd. **45**, Nr. 6.
- JOHNSON, P., 1953: Birds and Mammals in Peary Land in North Greenland. Including notes from Northeast Greenland. Dansk Pearyland Expedition 1947–50. – *Meddr Grønland*, Bd. **128**, Nr. 6.
- JUST, J., 1967: Ornithological Observations on the 4th Pearyland Expedition in the Summer of 1966. (Danish, with English Summary). – *Dansk orn. Foren. Tidsskr.* **61**: 133–137.
- KNUTH, E., 1940: Under det nordligste Dannebrog. – København.
- KOCH, I. P., 1913: Gennem den hvide Ørken. – København.
- 1916: Survey of Northeast Greenland. – *Meddr Grønland*, Bd. **46**, Nr. 2.
- & A. WEGENER, 1911: Die glaciologischen Beobachtungen der Danmark-Expedition. – *Meddr Grønland*, Bd. **46**, Nr. 1.
- LUNDAGER, A., 1912: Some notes concerning the vegetation of Germanialand, North-east Greenland. – *Meddr Grønland*, Bd. **43**, Nr. 13.
- LØPPENTHIN, B., 1932: Die Vögel Nordöstgrønlands zwischen 73°00' und 75°00' N. br. samt Beobachtungsergebnissen von der dänischen Godthaab-Expedition 1930. – *Meddr Grønland*, Bd. **91**, Nr. 6.

- MANNICHE, A. L. V., 1910: The terrestrial Mammals and Birds of North-East Greenland. Biological Observations. – *Meddr Grønland*, Bd. 45, Nr. 1.
- 1911: Nordøstgrønlands Fugle. Biologiske Undersøgelser. – *Dansk orn. Foren. Tidsskr.* 5: 1–114.
- MARRIS, R. & A. H. F. WEBBE, 1969: Observations of Birds in East Greenland, 1966. – *Dansk orn. Foren. Tidsskr.* 63: 161–170.
- MELTOFTE, H., 1970: Grønland. Et år i Nordøstgrønland. – *Feltornithologen* 12: 84–87.
- 1972: Ornithological Observations in the Norwegian Sea, the Greenland Sea, and NE Greenland, July–August 1972. – *Dansk orn. Foren. Tidsskr.* 66: 108–112.
- 1976: Ornithological Observations in Southern Peary Land, North Greenland, 1973. – *Meddr Grønland*, Bd. 205, Nr. 1.
- MØHL-HANSEN, U., 1949: The Bird-Life in Pearyland, North-Greenland. Observations on “Dansk Pearyland Ekspedition” in the summer 1947. (Danish, with English Summary). – *Dansk orn. Foren. Tidsskr.* 43: 109–129.
- NETTERSTRØM, B., 1970: The Autumn Migration of the Knot (*Calidris canutus*) in Western Jutland. (Danish, with English Summary). – *Dansk orn. Foren. Tidsskr.* 64: 223–228.
- NORDENHAUG, M., 1970: The present status of the Brent Goose (*Branta bernicla hrota*) in Svalbard. – *Norsk Polarinstitut, Årbok* 1968: 7–23.
- 1970a: The present status of the Barnacle Goose (*Branta leucopsis*) in Svalbard. – *Norsk Polarinstitut, Årbok* 1968: 24–35.
- PARMELEE, D. F., 1970: Breeding Behavior of the Sanderling in the Canadian High Arctic. – *The Living Bird* 9: 97–146.
- & S. D. MACDONALD, 1960: The Birds of West-Central Ellesmere Island and Adjacent Areas. – *Nat. Mus. Canada Bull.* 169: 1–103.
- & R. B. PAYNE, 1973: On Multiple Broods and the Breeding Strategy of Arctic Sanderlings. – *Ibis* 115: 218–226.
- PEDERSEN, A., 1934: Die Ornis des mittleren Teiles der Nordostküste Grønlands. Treårsexpeditionen til Christian den X's Land 1931–34 under Ledelse af LAUGE KOCH. – *Meddr Grønland*, Bd. 100, Nr. 11.
- 1942: Säugetiere und Vögel. Dansk Nordøstgrønlands expedition 1938–39. – *Meddr Grønland*, Bd. 128, Nr. 2.
- ROSENBERG, N. TH., N. HESSELBJERG CHRISTENSEN & B. GENSBØL, 1970: Bird Observations in Northeast Greenland. – *Meddr Grønland*, Bd. 191, Nr. 1.
- RØEN, U., 1965: Ornithological Observations on the 3rd Pearyland Expedition in the Summer of 1964. (Danish, with English Summary). – *Dansk orn. Foren. Tidsskr.* 59: 85–91.
- SALOMONSEN, F., 1950: Grønlands Fugle, The Birds of Greenland. – København.
- 1967: Fuglene på Grønland. – København.
- 1971: Twelfth Preliminary List of Recoveries of Birds ringed in Greenland. (Danish, with English Summary). – *Dansk orn. Foren. Tidsskr.* 65: 11–19.
- 1971a: Recoveries in Greenland of Birds Ringed Abroad. – *Meddr Grønland*, Bd. 191, Nr. 2.
- SCHÜZ, E., 1971: Grundriss der Vogelzugskunde. – Berlin.
- VIBE, C., 1967: Arctic Animals in Relation to Climatic Fluctuations. – *Meddr Grønland*, Bd. 170, Nr. 5.
- WADER STUDY GROUP, 1972 (R. EADES): Some Results from Ringing Dunlin *Calidris alpina* L. on the Dee in May. – Wader Study Group, *Bulletin* No. 6, July 1972.
- WEGENER, A., 1911: Meteorologische Terminbeobachtungen am Danmarks-Havn. – *Meddr Grønland*, Bd. 42, Nr. 4.