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REPORT ON THE ORNITHOLOGICAL EXPEDITION TO NORTHWEST GREENLAND 1965

BY

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AND
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WITH 20 FIGURES AND 9 TABLES IN THE TEXT,
AND 4 PLATES

KØBENHAVN
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Abstract

The Ornithological Expedition to Northwest Greenland 1965 visited Sarqaqdalen in the northern part of Disko Bugt in early July and carried out a general faunistic survey of the bird life and an intensive census of the breeding passerine population in a 152 hectare plot. From medio July to the end of August the expedition surveyed Upernavik District with special emphasis on the distribution and size of seabird colonies. Most of these were visited, including the huge *Uria lomvia* colony at Kap Shackleton (Agparssuit) with abt. one million birds. The observations in 1965 are compared with the observations by SALOMONSEN in 1936.

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CONTENTS

INTRODUCTION

In July–August 1965 an ornithological expedition sponsored by the Committee for Ornithological Research in Greenland visited Northwest Greenland. The members of the expedition were: ANDREAS LUND-DROSVAD, ANDERS HOLM JOENSEN, NIELS OTTO PREUSS, GEORGE WATERSTON and IRENE WATERSTON. TORBEN ANDERSEN, leader of the Arctic Station in Godhavn, also participated in some of the studies in the northern part of Upernavik District.

The expedition carried out investigations both in Sarqaq area in the northern part of the Disko Bugt and in Upernavik District. The aim of the investigations were quite different in these two areas, and therefore the results are treated in two separate sections in the report.

The expedition was financed by the CARLSBERG FOUNDATION and the MINISTRY FOR GREENLAND, and we express our gratitude to these bodies for their support.

The following institutions and persons assisted the expedition in various ways:

TORBEN ANDERSEN, who placed at our disposal the cutter "Porsild" of the Arctic Station.

THE ROYAL GREENLAND TRADE DEPARTMENT which lent us a house in Prøven.

THE SCHOOLBOARD OF UPERNAVIK which provided housing during our stay here.

The shipmaster of "Porsild" HARRY CHRISTENSEN and his crew.

Manager HANNIBAL FENCKER, Sarqaq, who assisted during our visit to Sarqaqdalen.

Sealer LARS JENSEN, Sarqaq, who camped with us and assisted the expedition in Sarqaqdalen.

RASMUS KLEEMANN, Upernavik, who acted as pilot on our journey with "Porsild" in the northern part of Upernavik District.

Manager OLE NIELSEN, Prøven, who continuously assisted our work in the southern part of Upernavik District.

PREBEN JØRGENSEN, Upernavik, who helped us on excursions from Upernavik.

D. N. WEIR, Scotland, who determined the contents of Snowy Owl pellets and food of Gyr Falcon.

We are very much indebted to them all, and we also want to thank the many men from Prøven, Upernavik, Kûk and Nutârmiut, the names of which are not mentioned here, who took part in the ringing programme.

We thank our expedition comrades, A. LUND-DROSVAD and GEORGE and IRENE WATERSTON for their pleasant company and most efficient participation in the work. LUND-DROSVAD's experience from more than 30 years in Greenland, was invaluable for the success of the expedition. GEORGE WATERSTON has criticized and improved the manuscript of the report.

Finally we want to thank dr. FINN SALOMONSEN, who encouraged this project and provided much valuable information in the stage of planning.

Two preliminary reports on the expedition have appeared in Danish, JOENSEN, 1966 and PREUSS, 1968.

INVESTIGATIONS IN SARQAQ

In the period July 1–12 the expedition investigated the Sarqaq area on the south side of the Nûgssuaq NE of Disko. On July 1 we arrived at Sarqaq, but on July 3 the camp was moved to Sarqaqdalen, where most of our studies were concentrated. The main objectives of our visit to the area were to carry out ringing of White-fronted Geese and to make quantitative studies of passerine bird communities.

White-fronted Geese breed quite numerously in Sarqaqdalen, and also many moulting adults are found (FENCKER, 1950). In 1965 breeding was, however, late and the number of birds was small. At the time of our arrival no moulting geese had been observed. Since the chances of catching any significant number of geese were very small, we decided to give up this part of the programme, and during our stay in the valley most emphasis was put on a census of breeding birds in the area along the south coast. The lowlying parts of the valley outside the study area were also visited on several excursions, and data on breeding birds were collected. Following this chapter is a report on the quantitative survey as well as a list of species recorded in the Sarqaq area. In the period July 14–19 IRENE WATERSTON made observations of birds at Qutdligssat on the N side of Disko, and records from this area have been included here.

Two rivers run through Sarqaqdalen, one from the NE and one from the N, and are separated by about 1.5 km at the coast. Their lower course runs through low lying, partly marshy and rather luxuriantly vegetated areas. The valley is 1–3 km wide in its lower parts, surrounded to the W by tertiary sandstone mountains and to the E by low precambrian rocks. To the NE the precambrian mountains rise to altitudes more than 1000 metres above the sea level. Between the two rivers there is a mountainous ridge rising to 300–400 metres above sea level with several lakes on the plateau. The valley bottom is characterized by heath- and moorland vegetation typical of the low arctic region. Willow scrub is found in several places, mostly, however, small in size, and the vegatation is dominated by very low plants, e.g. grasses, sedges, *Vaccinium*, *Betula*, *Empetrum* and *Cassiope*.

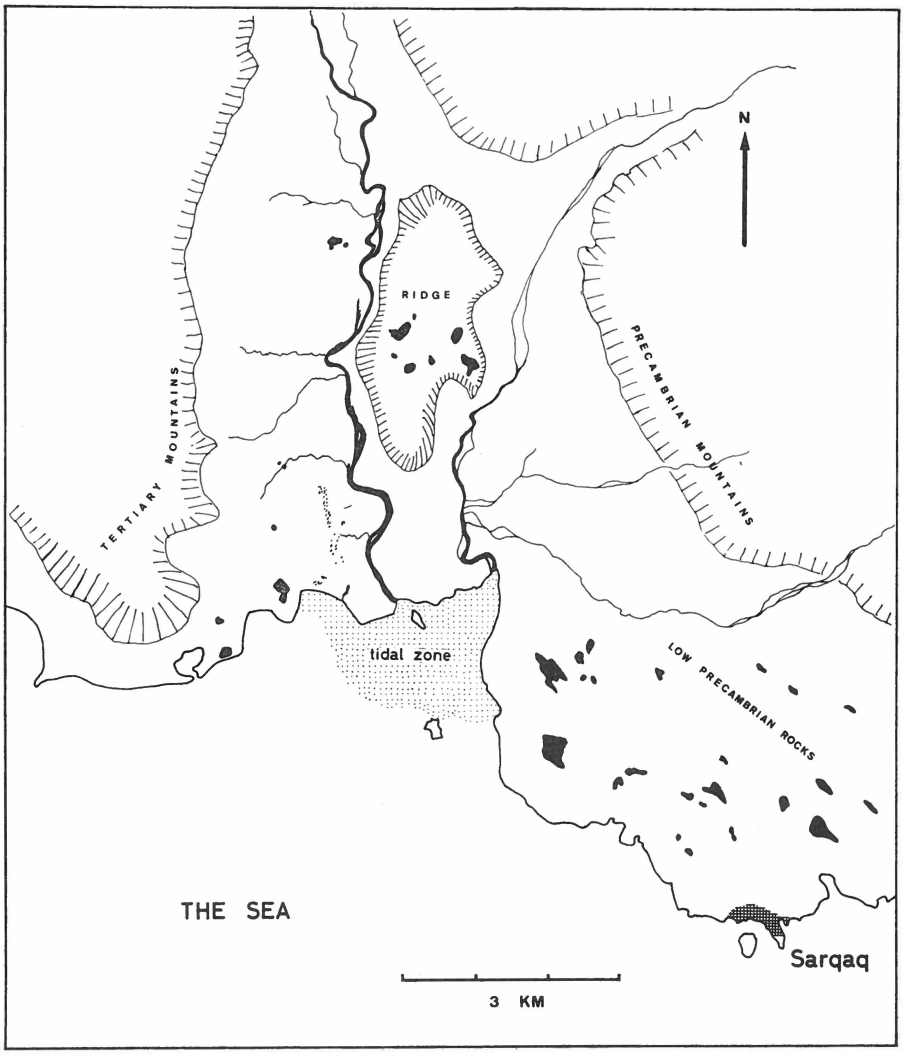

Fig. 1. Map of the Sarqaqdalen.

The bird life of the Sarqaq area has been described by SALOMONSEN (1950–51), and in addition FENCKER (1947 and 1950) has published two reports.

Quantitative investigations of passerine populations

An important part of the investigations in Sarqaq was a quantitative study of the population in an area along the south coast of the valley. The object was to measure the size of the stationary population in a well defined area.

Fig. 2. The upper part of Sarqaqdalen seen from the ridge between the two rivers. A. H. J. phot.

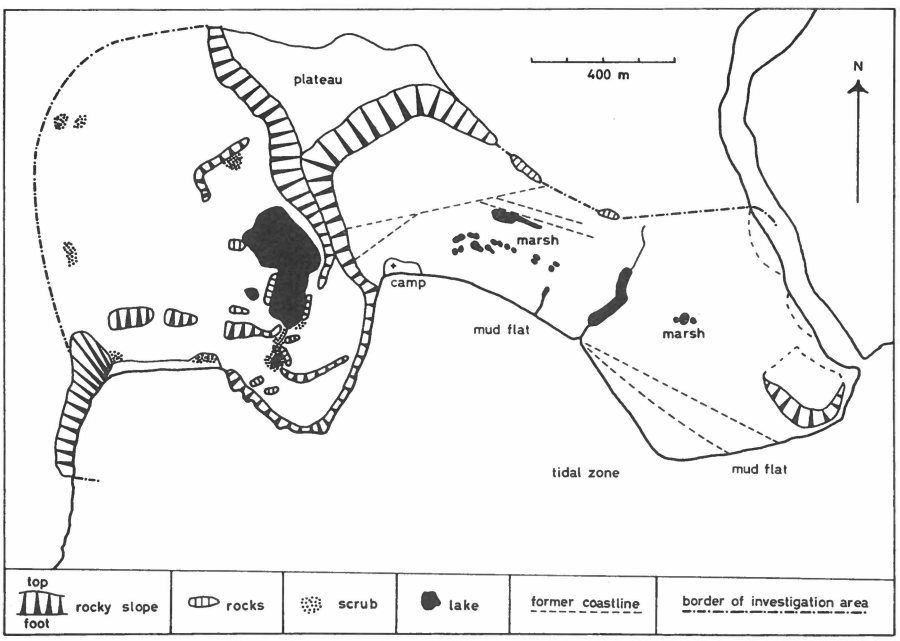

Fig. 3. The investigation plot in lower Sarqaqdalen.

The area, topography and vegetation

The investigation area covers 1.52 km² (152 hectares) and is situated in the southernmost part of Sarqaqdalen W of the river. The sketch map fig. 3 shows the most important topographical features. The area can be divided into two sections, the E-section and the W-section, separated by a rocky ridge and a plateau abt. 150 metres above sea level. The two sections are nearly the same size but differ much as to topography and vegetation, the E-section being a low lying level and partly swampy area with very few rocks, while the W-section is a hilly, rocky and much drier area.

The E-section (70 hectares) is a low, level and partly swampy area with very few rocks and stones. In the SE part there are relatively recent deposits of silt with sparse vegetation. Most parts of the area are older deposits with luxuriant but low vegetation. The western and central parts are swampy with several small marshes. The eastern parts are mostly a few metres higher and generally much drier. A brackish slough with connection to the sea is found in the central part of the section. Apart from grasses and mosses the following plants dominate the wetter parts of the section: *Dryas integrifolia*, *Betula nana*, *Polygonum viviparum*, *Cassiope tetragona*, *Empetrum nigrum*, *Vaccinium uliginosum*, *Eriophorum* and *Carex*. The drier parts of the section have a few very small areas of willow scrub (*Salix*), but mostly the vegetation is very low: The commonest plants found were e.g. *Dryas*, *Saxifraga tricuspidata*, *Betula nana*, *Armeria maritima*, *Cassiope tetragona*, *Vaccinium uliginosum* and *Pedicularis lanata*.

In the eastern part of the section there is a small hill with rocky slopes on the E and S sides. In the northwestern part there is a grass covered slope and above this a rocky ridge.

The W-section (82 hectares) of the investigation area is much more hilly and has many areas with rocks and boulders. The highest parts are nearly 150 metres above sea. There is one lake and two ponds, and several places have small willow scrub (*Salix*) up to two metres high. In 1962 large areas of scrub burned, and in 1965 these areas were covered with very luxuriant growths of *Cerastium alpinum*. Also the following species were very abundant in the section: *Dryas integrifolia*, *Betula nana*, *Polygonum viviparum*, *Silene acaulis*, *Pyrola grandiflora*, *Cassiope tetragona*, *Vaccinium uliginosum*, *Empetrum nigrum* and *Campanula rotundifolia*. *Elymus arenarius* was found on a sandy beach.

Method of survey

The method used in the bird population study was the so-called "mapping method". The principle is that all parts of the investigation

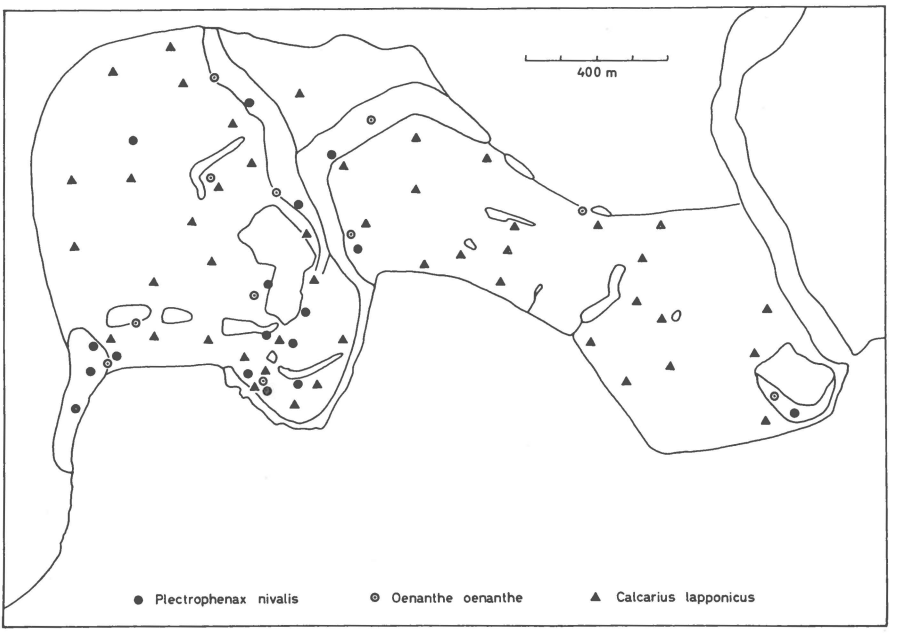

Fig. 4. The distribution of pairs of Snow Bunting, Wheatear and Lapland Bunting (minimum figures) in the investigation plot.

area are visited several times, and all birds observed are marked on special "visit maps". When the stationary population is calculated not only the number of contacts but also the location of each contact are considered. A pair (or a stationary, territorial male) is only recognized if it has been registered on several of the visits and provided the contacts of this pair or bird form a cluster. The method has been described in detail by e.g. ENEMAR (1959), WILLIAMSON & HOMES (1964) and JOENSEN (1965).

A map (scale 1:6000) of the investigation area in Sarqaq was drawn from aerial photographs. The map contained all distinct topographical features and in the very uniform E-section also reference to posts put up in the area with regular intervals. This was done in order to facilitate a very accurate location of all contacts. Counts were made in the period July 4–11. Every day 2–4 persons covered some areas. All areas were covered at least five times, and very large parts were covered every day (areas around the camp several times daily).

Most pairs of Lapland Bunting were recognized only on the basis of observations of adult birds, including singing males. In many cases, however, the presence of a breeding pair was ascertained by the observation of a nest or a group of newly fledged young. Most pairs of Snow Buntings and Wheatears were recognized on the basis of nests or obser-

vations of newly fledged young. Redpolls are less attached to a territory than other passerine species, and we found it very difficult to establish an accurate population figure. In addition to the counts in the investigation area itself notes on species including passerines were made on excursions to other parts of the valley.

Results

The results of the investigation are given in table 1. Fig. 4 shows the distribution of pairs of the three most abundant passerine species. Here only minimum figures are used, i.e. pairs recognized with certainty.

Table 1. *The stationary population in the investigation area in Sarqaqdalen, July 1965. For each species the minimum and maximum population is given. Dominance values and densities are calculated from mean figures.*

	E-section (70 ha)		W-section (82 ha)		Total area (152 ha)		No. of nests or groups of fledglings seen
	Breeding pairs	% of pop.	Breeding pairs	% of pop.	Breeding pairs	% of pop.	
Lapland Bunting (*Calcarius lapponicus*)	21–27	62	24–29	45	45–56	52	15
Snow Bunting (*Plectrophenax nivalis*)	3–5	10	14–15	25	17–20	19	16
Wheatear (*Oenanthe oenanthe*) ..	4	10	7–8	13	11–12	12	7
Redpoll (*Carduelis flammea*) ..			4–6?	9	4–6	5	
Passerines 4 species no. of pairs	28–36	82	49–58	92	77–94	88	38
Pairs per km²	46		65		56		
Purple Sandpiper (*Calidris maritima*) ..	6–8	18	1	1.5	7–9	8	4–5
Red-necked Phalarope (*Phalaropus lobatus*) .			2	3	2	2	1
Ptarmigan (*Lagopus mutus*).....			1	1.5	1	1	1
Mallard (*Anas platyrhynchos*).			1	1.5	1	1	1
All 8 species no. of pairs.....	34–44	100	54–63	99.5	88–107	100	45–46
Pairs per km²	56		72		64		

Fig. 5. The E-section of the investigation area. A. H. J. phot.

The four passerine species comprised 88 % of the total stationary population, and the Lapland Bunting alone accounted for half of all pairs. The density of this species was very equal in the two sections, and pairs were uniformly distributed over the whole area (fig. 4). Snow Buntings and Wheatears were only found in areas where suitable nesting places in crevices and between boulders were present. Thus they were much more abundant in the rocky W-section than in the E-section, together accounting for 37 % and 20 % of the total population in the two areas respectively.

The high dominance value of the Lapland Bunting in pure heathland was also noted in Sarqaqdalen outside the investigation area. On two excursions (26 km) in heath areas with practically no rocks or boulders 92 Lapland Buntings were recorded, but only 10 Wheatears (probably breeding in holes in the mud banks along rivulets) and 6 Snow Buntings. On an eight km walk through rocky terrain around Sarqaq we saw, however, only 10 Lapland Buntings against 11 Snow Buntings and 4 Wheatears.

The total stationary population was 88–107 pairs (mean 98 pairs), i.e. a density in the whole area of abt. 64 pairs per km^2. Density was a little higher in the rocky W-section than in the E-section.

The area S of the lake was particularly rich in birds corresponding with a greater variety in habitat here than in any other part of the investigation area. On an area of abt. 10 hectares (7 % of the whole investigation area) we found abt. 20 % of the pairs (see fig. 4).

A number of passerine pairs were recognized on the basis of nests found or observations of newly fledged young. The data give some indication of the time when breeding had started.

Lapland Bunting: In the E-section we found 5 nests with eggs and two nests with newly hatched young. In the W-section only one nest had eggs, 3 had about one week old young, while 4 broods were seen flying. This indicates that in the lower and wetter E-section breeding had started later (egg laying around June 20–27) than in the higher and drier W-section (egg laying around June 10–15). This difference may well be correlated to both the time of the disappearance of snow and the ground temperature.

Snow Bunting: In the period July 6–9 we found 11 nests with young and saw 5 newly fledged broods. Most pairs (12) had started egg laying in the period June 10–15, while a few (4) had started about one week later.

Wheatear: In the period July 6–10 we saw seven broods of nearly fledging or newly fledged young, indicating egg laying around June 5–10.[1])

It appears that most passerines had started breeding within the period June 5–15. Pairs of Lapland Buntings breeding in the marshy areas were, however, abt. two weeks later.

Discussion

In the ornithological literature several reports on quantitative studies in arctic tundra bird communities can be found. In many cases, however, the methods used are not similar to the method used in Sarqaq, and therefore comparison between results is difficult. In the studies by ALM *et al.* (1965 and 1966) and WATSON (1963) the mapping method was applied, and the results can be compared with our data.

In a study area on Baffin Island very similar to the Sarqaq plot WATSON (1963) found a density of abt. 154 adult birds per km². Five passerine species were found of which the Lapland Bunting (61 %) and the Snow Bunting (22 %) made up the greater part of the total bird population. In wet and dry grass flats with very few boulders (similar to

[1]) The time of egg laying has been calculated using the following sources of information on incubation and fledging times: Lapland Bunting, WITHERBY *et al.*, 1952, vol. I p. 146; WYNNE-EDWARDS, 1952.—Snow Bunting, BERTELSEN, 1921, NESTHERSOLE-THOMPSON, 1966, WITHERBY *et al.*, 1952, vol. I p. 150.—Wheatear, MENZEL, 1964.

Fig. 6. Small area with boulders in the E-section of the investigation plot. Nesting place for Wheatear. A. H. J. phot.

the E-section in Sarqaq) the Lapland Bunting alone accounted for 77 % of the total population.

Alm *et al.* (1965, 1966) made a two year study of two areas in Northern Sweden very similar to the lower Sarqaqdalen. In one area, which had 11 breeding species (5 passerines and 6 non-passerines), the density was 106 and 84 pairs per km² in the two years respectively. In the other area (with 4 passerine and 5 non-passerine species breeding) the density was 54 and 27 pairs per km² in the two years. In the tundra areas in Sweden one species (*Anthus pratensis*) accounted for a little more than half the stationary population.

The density and the structure of the stationary population in the study areas mentioned above are very similar to that found in Sarqaq in 1965. Our results only account for one small area in a single year, and major conclusions should not be drawn from the material. It seems likely, however, that a density of abt. 60 pairs per km² found in Sarqaqdalen is quite usual for this rather luxuriant type of tundra habitat. At the same time it must, however, be emphasized that most terrains in Greenland undoubtedly have much lower values.

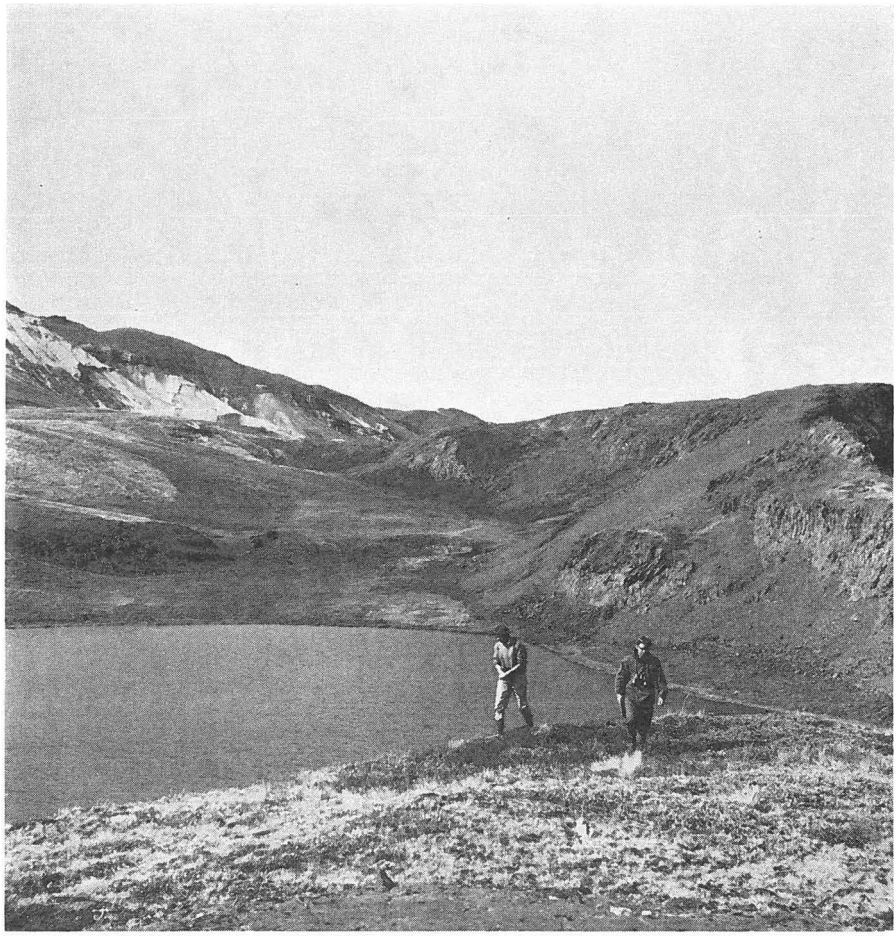

Fig. 7. View over part of the W-section of the investigation area at the big lake. A. H. J. phot.

Quantitative studies of bird communities of the type described here have in recent years proved very valuable for understanding factors influencing bird populations, and we hope that more work of this type can be undertaken in Greenland in the future.

Notes on species in Sarqaq and Qutdligssat

Red-Throated Diver (*Gavia s. stellata* (PONT.)).

H. FENCKER reported that the species bred in three lakes: 4.5 km NW of the village, at the lake in the W-section of the investigation plot, and on the ridge between the two rivers. On July 3 a pair was seen on the first mentioned lake, and although the nest was not found they probably

bred here. A pair was seen on the second locality as well, but there was no nest. On a single visit to the ridge no divers were seen. Flocks of divers were occasionally seen flying at high altitude between Sarqaqdalen and the bay at Sarqaq, and up to twenty birds were seen on the sea. The Great Northern Diver (*Gavia immer* (BRÜNNICH)), which according to SALOMONSEN (1950–51) breeds in this part of Greenland, was not seen in 1965.

Greenland White-fronted Goose (*Anser albifrons flavirostris* DALGETY and SCOTT).

Small groups of 2–4 birds were often seen or heard in the lower valley. On July 15 abt. 15 adults and 20 goslings were seen on the ridge between the two rivers. Most goslings were less than one week old, but of five caught one was about one week and two were at least two weeks old. On our arrival at the top of the ridge, the goslings rushed to the valley bottom, while the adults flew cackling around. Only one adult bird was apparantly moulted and unable to fly. Two nests from previous years were found in low grass and willow vegetation near the coast. According to verbal information from H. FENCKER the spring thaw in 1965 was very late (around May 8–10) and the geese arrived immediately after. Judging from the age of the goslings seen some geese must have started nest building right after their arrival, around the middle of May. Adverse conditions probably was the reason for a smaller population of geese than has earlier been reported from the valley (FENCKER, 1950).

Greenland Mallard (*Anas platyrhynchos conboschas* BREHM).

Flocks of 5–15 birds were regularly seen flying between the valley and the sea. On July 4 a nest with eight eggs was found in a willow scrub at a lake just north of the W-section of the investigation plot, and the same day a female with six about one week old ducklings was seen on the lake in the plot.

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

On July 5 six birds were seen on a lake on the ridge between the two rivers, and two days later two males and one female were seen on a lake five km up the valley.

Arctic Eider (*Somateria mollissima borealis* (BREHM)) and King Eider (*Somateria spectabilis* (L.)).

Large flocks were seen E of Skansen on Disko on July 1. Along the coast of Sarqaqdalen flocks of up to 300 birds were seen, most of which were Arctic Eiders.

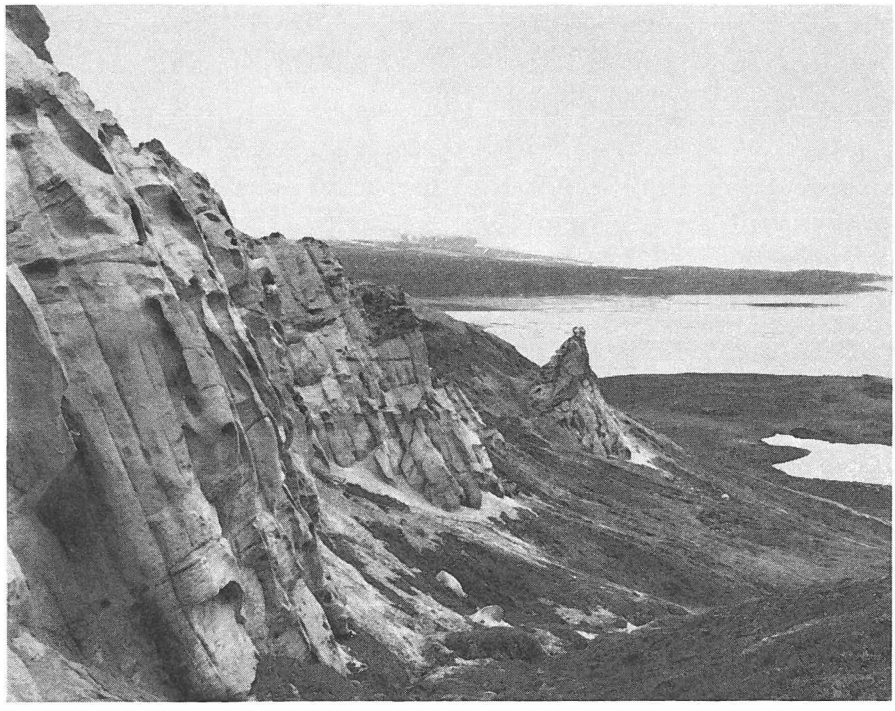

Fig. 8. The sandstone cliffs west of Sarqaqdalen where the nest of Gyr Falcon was found. The nest is seen in the left part of the picture. A. H. J. phot.

Greenland Red-breasted Merganser (*Mergus serrator schiøleri* SALOMONSEN).

This species was seen only twice: On July 2 five birds were seen near Sarqaq, and on July 3 two males and one female were seen on a lake abt. 1.5 km SE of the river estuary.

Greenland White-tailed Eagle (*Haliaetus albicilla groenlandicus* BREHM).

This species was not seen but a well preserved feather (third outermost primary from the left wing) was found, indicating that a bird had visited the coast within the last few months.

Greenland Gyr Falcon (*Falco rusticolus candicans* GMELIN).

On July 10 a nest of Gyr Falcon with four nearly fully fledged young was found on a sandstone cliff W of the Sarqaq river. The nest was an old Raven nest. The parents were seen near the nest while we were there, but no other observations of the species were made at Sarqaq. Remains of prey under the nest included the following species: Arctic Hare (*Lepus timidus*), Ptarmigan, Kittiwake, Iceland Gull and probably Eider.

Fig. 9. The young of Gyr Falcon. Of four young one was nearly pure white while three had distinct light brown spots particularly on the wings. A. H. J. phot.

American Peregrine Falcon (*Falco peregrinus anatum* BONAPARTE).

On July 10 a Peregrine Falcon mobbed by two Arctic Skuas was flying over the river estuary. LARS JENSEN reported, that the species nested on the ridge between the two rivers. On July 17 and 18 IRENE WATERSTON saw one Peregrine Falcon and a probable eyrie N of Qutdligssat.

Great Black-backed Gull (*Larus m. marinus* L.).

A single bird was seen on July 6 at the river delta.

Glaucous Gull (*Larus h. hyperboreus* GUNNERUS) and Iceland Gull (*Larus g. glaucoides* MEYER).

Flocks of up to 600–700 birds of both species were often seen on the mud flats off the coast.

Kittiwake (*Rissa t. tridactyla* (L.)).

Only few birds seen along the coast.

Arctic Skua (*Stercorarius parasiticus* (L.)).

Single birds or flocks of 2–3 skuas were seen regularly flying over the delta, most often between the two rivers. This area was, however, not thoroughly searched.

Greenland Black Guillemot (*Cepphus grylle arcticus* (BREHM)).

West of the valley several pairs bred among the boulders along the coast, and up to 35 adult birds were seen here.

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

On July 10–11 one bird was seen near the estuary of the Sarqaq river. On several occasions in the period July 14–19 up to eight birds were seen by IRENE WATERSTON. The birds stayed in an area just N of Gamle Qutdligssat, and on every visit they were behaving as breeding (alarm calls, display, distraction behaviour). No evidence was, however, found, but it seems most likely that a few pairs actually bred in the area.

While extremely abundant as a breeding bird in the high arctic parts of Greenland, the Ringed Plover is a rare breeder in Westgreenland. Among the very few certain records SALOMONSEN (1950–51, 1967) mentions Sarqaqdalen, and he also suggests that the species breeds in other places in the Disko Bugt area.

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

In the investigation area in the southernmost part of the valley 7–9 pairs were found. In addition four pairs were seen N of this area, and 13 pairs were seen between the river and Sarqaq. Most of the pairs had fully fledged and well flying young corresponding to egg laying not later than the very first days of June. (Calculation based on information from LØVENSKIOLD (1964) and HOLMSTRØM *et al.* (1946)). Two nests with eggs were, however, found: one with three eggs on July 3 and one with four eggs on July 10 (see fig. 10).

Red-necked Phalarope (*Phalaropus lobatus* (L.)).

At nearly all lakes and ponds in the Sarqaqdalen one or two pairs were found showing typical distraction behaviour. The largest number was seen around a lake 5 km up the valley, where abt. 40 adult birds were observed on two occasions. Young birds varied much in age, some were just hatched while others were nearly fledged. Altogether 68 adult birds were seen W of the river, 10 were seen between the two rivers, and 10 between the eastern river and Sarqaq (see fig. 10). Often birds were seen off the coast or flying between the sea and the breeding ponds.

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

This species was not seen, but many feathers were found along the coast. Judging from their condition they had not been covered by snow, which means that a bird must have visited the area in the spring or early summer.

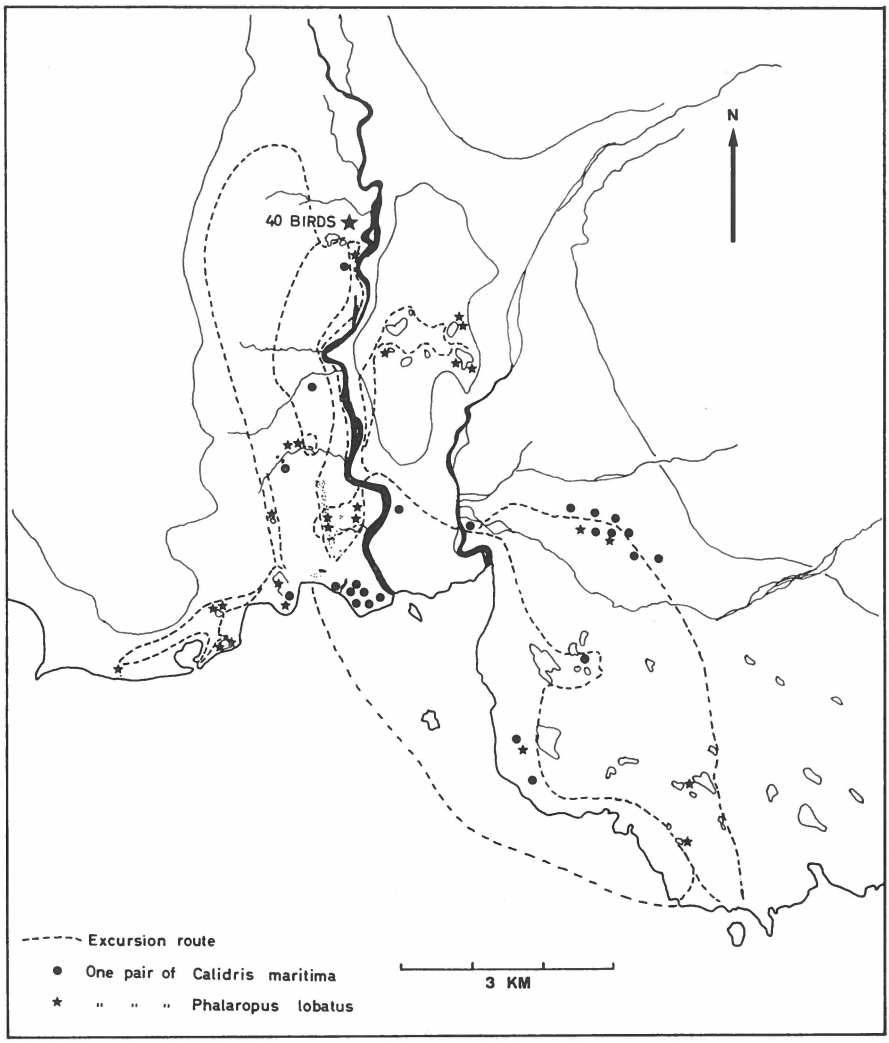

Fig. 10. Map of lower Sarqaqdalen with excursion routes. The number of pairs of Red-necked Phalaropes and Purple Sandpipers recorded is shown.

NW Greenland Ptarmigan (*Lagopus mutus saturatus* SALOMONSEN).

A pair was seen on July 2 between Sarqaq and the river, and on July 8 a pair with nine about one week old chicks was seen in the W-section of the investigation plot. A year old deserted nest with seven eggs were found abt. 1.5 km from the coast.

Northern Raven (*Corvus corax principalis* RIDGWAY).

A family with three young was seen near the coast.

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

Common in the area. See further page 12.

Greenland Redpoll (*Carduelis flammea rostrata* (COUES)).

Scarce in the investigation plot but more numerous in areas 4–6 km from the coast where several family flocks were seen.

Lapland Bunting (*Calcarius lapponicus subcalcaratus* (BREHM)).

Extremely abundant. See further page 12.

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

Very common. See further page 12.

INVESTIGATIONS IN UPERNAVIK DISTRICT

The investigations in Upernavik District in the period July 14–August 27 formed the most important part of the expedition in 1965. Upernavik District is the most northerly district in Westgreenland, extending from Svartenhuk Halvø (71° N) in the south to the Melville Bugt (75° N) in the north, a distance of abt. 400 km. The area is one of the most thinly populated in Greenland. In 1965 there were 1800 inhabitants, of which 700 lived in the main settlement Upernavik, while the rest were spread over 13 villages, six of which had 100–200 inhabitants.

The way of living has changed very much in Greenland in the last decades, particularly along the southern parts of the Westgreenland coasts, where the majority of inhabitants live. In Upernavik, as in the small communities of East- and Northgreenland (Angmagssalik, Scoresbysund and Thule) the hunting and catching of fur-bearing mammals is still by far the most important source of income, and it provides also most of the meat used by the inhabitants and their sledge dog teams.

Upernavik produces more seal skins than any other district of Greenland. In the fiscal year of 1965/66 altogether 72.000 seals were killed in Greenland, and 22.000 of these in Upernavik district (according to Hunting Statistics, published by the Ministry for Greenland). The Ringed Seal (*Phoca hispida*) is by far the most important, comprising 90 $^0/_0$ of the seals killed in the district. The Harp Seal (*Phoca groenlandica*) accounts for half of the remaining 10 $^0/_0$, whereas the Harbor Seal (*Phoca vitulina*), the Bearded Seal (*Erignathus barbatus*), the Hooded Seal (*Cystophora cristata*) and the Walrus (*Odobenus rosmarus*) are killed only in very small numbers. Also small numbers of Narwhales (*Monodon monoceros*) and White Whales (*Delphinapterus leucas*) are caught, as well as a few Polar Bears (*Thalarctos maritimus*), Caribou (*Rangifer tarandus*) and Arctic Foxes (*Alopex lagopus*).

Upernavik has some of the largest colonies of sea birds in Greenland with notable populations particularly of Brünnich's Guillemots (*Uria lomvia*) and Eiderducks (*Somateria mollissima*). Both are important game species collected in very large numbers. Guillemots are "exported" to municipals further south in Greenland which are in shortage of sea bird

meat. Eiderdown is collected in several colonies and forms the basis of an important down industry in Upernavik.

In spite of the great importance of the sea bird colonies in Upernavik District which are of benefit to the human population along the whole Westgreenland coast, very little exact knowledge has hitherto been collected on their distribution and size within the district. In fact very little information on the bird life of Upernavik has been published. The Natural History Expedition to Northwest Greenland 1936, under the leadership of Dr. FINN SALOMONSEN, was the first thorough ornithological investigation in the area. A preliminary report appeared in 1943 (SALOMONSEN, 1943). Further details from this and earlier sources have been published by SALOMONSEN (1950–51), and additional later information has been published by SALOMONSEN (1967). Since 1958 A. LUND-DROSVAD has arranged ringing of Brünnich's Guillemots and Eiders, but from 1936 to 1965 no ornithological investigations had been undertaken in Upernavik District.

The lack of detailed and up to date knowledge on the bird life of Upernavik was the background for the expedition in 1965. The main objectives of the expedition were to study the distribution and numbers of sea birds and to carry through ringing of Brünnich's Guillemots.

The investigations lasted from July 13 to August 27. During the first part of that period (July 13–22) we sailed with the 36 ft motor boat "Porsild" in the northern part of Upernavik District. From July 23 to August 27 we were stationed in Prøven. From here and from Upernavik trips were made with smaller motor boats to areas in the southern part of the district.

In the itinerary a summary of the day to day activities is given. All localities visited are mentioned, and the most important are briefly described. The routes are shown on maps (fig. 11 and fig. 12), and all the localities visited are indicated. On the maps some of the most important areas are indicated by their names, and all localities have a number refering to the list in Appendix 1. Both in the itinerary and in the reports on individual species we have referred to these locality numbers. Firstly because several localities in the same area often have the same Greenland name, secondly because in 1965 good maps were only available for some parts of the district. For areas north of Upernaviks Isfjord only charts (scale 1:400.000) were available. For the southern part both charts (in some areas scale 1:80.000) and topographical maps (scale 1:250.000) were available. Aerial photographs covered most parts of the district. Since 1968 the whole district has been mapped (scale 1:250.000).

Ringing formed an important part of the work in 1965. A total of 3467 birds were ringed including 2901 Brünnich's Guillemots, 325 Arctic Terns and 130 Black Guillemots. The remaining 111 were distributed over 10 species.

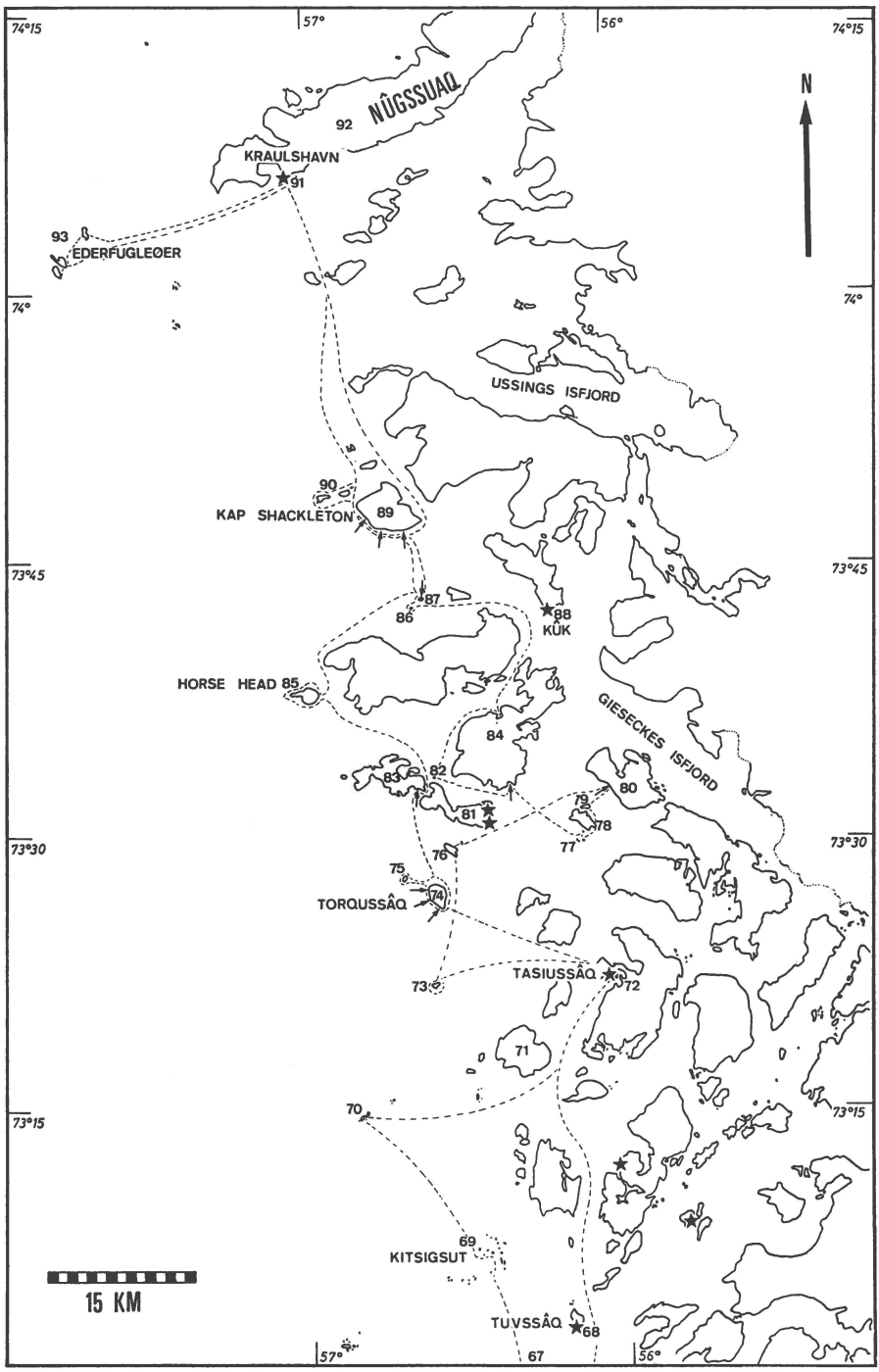

Fig. 11. The northern part of Upernavik District with the routes sailed during the expedition in 1965 indicated (dash-line). Asterisks indicate settlements. Numbers refer to the list of geographical names Appendix 1. Arrows indicate bird cliffs.

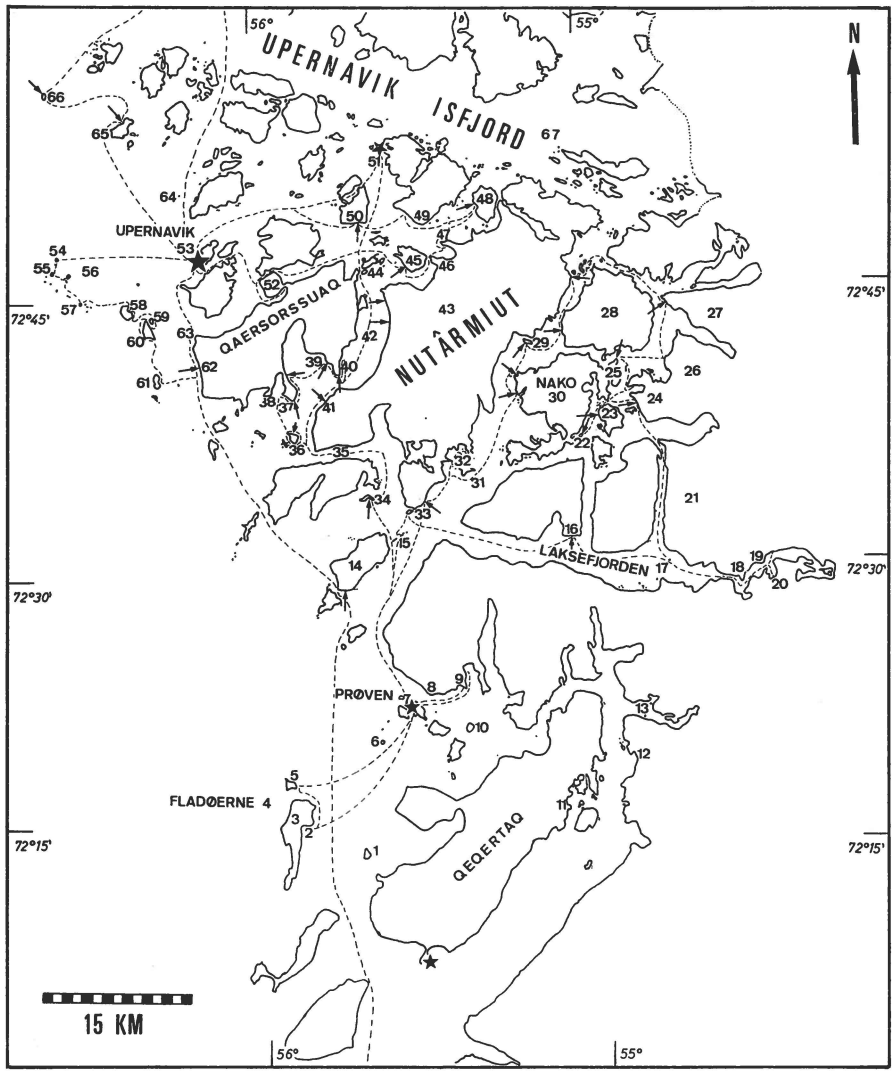

Fig. 12. The southern part of Upernavik District with the routes sailed by the expedition in 1965 indicated (dash-line). Asterisks indicate settlements. Numbers refer to the list of geographical names Appendix 1. Arrows indicate bird cliffs.

Intinerary

The northern part of Upernavik District July 13–23

July 13

Onboard "Porsild" we left Sarqaq 0900. After a short landing in Qutdligssat we proceeded directly to Upernavik. IRENE WATERSTON stayed in Qutdligssat for studies on the bird life in the following days.

July 14

We arrived at Upernavik (53) 1600. During the voyage through the district two bird cliffs were visited and briefly examined: a colony of Cormorants and gulls

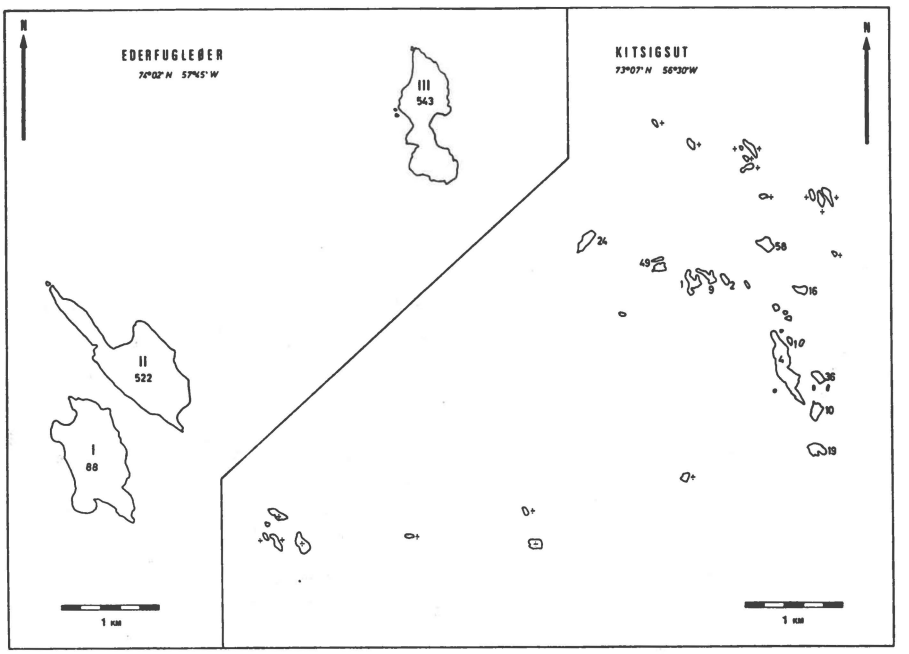

Fig. 13. Sketch maps of 1) Ederfugleøer (93) drawn from aerial photographs. 2) the Kitsigsut islands (69) drawn from aerial photographs. Islands not visited are marked with ÷. Numbers of Eider nests found is indicated.

at the S end of Iperaq (14) and the large Guillemot-Kittiwake colony on the W side of Qaersorssuaq (Sandersons Hope) (62).

July 15

At 1000 we left Upernavik. RASMUS KLEEMANN, Upernavik, went along as pilot and participated in "Porsild"'s voyage during the next week.—We first visited the island Angissoq (65) (1120–1220) along the NW side of which there is a low cliff with grass covered slopes with small colonies of Guillemots, Razorbills and Puffins. —Kingigtuarssuk II (66) (1300–1400) has a colony of Guillemots, Razorbills and Kittiwakes on the E side. Colonies were counted both from land and sea.—Kitsigsut islets (69) (1630–1915) 12 small islands in the centre of this group were thoroughly walked over (see fig. 13). Eiders, Long-tailed Ducks, Arctic Terns and Grey Phalaropes were breeding here. All the islands are very low with luxuriant grass vegetation, some with small ponds.—Kingigtuarssuk III (70) (2120–2240) is less than 1 km long, a rather high and barren rocky island. On the S and W sides there was a Guillemot-Puffin colony, which we studied from land and sea. Some low barren rocks very close to the island with many breeding Eiders were investigated also.— From here we sailed S of Igdlúnguit (71) to Tasiussaq (72) where we arrived at 0120.

July 16

In sunny and calm weather we started at 0900 from Tasiussaq and proceeded to Torqussâq (74) (1100–1320), an abt. 2.5 km long and almost 300 m high depressingly barren island. In the dinghy we sailed round the island and at the W and SW coast Guillemots and Kittiwakes in three colonies were counted.—A short trip was made to the low islet Upernaviarssuk (75) abt. 2.5 km NW of Torqussâq, but very few

Fig. 14. Counts of Eider nests on Ederfugleøer. A. H. J. phot.

birds were seen.—"Porsild" proceeded to the SE corner of Mátângassut (83) where a Kittiwake-gull colony was visited (1420–1450).—Through the sound between Mátângassut and Nutârmiut (81) we proceeded to Horse Head (Agpalersalik) (85), an abt. 3.5 km long and nearly 300 m high island with very abrupt slopes along all coasts. We sailed round the island (1600–1700) and observed flocks of Little Auks, Puffins, Razorbills and gulls. Because of strong wind it was impossible to land on the island.—We proceeded to Kipako (87) (1740–1825), an abt. 500 m long island with sheer cliffs along the N and NE sides and grass covered slopes along the S and SW sides. A large colony of Guillemots, Kittiwakes and Razorbills was studied on the N side.—From here we sailed to the huge, Greenlands largest, Guillemot colony on the SW side of the island Agparssuit (Kap Shackleton) (89). The weather was not favourable for a thorough survey, but while proceeding northwards along the cliffs we made sketches of the colonies.—We sailed to Kraulshavn (91) arriving here at 2300.

July 17

At 0900 we left Kraulshavn with Ederfugleøer (93) as destination. Arriving here at 1130 we spent the next 12 hours counting nests of Eiders, gulls etc. nearly continuously. Ederfugleøer consists of three islands (see fig. 13). The biggest (II) is abt. 2 km long and nearly 1 km wide, and the smallest (I) is abt. 1.2 km long and nearly 1 km wide. The total area of the three islands is abt. 2.2 km^2. On the southern island (I) slopes are rising to nearly 100 m above sea, while the two others are much lower. In places luxuriant grass vegetation was found, while other areas were barren rocky or covered with boulders. On the central island (II) there were two ponds. A detailed account of the Eider-census is given on page 40. Besides Eiders many Glaucous

Gulls and a few Puffins were found.—Shortly after midnight we were back in Kraulshavn, where we stayed the following day.

July 19

We left Kraulshavn at 0715 with Kap Shackleton (89) as destination. From 1045 to 1410 and again from 1515 to 1755 a thorough mapping and count of the bird colonies was made. Weather conditions were absolutely perfect. At two places we went ashore. The methods and results of the survey of this 8 km long and 300–650 m high precipitous bird cliff are described in detail on page 47.—We sailed round Kitdleq islands (90) (1410–1515) W of Kap Shackleton, two low and rather barren islands with plenty of Black Guillemots and Glaucous Gulls.—From Agparssuit we proceeded to Kípako (87) where most of the colony was repeatedly counted.—Also a small very luxuriant unnamed island SW of Kípako (86) (1925–1945) with a large Eider colony was visited.—From here we proceeded through icefilled fjords SW of the settlement Kûk (88) to a sheltered anchor place on the NW side of Qavdlunât (84) arriving here at 2135.

July 20

We left the camp at 0800 and during the day visited the following localities: An unnamed island 0.5 km N of the NW end of Nutârmiut (82) (0900–0915) with breeding Eiders.—SE end of Qavdlunât (84) (1000–1015) a Kittiwake and gull colony.—The islands Sãtoq (79) and Sãtúnguit (77) and the S end of Sãtorssuaq (78) (1130–1430) with colonies of Eiders and Arctic Terns.—The cliffs on the NW side of Nûluk island (80) (1500–1515) with a gull colony.—The island Pikiutdle (76) (1700–1830) with a large colony of Arctic Terns and a few Eiders (mostly on a rock NE of Pikiutdle).—The isolated island Torqussârssuk (73) (1945–2130) which has as far as is known never been visited by ornithologists before. Considerable numbers of Razorbills, Puffins and Black Guillemots were seen and the colonies were studied both from sea and land. The island is abt. 1 km long and up to 100 m high with steep cliffs along the E and N sides and grass covered slopes facing W and S.—At 2130 a storm was approaching and we sailed to Tasiussaq (72) where we stayed sheltered for the whole of the next day.

July 22

Wind was still rather strong and on the route from Tasiussaq to Upernavik (53) it was not possible to make observations. In Upernavik Irene Waterston joined the expedition again.

July 23

With "Porsild" we sailed from Upernavik to the settlement Prøven (7) where the members of the expedition went ashore, while Torben Andersen proceeded with "Porsild" southwards to Godhavn.

The southern part of Upernavik District July 23–August 27

In the following only those days when excursions from Prøven or Upernavik were undertaken, are mentioned.

July 25

In bright sunshine and calm weather we visited Fladøerne (4) SW of Prøven. Left Prøven at 0830 and arrived at Igdlorssuit (2) on the E side of Store Fladø (3) at 1010. Until 1815 we made excursions on the northern part to the area around the lakes in the centre of the island. Store Fladø is 4.5 km long and very low. Near Igdlorssuit there are several ponds. Large areas have luxuriant vegetation, in places

with swamps, but also large areas covered with boulders are quite barren. Arctic Skuas, Long-tailed Skuas, Grey Phalaropes, Red-necked Phalaropes, Purple Sandpipers and one Snowy Owl were observed, and Snow Buntings were more numerous than in any other locality visited in the district.—Lille Fladø (5) (1900–2100) was also visited. This 1.2 km long, low and fertile island had a large colony of Arctic Terns and many Black Guillemots.

July 27

With OLE NIELSEN we left Prøven at 1610 with Laksefjorden (17) as destination. First we visited Qeqertârssuit (15) NE of Iperaq (14), a small group of islands with breeding Eiders.—At the small island Sagdlíngualua (33) S of Nutârmiut (43) thousands of Guillemots passed to and from Laksefjorden and Angmarqua (31).—We proceeded into Laksefjorden and visited a colony with Cormorants, Kittiwakes and gulls on the peninsula Pûgutâ (16) and a gull colony at Naujat nûat (18).—At Eqalugârssuit (20) we anchored and camped for the night near the river.

July 28

In the morning excursions were made to willow scrub areas along the river and at two small lakes at Eqalugârssuit.—In the afternoon we visited Orpît (19) (1300–1600) on the opposite side of Laksefjorden. One of the most luxuriant willow scrubs in NW Greenland is found here. The largest "wood" near the coast has up to 2 m high growths, and smaller scrub areas are also found further inland along the rivulets. Lapland Buntings and Redpolls were observed here.—We left Laksefjorden at 1600 and proceeded through the sound E of Amarortalik (21).—During the following 11 hours a number of colonies with Cormorants, Kittiwakes, Glaucous Gulls and Iceland Gulls were visited along the coasts of Pâq (23), Nako (30), Sáningassoq (28) and Nutârmiut (43) (see fig. 12).

July 29

At 0300 a storm forced us to seek shelter west of Nerrítut (32), where we camped for the night. At 1200 the weather was calm again, and we proceeded to Prøven. On the way we visited a minor bird cliff at the S end of Nutârmiut (43). We arrived at Prøven 1430.

August 3

With the trade cutter "Kraul" we sailed from Prøven 1555 via Augpilagtoq (51) to Upernavik (arriving at midnight). On the way a number of bird colonies were observed, most of which were, however, not closer examined.

August 5

In cloudy but calm weather we sailed from Upernavik at 0950 in a small motor boat to areas further E. Here we visited a number of colonies on the islands Angmaussarssuaq (50), Tâterât qáqâ (49), Akínaq (48), Nutârmiut (43) and Nûna (45). Along the S coast of Nûna we found the largest colony of Cormorants in the district. On the return trip we visited an abandoned Guillemot colony at the NW corner of Umiasugssuk (52) as well as Razorbill and Black Guillemot colonies along the W and S coasts of this peninsula. Arrived Upernavik 1915.

August 7

With a small motor boat we sailed from Upernavik at 1400. First we visited Agpagdlit (63) at the NW side of Sandersons Hope (62). Then a thorough count was made of the Guillemot and Kittiwake colonies on the W side of Sandersons Hope (1515–1645).—We proceeded to Hvalø (61) where we went ashore and surveyed the southern higher parts of the island (1715–1900). There were colonies of Puffins and Razorbills along the E coast.—From here we sailed along the S and W coasts of

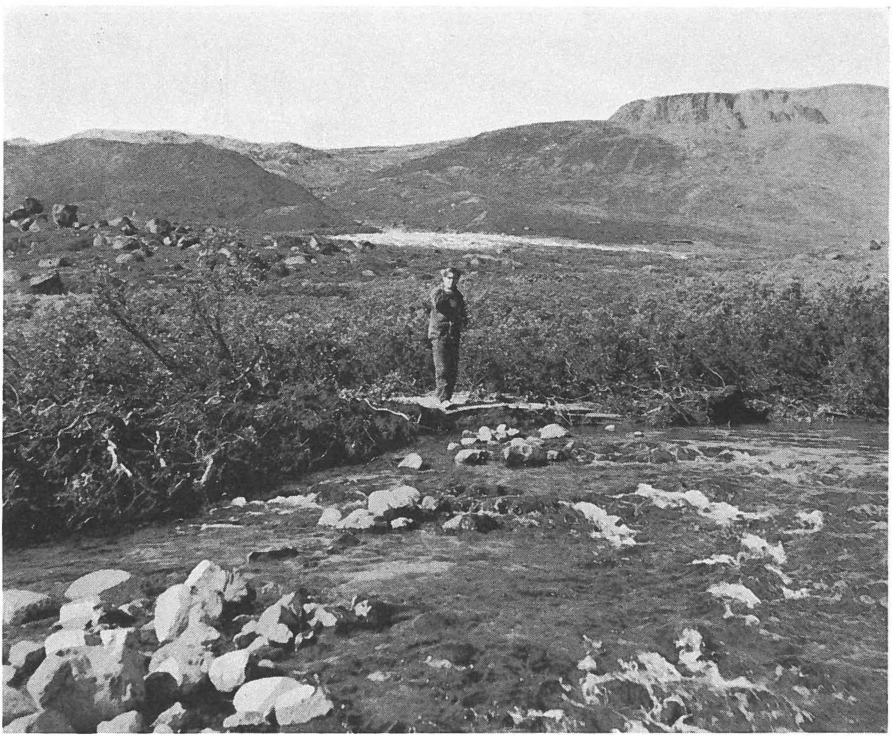

Fig. 15. The "wood" at Orpît, Laksefjorden. A. H. J. phot.

Bruuns Ø (60), through the sound between this island and Madsens Ø (59), and on to the E coast of Nordø (58) the shores of which were searched (2130–2300).—We proceeded to Smålandene (56), first to the low island Kingigtuarssuk I (57), where many Puffins were observed, and then further on to the small islands N hereof. They are all very low and apart from Itivsâlik (55) and Igdlutalik (54) almost without vegetation. We only went ashore on Igdlutalik, where many Arctic Terns and Eiders as well as a few Puffins were breeding.—From here we returned to Upernavik arriving 0315.

August 9

At 1100 we sailed with the trade cutter "Kraul" from Upernavik through the sound Sortehul (42) to Prøven, where we arrived 1800. At some distance we saw three bird colonies in the N part of Sortehul, which we did not have the opportunity of examining more thoroughly later.—At Qôrnoq Kitdleq (40) and Tingmiakulugssuit (41) surveys were made of colonies of Guillemots, Razorbills and Kittiwakes, and also the colony of Cormorants on the E side of Ũmánaq (36) was studied.—In the bays on the E side of Nutârmiut (43) we saw from the distance 2–3 small colonies which we could not visit later.

August 10

Irene and George Waterston left the expedition. They sailed with "Kraul" via Augpilagtoq to Upernavik and from here on August 13 with "Tikerak" to the Disko Bugt. They arrived in Godhavn August 16.—In the evening with Ole Nielsen we visited Igdlúnguaq (9) abt. 6 km NE of Prøven.

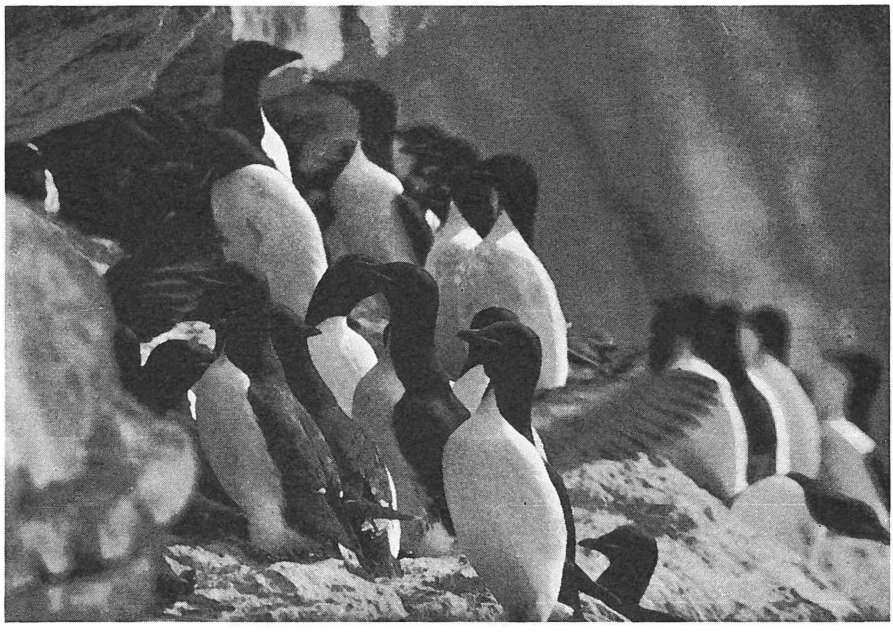

Fig. 16. Guillemot assembly at Kap Shackleton. A. H. J. phot.

August 13

In the evening we again visited Igdlúnguaq (9) and a lake abt. 1 km further NE.

August 14

At 1100 we sailed from Prøven with 6 men for the ringing of Guillemots. We arrived at Tingmiakulugssuit (41) at 1600, where ringing as well as cliff surveys took place.—Later we visited Qôrnoq Kitdleq (40), Agpatsiait (39), Kingigtoq Agparssuit (37) and a small colony at the E side of the Agparssuit peninsula.—On returning we sailed round Ũmánaq (36), leaving here at 0100, visited a Cormorant and Kittiwake colony at the S coast of Manîtsúnguaq (34), and arrived in Prøven 0600 (August 15).

August 17

A. LUND-DROSVAD sailed with "Kraul" via Augpilagtoq to Upernavik from where he arranged ringing of Guillemots at Sandersons Hope (62) during the following days.

August 21

The authors sailed with OLE NIELSEN from Prøven through Sortehul (42) to Upernavik.

August 23

With a small motor boat we sailed from Upernavik to Augpilagtoq (51) and back.

August 25

A. LUND-DROSVAD sailed with "Kraul" via Tuvssâq (68) to Tasiussaq (72) and from here further on to Kûk (88) and Nutârmiut (81). Here he arranged ringing of Guillemots on Kap Shackleton (89) and Kípako (87).

August 27

The authors left Upernavik onboard the "Tikerak" arriving at Egedesminde on August 30. On September 4 we proceeded with plane to Copenhagen. A. LUND-DROSVAD left Upernavik on September 1 on the "Kununguaq" and went via Egedesminde to Copenhagen.

Notes on species in Upernavik District

Red-throated Diver (*Gavia stellata* (PONT.)).

Observed at the following places: Tasiussaq (72) July 21 one pair in the harbour. According to local people the species breeds on a lake behind the village.—Store Fladø (3) July 25 one pair was seen on the lake N of Igdlorssuit (2).—Laksefjorden (17) July 27 two pairs and two single birds. According to OLE NIELSEN many birds breed here.— In the sound N of Sáningassoq (28) July 28 one bird.—On the lake N of Igdlúnguaq (9) August 13 one pair.—Igdlutalik (10) according to MATHIAS LERCH the species breeds here.— In Amitsorssuaq (13) July 25 we saw abt. 15 birds.—In August some years ago OLE NIELSEN saw 30–50 birds on the lakes on Nûgssuaq (92).

Great Northern Diver (*Gavia immer* BRÜNNICH).

OLE NIELSEN reports that on July 20 he saw a few birds on the lakes at Eqalugârssuit (20).—MATHIAS LERCH observed four birds on July 25 in Amitsorssuaq (13).

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

The only breeding place of this species in Upernavik District is Tingmiakulugssuit (41) where SALOMONSEN in 1936 estimated the population to abt. 30–40.000 pairs (FISHER, 1952). We visited the colony several times in 1965 but found it impossible to estimate numbers from the sea only. The maximum number observed on the cliff was 1000–1500 (August 10) but many birds may well have been overlooked. Most of the nests were on grass covered ledges several hundred metres up the 800 m high cliff.

Fulmars were observed all over the district and dark phase birds were regularly seen. On August 7 several hundred birds were observed feeding together with Kittiwakes W of Hvalø (61), Bruuns Ø (60) and Nordø (58).

Cormorant (*Phalacrocorax c. carbo* (L.)).

In the area between Prøven (7) and Upernaviks Isfjord (67) the Cormorant is a numerous breeding bird. 14 breeding places and 11 roosting places were found (see table 2 and fig. 17). Roosting places are included as they may be potential future breeding places. 12 breeding

Table 2. *Breeding colonies and roosts of Cormorant investigated in Upernavik District in 1965. The number of adults and nests seen, the size of broods and the total number of breeding pairs estimated. All cliffs were observed from the sea only.*

Locality (no.)	Date	Adult birds	Nests seen	No. nests with young					Total no. of young	Remarks	Number of breeding pairs
				Total	1y	2y	3y	4y Groups of y			
Iperaq (14) S end	14.7.	6–8	1						10	Young seen by OLE NIELSEN Aug. 11	3–4
Pûgutâ (16) S side	27.7.	10								Roost	
Naujat nûat (18) 3 km W of	27.7.	15								Roost	
Niaqornarssuaq (24) SW coast facing Pâq	28.7.		11	11					26–28		11
Niaqornarssuaq (24) 2 km further N	28.7.	1								Roost	
Pâq (23) NW side	28.7.	10	5	5	1	3	1		15		5
Qâmutit (25) N side	28.7.	18–19	18–19			5	6	7–8g/23y	62		20
Tasersuatsiaup Qa (27) W promontory	28.7.	12	5							Nests apparently empty	5
Kangerdluarssûp nûna (26) due E of Qâmutit colony	28.7.									Roost or deserted colony	

Qardlît Qeqertât (29) SW side	28.7.	12								Roost	
Nako (30) NW side of W peninsula	28.7.	4								Roost	
Nako (30) SW side of W peninsula	28.7.	16	12	9	1	8			26		12
Nerrítut (32) W side	29.7.	35								Roost	
Umiasugssuk (52) S side	5.8.	7								Roost	
Nûna (45) SW side	5.8	150	69–70	67–68	7	10	36	11	3–4g/11–12y	190–191	A few flying young. 2 roosts close to the colony	80–90
Inugsugârssuk (47) S side	5.8.	2									Roost	
Akínaq (48) W side	5.8.	14	11	8–9						22		11
Nutârmiut (43) W side of Sortehul, N colony	9.8.	4	1								Surveyed only from great distance	?
Nutârmiut (43) W side of Sortehul, S colony	9.8.	12	3–4								Surveyed only from great distance	?
Torssukátaq (35) S side of the Nutârmiut peninsula	9.8.	6									Roost	
Ûmánaq (36) E side	9.8.			29	4	5	18	2		76	Several flying young; several empty nests	45–50
Ûmánaq (36) W side	14.8.	30	5–7	1	1					1	Several flying young	
Agpatsiait (39) SW side	14.8.	1									Roost	
Manîtsúnguaq (34) S side	14.8.	80		40						110+	Several flying young	40–50

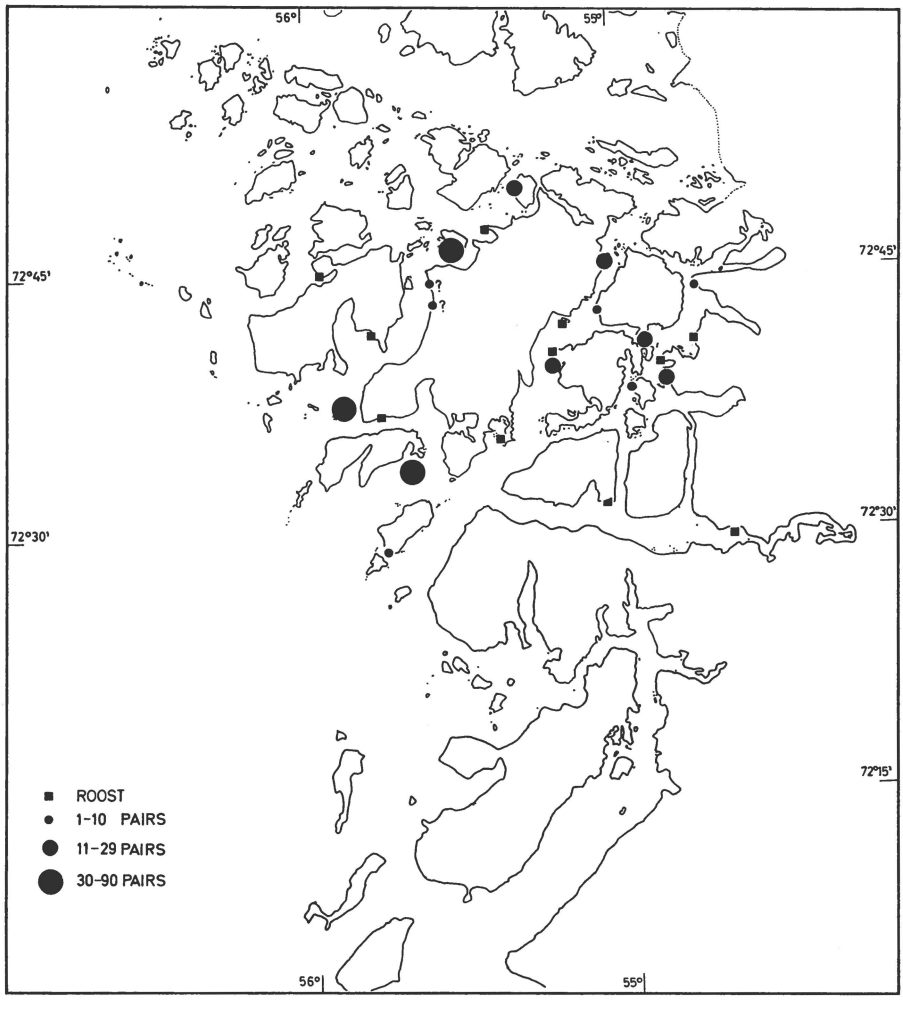

Fig. 17. Colonies and roosts of Cormorant found in 1965 in Upernavik district.

colonies were closely examined and nests and young were counted. The counts were with one exception (Iperaq (14)) made in the period July 27–August 14. At the beginning of this 19 days period most young stayed in their nests and the size of each brood could quite easily be established. At the end of the period most young were completely fledged, most having left their nest site, and some having even left the colony. Figures obtained are therefore not of the same accuracy in the different colonies.

Fledging in mid August corresponds to egglaying in June and hatching at the latest around mid July. SALOMONSEN (1950–51, p. 157), however, reports that hatching in Greenland normally takes place in August.

Three large colonies were found in the district: Nûna (45) 80–90 pairs, Ũmánaq (36) 45–50 pairs, and Manîtsúnguaq (34) 40–50 pairs. Two colonies had abt. 20 pairs each (Qâmutit (25) and Nutârmiut NE (43)), while seven colonies had between a few and 12 pairs each. Total number of pairs in these 12 colonies was 245–271, and two colonies with unknown numbers were observed. Furthermore we may have overlooked a few colonies in the district, so that the total number of pairs can be estimated to at least 300.

Of 138 broods which could be clearly separated from other groups of young there were 14 with one young (10 %), 21 with 2 young (15 %), 79 with 3 young (57 %), and 24 with 4 young (17 %). The average brood size was 2.8 young.

All colonies were on steep cliffs, and the nests were mostly on quite wide ledges. Cormorants were breeding together with Kittiwakes, Glaucous Gulls, Iceland Gulls, Razorbills and Black Guillemots. Outside the close vicinity of the colonies and roosts only one bird was observed (between Prøven (7) and Fladøerne (4) on July 25).

Salomonsen (1950–51) mentions only a few breeding places: Inugsugârssuk (47) 2 colonies, presumably mistaken for Akínaq (48) and Nûna (45) close to this colony, Angmarqua (31) 3 colonies, and Ũmánaq (36). In addition two colonies already abandoned in 1936. Even though previous surveys in the area were incomplete, no doubt the Cormorant has increased during the last years. This has been confirmed verbally by local people.

Greenland Mallard (*Anas platyrhynchos conboschas* Brehm).

On August 13 a female with three 10 days old ducklings were seen on the lake N of Igdlúnguaq (9).

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

Observed at six places: Kitsigsut (69) a pair and a nest with 7 eggs.—Sãtúnguit (77) one bird.—Store Fladø (3) two pairs and seven males on the small lakes.—Lille Fladø (5) one egg taken by gulls was found.—Eqalugârssuit (20) one bird.—Pâq (23) 3–5 birds.

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

The Eider is one of the most common species in Upernavik District and was observed all over the district in large and small flocks. Eiders were found breeding in 14 localities, practically all small islands. On most breeding places visited the nests were counted by up to six persons walking closely together in a row through the area covering it as good as topography and time permitted (see fig. 14). Table 3 gives a summary of the colonies visited in 1965.

Table 3. *List of breeding places for Eiders investigated in 1965.*

Kitsigsut (69) (July 15): 229 nests found on 12 islands.

Kingigtuarssuk III (70) (July 15): 215 nests found on the low rocks at the N coast.

Upernaviarssuk (75) (July 16): Old nest grooves found, but none with down. Possibly a few breeding.

Ederfugleøer (93) (July 17): 1154 nests were counted, total population estimated to abt. 1500 pairs. (see page 40).

Island SW of Kípako (86) (July 19): 141 nests found.

Island N of NW end of Nutârmiut (82) (July 20): 20 nests found.

Sãtorssuaq (78) and Sãtúnguit (77) (July 20): 72 nests found.

Pikiutdle and the rock NE hereof (76) (July 20): 11 nests found.

Torqussârssuk (73) (July 20): One nest and 8 old grooves found.

Store Fladø (3) (July 25): A few nests found on N part.

Lille Fladø (5) (July 25): One nest found.

Qeqertârssuit (15) (July 27): At least 75 nests.

Bruuns Ø (60) (August 7): Many young broods around the island.

Igdlutalik (54) (August 7): 200–400 breeding pairs estimated. According to NIELS MØLLER, Upernavik, this is by far the biggest colony in Smålandene (56), but smaller colonies can be found also on the other islands in this group.

NOTE: In colonies visited later than July 20 the majority of nests had hatched, and estimates are uncertain (minimum figures).

Table 4. *The distribution on clutchsize and the number of nests with ducklings*

Locality	No. eggs or yo									
	1		2		3		4		5	
	No. nests	%	No. nests	%	No. nests	%	No. nests	%	No. nests	%
Kitsigsut (69)	4	2,3	8	4,6	50	28,7	84	48,3	25	14
Kingigtuarssuk III (70)	1	0,5	13	6,4	41	20,1	103	50,5	38	18
Ederfugleøer I (93)	5	7,4	11	16,2	28	41,2	20	29,4	3	4
Ederfugleøer II (93)	19	5,1	87	23,6	132	35,9	122	33,2	9	2
Ederfugleøer III (93)	19	5,1	74	20,0	135	36,5	124	33,5	16	4
Sãtorssuaq (78) and Sãtúnguit (77)	6	12,0	7	14,0	12	24,0	13	26,0	8	16
Kípako, unnamed island SW of (86)	8	12,5	16	25,0	18	28,1	13	20,3	3	4
Total	62	4,8	216	16,6	416	32,0	479	36,8	102	7

The number of eggs and ducklings in each nest was registered as well as the number of nests which contained only down. Also old nest hollows, *i.e.* nests from previous years, were counted. Table 4 gives the contents of nests in the seven largest colonies. These were all visited in the period July 15–20 and therefore most likely were in the same stage of development. The rather large number of down nests on the island SW of Kípako (86), however, indicates that the Eiders here had started laying earlier than in other colonies. On some occasions our attention was drawn to the fact, that the proportion of down nests varied considerably in the different parts of the same colony. On a ridge on the central island of Ederfugleøer (93, II) 40 % of the nests had hatched against 21 % for the rest of the island. We assume that this area had been free of snow and fairly dry earlier than other parts of the island, thus enabling the Eiders to start laying earlier here.

In table 4 it is seen that clutches with 4 eggs are most common, representing 37 % of all clutches. Hereafter follow clutches with 3 eggs (32 %) and 2 eggs (17 %) while only 8 % had 5 eggs. When all seven colonies are taken together the average clutchsize is 3.4 eggs with variation from 3.0 to 3.9 in the individual colonies. The two southernmost colonies (Kitsigsut (69) and Kingigtuarssuk III (70)) had a higher mean clutchsize than the colonies further north.

Most nests were found in grass- and herb-vegetation, usually between boulders. Some nests, however, lay completely unprotected on

wn in the seven largest Eider colonies investigated in Upernavik District in 1965.

6		7		8		Total	Nests with ducklings	Nests with down only		Total number of nests	Average clutchsize
No. nests	%	No. nests	%	No. nests	%		No. nests	No. nests	%		
2	1,1	1	0,6	0	0	174	10	45	19,6	229	3,7
6	2,8	1	0,5	1	0,5	204	11	0	0	215	3,9
1	1,5	0	0	0	0	68	2	18	20,5	88	3,1
0	0	0	0	0	0	369	33	120	23,0	522	3,0
2	0,5	0	0	0	0	370	50	123	22,7	543	3,1
4	8,0	0	0	0	0	50	0	22	30,6	72	3,4
6	9,4	0	0	0	0	64	2	80	54,8	146	3,1
21	1,6	2	0,2	1	0,1	1299	108	408	22,5	1815	3,4

open gravel flats. This was the case on Kingigtuarssuk III (70) and can explain the fact that there were no down nests at all in this area. Nest down had blown away immediately ofter hatching.

Even in a very thorough survey of a breeding area some nests will inevitably be overlooked, particularly on larger islands where nests are more scattered. In order to correct for this error in the most important breeding place in the district, Ederfugleøer (93) a control investigation was undertaken. During the first count eggs in all nests recorded were marked with a pencil. Later parts of one island were surveyed again, and we checked whether eggs were marked or not. Of 113 nests found in the second survey, 86 were marked, while 27 had not been recorded during the first survey. On all three islands nests were counted in the same way, and it is suggested that abt. 25 % of all nests had been overlooked. The breeding population on Ederfugleøer in 1965 is thus around 1500 pairs. This is much less than the 7000 pairs stated by SALOMONSEN (1950–51). His information however is based on findings by other people, not his own investigations (SALOMONSEN, 1943). Several persons have, however, confirmed verbally that the population around 1965 was much smaller than a few decades earlier.

It should be mentioned that only the inhabitants of Kraulshavn (91) collect down on Ederfugleøer. At the time of our visit in 1965 this had not yet been done, and there was no sign of human activity on the islands. We therefore assume that the colonies had been undisturbed until our visit.

Eiders are important for the inhabitants of Upernavik District. Many are shot, and the down collected in many colonies is of some

Table 5. *The amount of Eider down sent to Upernavik from various settlements in the district in 1962–1964 (information from Kongelige Grønlandske Handel).*

Kilograms.

	1962	1963	1964
Søndre Upernavik	0	8	32
Prøven	245	160	159
Augpilagtoq	113	140	56
Tuvssâq	68	40	38
Tasiussaq	22	12	6
Kraulshavn	143	114	102
Kuvdlorssuaq	4	13	0
Upernavik	40	52	33
Total	635	539	426

economical importance (see table 5). The price paid for raw down is 9 kr. per kg. Approximately 10 kg raw down are needed for the production of 1 kg pure down. All Eider down from Westgreenland is sent to Upernavik for cleaning, and the production is about 100 kg pure down per year.

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

Numerous summer visitor in the whole district. Flocks of several hundred birds were seen e.g. at Kitsigsut (69), Sãtorssuaq (78), Store Fladø (3), and in the fjords E of Nako (30) and Sáningassoq (28). Most of the birds were males which moult in several places in the district.

Greenland Red-breasted Merganser (*Mergus serrator schiøleri* SALOMONSEN).

Observed in four localities: Sãtoq (79) July 20 one pair.—Pâq (23) July 28 one pair and one male.—Qâmutit (25) July 28 one female flew from a grasscovered slope under the Cormorant colony.—Naujat nûat (18) July 27 two pairs.

Greenland White-fronted Goose (*Anser albifrons flavirostris* DALGETY & SCOTT).

On July 28 one bird was seen at Orpît (19).—On July 25 MATHIAS LERCH saw abt. 40 birds in Amitsorssuaq (13). Eight goslings were ringed, and he recaptured one adult bird which had been ringed as gosling July 29 1958 in the same area. He reports that every year a few breed in this area.—In October a few years ago OLE NIELSEN saw abt. 30 on Upernaviarssuk (44) E of Upernavik, and two were shot.

American Peregrine Falcon (*Falco peregrinus anatum* BONAPARTE).

On July 15 an adult female was observed on Kingigtuarssuk III (70). Many killed Kittiwakes were found.

Greenland Gyr Falcon (*Falco rusticolus candicans* GMELIN).

MATHIAS LERCH reports that until 1963 a pair regularly bred on the cliff Sisússat (8) just N of Prøven (7). We did not see the species in 1965.

NW Greenland Rock Ptarmigan (*Lagopus mutus saturatus* SALOMONSEN).

This species was only seen in the end of July at Prøven (7) (one brood). Numerous droppings found on Kitsigsut (69), Ederfugleøer (93), Sãtorssuaq (78), Nordø (58), Pikiutdle (76), Store Fladø (3) and Orpît (19) however indicated, that the species is widespread in the district.

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

The species was seen at Ederfugleøer (93) six, Sãtorssuaq (78) two, Store Fladø (3) six, and Qeqertârssuit (15) 18.

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

On July 25 at least five pairs were seen on the N part of Store Fladø (3). The birds showed typical distraction behaviour. MATHIAS LERCH reports that on July 25 he saw 21 birds in Amitsorssuaq (13).

Sanderling (*Crocethia alba* (PALLAS)).

One bird was seen on Ederfugleøer (93).

Red-necked Phalarope (*Phalaropus lobatus* (L.)).

One pair was seen on Store Fladø (3) showing distraction behaviour. At Eqalugârssuit (20) one bird was seen July 27.

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

Observed the following places: Kitsigsut (69) nine seen, one found dead. On some of the islands there are suitable nesting areas around ponds.—Store Fladø (3) one pair showed distraction behaviour at the largest lake.—Lille Fladø (5) one bird seen.—Nitserfik (6) on July 26 a man from Prøven shot three out of a larger flock.

Arctic Skua (*Stercorarius parasiticus* (L.)).

On July 25 at least 15 birds were seen on the N part of Store Fladø (3). Some showed distraction behaviour. One bird was dark phase and the others were typically light phase.

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

On July 25 a pair was seen near Igdlorssuit (2) on Store Fladø. The birds displayed and showed typical and at times very intensive distraction behaviour. No evidence of breeding was, however, found.

Great Black-backed Gull (*Larus m. marinus* (L.)).

On August 5 an adult bird was seen just E of Upernavik (53) and PREBEN JØRGENSEN reported one bird seen in the harbour a few days later. There are only two previous records of this species from Upernavik District, the nearest breeding places being in the southern part of Umanak District (SALOMONSEN, 1967).

Glaucous Gull (*Larus h. hyperboreus* GUNNERUS) and Iceland Gull (*Larus g. glaucoides* MEYER).

The two gull species were found breeding along all coasts in the district. Mostly a single or a few pairs bred together, but many colonies were also found. The size of the colonies was estimated from observations of nests and adult birds, most of which gathered around the colony when disturbed. Fig. 18 shows all breeding places with more than 10 adult birds or 5 nests recorded. Of 43 colonies, 16 had only Glaucous Gulls, 16

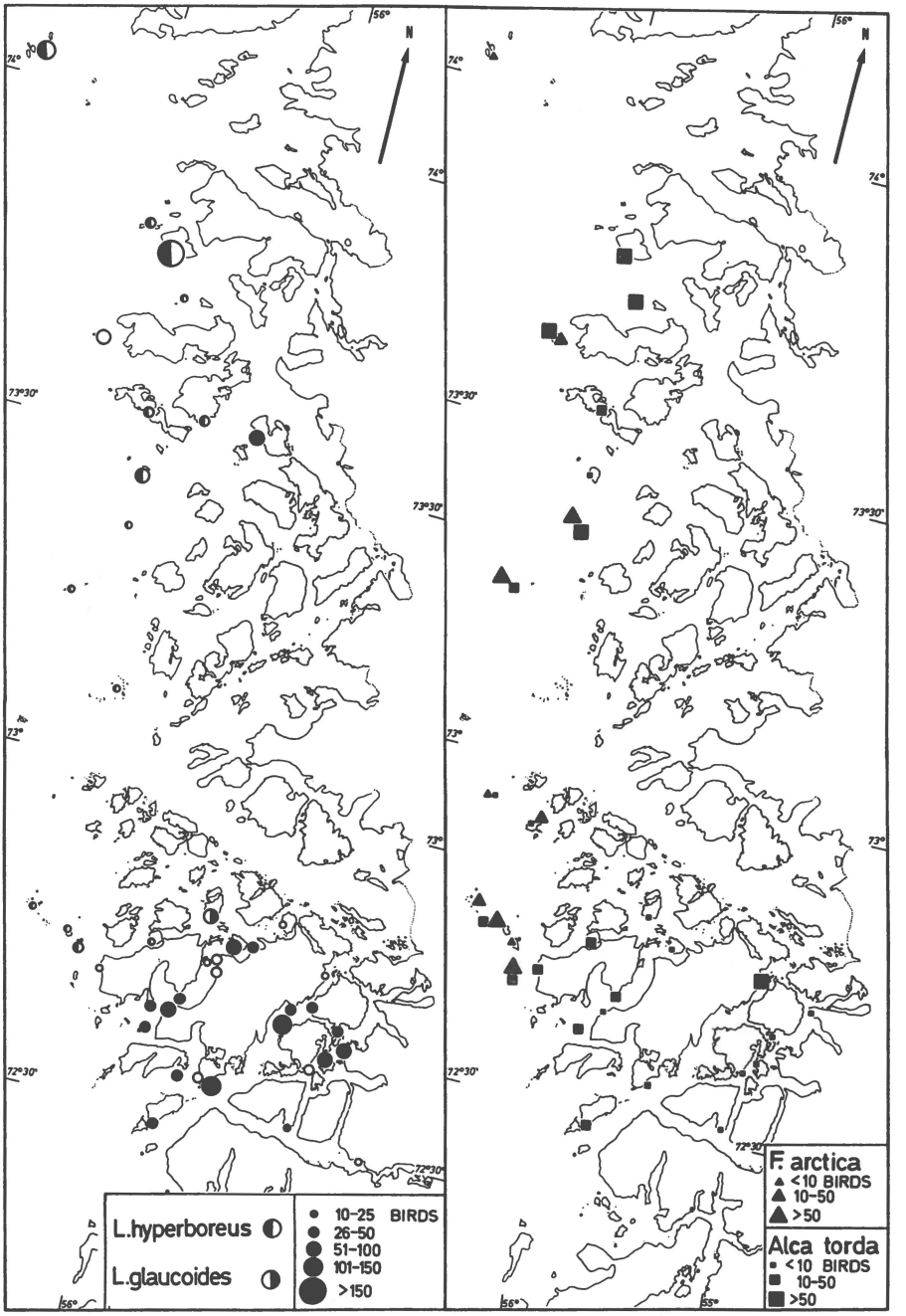

Fig. 18 Fig. 19

Fig. 18. The colonies of Glaucous Gulls and Iceland Gulls recorded in 1965.

Fig. 19. Breeding places of Puffins and Razorbills recorded in 1965.

had both species, while only one colony had Iceland Gulls alone. In ten colonies the species was not determined with certainty.

On low islands only Glaucous Gulls were found, while both species bred on steep cliffs. Glaucous Gulls were numerous throughout the district. The northermost colony of Iceland Gulls was found on Nûluk (80), which is abt. 80 km N of Augpilagtoq (51), by SALOMONSEN (1950–51) reported to be the northernmost breeding area in Upernavik District of this species.

The largest colonies were: Kap Shackleton (89) some hundred Glaucous Gulls, Ederfugleøer (93) abt. 140 Glaucous Gulls and 63 nests found, Nutârmiut (43) 150 birds both species. Angmaussarssuaq (50) 100 Iceland Gulls, Nûluk (80) 90–100 birds both species. The total number of gulls in the localities shown on fig. 18 was abt. 2000, but since a number of colonies particularly in sheltered fjords in the northern part of the district may well have been overlooked, it is not possible to estimate the total populations in the district.

Kittiwake (*Rissa t. tridactyla* (L.)).

Kittiwakes were found breeding in 25 localities (table 6 and fig. 20). The total number found was abt. 15.000 pairs which probably represents the majority of kittiwakes in Upernavik District. About half the colonies with only abt. 15 % of the total population were found in the fjords between Prøven and Augpilagtoq. All large colonies (with 500 or more pairs) were found in association with Brünnich's Guillemot colonies, and only three small Guillemot colonies did not have breeding Kittiwakes (Kingigtuarssuk III (70), Angissoq (65) and Qôrnoq Kitdleq (40)). In the fjords E of Upernavik Kittiwakes were breeding together with Glaucous Gulls, Iceland Gulls, Cormorants, Razorbills and Black Guillemots.

Kittiwakes were counted in two different ways: In most small colonies the nests were counted, whereas in some of the larger colonies the birds on the cliff were counted. In two colonies where both methods were applied the number of birds on the cliff was found to be abt. 50 % higher than the number of nests. This has been considered when total numbers were estimated (table 6).

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

Breeding Arctic Terns were only found in a few places in the district (see table 7). The clutchsize of all nests found is given in table 8.

On Kitsigsut (69), Pikiutdle (76) and Lille Fladø (5) some eggs from nests with both one and two eggs were found to be heavily incubated. All the young found on Pikiutdle, Sâtorssuaq (78) and Lille Fladø were only a few days old, whereas the young on Igdlutalik (54) were from a few

Table 6. *Breeding places of Kittiwakes investigated in Upernavik District in 1965.*

Locality (no.)	Date	Observations		Estimated No. of pairs	Remarks
		No. of birds	No. of nests		
Iperaq (14) S end	14.7.	2		0	
Sandersons Hope (62) W side of Qaersorssuaq	14.7.&7.8.	1000		600–700	
Kingigtuarssuk II (66) W side	15.7.		925–1025	925–1025	
Torqussâq (74) W and SW side	16.7.		535–585	535–585	3 colonies
Mátângassut (83) SE corner	16.7.		450	450	
Kípako (87) N side	16.&19.7.		1750–1850	1750–1850	
Kap Shackleton (89)	19.7.	10.000		6–7000	Several colonies
Qavdlunât (84) SE corner	20.7.	250–260		150–200	
Pûgutâ (16) S side	27.7.	150–200	100	100	
Nutârmiut (43) NE side facing Sáningassoq	28.7.		30–40	30–40	
Qâmutit (25) N side	28.7.		115–140	115–140	
Qardlît Qeqertât (29) SW side	28.7.		100	100	
Nako (30) NW side of W peninsula	28.7.		250–260	250–260	
Nako (30) SW side of W peninsula	28.7.		230	230	
Pâq (23) NW side	28.7.		100	100	
Pâq (22), unnamed island 2.5 km SW of	28.7.		150–165	150–165	
Niaqornarssuaq (24) SW coast facing Pâq	28.7.		43	43	
Nutârmiut (43) SE side of southernmost peninsula	29.7.		80	80	
Akínaq (48) W side	5.8.	115–120	73–76	73–76	
Nûna (45) SW side	5.8.		9	9	
Angmaussarssuaq (50) S side	5.8.		41	41	
Tingmiakulugssuit (41) NW side	9.8.	1500		1000	
Agpatsiait (39) SW side	14.8.	2040		1500	
Kingigtoq Agparssuit (37) E side of peninsula	14.8.	175		125–150	
Kingigtoq Agparssuit (37) promontory of peninsula	14.8.	1850–2350		1500–1800	
Manîtsúnguaq (34)	14.8.		200	200	
Oqaitsut (11)	–			?	According to M. Lerch
Pâkitsoq (12)	–				Now abandoned (M. Lerch)

Table 7. *Breeding places for Arctic Terns visited in 1965.*

Ivssortussoq (1) (ult. July): 145 young were ringed by people from Prøven.

Kitsigsut (69) (July 15): 111 nests were found and abt. 500 birds were seen over 12 islands.

Island N of NW end of Nutârmiut (82) (July 20): 4 birds seen, breeding not proved.

Sãtorssuaq (78) and Sãtúnguit (77) (July 20): abt. 100 pairs, 43 nests found.

Pikiutdle (76) (July 20): Several hundred pairs scattered all over the island. 15 nests found.

Store Fladø (5) (July 25): Many hundred birds seen over the N part, but breeding not proved.

Lille Fladø (3) (July 25): Several thousand birds seen over the island, 142 nests found.

Igdlutalik (54) (August 7): Probably several hundred breeding pairs.

Kingigtuarssuk I (57) and Smålandene (56) (August 7): A few birds seen over the islands.

Igdlúnguaq (9) (August 10): 40 birds seen fishing over the lake. Behaviour indicated breeding but no evidence was found.

Upernaviarssuk (64): According to RASMUS KLEEMANN the species breeds here.

Table 8. *Clutchsize in nests of Arctic Terns in five localities in Upernavik District 1965.*

Locality	Date	Clutchsize, no. of eggs				No. of nests with eggs	Nests with young	Total no. of nests
		1	2	3	4			
Kitsigsut (69)	15.7.	51	58	1	1	111	0	111
Lille Fladø (5)	25.7.	90	24	0	0	114	28	142
Pikiutdle (76)	20.7.	9	4	0	0	13	2	15
Sãtorssuaq (78) and Sãtúnguit (77)	20.7.	22	15	0	0	37	6	43
Igdlutalik (54)	7.8.	0	0	0	0	0	5	5
Total		172	101	1	1	275	41	316
Percentage of nests with eggs		62,5	36,7					

days to two weeks old. According to local people eggs of Arctic Terns are no longer collected in the district. The distribution on clutch sizes is therefore assumed to give a fairly correct picture of the natural distribution. It is remarkable that more than half the nests only had one egg, and mean clutchsize in 275 nests was 1.38. SALOMONSEN (1950–51) reports that in SW Greenland only 5 % of the nests have one egg. In Frederikshåb EKLUND (1944) found 65 % of the nests with two eggs and 34 % with one egg.

In most colonies the nests were widely scattered, Lille Fladø being the only dense colony. We found that the terns in Upernavik district were much less aggressive than is the case in colonies in Danmark and the Faroes, as well as SW Greenland (SALOMONSEN, 1950–51). When we approached a colony the birds ascended to high altitudes and stayed here during the whole of our visit, and we never saw them attacking an intruder.

Northern Razorbill (*Alca torda pica* (L.)).

Razorbills were seen in almost all colonies of Guillemots, Puffins, Cormorants and Kittiwakes. Fig. 19 shows the 22 localities where the species was found. Large colonies were seen at: Torqussârssuk (73) abt. 150, Kípako (87) 50–100, Horse Head (85) 50–75, Kingigtuarssuk III (70) abt. 25, Ũmánaq (36) at least 30, Qôrnoq Kitdleq (40) at least 20, Iperaq (14) abt. 40, a small island NE of Nutârmiut (82) abt. 40. These eight localities accounted for abt. 450 birds, whereas only abt. 150 birds were observed on the 14 smaller breeding places.

On the S part of Hvalø (61) we found a mixed colony of Puffins and Razorbills (abt. 15 seen) where both species bred under stones and in crevices abt. 50 m above sea level.

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

The Brünnich's Guillemot is the most numerous sea-bird in Upernavik District. All known colonies were visited and thoroughly examined. Fig. 20 shows the location of the colonies, and table 9 gives information on the number of birds counted in 1965.

The largest colony at Kap Shackleton (89) was first visited July 16, but only superficially surveyed because of bad weather. A few days later, on July 19, the weather was favourable, sunny and calm, and we spent 6 hours along the cliff counting Guillemots and Kittiwakes. The following method was applied: Each colony on the cliff was divided into natural sections, limited by crevices, ledges etc. Then each of 3–4 expedition members made independant estimates of the number of birds within a section. The results were then discussed and an order of magnitude was agreed upon. If individual figures varied much, i.e. more than 25 %, counts were repeated. In fact mostly the first count provided very similar figures from the individual observers.

The observers used the following technique:

a) 50–250 birds were counted one by one. b) this number was multiplied to an area containing 1000–5000 birds, and finally c) it was seen how many times this number was present in the whole section.

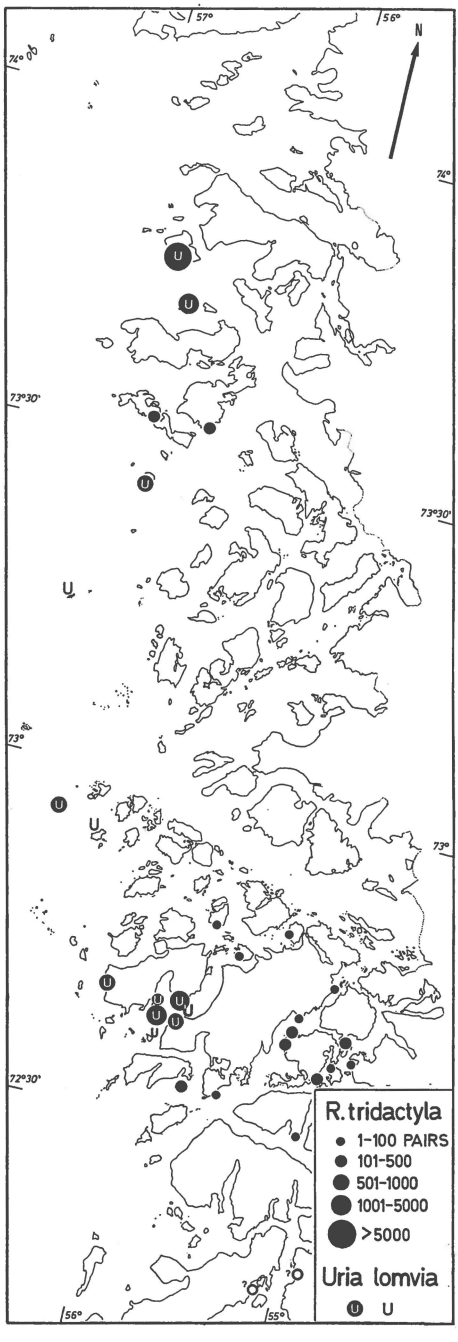

Fig. 20. Colonies of Brünnich's Guillemots and Kittiwakes recorded in 1965.

Particularly in the smaller colonies and the less densely populated part of the main colony at Kap Shackleton (89) very good agreement between the figures from the individual observers was obtained. In the

Table 9. *Colonies of Brünnich's Guillemots in Upernavik District. Minimum and maximum figures obtained by 2–4 individual observers. In colonies investigated in August many young had left the cliff, so the figures given may be much below the actual breeding population.*

Locality	Date	Birds counted	Mean
Kap Shackleton (89)	19.7.	850.000–1.090.000	970.000
Kípako (87) N side	19.7.	14.000–21.000	17.500
Torqussâq (74) 3 col. W and SW side	16.7.	2.050–2.225	2.150
Kingigtuarssuk III (70) W side	15.7.	1.000	1.000
Kingigtuarssuk II (66) E side	15.7.	2.500–4.500	3.500
Angissoq (65) NW side	15.7.	200	200
Sandersons Hope (62) W side	7.8.	24.400–29.900	27.200
Kingigtoq Agparssuit (37) promontory of peninsula	14.8.	5.800–6.900	6.350
Kingigtoq Agparssuit (37) E side of peninsula	14.8.	50–75	65
Agpatsiait (39) SW side	14.8.	8.450–8.950	8.700
Tingmiakulugssuit (41) NW side	14.8.	5.850–7.700	6.800
Qôrnoq Kitdleq (40) S side	9.8.	500–550	525
Ũmánaq (36) NE side	9.8.	50	50

densely populated part of the main colony birds were so numerous often sitting in several rows behind each other, that counts were very difficult. Here counts were repeated several times, and still a significant number of birds were hidden behind others and could not be seen. On several occasions 5–10,000 birds left the colony, but this apparently did not appreciably reduce the number of birds on the cliff.

The results of the census: abt. one million birds must, of course, be regarded as a very rough estimate, or rather an order of magnitude. A colony of this size cannot possibly be surveyed accurately from a boat with a traditional count-estimate method. Also we can only guess about the number of nests related to the number of birds observed. Tuck (1960) reports that in this stage of the breeding cycle there will normally be one bird per pair present on the ledges, which indicates that abt. one million pairs of Brünnich's Guillemots bred on Kap Shackleton.

A series of photographs showing the colonies on Kap Shackleton is given in Plates I–IV. The number of birds in each colony is indicated.

In all colonies the method described was applied: repeated counts in sections by several observers. Mostly a few percent of the birds left on our arrival, and they were included in the figures.

Figures obtained in colonies surveyed in July are reasonably good. In this month most birds were either incubating or brooding small

chicks. The young began leaving the cliffs around the beginning of August, and the figures obtained in colonies surveyed in this month are quite unsatisfactory. This is particularly the case for the colonies in Sortehul (42) (Tingmiakulugssuit (41), Kingigtoq Agparssuit (37), Agpatsiait (39) and Qôrnoq Kitdleq (40)) which were partly deserted when we made counts on August 14.

In 1936 SALOMONSEN visited all Guillemot colonies in the district and an account of the results is published (SALOMONSEN, 1950–51). Although his method of estimating may have differed from ours it is possible to make a rough comparison between the findings in 1936 and in 1965. Also information by local people has been used. It appears that the largest colony at Kap Shackleton (89) has not changed notably. SALOMONSEN also estimated the number of birds to abt. one million. Some of the smaller colonies too seem to be very much the same size (Tingmiakulugssuit (41), Qôrnoq Kitdleq (40), Angissoq (65) and Kingigtuarssuk III (70)). In some colonies a small reduction has taken place (Kípako (87), Torqussâq (74), Kingigtuarssuk II (66) and Agpatsiait (39)). Two large colonies are now much smaller than 30 years earlier (Sandersons Hope (62) and Kingigtoq Agparssuit (37)). One small colony at Umiasugssuk (52) which in 1936 had 100–1500 birds had disappeared by 1965, but guano on the cliff indicated breeding not many years ago. Finally a small colony on Ũmánaq (36) with 50 birds in 1965, was not mentioned by SALOMONSEN.

Brünnich's Guillemots often collect their food very far from the colony. At Ederfugleøer (93) situated abt. 45 km from Kap Shackleton many small flocks were seen flying N. At Sagdlíngualua (33) 17 km from the nearest colony (Kingigtoq Agparssuit (37)) several thousand birds passed towards E within one hour, and also at Pûgutâ (16) abt. 18 km further away notable numbers were seen flying E. In both localities also small flocks carrying fish were flying the opposite direction.

Little Auk (*Plotus a. alle* (L.)).

This species was observed at Horse Head (85) on July 16. We sailed round the island and saw several flocks of abt. 100 birds and one flock of abt. 250 birds. Landing was not possible, so no estimate of the population could be made. Small flocks were seen flying to and from the highest parts of the S and E facing slopes. SALOMONSEN (1950–51) estimates the breeding population to abt. 5000 pairs.

Apart from Horse Head Little Auks were only seen on one occasion: On July 25 two birds between Lille and Store Fladø (4).

We visited three other localities which according to SALOMONSEN (1950–51) have breeding Little Auks: Hvalø (61), Nordø (58) and Kingiguarssuk III (70), but nowhere was the species seen. According to

NIELS MØLLER, Upernavik, there are, however, still a few breeding on Nordø.

Remains of three Little Auks were found in Snowy Owl pellets collected on Igdlutalik (54), and remains from seven birds were found in Snowy Owl pellets collected on Fladøerne (4).

Black Guillemot (*Cepphus grylle*).

Black Guillemots were seen along all coasts. Most colonies were quite small, but also some larger concentrations were seen. In the following localities 100 birds or more were recorded: Ederfugleøer (93) abt. 620, Kitdleq (90) 300–350, Kípako (87) several hundred, Torqussârssuk (73) abt. 150, Lille Fladø (5) 200–300, Angmaussarssuaq (50) 250, Bruuns Ø (60) and Madsens Ø (59) 75–125, Nordø (58) abt. 100, Ũmánaq (36) at least 100, Manîtsúnguaq (34) abt. 150, and Torqussâq (74) several hundred. The species was breeding in nearly all colonies of Kittiwakes, Glaucous and Iceland Gulls, Brünnich's Guillemots, Razorbills and Cormorants. Very few were, however, seen at Kap Shackleton (89). Most nests were situated in screes and between boulders just above sea level, but some were seen also in crevices higher up the cliffs, sometimes more than 100 m above sea, often higher than Razorbills, Brünnich's Guillemots and Puffins in the same colony.

Atlantic Puffin (*Fratercula a. arctica* (L)).

Puffins were observed on several of the westernmost islands: Ederfugleøer (93) one bird seen at II and three at I.—Horse Head (85) 40–50 birds seen.—Torqussârssuk (73) on the W slope there was a fairly large colony, and smaller colonies were found on the N side on slopes. 250 birds seen.—Kingigtuarssuk III (70) on the south slope several hundred burrows and abt. 100 birds were seen.—Kingigtuarssuk II (66) one bird seen leaving the slope on the E side.—Angissoq (65) a colony with 50–75 birds on the NW side.—Smålandene (56) a few birds seen between the islands. Around Igdlutalik (54) 10 birds were seen, and on the N side a few nests were found.—Kingigtuarssuk I (57) 57 birds were seen, breeding probably on a slope on the E side.—Nordø (58) at the NW coast 9 birds were seen, potential breeding places present.—Hvalø (61) on the E side of the S part there was a colony covering several grass slopes and stone heaps. Several hundred burrows were found at at least 175 birds were seen. Nests with birds were found both in the turf and under boulders (see fig. 19).

SALOMONSEN (1950–51) mentions the following breeding places: The small islands west of Upernavik (Smålandene (56)) at the most 50 pairs, Angissoq (65) 100 pairs, Kingigtuarssuk III (70) 100 pairs, and Horse Head (85) 20 pairs being the northernmost breeding place. In 1965 the

species probably bred on Ederfugleøer abt. 50 km further N. Our observations in 1965 indicate, that the Puffin has increased in Upernavik District.

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

On July 25 an adult bird was seen on Store Fladø (3). The bird was all white with weak greyish spots on the back. On both Store Fladø and Lille Fladø (5) several pellets were found, eight of which contained at least seven Little Auk, two Black Guillemot, one Snow Bunting, one Ptarmigan and probably one Fulmar. MATHIAS LERCH reported that he had often seen owls on Fladøerne througout the year.—In 1964 he saw one bird at Eqalugârssuit (20). At Orpît (19) a few kilometres from here we found one pellet.—On Igdlutalik (54) we found a skeleton of a Snowy Owl as well as three pellets, two containing remains of Ptarmigan and one containing three Little Auks.

Northern Raven (*Corvus corax principalis* RIDGWAY).

The species was only seen a few places: Sandersons Hope (62) July 14 one bird.—Ederfugleøer (93) July 17, several birds seen, at least two pairs breeding.—Store Fladø (3) July 25 two birds seen.—Pûgutâ (16) August 7 three birds seen.—Igdlúnguaq (9) August 13 two birds.—Prøven (7) August 16 one bird. MATHIAS LERCH reports that every year a pair breeds on Sisússat (8) N of Prøven.

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

The species was only observed in four localities: Kraulshavn (91) July 18 one adult.—Eqalugârssuit (20) July 27 one family flock.—Igdlúnguaq (9) August 13 one family flock.—Prøven (7) end of August one adult bird.

Greenland Redpoll (*Carduelis flammea rostrata* (COUES)).

Redpolls were only seen on July 27–28 at Eqalugârssuit (20) and Orpît (19). SALOMONSEN (1950–51) mentions Orpît as the southernmost breeding place for Hornemann's Redpoll (*Carduelis flammea exilipes* (HOLBØLL)). All birds observed in 1965 (abt. 50) were carefully examined, but no Hornemann's Redpolls were seen.

Lapland Bunting (*Calcarius lapponicus subcalcaratus* (BREHM)).

This species was only observed on Store Fladø (3) July 25 where several adults and newly fledged young were seen, and at Eqalugârssuit (20) and Orpît (19) July 27–28 where abt. ten pairs with fledglings were seen. Local people reported that the species is breeding at Kraulshavn (91) and Tasiussaq (72).

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

Snow Buntings were found breeding all over the district from the innermost fjords to the outermost small islands. The population on Store Fladø (3) particularly was very dense. In the first half of July only very few males were heard singing in Sarqaq, but in Upernavik District song was often heard in the latter half of July.

Discussion and conclusion

During the expedition to Upernavik District in July–August 1965 36 species were recorded. Only one species, the Gyr Falcon, which is supposed to breed regularly in the district, was not seen. The observations include four species which are non breeding summer visitors in the area (King Eider, Turnstone, Sanderling and Snowy Owl). In addition a very irregular breeder, the Long-tailed Skua, was seen under conditions which indicated breeding, although evidence was not found. The observation of one Great Black-backed Gull was the only "rarity" of the expedition.

Bird life in Upernavik District is very much dominated by a few species of sea birds. Most numerous is the Brünnich's Guillemot and among several large colonies the district has the renowned bird cliff Kap Shackleton, which with about one million nests ranks among the largest in the world. Kittiwakes and Black Guillemots are also widespread and numerous, as well as the Eider, which together with the Brünnich's Guillemot is an important source of meat for the inhabitants of the district. Razorbills are found on several cliffs, and Puffins breed in fair numbers on many of the westernmost islands. Upernavik District has the largest colony of Little Auk in low arctic Westgreenland (on Horse Head, however, not thoroughly surveyed in 1965). The sheltered fjords in the southern part of the district have colonies of Cormorants and Iceland Gulls, whereas Glaucous Gulls are found in the whole district. Some small islands have colonies of Arctic Terns. It is seen from the notes on species that most other species were seen only in very few places and small numbers. This is true particularly for the land species. Although we worked primarily from boats, we did go ashore on several localities. Only the Snow Bunting was widespread and in places numerous whereas Wheatear was seen only in four, Lapland Bunting in two, Redpoll in one and Ptarmigan only in one locality.

We spent altogether 42 days in the district, and excursions by boat were made on 25 days comprising more than 260 hours of survey. Distances of altogether a little more than 2000 km were covered by boat. Even with this amount of activity it is understandable, that we could only

cover limited parts of this very large district with its many hundred islands and several thousand kilometers of coastline. In the northern part of the district, north of Upernaviks Isfjord, where surveys were made on five days, we visited the known Guillemot colonies and some of the most important Eider colonies on small islands along the western fringe of the archipelago. Some islands which may well have had breeding Eiders, were however not visited, and also large areas of sheltered fjords further east, which probably have colonies of gulls, Kittiwakes and maybe also Eiders, were not searched.

In the southern part of the district, from Upernaviks Isfjord to Fladøerne, where excursions by boat were undertaken on abt. 20 days, we made a much more thorough survey of both small islands and sheltered fjords. Still some areas were not visited, e.g. the archipelago north of Upernavik and the fjords east and southeast of Prøven, as well as all areas south of Prøven and Fladøerne. From local people we received information on bird colonies in some of the areas not investigated, but in general such information is of little value, because indications of numbers are often very inaccurate.

The conclusion is that the expedition did not cover Upernavik District so well that population figures for the whole district can be estimated. Only for a few species, we probably visited most or all the breeding places. No doubt nearly all colonies of Brünnich's Guillemots were visited. The breeding places of this species in the southern part of the district were visited after the young had started leaving the cliffs so our figures are quite unsatisfactory for estimating total populations.

Although figures for total populations in the whole district cannot be presented for any species, the observations made on very many colonies can form the background of evaluations of changes in abundance in connection with future surveys of the same breeding localities. When such figures are compared it is necessary also to compare methods used. Therefore we have in the material presented here given many details on the exact location of the colonies and the sections investigated, and also very many observation data are described in detail. No doubt if surveys are repeated in the way we made them, say every five or ten years, the trends in populations of very many species can be elucidated. We need not say that investigations of this type are extremely important these years, when conditions for humans and wildlife change so much and when several bird species seem to be threatened by human activities.

The only thorough ornithological investigation in the district prior to ours in 1965 was undertaken by SALOMONSEN in 1936. Apart from the itinerary and a few notes on the birds seen, which is published in a special report (SALOMONSEN, 1943) the results of the expedition are described under the various species in "The Birds of Greenland" (SALOMONSEN,

1950–51). Very little information on counting methods is given, and some of the figures are based on verbal information from local people.

Furthermore quite a number of sea bird cliffs visited in 1965 were not investigated in 1936, particularly in the southern part of the district. For these reasons we find it very difficult to make comparison between bird populations in 1936 and 1965. Only the following conclusions can be drawn: In 1965 many more Cormorants were found than in 1936, and the species has undoubtedly been increasing. We found more Puffins in 1965 than in 1936, many however on islands not visited in the first expedition. This species may have increased, but nothing certain can be concluded. Since 1960 the Cormorant is protected except for a few months and the Puffins is from the same year protected all year round. These protections may have favoured an increase. Apparently numbers of Brünnichs Guillemots have not changed very much in the northern part of the district. In the southern part our observations in 1965 are not sufficient for an evaluation of changes. Several local people, however, maintain that a reduction has taken place in some of the colonies. Eiders were still numerous in 1965, but on the largest breeding place (Ederfugleøer) we found much fewer than reported by SALOMONSEN (1950–51). His figure is, however, not based on his own observations. Apparently this species has decreased in the last decades.

Appendix 1

List of geographical names in Upernavik District used in the itinerary and notes on species. Figures correspond to the figures on route maps, fig. 11 and 12.

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Færdig fra trykkeriet den 28. juni 1972.

PLATES

Plate I–IV

Sketchmap and photographs of the Brünnich's Guillemot colonies on the island Kap Shackleton (Agparssuit (89)). The aerial photo Plate I viewing the island from W and showing the ice cap behind it is reproduced with permission from Geodætisk Institut (A. 800/71). The photographs of the colonies were taken on July 19 1965 by A. H. J. The individual colonies are shown on the sketchmap Plate I, and the letters refer to the photographs Plates I–IV. For each colony on the island the number of birds counted on the cliffs is given (mean figure for the results obtained by 3–4 observers). All figures indicate thousands. NOTE: The scale is not identical in the different photographs.

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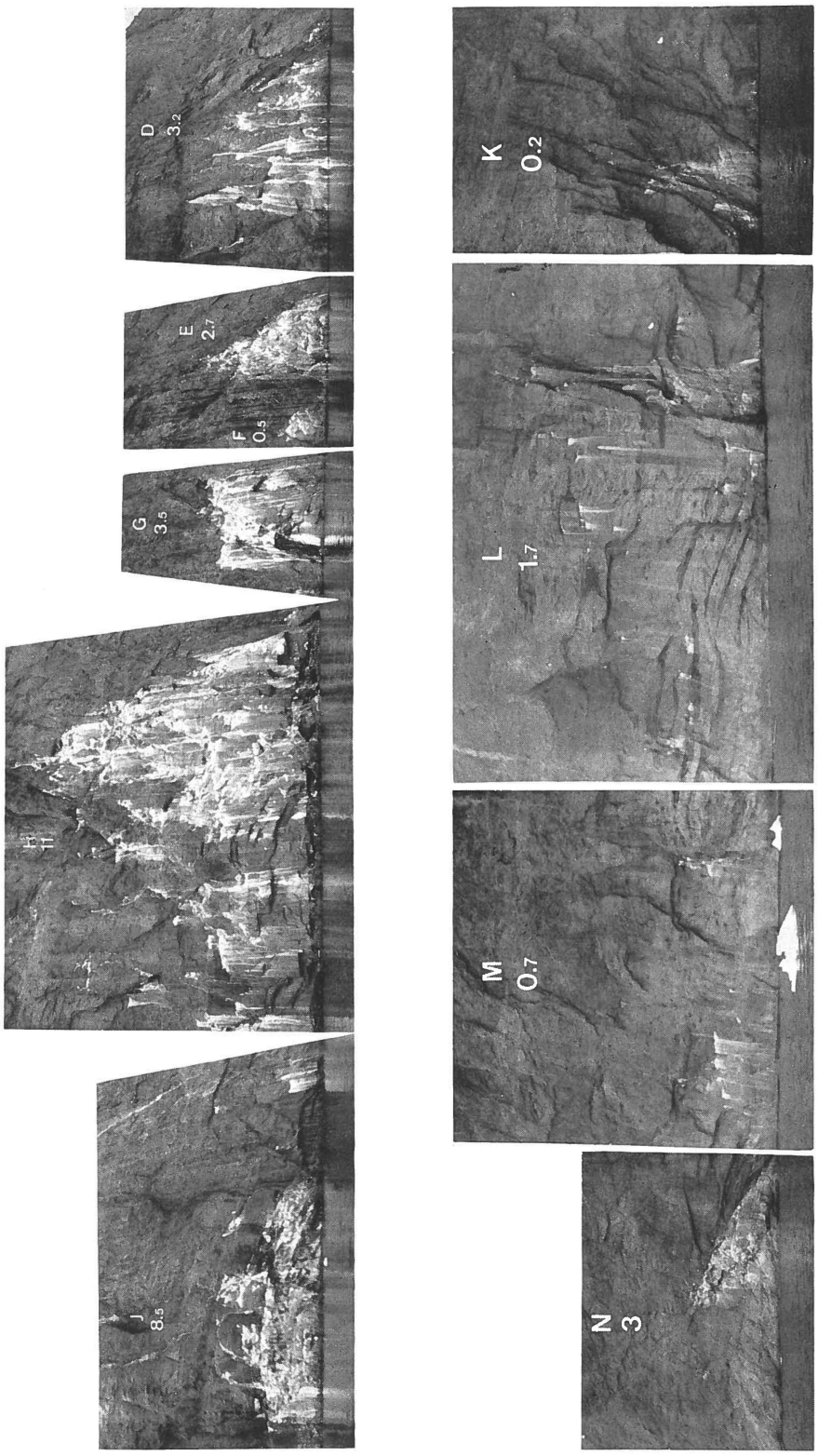
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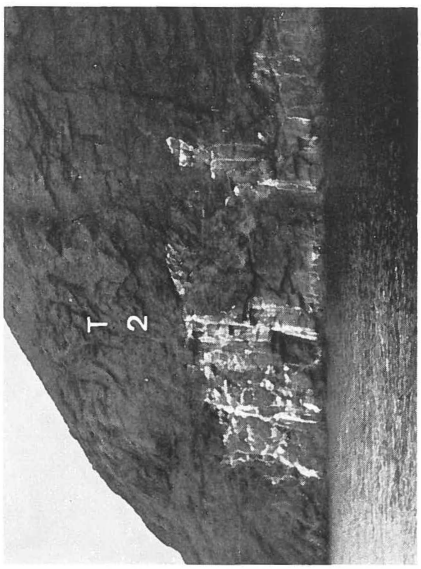
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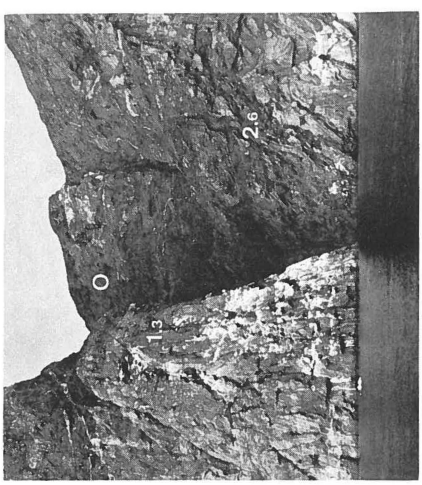
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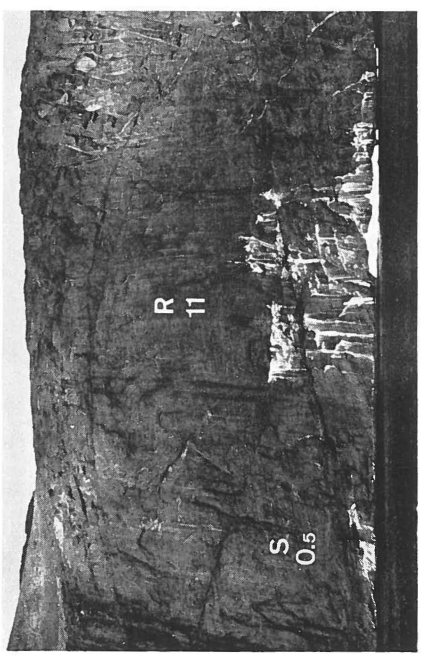
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