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ALASDAIR  NEILSON

Vascular plants from the  
northern part of Nordaustlandet,  
Svalbard



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NORSK POLARINSTITUTT  
OSLO 1968

DET KONGELIGE DEPARTEMENT FOR INDUSTRI OG HÅNDVERK

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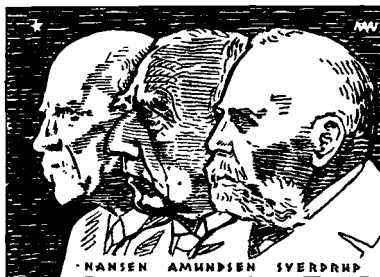
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## Abstract

During the summers of 1965 and 1966 collections of vascular plants were made at sixty localities in Nordaustlandet between Wahlenbergfjorden and Finn Malmgrenfjorden. The total number of species from the area is now 83, of which all except five were collected during this work, and of which all except four are known from more than one locality. Distribution frequencies have been computed from our own data and from that of previous authors; some comments are made about significant differences between the two. Some new northern limits have been set.

## Acknowledgements

We had the good fortune to spend the summers of 1965 and 1966 in Nordaustlandet, and to be able to visit most parts of the area north of Wahlenbergfjorden and almost as far east as the ice-free land. For this privilege we are deeply indebted to Dr. TORE GJELSVIK, director of Norsk Polarinstitut, who kindly arranged that we accompany Norsk Polarinstitut parties under the leadership of cand. real. THOR SIGGERUD in 1965, and that in 1966 we accompany the joint group from Norsk Polarinstitut and Naturgeografiska Institutionen, Stockholms Universitet, under the leadership of professor GUNNAR HOPPE and docent VALTER SCHYTT. It is a pleasure to thank all of these, together with my good friend, deputy director KAARE Z. LUNDQUIST, who has been overall leader of the expeditions. I should also like to thank cand. real. THORE WINSNES, geologist, Norsk Polarinstitut, for many helpful discussions on Svalbard plants, my old friend Dr. D. G. GEE, Sveriges Geologiska Undersökning, for kindly collecting material which first indicated to me the richness of the vascular flora on the eastern shores of Duvefjorden, and also members of Norsk Polarinstitut field parties for collecting material from the most easterly parts of the area which I have not myself been able to visit. The determination of *Drabae* was ably carried out by Mr. D. P. SPICER, University of Leicester, to whom we give our best thanks, and we are also grateful to cand. real. PER SUNDING for reading a draft of this paper and offering some useful comments. Finally to my patient and helpful assistants, BJARNE FOSSØY, AXEL ØDEGAARD, TROND HARSTAD, and MARTIN TAKSDAL, without whose effort this work would never have been possible, I extend my very best thanks; their collections of especially interesting plants are specifically indicated in the plant list.

## General account of botanical investigations in Nordaustlandet

### *Work previous to 1931*

NATHORST (1883) has given a summary of vascular plant records for the whole of Svalbard, drawing extensively with respect to Nordaustlandet on the paper of MALMGREN (1864). He includes in his list of localities one given simply as "Brandewijnebay"; this, following SCHOLANDER, we may almost certainly identify as Depotodden, since NORDENSKIÖLD's map of 1874, which is reproduced in NATHORST's paper, shows that "Brandewijnebay" coincides more or less with the present limits of Zeipelbukta, and that the fjord is much shorter in southern extension than we now know to be the case. NATHORST lists 36 species from here, including *Ranunculus hyperboreus*, *Dryas octopetala*, *Silene acaulis*, and *Juncus biglumis*. All of these apart from *Silene acaulis* had been recorded by MALMGREN, and all of them except *Dryas octopetala* and *Juncus biglumis* have subsequently been recorded by later workers, *Ranunculus hyperboreus* by BRUUN (1958), and *Silene acaulis* from "Brandy Bay" by KEITH in 1936. We have also recorded the latter from Birddalen, but there seems to be no authenticated record of *Dryas octopetala* from any locality in Brennevinsfjorden. We have found neither the plant nor the sort of habitat in which we might reasonably expect to find it and we are inclined to suspect that this record has come from some other locality on the west coast of Nordaustlandet.

It seems also certain that what MALMGREN and NATHORST have designated as "Augusti Bay" is in fact Idunfjellet in Wahlenbergfjorden.

We would also add a record of *Koenigia islandica* from Waldenøya collected in 1896 by GREGORY, who was geologist on the CONWAY expedition which made a very brief visit to Sjuøyane. This is the only record of this easily overlooked plant and for this record we are grateful to Dr. G. HALLIDAY, University of Leicester, who found it among material in the British Museum.

We are extremely fortunate in having SCHOLANDER's (1934) excellent account of the vascular flora of Nordaustlandet, which brings together most of the earlier work, including that of the 1923 and 1924 Oxford expeditions (SUMMERHAYES and ELTON, 1928).

### *The investigations of SCHOLANDER 1931*

In 1931 the Swedish-Norwegian Arctic Expedition under Professor HANS WILSON AHLMANN visited extensive parts of Nordaustlandet.

The botanical group of the 1931 expedition carried out work between Kapp Sparre in the south and Depotodden in the north; the last was also the most easterly locality visited. Especially detailed work was carried out in Murchisonfjorden, the greatest number of species in one locality being found on Floraberget, and some important observations were made in the inner part of Brennevinsfjorden which encouraged SCHOLANDER to remark, "Judging from my brief visit,



to the undulating granite mountains in Brennevinsfjorden, I should not be surprised if it were in this area and in the unexplored, deep granite-bordered fjords of the north coast that the richest flora of North-East Land is to be found." This has turned out to be substantially true, but the paper is noteworthy not only for this perceptive comment and for the seventeen species new to Nordaustlandet which are recorded, but also for two other important reasons. In the first place, he gives precise notes of all the localities from which material was collected — this was no doubt partly made possible by the better maps by then available, and is in sharp contrast to much of the previous work in which it is now impossible accurately to identify localities, and in which frequently only the name of the fjord is recorded. In the second place, SCHOLANDER has given us a scholarly account of certain critical taxonomic problems; he has given us an excellent account of the morphology of viviparous grasses, and utilising LINDMAN's division of *Poa* he has given us clear descriptions of the five species or varieties belonging to the *Poa arctica* and *Poa alpigena* groups. He has also given a critical and illuminating account of *Puccinelliae* including what he designates *Puccinellia vaccilans* and *Puccinellia vahliana*; since this time these have been transferred to the *Colpodium* genus, but the original descriptions still hold good, and we discuss this matter in detail later.

We have no competence to remark on the lichenological work which is simultaneously described; it seems that little work has been done in this area since then and we await the paper of Dr. LARS WESTMAN who accompanied the 1966 Swedish Expedition.

#### *Work subsequent to that of SCHOLANDER*

The Oxford University Expedition under GLEN spent the year 1935–36 in Nordaustlandet; the expedition was concerned mainly with the setting up of the ice-cap station, and in topographic work. There are but few floristic records and the designation of localities is rather imprecise; one interesting record by KEITH, however, is that of *Silene acaulis* from "Brandy Bay"; this material is in the British Museum and was kindly brought to our attention by Dr. G. HALLIDAY. We make further comment on this later and we also quote from the meteorological data collected by the expedition.

Two significant botanical investigations have, however, been carried out since SCHOLANDER's work and prior to our own. In 1936 EILIF DAHL paid a brief visit to the western side of Duvefjorden, the inner part of Rjippfjorden, Depotodden, and the southern extremity of Phippsøya in Sjuøyane (DAHL 1937, 1946). As far as we can see this is the first botanical work carried out in the eastern fjords, and in addition three new species to the island were recorded, *Carex subspathacea* from the inner part of Rjippfjorden, and *Erigeron eriocephalus* and *Draba norvegica* (*Draba rupestris*) from Depotodden.

In 1957 MAGNE BRUUN, working as a geological assistant on a Norsk Polar-institutt Expedition, carried out extensive work in Wahlenbergfjorden, and also paid rather brief visits to localities in Lady Franklinfjorden, Brennevinsfjorden and the inner part of Rjippfjorden. The special interest of this work was, firstly,

the finding in accord with the suggestion of SUMMERHAYES and ELTON (1928) of a rich vegetation in the inner part of Wahlenbergfjorden, and secondly the addition of a further five species to the vascular flora. These five were: *Equisetum variegatum*, *Braya purpurascens*, *Minuartia biflora* and *Trisetum spicatum*, of which *Trisetum* and *Braya* are extremely rare. In addition he found *Silene acaulis* to be fairly widespread, and it seems that this is now at least quite common in some areas. We have read only the unpublished report by BRUUN (1958), from which the above records are taken and we have seen none of his material; we have, however, no reason to question his observations which agree closely with our own in the few areas in which our work has overlapped.

These investigations brought the number of species of vascular plant from Nordaustlandet to 76.

#### *The present investigations*

In 1965 we landed on Søre Russøya on July 20 and from there we carried out work in Murchisonfjorden at Triodalen, Snaddvika, and Floraberget; from camps established by helicopter in Lady Franklinfjorden and Brennevinsfjorden, we carried out work on Hansøya, in Jäderinfjorden, at Depotodden, Svartneset, and in Birddalen. The expedition ship then moved to the inner part of Wahlenbergfjorden; we carried out work in that fjord from Bodleybukta, and from camps again established by helicopter in Innvika and Planciusdalen, we worked in the inner part of Duvefjorden and the outer western part of Rijpfjorden. A brief but very profitable trip was made from Innvika to the eastern side of Rijpfjorden somewhat south of the western end of Korridoren.

In 1966 we arrived at Kinnvika on July 13, and the work was carried out from base camps set up by helicopter at Depotodden in Brennevinsfjorden, Wordiebukta (Stegdalen) in Rijpfjorden, and Sætherbukta in Duvefjorden. At the end of the summer we carried out some further work from Kinnvika on Floraberget, in Wargentindalen and at Celsiusodden.

We are publishing here data collected at 60 stations; the localities are given in the list below together with latitude and longitude, and on the several maps which were kindly provided by Norsk Polarinstittutt. Each fjord has been given a single letter designation as follows:

A	Wahlenbergfjorden	5 localities
B	Murchisonfjorden	8 localities
C	Lady Franklinfjorden	5 localities
D	Brennevinsfjorden	10 localities
E	Rijpfjorden	18 localities
G	Duvefjorden	14 localities

Each locality is given both a number and a letter from which the fjord may immediately be identified (see Fig. 1). In the list below the number in brackets after the locality designation is the number of species we have recorded for that locality.

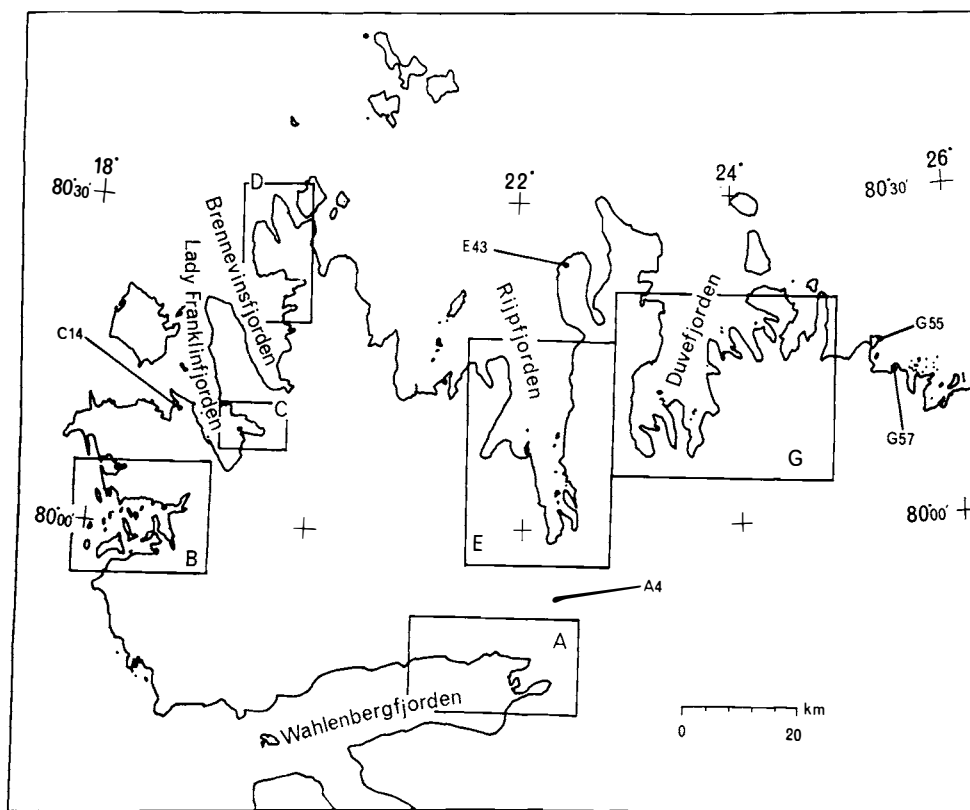


Fig. 1. General map of Nordaustlandet showing division into areas.

### List of localities

	Locality	Lat. °N	Long. °E.	Date
<i>Wahlenbergfjorden</i> (see Fig. 2)				
A1(42)	Kløverbladbukta The northern side of the bay, on wet low-lying areas, close to the shore, and also some drier areas with rock exposures.	79°46'	21°56'	4.8.65
A2	Oxfordhalvøya An area including both sides of Bodleyelva, on the south a boggy area near the river, and on higher ground north-east facing stone polygons. On the north side from an area of soil polygons with some damp patches – also from the drier parts of the river bed itself.	79°48'	22°02'	—
A3(42)	Bodleybukta Low-lying areas of soil fairly near the shore and also a little farther eastwards under the cliffs.	79°49'	21°56'	6.8.65
A4( 8)	Rijpdalen Solifluction slopes with occasional patches of scree and soil polygons, west of the lakes in the centre of the valley.	79°54'	22°18'	9.8.65

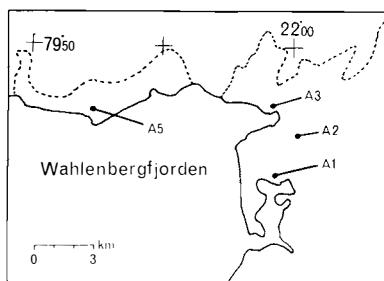


Fig. 2. Detailed map of localities in Wahlenbergfjorden.

	Locality	Lat. °N.	Long. °E.	Date
A5(45)	North side of Wahlenbergfjorden An ice-free area between Bodleybreen and Eltonbreen; moraines on the eastern and western extremities, but a flat area in the centre composed of green and red shales with outcrops of quartzite. To the west merging into Ryssø dolomites.	79°49'	21°30'	7.8.65

*Murchisonfjorden* (see Fig. 3)

B6(37)	Triodalen Hummocky soil near the head of the valley, and much more fertile slopes on the north side of the river near the mouth.	79°57'	18°41'	24.27.7.65
B7(29)	Snaddvika Low-lying screes with patches of red siltstones on the south side of the river at the south-east corner.	79°58'	18°50'	24.7.65

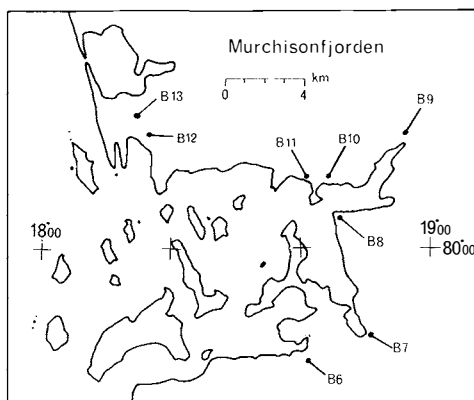


Fig. 3. Detailed map of localities in Murchisonfjorden.

B8(30)	Celsiusodden Low screes somewhat inland, and on the south facing slopes of the small lake; outcrops of shales with quartzites.	80°01'	18°46'	25.8.66
B9(34)	Wargentindalen Screes and solifluction slopes on both the east and west sides of the river – low-lying.	80°04'	18°56'	—

	Locality	Lat. °N.	Long. °E.	Date
B10	Floraberget On steep south facing shales, a little north-east of Selpynten; also some wet patches of clay nearer the shore.	80°02'	18°42'	25.7.65 24.8.66
B11(46)	Floraberget rookery The steep south facing quartzite cliff, and the grassy slopes below.	80°02'	18°40'	25.7.65 24.8.66
B12(25)	Kinnvika Dolomite areas with patches of soil near the IGY station.	80°03'	18°16'	23.8.66
B13(14)	Kinnvika A dry area north-west of the IGY station toward Claravågen – collected by B. Fossøy.	80°04'	18°14'	24.7.65

*Lady Franklinfjorden* (see Fig. 4)

C14(29)	Westmanbukta East side on point due east of Persberget, an area of low-lying shales with extensive areas of soil near the sea.	80°11'	18°42'	23.8.66
C15(34)	Hansøya The north-west corner of the island among quartz porphyries.	80°09'	19°21'	29.7.65
C16 (2)	The mainland just south of Hansøya, on low-lying screes near the shore.	80°09'	19°22'	—
C17(41)	Svartakstoppen Large boulder scree under some steep dolerite cliffs on which some birds were nesting; some small areas of finer material.	80°09'	19°31'	30.7.65
C18(16)	Storkobbodden North-west facing slopes of steep knoll north-east of the point – a bird-cliff.	80°10'	19°18'	28.7.65

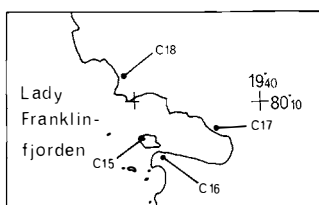


Fig. 4. Detailed map of localities in Lady Franklinfjorden.

*Brennevinsfjorden* (see Fig. 5)

D19(18)	Sjølivhaugane West facing slopes of the prominent granite bird-cliff.	80°20'	19°43'	16.7.66
D20(26)	Birddalen SE The south-east entrance, on dolerite screes c. 80 m a.s.l.	80°24'	19°46'	18.7.66

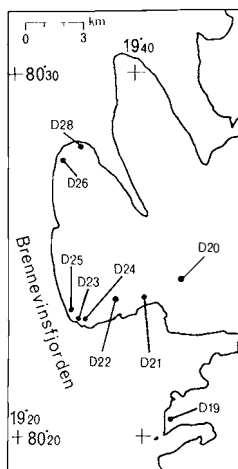


Fig. 5. Detailed map of localities in Brennevinsfjorden.

	Locality	Lat. °N	Long. °E	Date
D21(33)	Birddalen SW South facing slopes on the dolerite sill and among boulders below the sill – small soil banks with a rich vegetation.	80°24'	19°41'	1.8.65 17.7.66
D22(11)	Snotoppbreen moraine The lateral and terminal moraines with some clay patches, 100 m a.s.l.	80°24'	19°35'	20.7.66
D23(13)	Depotodden A mossy green place immediately under the bird-cliff covered by <i>Caloplaca elegans</i> .	80°23'	19°28'	18.7.66
D24(37)	Depotodden The steep granite screes on Basisfjellet, east of the hut. Well-drained and rich in vegetation.	80°23'	19°30'	31.7.65 15.7.66
D25(24)	Basisfjellet Steep west facing granite screes with dry gullies of finer material.	80°23'	19°27'	1.8.65
D26(17)	Svartnestoppen Steep west facing screes.	80°28'	19°26'	—»—
D27(5)	 The beach below the scree slopes, a wide flat area above the beach with patches of clay.	80°28'	19°26'	—»—
D28(8)	Birdvågen The northern entrance to Birdvågen – low-lying screes with a northerly exposure. A very barren area.	80°29'	19°30'	—»—
<i>Rippfjorden</i> (see Fig. 6)				
E29(27)	Planciusdalen The area around the low col – fine low-lying screes, fairly dry.	80°12'	21°46'	23.8.65
E58(19)	Planciusbukta The south-east extremity of the bay, damp soil and shales, rather barren.	80°13'	21°42'	22.8.65

	Locality	Lat. °N	Long. °E	Date
E30(27)	Steep south-east facing black shales just north of prominent quartzite boss.	80°10′	21°42′	22.8.65
E31(23)	Gerritzodden Bird-cliff about 1 km north of Gerritzodden, mossy east facing slopes. The cliff was by that time deserted.	80°13′	21°51′	—»—
E32(31)	Bergesenneset Flat screes in the wide valley running almost due south – patches of soil and wet areas.	80°08′	22°00′	13.8.66
E33(23)	Rijpelva On the east side just south of the entrance to the fjord, low-lying slopes and on patches of gravel in damp areas of the river bed.	79°59′	22°16′	27.7.66
E34(20)	Kvitrevdalen About 4 km up the valley on south facing scree slopes with boulders.	80°00′	22°32′	26.7.66
E35(14)	Kvitrevdalen A boggy area on the north side of the river near the entrance to Kræmerbukta.	80°01′	22°30′	—»—
E59(42)	Point south of Stegdalen and north of Kvitrevdalen, flat rather exposed area with many small south facing soil banks and a particularly rich vegetation.	80°01′	22°30′	—»—
E36(35)	Gjuvekallen South facing granite screes, fairly dry except in small gullies. No longer inhabited by birds but might be an ancient bird-cliff.	80°02′	22°39′	29.7.66
E37(29)	Stegdalen Gravelly bank about 2 km inland, with patches of soil, south facing.	80°02′	22°33′	31.7.66
E38(32)	Wordieodden Marsh near the south-east end, standing water with magnificent strands of <i>Ranunculus hyperboreus</i> .	80°02′	22°29′	28.7.66
E39(34)	Wordieodden Steep granite cliffs, facing south-west with some damp gullies. Luxuriant and rich vegetation.	80°03′	22°21′	— »—
E60(29)	Wordiebukta Solifluction slopes near the southern extremity, patches of scree and clay near the shore.	80°02′	22°29′	29.7.66
E40(41)	Tyskehuset (the ruined German station on the east side of Wordiebukta) On a small granite knoll behind the house, and on a wet boggy area just below the house towards the sea.	80°03′	22°29′	24, 25.7.66
E41(21)	Beistelva A clay area with patches of shells south of the river, also on the river delta itself.	80°03′	22°28′	24.7.66
E42	Tjuvjomyra A well developed marsh with extensive sheets of standing water-clay underneath, just east of the small hill on the point. Also some much drier areas a little farther north.	80°06′	22°20′	16.8.65 25.7.66

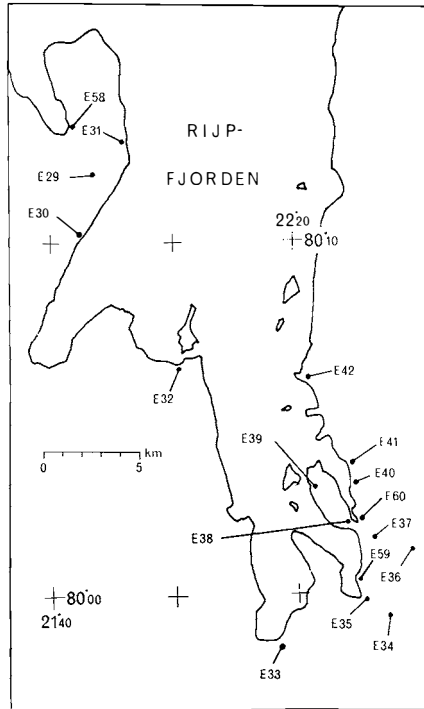


Fig. 6. Detailed map of localities in Rijpfjorden.

	Locality	Lat. °N.	Long. °E.	Date
E43(26)	Kapp Wrede Scree slopes, mainly shales facing north-west. A fairly dry locality, but covered in snow shortly after our arrival and before a full investigation could be carried out.	80°25'	22°28'	14.8.66
<i>Duvefjorden and areas farther east (see Fig. 7)</i>				
G44(14)	Innvika About 2 km south of the entrance to Korridoren, a small area of soil polygons about 250 m a.s.l.	80°09'	22°58'	13.8.65
G45(36)	Ringgåsdaalen North-west facing screes below the cliff on the east side of the river, and low-lying screes on the western side.	80°07'	23°14'	10.8.65
G46(36)	Innvikdalen On the east side of the valley, gentle south-west facing scree slopes on Storrtoppen, and on the river terraces.	80°07'	23°14'	11.8.65
G47(24)	Vikodden Low rather barren screes with patches of black lichens.	80°09'	23°08'	18.8.65
G48(33)	Louise Richardfjellet Steep south-west facing scree slopes, well drained, fairly high and an exceedingly rich and luxuriant locality.	80°11'	23°21'	19.8.65



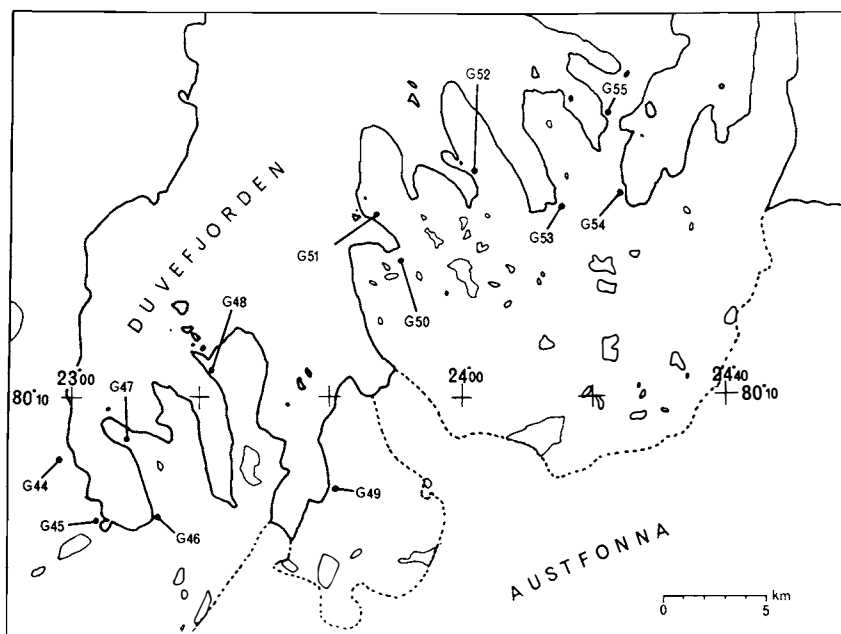


Fig. 7. Detailed map of localities in Duvefjorden and the East.

	Locality	Lat. °N.	Long. °E.	Date
G49(39)	Stjerneblomdalen On the north side of the river, on sandy terraces with some damper areas – also muddy area near the sea sheltered by timber.	80°08′	23°40′	19.8.65
G50(14)	Dokkvatna An area of moderately high scree – dry and generally barren, though less so on the damper areas.	80°15′	23°50′	7.8.66
G51(27)	Dokken The north side of the bay on steep south facing scree slopes – nearer sea level a wet boggy area, very rich in vegetation.	80°15′	23°46′	4.8.66
G52(36)	Polarklubben Steep and, in parts, wet south-west facing slopes about 70 m a.s.l.	80°16′	24°00′	3.8.66
G53(16)	Godfreybukta The south-east corner of the bay – a low wet area on east side of river.	80°15′	24°17′	5.8.66
G54(18)	Isåa On the western side of the river on low-lying scree and a little farther to the north on a rich sandy bank above the shores of Finn Malmgrenfjorden.	80°15′	24°24′	9.8.66
G55(22)	Pollen On the east side of the bay just south of the point – low broken scree with small patches of soil on south-facing banks.	80°17′	24°22′	9.8.66
G56( 6)	Kapp Bruun Near the shore – collected by D. G. GEE.	80°16′	25°20′	12.8.65
G57(11)	Bêhounekodden Near the point on an area of granite/gabbro – collected by D. G. GEE.	80°14′	25°30′	—

The material has been deposited with Botanisk Museum, Universitetet i Oslo, Oslo, except for a very small number of duplicates which I have retained. Material corresponding to every record was not collected, and of the common and readily identified material very little was collected. The only material which may be deemed critical which was not collected is that belonging to the *Cerastium arcticum* complex, and that of the *Saxifraga rivularis* group. It has seemed to us that the former is fairly uniform and not being taxonomists we are not happy about the precise basis on which we are to separate *Saxifraga rivularis* and *Saxifraga hyperborea*.

In general this paper is patterned fairly closely on SCHOLANDER's original and it is hoped that this may facilitate comparison; we have not included records already given from the area by SCHOLANDER. In our plant lists we have, however, for the rarer species, noted DAHL's published records, and some but by no means all of the unpublished records of MAGNE BRUUN.

### General description of Nordaustlandet

#### *Climate*

General. — Meteorological records from this area have been published for one summer (ERIKSSON, 1933), and for two single years covering one winter and two summers in each case. GLEN (1937) has published records of temperature, precipitation and cloud cover from Depotodden, collected in 1935–36 during the Oxford University Arctic Expedition; LILJEQUIST (1959) has published in summary rather fuller data taken at Kinnvika in 1957–58 during the International Geophysical Year. Some of these observations are tabulated below:

	Kinnvika 1957–58				Depotodden 1935–36			
	May	June	July	August	May	June	July	August
Mean daily temperature (°C) . . . . .	–4.3	–0.3	+2.3	+1.1	–2.3	+0.7	+2.5	+3.4
Humidity (%). . . . .	82	87	89	89				
Precipitation (mm) . . . . .	6.4	15.1	32.2	14.7	15.4	43.9	20.1	0
Yearly mean temperature (°C)	–6.7							
Yearly mean humidity (%) . . . . .	73							
Yearly precipitation (mm). . . . .	251				167			

From these observations it is seen that the average daily summer temperature is just above zero, that the summer humidity is very high, and that the total precipitation is relatively high. The data are, as would be expected, more comparable to values for coastal stations in Ellesmere Island given by MOHN (1907) than to those for the more continental areas in Peary Land, which are summarised by HOLMEN (1957). See also FRISTRUP, (1952). These data are compared below:

	Ellesmere Island*				Peary Land**			
	1899-1902				1949-50			
	May	June	July	August	May	June	July	August
Mean daily temperature (°C) . . . . .	-10.0	+1.1	+3.6	+1.2	-7.7	+2.6	+6.2	+3.7
Humidity (%) . . . . .	79	79	81	87	66	73	65	66

\*mean of data for three years collected at three coastal stations.

\*\*mean of data for two years collected at Jørgen Brønlund Fjord.

Although the flora of Nordaustlandet (83 species) is more comparable to that either of Ellesmere Island (115 species), or Peary Land (105 species) than it is to that of ice-bound islands such as Ellef Ringnes Island in the Queen Elizabeth Archipelago (49 species), the climate of Nordaustlandet does indeed seem comparable to that of the latter. We point that comparison by giving below thirteen-year averages for Isachsen (SAVILE 1961).

	June	July	August
Mean temperature (°C) . . . . .	-0.4	+3.5	+1.3
Precipitation (mm) . . . . .	0.35	21.4	20.6

It must, however, be noted that it is the micro-climate experienced by the plant which is important and not the gross meteorological climate as revealed in the above figures. The importance of soil temperatures has been discussed by SAVILE (1961) and by HOLMEN (1957), and WEEDFALL (1963) has presented some valuable data on the variation of surface temperature with the nature of the terrain. For a rocky granite soil, the average maximum temperature at various heights above the ground shows little variation, and there is only a slow decrease in the temperature within the ground and at increasing depths; by contrast in a swampy soil there is an abrupt and substantial decrease in temperature at the soil surface followed by a slower steady decrease at increasing depths. It is presumably for reasons like this that some of the steep granite scree in Nordaustlandet exhibit such a rich flora. One important factor which we have not mentioned is the effect of wind; this is probably an important factor for two reasons. Firstly, because of the generally unfavourable effect on plants during the summer, and secondly because during the winter the wind may remove the protective layers of snow. The overall effect is to permit growth only of robust species of which surely *Luzula confusa* is the best example; we would like tentatively to suggest that it is the effect of wind that is primarily responsible for the barrenness of the areas on the eastern side of Rjipfjorden towards the southern end of the fjord – the transition from the rich though low-lying granites farther north is quite sharp as shelter from the south is lost.

Sea ice conditions. – It is hardly possible to make any meaningful general statements about ice conditions after only two summers in the area, and we shall merely record our own observations, remarking, however, that ice conditions in 1965 were much worse than in 1966.

The fjords may usually be expected to be free of fjord ice during part of the summer but the polar pack ice is never very far to the north even during the summer and may drift or be blown on to the exposed north coast at any time;

the summer southern limits of the pack ice vary enormously from year to year as may readily be seen from the data presented by LUNDE (1963). See also ARCTIC PILOT (1949, pp. 43, 387).

On our arrival in Murchisonfjorden on July 20, 1965, the winter ice was still fast, though a week later it was beginning to loosen along the shore lines. On July 13, 1966, it was much more open at least along the northern shores of the fjord, and the fjord was free of ice before the end of July. During the last days of July in 1965 and during the whole of our stay from July 14 to 23, 1966, Brennevinsfjorden was completely frozen at least as far north as a line joining Kapp Hansteen and Svartneset; on our return from the east on August 22, 1966, the fjord was still frozen although the ice was very rotten. In 1965 Rjipfjorden was essentially closed all summer; when we left Planciusdalen on August 23, although the floes were loose, the small patches of open water were beginning to refreeze. Conditions in 1966 were much better, and there was completely open water in the inner part at least until the end of July though the fjord was completely blocked again after August 16. On August 10, 1965, Duvefjorden was open only as far north as a line joining the eastern end of Korridoren with Kapp Leijonhufvud; by contrast in 1966 it was completely open when we arrived on August 2, and until August 8 the sea to the north and east was open. Drift ice began to come in from the north fairly quickly within the next week. Even in 1966 Finn Malmgrenfjorden must have been blocked with winter ice all summer though there was a substantial area of open water in the inner western part.

It seems safe to say that the fjord ice will remain frozen until at least the middle of July and that open water may be expected from then on till about the middle of August; in severe ice years or in shallow bays, however, the winter ice may remain fast during the whole summer.

#### *Geology and topography*

Nordaustlandet is dominated by two extensive ice-caps, Vestfonna and Austfonna, which together comprise approximately 80% of the total land surface (AHLMANN 1933) and which are separated by a relatively narrow strip of ice-free land. From Austfonna particularly, substantial melt streams emerge and may be especially troublesome to cross in the inner part of Rjipfjorden and in Finn Malmgrenfjorden. The eastern edge of Vestfonna extends almost to the western shores of Rjipfjorden, and continues southwards to the head of Wahlenbergfjorden; the western edge of Austfonna runs in an approximately north-easterly direction from Oxfordhalvøya at the head of Wahlenbergfjorden, descending to the sea first in Duvebreen and finally in Albertinibukta; farther east there are only small areas of ice-free land. The main ice-free areas are, therefore, mainly along the coastline from the mouth of Wahlenbergfjorden to the western shores of Albertinibukta – these areas are generally fairly small and hence there are few parts with well-developed valleys.

It would be an impertinence here to attempt any discussion of the fascinating and complex geology of the area. A recent account which includes a synthesis of earlier ones by KULLING (1934), and SANDFORD (1963 and previous papers), has

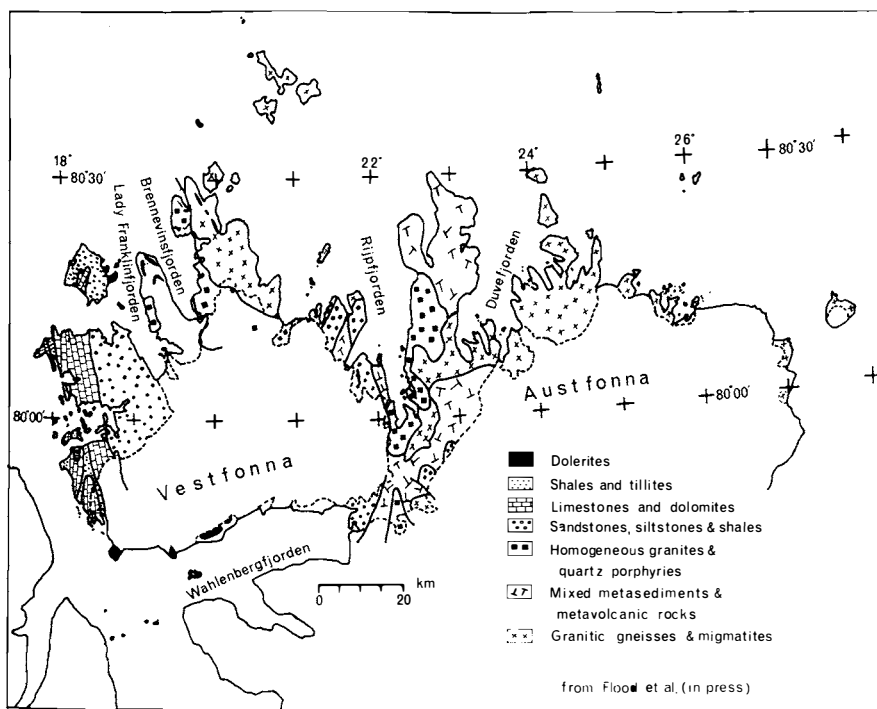


Fig. 8. Geological map of Nordaustlandet, simplified from FLOOD, HJELLE, GEE, SIGGERUD, and WINSNES.

recently been given by FLOOD, GEE, HJELLE, SIGGERUD, and WINSNES (in press). We shall, therefore, merely attempt a brief description of the geology in so far as it reflects on the topography.

The most recent sediments are Triassic rocks, and carbonates of Permian and Carboniferous age; these are exposed mainly in the area south of Wahlenbergfjorden, and both there and indeed throughout Nordaustlandet, there are large numbers of dolerite intrusions. The northern areas belong to the Hecla Hoek sequence, and range downwards from unmetamorphosed Cambrian sediments, through late Precambrian limestones, dolomites, sandstones and shales, into mixed low-grade metasediments and metavolcanics; lower down these merge into granitic gneisses and migmatites. The lower parts of the succession are intruded by more or less homogeneous granites. The distribution of all these is shown in the map, Fig. 8, which is a simplified version of the map of FLOOD *et al.*

The most westerly parts of Murchisonfjorden are composed of low-lying dolomites which are completely frost-shattered and in general barren of vegetation except on small areas of soil which occur occasionally. Towards the inner part of the fjord, however, we have a complex succession of shales, sandstones, and quartzites which, on the north side of the fjord are well exposed on Floraberget where the beds are almost vertical. On areas of low-lying red and black shales the vegetation is frequently quite rich. This contrasts strongly with the statement of SUMMERHAYES and ELTON (1928, p. 211) that "Murchison Bay appears to be quite

barren throughout its length." SCHOLANDER's collections in Triodalen, Snaddvika and Floraberget, and our own in Wargentindalen and at Celsiusodden would seem to show that this is not completely true.

By contrast the eastern shore of Brennevinsfjorden consists of steep massive granites, which are fairly uniform here but become less homogeneous farther east. Some of the typical granite cliffs may be seen in Fig. 12, which also shows one of the dolerite intrusions which are a common feature of this area. We shall comment on the vegetation of some similar areas later, and here merely note that it is on the steep well-drained scree-slopes below such cliffs that the richest vegetation is to be found. Fig. 13 shows the massive scree-slopes on Basisfjellet, somewhat east of Depotodden.

Although the northern part of the eastern shore of Rjipfjorden consists of rocks of widely varying lithologies and structures, the southern part of the peninsula consists of granites, here low-lying and more or less homogeneous. It is in this area that several well-developed valleys are found. Fig. 9 shows a typical valley in the southern part of Platenhalvøya, and illustrates the flat rolling granite screes common in this area. Such valleys carry substantial volumes of melt-water from ice-caps, but neither the valleys themselves nor the areas round the deltas are particularly rich in vegetation unless shelter has been provided by a cliff or by small granite knolls. Some typical scenery can be seen in Fig. 11 which is a view looking eastwards up Stegdalen.

The eastern shores of Duvefjorden are composed of rocks of widely varying composition; these range from a heterogeneous complex of migmatites to granitic gneisses with large areas of metasedimentary inclusions. This results in very irregular relief and in some parts of the area only poorly developed valleys. One of the small valleys typical of the inner part of Duvefjorden is shown in Fig. 10. The fjord is indented by many bays with steep cliffs plunging into the sea; many of these are so steep as to be accessible only by boat since descent from the top is an hazardous operation. Fig. 15 shows the spectacular cliff Conwayfjellet (Godfreybukta) to whose slopes we were unable to gain access. A similar cliff with its massive scree-slopes is shown in Fig. 14; here again it is on such steep south facing slopes that the richest vegetation is found. Although some of these cliffs or parts of them are occupied by enormous rookeries, the slopes under such cliffs are rather luxuriant in growth than rich in species. Farther east the land tends to be lowlying, it is scree covered and dotted with many lakes filled with melt-water from Austfonna. In Fig. 16 the more or less barren screes at the southern end of Finn Malmgrenfjorden may be seen; even the surrounding mountains are here relatively low.

The land surrounding Wahlenbergfjorden is low-lying with extensive dolerite intrusions along the northern side. The innermost part of the fjord, including Bodleyelva and Oxfordhalvøya, is quite remarkable; almost surrounded by ice-caps this area must yet be especially sheltered since it supports possibly the richest vegetation in the whole of Nordaustlandet – about fifty species. This richness had been surmised by SUMMERHAYES and ELTON on the rather slender evidence of the finding of *Dryas octopetala* there; they say (1928, p. 211), "For instance, Wahlenberg Bay is very barren at its mouth (Cape Idun, Gylden Islands) but Oxford Peninsula



Fig. 9. Rjupfjorden - view NW from the south side of Beistelva, showing typical rolling screes. The knoll on the right near background is due west of Tjuvjomyra; the flat top of Kapp Lovén is seen in the right far background with low ice-fog coming in from the north.

Photo: A.H. NELSON, 25.7.66.

which lies at the head of the fjord, seems in its vegetation to be much more like Reindeer Peninsula in Liefde Bay (e.g. presence of *Dryas*) and in its birds and mammals." We would endorse this though we would make the comparison with the valleys of Central Spitsbergen. On the wetter areas we find *Saxifraga hirculus*, *Eriophorum scheuchzeri* and *Equisetum arvense*, all rare species; on drier areas extensive cover of *Carex rupestris*; and on small dry knolls, *Potentilla pulchella*, *Poa abbreviata* and *Festuca baffinensis*, the last being elsewhere rare in Nordaustlandet.

We have already noted the presence of dolerite intrusions throughout Nordaustlandet; some of these are quite massive, such as the ones south-east of Kapp Hansteen, at Depotodden, Birddalen and Beverlydalen, or those along the northern shore of Wahlenbergfjorden. Many of these dolerite intrusions have areas of rich vegetation associated with them; whether this is due to the type of soil produced in the weathering of such rocks, or whether it is primarily that the weathering takes place in such a way as to give favourable shelter to the plants which grow among the blocks of dolerite, or under the steep well-drained cliffs we do not know. SCHOLANDER's plant lists from the Kapp Hansteen sill, MALMGREN's from Idunfjellet, or our own from Jäderinfjorden and Birddalen sufficiently point the effect of such sills. SUMMERHAYES and ELTON must surely be wrong when they say (1928, p. 201) "The vegetation occurring on the igneous rock dolerite is described in detail, to give an idea of the plant communities found in this, the most barren and inhospitable part of the archipelago." Among the localities specifically mentioned are Gyldénøyane and Kapp Idun. From their own plant list from the former, which comprises 21 species including *Melandrium apetalum* (the only locality until the work of BRUUN 1958) and *Carex nardina*, and from MALMGREN's list from Idunfjellet which has 24 species including the rare *Colpodium vacillans* and *Minuartia rossii*, it can hardly be concluded that these are barren areas. We note that before SCHOLANDER's work the total number of species was a mere 50, so that the above collections represent a substantial fraction of the total; no doubt several more could be found on thorough examination.

### Enumeration of vascular plants and their distribution

The nomenclature in general follows that used by RØNNING (1964) with the following exceptions which are used by BÖCHER, HOLMEN and JAKOBSEN (1966):

*Draba arctica* J. VAHL ssp. *groenlandica* (EKMAN) BÖCHER.

*Melandrium apetalum* (L.) FENZL ssp. *arcticum* (FR.) HULT.

*Saxifraga flagellaris* WILLD. ssp. *platysepala* (TRAUTV.) A. E. PORS.

*Festuca richardsonii* R. BR. ssp. *cryophila* (KREZC. and BOBR.) L. and L.

The numbers given below the name of each species are the percentage distribution frequencies calculated from data for 93 of our localities, and in brackets we give the corresponding numbers calculated from SCHOLANDER's data for 51 localities. Thus a single finding corresponds to frequencies of 1% and 2% respectively. It should be noted that we have used a larger number of localities than are



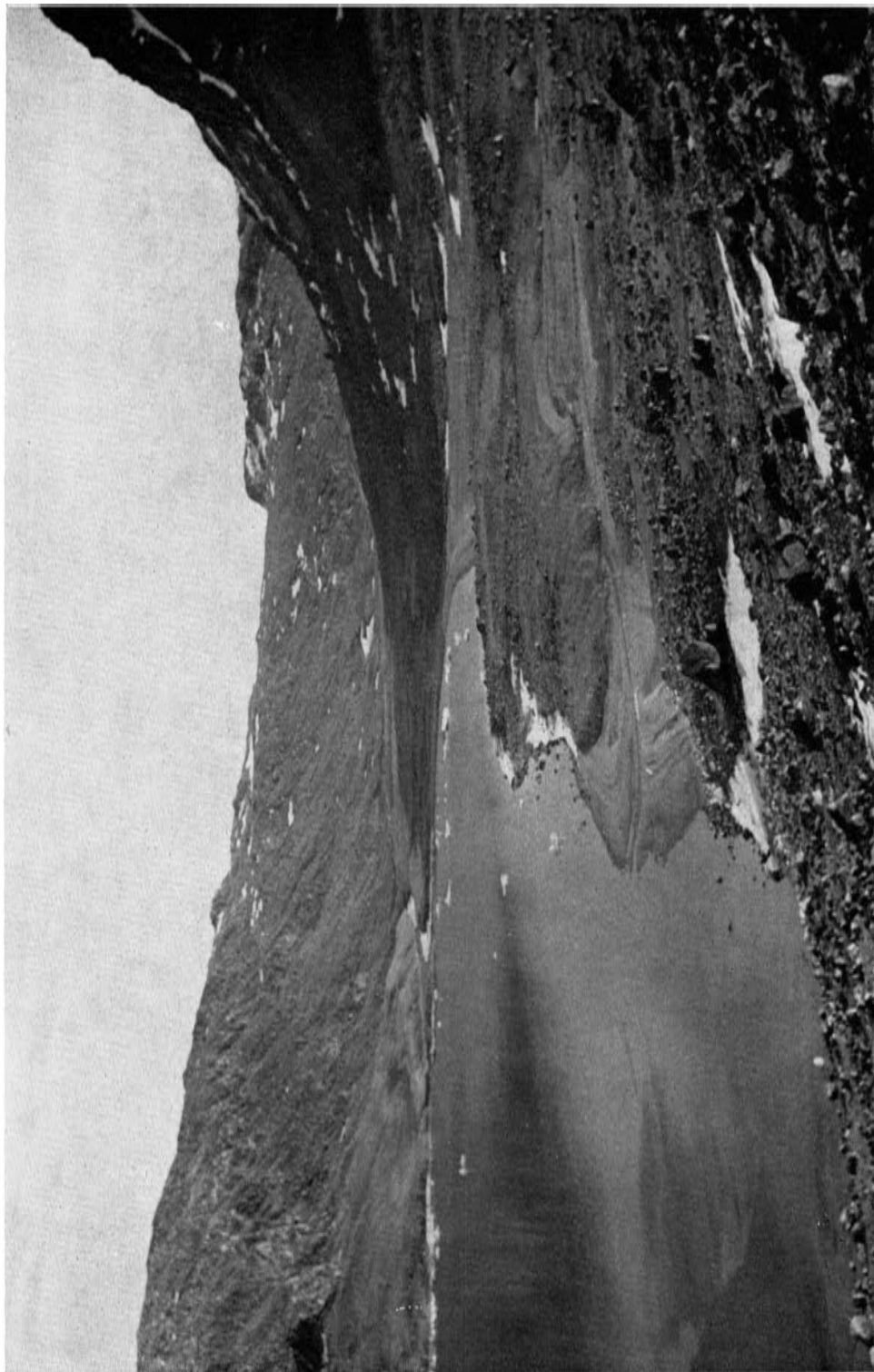


Fig. 10. Duvefjorden - view SE showing the inner eastern parts of Innvika with Innvikdalen behind the mountain in shadow. The foreground of lichenclad boulders is almost barren of vascular plants. The low screens on the extreme left of the photograph are rich with *Silene acaulis* and *Carex misandra*. Photo: A. H. NELSON. 18.8.65.

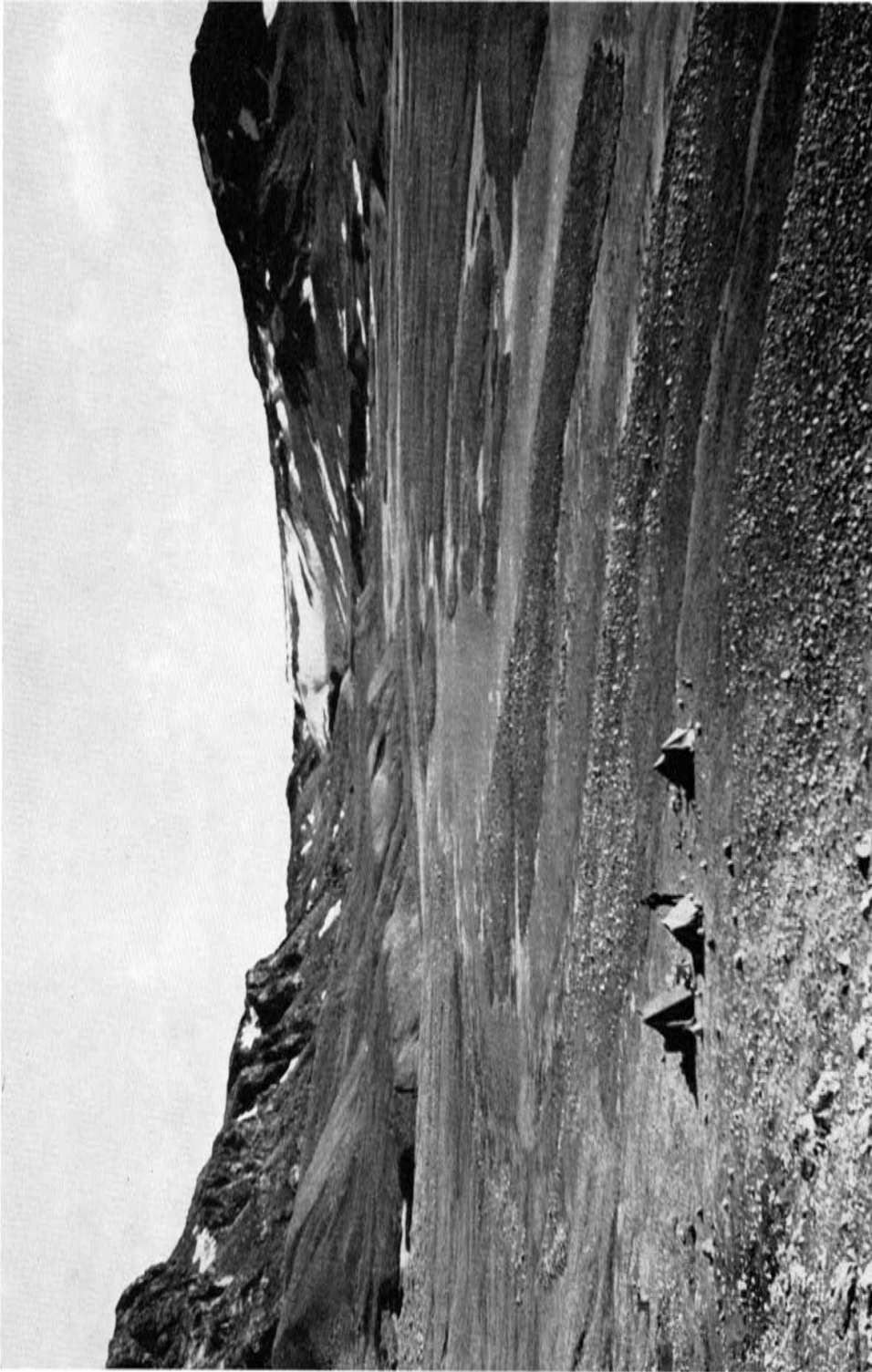


Fig. 11. Rijpfjorden - Stegdalen looking almost due east, with Gjuvekalen on the extreme left. The river terraces may be seen a little to the right and the great river flowing from Austfonna which lies along the skyline. Photo: A. H. NEILSON. 25.7.66



Fig. 12. Brennevinnsfjorden – view SE from Depotodden, showing the steep granite cliffs typical of the eastern shores of the fjord. In the left background may be seen the cliff Sjølivhaugane, and in the left foreground the dolerite sill exposed at sea level.

Photo : A. H. NEILSON. 20.7.66.



Fig. 13. Brennevinnsfjorden - the south side of Basisfjellet, Depotodden, showing the steep cliffs of the rookery, the granite screes to the east and the Oxford University Expedition hut in the foreground. The jointed blocks of dolerite are seen on the right foreground.

Photo: A. H. NEILSON. 20.7.66.

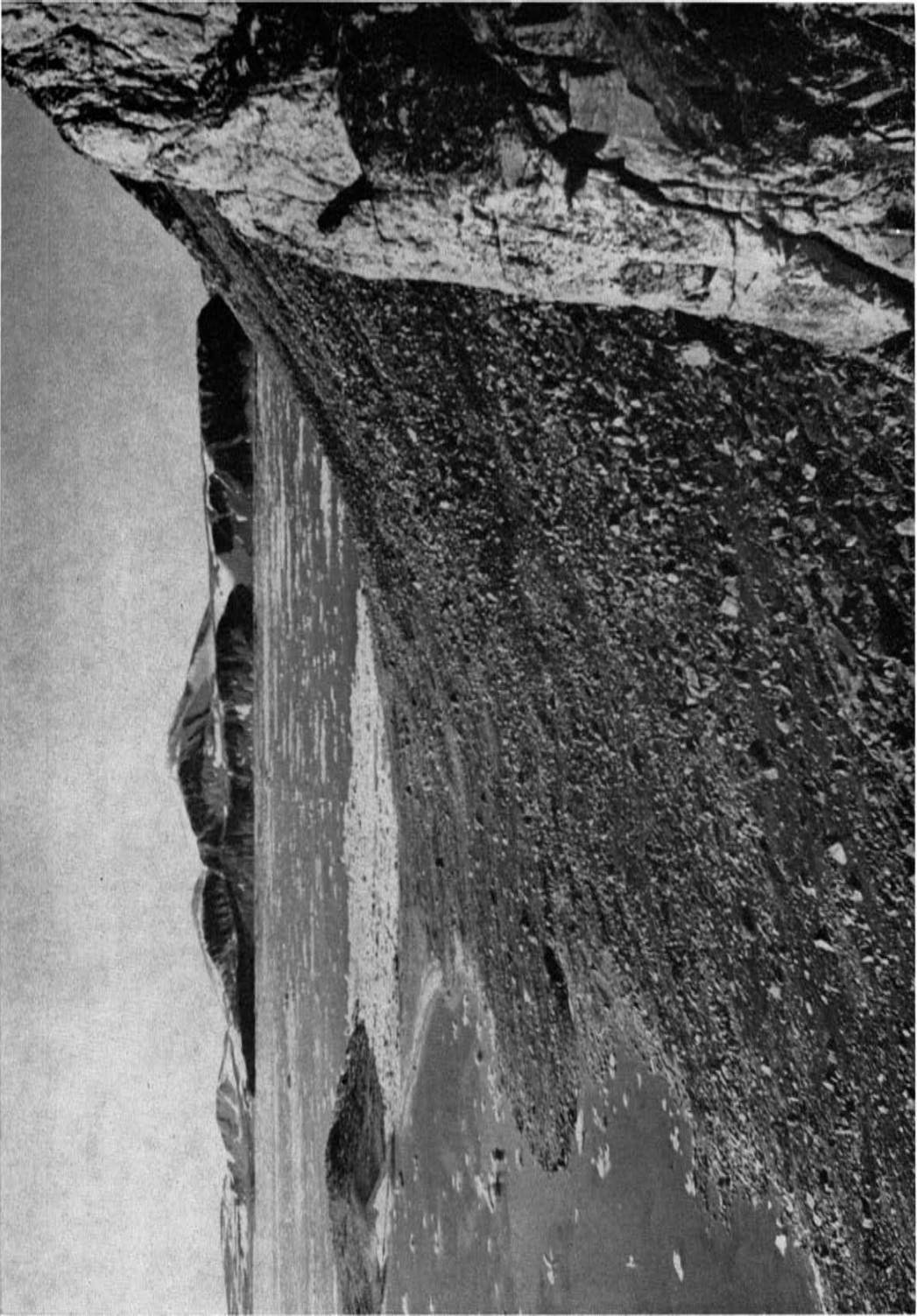


Fig. 14. Duvefjorden - view SW from the cliffs on the north side of Dokken. The steep south facing scree are seen with some wetter areas towards the small island. Wrighttoppen is seen on the western side of the fjord. Photo: A. H. NEILSON. 4.8.66.



Fig. 15. Duvefjorden - Conwayfjellet, Godfreybukta showing typical steep west facing screes and flat topped mountains. The foreground shows a sandy beach with driftwood among which may sometimes be found small patches of *Paccinellia phryganodes*.

Photo: A. H. NEILSON. 5.8.66.

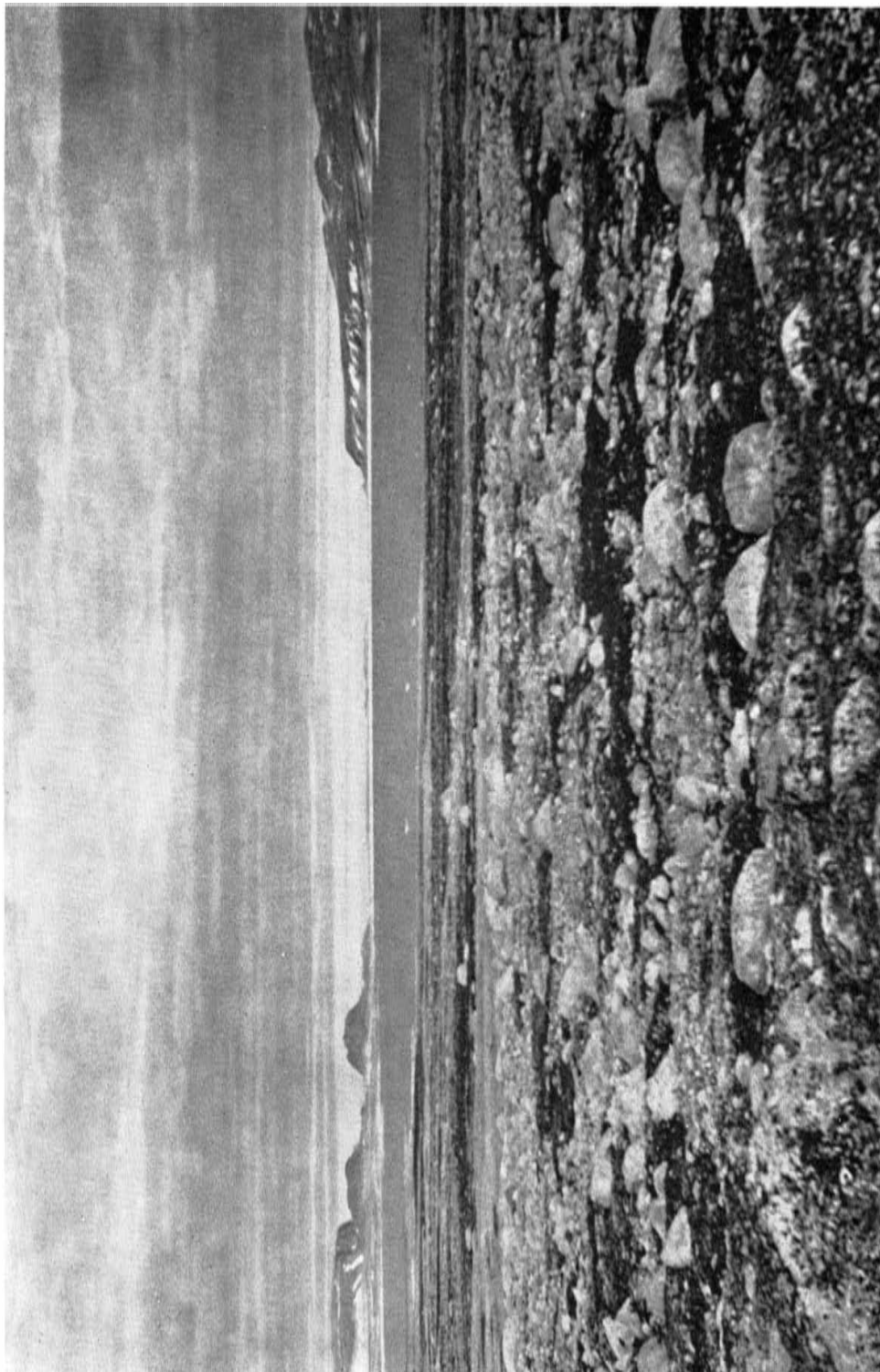


Fig. 16. Finn Malmgrenfjorden - view due north from southern end of the fjord. The low-lying foreground is almost barren of vascular plants; the winter ice may be seen as a thin white line across the photograph. Photo: A. H. NEILSON, 9.8.6

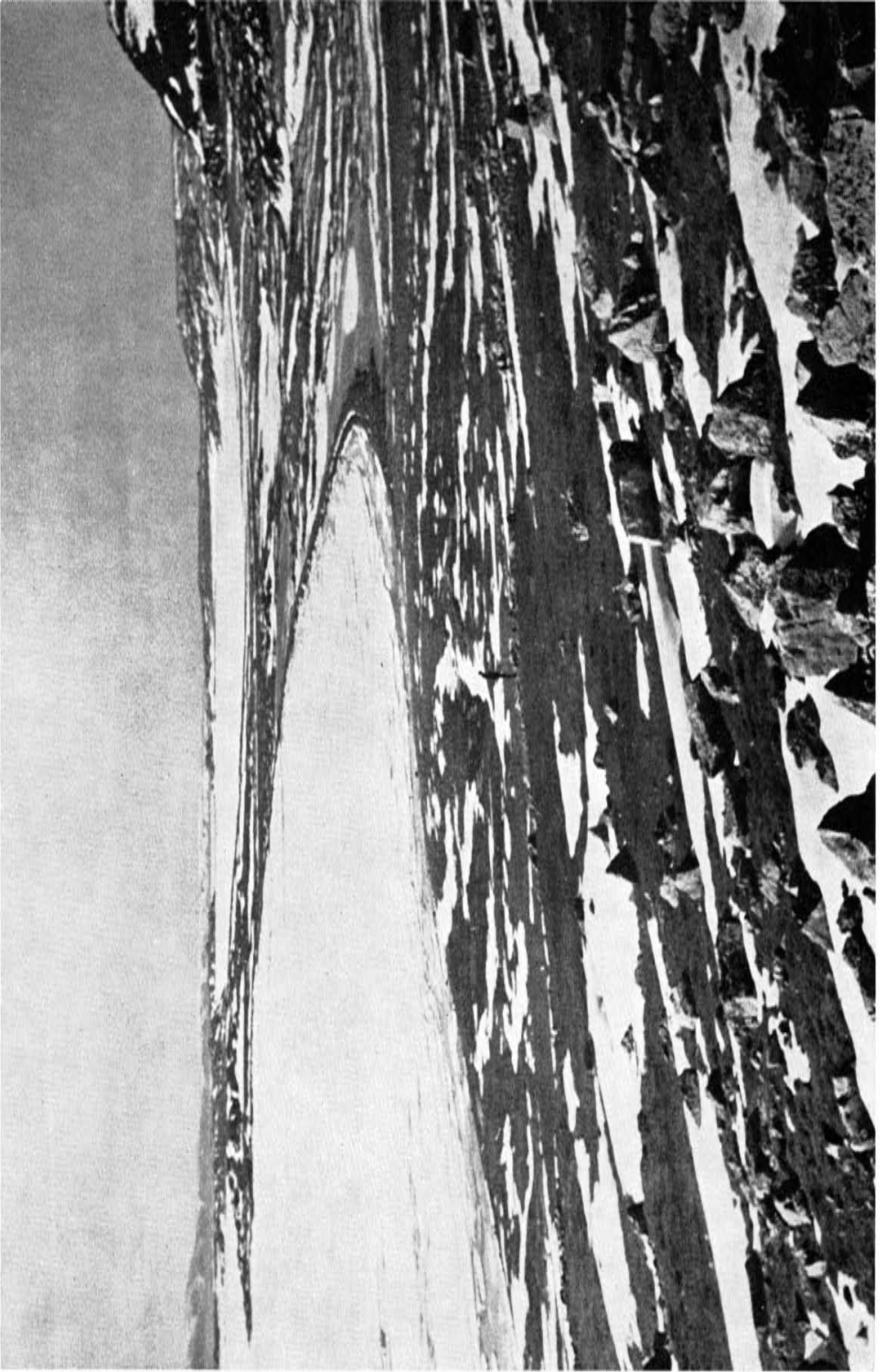


Fig. 17. Murchisonfjorden - looking almost due west from the rookery on Floraberget. The areas among the blocks in the foreground are grasses, with patches of the sedge *Carex maritima*. The low-lying screens farther west are typical of the western areas; the fjord is still completely frozen.

Photo: A. H. NEILSON. 25.7.65.



given in our list; many of these are barren areas with but a few species, or refer to small collections brought in by others. By including these we deliberately bias our frequencies to lower values and we then feel that values substantially larger than SCHOLANDER's are significant.

PTERIDOPHYTA

Lycopodiaceae

*Lycopodium selago* L.

10 (2)

A: A2 Oxfordhalvøya

B: B10 Floraberget

D: D21 Birddalen SW.

E: E36 Gjuvekallen; E39 Wordieodden; E40 Tyskehuset

G: G46 Innvikdalen; G48 Louise Richardfjellet; G49 Stjerneblomdalen; G52 Polarklubben

Equisetaceae

*Equisetum arvense* L.

A: A1 Kløverbladbukta; A2 Oxfordhalvøya

E: E60 Wordiebukta

A rare species and new to Nordaustlandet, on wet low-lying and locally sheltered localities.

*Equisetum variegatum* SCHLEICH

A: A1 Kløverbladbukta; A2 Oxfordhalvøya

B: B6 Triodalen; B8 Celsiusodden; B13 Kinnvika (B.F.)

A rare species though not very uncommon in Murchisonfjorden, and on Oxfordhalvøya – occurs in both dry localities (Kinnvika) and in damper ones (Oxfordhalvøya). Recorded by BRUUN from the second locality.

SPERMATOPHYTA

DICOTYLEDONEAE

Ranunculaceae

*Ranunculus hyperboreus*. ROTTB.

11 (6)

A: A2 Oxfordhalvøya

B: B11 Floraberget rookery

E: E35 Kvitrevdalen; E38 Wordieodden; E40 Tyskehuset; E41 Beistelva; E42 Tjuvjomyra

G: G45 Ringgåsaldalen; G49 Stjerneblomdalen; G51 Dokken

Either in shallow pools on in gently running water – seems to be most common in the eastern part of the area, though this may be at least partly due to the fact that this is a late-developing species.

*Ranunculus nivalis* L.

0 (2)

One of the species not found by us, and recorded by SCHOLANDER only from Floraberget.

*Ranunculus pygmaeus* WAHLENB.

24 (10)

- A: A1 Kløverbladbukta; A5 North side of Wahlenbergfjorden
- B: B10 Floraberget; B11 Floraberget rookery
- C: C17 Svartakstoppen
- D: D20 Birddalen SE; D21 Birddalen SW; D23 Depotodden; D24 Depotodden
- E: E29 Planciusdalen; E30; E31 Gerritzodden; E36 Gjuvekallen; E37 Stegdalen; E39 Wordieodden; E59; E62 Wordiebukta
- G: G46 Innvikdalen; G47 Vikodden; G49 Stjerneblomdalen; G51 Dokken; G52 Polarklubben

Rather less common than the following, both a non-nitrophilous plant on soily fairly sheltered banks, and sometimes also a luxuriant one on rookeries such as Polarklubben.

*Ranunculus sulphureus* SOLAND.

35 (32)

- A: A2 Oxfordhalvøya; A3 Bodlybukta; A5 North side of Wahlenbergfjorden
- B: B6 Triodalen; B7 Snaddvika; B11 Floraberget rookery
- C: C14 Westmanbukta; C17 Svartakstoppen; C18 Storkobbodden
- D: D19 Sjølivhaugane; D24 Depotodden; D25 Basisfjellet; D26 Svartnestoppen; D27
- E: E29 Planciusdalen; E32 Bergesenneset; E39 Wordieodden; E40 Tyskehuset; E38 Wordieodden; E36 Gjuvekallen; E42 Tjuvjomyra; E43 Kapp Wrede; E59; E60 Wordiebukta
- G: G44 Innvika; G45 Ringgåsaldalen; G46 Innvikdalen; G48 Louise Richardfjellet; G49 Stjerneblomdalen; G51 Dokken; G52 Polarklubben

In wet places, responds well to high nitrogen, e. g. on rookeries.

Saxifragaceae

*Chrysosplenium tetrandum.* (N. LUND.) TH. FR.

2 (2)

- B: B11 Floraberget rookery
- E: E31 Gerritzodden

Only found on bird-cliffs and then extremely rare – we note the northern exposure of the rookery north of Gerritzodden. Recorded previously by ELTON from Ulvebukta (7/8 1923) (specimen in British Museum), and by SCHOLANDER also from Floraberget.

*Saxifraga caespitosa* L.

52 (64)

- A: A1 Kløverbladbukta; A2 Oxfordhalvøya; A3 Bodleybukta; A5 North side of Wahlenbergfjorden
- B: B6 Triodalen; B7 Snaddvika; B8 Celsiusodden; B9 Wargentindalen; B10 Floraberget; B11 Floraberget rookery; B12 Kinnvika; B13 Kinnvika
- C: C14 Westmanbukta; C15 Hansøya; C17 Svartakstoppen
- D: D21 Birddalen SW; D22 Snotoppbreen moraine; D24 Depotodden; D25 Basisfjellet; D26 Svartnestoppen
- E: E29 Planciusbukta; E30; E31 Gerritzodden; E32 Bergesenneset; E34 Kvitrevdalen; E36 Gjuvekallen; E37 Stegdalen; E38 Wordieodden; E39 Wordieodden; E40 Tyskehuset; E41 Beistelva; E42 Tjuvjomyra; E43 Kapp Wrede; E58 Planciusbukta; E59; E60 Wordiebukta
- G: G44 Innvika; G45 Ringgåsaldalen; G46 Innvikdalen; G47 Vikodden; G48 Louise Richardfjellet; G49 Stjerneblomdalen; G50 Dokkvatna; G51 Dokken; G52 Polarklubben; G55 Pollen

*Saxifraga cernua* L.

62 (76)

- A: A1 Kløverbladbukta; A2 Oxfordhalvøya; A3 Bodleybukta; A4 Rijpdalen; A5 Northern side of Wahlenbergfjorden  
B: B6 Triodalen; B7 Snaddvika; B8 Celsiusodden; B9 Wargentindalen; B10 Floraberget; B11 Floraberget rookery; B12 Kinnvika; B13 Kinnvika  
C: C14 Westmanbukta; C15 Hansøya; C17 Svartakstoppen; C18 Storkobbodden  
D: D19 Sjølivhaugane; D20 Birddalen SE; D21 Birddalen SW; D22 Snotoppbreen moraine; D24 Depotodden; D25 Basisfjellet; D26 Svartnestoppen  
E: E29 Planciusdalen; E30; E31 Gerritzodden; E32 Bergeseneseet; E33 Rijpelva; E34 Kvitrevdalen; E36 Gjuvekallen; E37 Stegdalen; E38 Wordieodden; E39 Wordieodden; E40 Tyskehuset; E41 Beistelva; E42 Tjuvjomyra; E43 Kapp Wrede; E58 Planciusbukta; E59; E60 Wordiebukta  
G: G44 Innvika; G45 Ringgåsaldalen; G46 Innvikdalen; G47 Vikodden; G48 Louise Richardfjellet; G49 Stjerneblomdalen; G50 Dokkvatna; G51 Dokken; G52 Polarklubben; G53 Godfreybukta; G55 Pollen

A very nearly ubiquitous species and one of the few plants found on the moraines of Snotoppbreen. On rookeries a large robust plant with fleshy leaves.

*Saxifraga flagellaris* WILLD. ssp. *platysepala* (TRAUTV.) A. E. PORR.

- A: A1 Kløverbladbukta; A2 Oxfordhalvøya; A3 Bodleybukta; A5 North side of Wahlenbergfjorden  
B: B6 Triodalen; B7 Snaddvika; B8 Celsiusodden; B9 Wargentindalen; B10 Floraberget; B11 Floraberget rookery; B12 Kinnvika  
C: C14 Westmanbukta; C15 Hansøya; C17 Svartakstoppen  
E: E29 Planciusdalen; E32 Bergeseneseet; E38 Wordieodden; E59; E60 Wordiebukta

This beautiful plant occurs usually on soily areas near the sea, especially on shales. Common only in Rijpfjorden and absent from Brennevinfjorden and Duvefjorden. The various races and their geographical distribution have been treated by HULTÉN (1964).

*Saxifraga foliolosa* R. BR.

38 (18)

- A: A1 Kløverbladbukta; A2 Oxfordhalvøya; A3 Bodleybukta  
B: B6 Triodalen; B7 Snaddvika  
C: C14 Westmanbukta; C15 Hansøya  
D: D19 Sjølivhaugane; D20 Birddalen SE; D21 Birddalen SW; D22 Snotoppbreen moraine; D24 Depotodden  
E: E29 Planciusdalen; E33 Rijpelva; E35 Kvitrevelva; E38 Wordieodden; E39 Wordieodden; E40 Tyskehuset; E42 Tjuvjomyra; E59  
G: G44 Innvika; G45 Ringgåsaldalen; G46 Innvikdalen; G47 Vikodden; G48 Louise Richardfjellet; E49 Stjerneblomdalen; G50 Dokkvatna; G51 Dokken; G52 Polarklubben; G53 Godfreybukta; G54 Isåa; G55 Pollen; G56 Kapp Bruun (D.G.G.)

Common on wet areas, often associated with late-melting snow. This species seems especially common in Duvefjorden and its higher distribution frequency over that calculated from SCHOLANDER's data is probably due primarily to its common occurrence in the eastern fjords.

*Saxifraga hieraciifolia* WALDST. and KIT.

- B: B10 Floraberget (T. H.)

This species is new to Nordaustlandet and appears to be extremely rare in other areas.

*Saxifraga hirculus* L.

9 (6)

- A: A1 Kløverbladbukta; A2 Oxfordhalvøya  
B: B6 Triodalen  
E: E38 Wordieodden; E42 Tjuvjomyra; E59; E60 Wordiebukta

Damp sheltered areas, usually almost marshy – common only in Rijpfjorden and Wahlenbergfjorden.

*Saxifraga nivalis* L.

52 (40)

- A: A1 Kløverbladbukta; A2 Oxfordhalvøya; A3 Bodleybukta; A5 North side of Wahlenbergfjorden  
B: B6 Triodalen; B7 Snaddvika; B8 Celsiusodden; B9 Wargentindalen; B10 Floraberget; B11 Floraberget rookery; B12 Kinnvika; B13 Kinnvika  
C: C14 Westmanbukta; C15 Hansøya; C18 Storkobbodden  
D: D20 Birddalen SE; D21 Birddalen SW; D24 Depotodden; D25 Basisfjellet; D26 Svartnes-toppen  
E: E29 Planciusdalen; E30; E31 Gerritzodden; E32 Bergeseneseet; E33 Rijpelva; E36 Gjuvekallen; E38 Wordieodden; E39 Wordieodden; E40 Tyskehuset; E41 Beistelva; E42 Tjuvjomyra; E43 Kapp Wrede; E58 Planciusbukta; E59; E60 Wordiebukta  
G: G44 Innvika; G45 Ringgås-dalen; G46 Innvikdalen; G47 Vikodden; G48 Louise Richardfjellet; G49 Stjerneblomdalen; G50 Dokkvatna; G51 Dokken; G52 Polarklubben; G53 Godfreybukta; G55 Pollen

Usually on dry, and sometimes quite exposed areas.

*Saxifraga oppositifolia* L.

51 (84)

- A: A1 Kløverbladbukta; A2 Oxfordhalvøya; A3 Bodleybukta; A4 Rijpdalen; A5 North side of Wahlenbergfjorden  
B: B6 Triodalen; B7 Snaddvika; B8 Celsiusodden; B9 Wargentindalen; B10 Floraberget; B11 Floraberget rookery; B12 Kinnvika; B13 Kinnvika  
C: C14 Westmanbukta; C15 Hansøya; C17 Svartakstoppen; C18 Storkobbodden  
D: D20 Birddalen SE; D21 Birddalen SW  
E: E29 Planciusdalen; E31 Gerritzodden; E32 Bergeseneseet; E33 Rijpelva; E34 Kvitrevdalen; E36 Gjuvekallen; E38 Wordieodden; E39 Wordieodden; E40 Tyskehuset; E41 Beistelva; E42 Tjuvjomyra; E43 Kapp Wrede; E59; E60 Wordiebukta  
G: G45 Ringgås-dalen; G46 Innvikdalen; G47 Vikodden; G48 Louise Richardfjellet; G49 Stjerneblomdalen; G50 Dokkvatna; G51 Dokken; G52 Polarklubben; G53 Godfreybukta; G54 Isåa; G55 Pollen

Rather surprisingly not the most common saxifrage, and indeed rare in Brennevinsfjorden. Generally in small patches though widespread.

*Saxifraga rivularis* L.

52 (38)

- A: A1 Kløverbladbukta; A2 Oxfordhalvøya; A4 Rijpdalen; A5 North side of Wahlenbergfjorden  
B: B7 Snaddvika; B10 Floraberget; B11 Floraberget rookery  
C: C14 Westmanbukta; C15 Hansøya; C17 Svartakstoppen; C18 Storkobbodden  
D: D19 Sjølivhaugane; D20 Birddalen SE; D21 Birddalen SW; D22 Snotoppbreen moraine; D23 Depotodden; D24 Depotodden; D25 Basisfjellet; D26 Svartnes-toppen; D27; D28 Birdvågen

- E: E29 Planciusdalen; E30; E31 Gerritzodden; E32 Bergesenneset; E33 Rjipelva; E36 Gjuvekallen; E37 Stegdalen; E38 Wordieodden; E39 Wordieodden; E40 Tyskehuset; E42 Tjuvjomyra; E43 Kapp Wrede; E59 Planciusbukta  
 G: G44 Innvika; G45 Ringgåsaldalen; G46 Innvikdalen; G47 Vikodden; G48 Louise Richardfjellet; G49 Stjerneblomdalen; G50 Dokkvatna; G51 Dokken; G52 Polarklubben; G53 Godfreybukta; G54 Isåa; G55 Pollen; G56 Kapp Bruun

We use this for all specimens including possible *Saxifraga hyperborea*; we note that the separation depends on the lack of stolons in the latter species (JØRGENSEN et al. 1953 and RØNNING 1961). This is a very common species with a wide variety of habitat – we note its dominance on the moraines of Snøtoppbreen, and on the bird-cliff in Stegdalen.

*Saxifraga tenuis* (WAHLENB.) H. SM.

37 (28)

- A: A3 Bodleybukta; A5 North side of Wahlenbergfjorden  
 B: B7 Snaddvika; B9 Wargentindalen; B10 Floraberget; B11 Floraberget rookery  
 C: C14 Westmanbukta; C15 Hansøya; C17 Svartakstoppen  
 D: D21 Birddalen SW; D20 Birddalen SE; D24 Depotodden  
 E: E29 Planciusbukta; E30; E31 Gerritzodden; E32 Bergesenneset; E33 Rjipelva; E35 Kvitrevdalen; E36 Gjuvekallen; E37 Stegdalen; E38 Wordieodden; E39 Wordieodden; E40 Tyskehuset; E42 Tjuvjomyra; E43 Kapp Wrede; E59  
 G: G45 Ringgåsaldalen; G46 Innvikdalen; G48 Louise Richardfjellet; G49 Stjerneblomdalen; G52 Polarklubben; G54 Isåa

Damp slopes in contrast to *S. nivalis*. Generally common.

Rosaceae

*Dryas octopetala* L.

26 (32)

- A: A1 Kløverbladbukta; A2 Oxfordhalvøya; A3 Bodleybukta; A5 North side of Wahlenbergfjorden  
 B: B6 Triodalen; B7 Snaddvika; B8 Celsiusodden; B9 Wargentindalen; B10 Floraberget; B11 Floraberget rookery; B12 Kinnvika  
 C: C15 Hansøya; C17 Svartakstoppen  
 E: E29 Planciusdalen; E34 Kvitrevdalen; E36 Gjuvekallen; E38 Wordieodden; E37 Stegdalen; E39 Wordieodden; E40 Tyskehuset; E42 Tjuvjomyra; E59; E60 Wordiebukta

Not uncommon in dry gentle slopes, well exposed, though we have not found it in Brennevinsfjorden or in Duvefjorden (cf. record of MALMGREN (1864) from “Brandewijne Bay”). SUMMERHAYES and ELTON (1928, p. 258) comment “. . . . . . . . . . seems to indicate that *Dryas* is indifferent to the presence of calcium as such in the soil, but that it cannot tolerate an acid reaction.” This seems to accord with our finding in the granite areas of Rjipfjorden, and we attribute its lack from Duvefjorden to lack of sheltered sunny banks rather than to the nature of the rock.

*Potentilla hyparctica* MALTE

42 (36)

- A: A1 Kløverbladbukta; A2 Oxfordhalvøya; A3 Bodleybukta; A5 North side of Wahlenbergfjorden  
 B: B6 Triodalen; B7 Snaddvika; B8 Celsiusodden; B11 Floraberget rookery  
 C: C15 Hansøya; C17 Svartakstoppen; C18 Storkobbodden  
 D: D19 Sjølivhaugane; D20 Birddalen SE; D21 Birddalen SW; D23 Depotodden; D24 Depotodden; D25 Basisfjellet; D26 Svartnestoppen

- E: E29 Planciusbukta; E30; E31 Gerritzodden; E32 Bergesenneset; E33 Rijpelva; E34 Kvitrevdalen; E36 Gjuvekallen; E37 Stegdalen; E39 Wordieodden; E40 Tyskehuset; E59; E60 Wordiebukta  
G: G45 Ringgåsdaalen; G46 Innvikdalen; G48 Louise Richardfjellet; G49 Stjerneblomdalen; G51 Dokken; G52 Polarklubben; G55 Pollen

Usually on dry screes, not uncommon and quite often growing profusely on the rookeries.

*Potentilla pulchella* R. BR.

5 (2)

- A: A1 Kløverbladbukta; A2 Oxfordhalvøya; A5 North side of Wahlenbergfjorden  
C: C15 Hansøya

On dry exposed places, e. g. the southern part of Oxfordhalvøya in the company of *Poa abbreviata* and *Festuca baffinensis*. As seen from the plant list much less common than the foregoing species; recorded by SCHOLANDER from Kontaktberget.

Papaveraceae

*Papaver dahlianum* NORDH.

60 (90)

- A: A1 Kløverbladbukta; A2 Oxfordhalvøya; A3 Bodleybukta; A4 Rijpdalen; A5 North side of Wahlenbergfjorden  
B: B6 Triodalen; B7 Snaddvika; B8 Celsiusodden; B9 Wargentindalen; B10 Floraberget; B11 Floraberget rookery; B12 Kinnvika  
C: C14 Westmanbukta; C15 Hansøya; C17 Svartakstoppen  
D: D20 Birddalen SE; D21 Birddalen SW; D22 Snøtoppbreen moraine; D24 Depotodden; D25 Basisfjellet; D26 Svartnestoppen; D28 Birdvågen  
E: E29 Planciusdalen; E30; E31 Gerritzodden; E32 Bergesenneset; E33 Rijpelva; E34 Kvitrevdalen; E36 Gjuvekallen; E37 Stegdalen; E38 Wordieodden; E39 Wordieodden; E40 Tyskehuset; E41 Beistelva; E42 Tjuvjomyra; E43 Kapp Wrede; E58 Planciusbukta; E59; E60 Wordiebukta  
G: G44 Innvika; G45 Ringgåsdaalen; G46 Innvikdalen; G47 Vikodden; G48 Louise Richardfjellet; G49 Stjerneblomdalen; G50 Dokkvatna; G51 Dokken; G52 Polarklubben; G53 Godfreybukta; G54 Isåa; G55 Pollen; G57 Bêhounekodden (D.G.G.)

Cruciferae

*Braya purpurascens* (R. BR.) BUNGE

- A: A2 Oxfordhalvøya  
B: B6 Triodalen

Previously recorded by BRUUN from the eastern end of Bodleyelva; river sand is a typical habitat, but we have found it also on a clayey slope in Triodalen where it was flowering freely on July 24.

*Cardamine bellidifolia* L.

49 (42)

- A: A1 Kløverbladbukta; A2 Oxfordhalvøya; A3 Bodleybukta; A4 Rijpdalen; A5 North side of Wahlenbergfjorden  
B: B6 Triodalen; B7 Snaddvika; B8 Celsiusodden; B9 Wargentindalen; B10 Floraberget; B11 Floraberget rookery; B12 Kinnvika  
C: C14 Westmanbukta; C15 Hansøya; C18 Storkobbodden  
D: D19 Sjølivhaugane; D20 Birddalen SE; D21 Birddalen SW; D24 Depotodden; D25 Basisfjellet; D28 Birdvågen

- E: E29 Planciusdalen; E30; E31 Gerritzodden; E32 Bergesenneset; E33 Rjippelva; E34 Kvitrevdalen; E36 Gjuvekallen; E37 Stegdalen; E38 Wordieodden; E39 Wordieodden; E40 Tyskehuset; E42 Tjuvjomyra; E59
- G: G45 Ringgåsdaalen; G46 Innvikdalen; G47 Vikodden; G48 Louise Richardfjellet; G49 Stjerneblomdalen; G50 Dokkvatna; G51 Dokken; G52 Polarklubben; G53 Godfreybukta; G55 Pollen; G57 Bøhounekodden

An almost ubiquitous species which is able to survive the most unfavourable habitats such as low exposed dry screes. According to SCHOLANDER it shuns the dolomite though we found it along with *Dryas* near Kinnvika.

*Cardamine nymani* GAND.

1 (4)

- E: E42 Tjuvjomyra

We found this only among wet moss at the above locality though it has been recorded by SCHOLANDER from Floraberget and from Snaddvika, and by BRUUN from Oxfordhalvøya. The plant was locally abundant though occurring only as sterile rosettes which are characteristic of this habitat in high-arctic areas (e.g. SØRENSEN 1948). It was accompanied by *Saxifraga hirculus* and *Dupontia fisheri*.

*Cochlearia officinalis* L.

39 (66)

- A: A2 Oxfordhalvøya; A3 Bodleybukta; A5 North side of Wahlenbergfjorden
- B: B6 Triodalen; B8 Celsiusodden; B9 Wargentindalen; B11 Floraberget rookery; B12 Kinnvika; B13 Kinnvika
- C: C 14 Westmanbukta; C15 Hansøya
- D: D19 Sjølivhaugane; D23 Depotodden; D24 Depotodden; D25 Basisfjellet; D26 Svartnes-toppen
- E: E29 Planciusdalen; E30; E32 Bergesenneset; E31 Gerritzodden; E36 Gjuvekallen; E38 Wordieodden; E40 Tyskehuset; E42 Beistelva; E43 Kapp Wrede; E58 Planciusbukta; E59
- G: G45 Ringgåsdaalen; G47 Vikodden; G48 Louise Richardfjellet; G49 Stjerneblomdalen; G51 Dokken; G52 Polarklubben; G54 Isåa; G56 Kapp Bruun (D.G.G.)

This strongly nitrophilous species is specially represented in the great rookeries by the var. *groenlandica* (L.) GEL.; in such localities the plant consists of robust freely flowering rosettes and at Depotodden and in Sætherbukta we ate large amounts of this material prepared in excellent manner by Mr. TAKSDAL. In Rjippfjorden, however, the plant is much less common and is found near the sea on wet low-lying ground where frequently we met with only young non-flowering rosettes of the above material. We have collected virtually no material, but we have no evidence for the presence of var. *arctica* in Nordaustlandet. This accords with LYNGE's finding on Novaya Zemlya.

The *Draba* material has been determined by Mr. D. P. SPICER, University of Leicester; in due course he will publish a full account of his taxonomic studies, and some of the present determinations may subsequently be altered. He has based his work partly on the paper of RØNNING (1961) and partly on Mrs. EKMAN's older work; we use the names given by RØNNING (1964) here, but replacing *Draba cinerea* by *Draba arctica* (BÖCHER, HOLMEN and JAKOBSEN, 1966).

*Draba alpina* L.

- B: B9 Wargentindalen; B10 Floraberget  
E: E34 Kvitrevdalen; E36 Gjuvekallen; E42 Tjuvjomyra  
G: G46 Innvikdalen; G47 Vikodden; G51 Dokken

*Draba arctica* J. VAHL ssp. *groenlandica* (EKMAN) BÖCHER

- B: B11 Floraberget rookery

This, the only locality known for the species in Nordaustlandet, has already been noted by SCHOLANDER.

*Draba bellii* HOLM.

- A: A1 Kløverbladbukta; A2 Oxfordhalvøya; A5 North side of Wahlenbergfjorden  
B: B6 Triodalen; B9 Wargentindalen; B12 Kinnvika; B13 Kinnvika  
C: C14 Westmanbukta  
E: E41 Beistelva; E42 Tjuvjomyra; E59

*Draba daurica* DC.

- D: D23 Depotodden; D24 Depotodden

This species seems to be new to Nordaustlandet but is obviously very rare, being confined to an area which has an especially rich *Draba* flora.

*Draba gredimii* EKMAN

- A: A1 Kløverbladbukta; A3 Bodleybukta; A5 North side of Wahlenbergfjorden  
B: B6 Triodalen; B8 Celsiusodden; B11 Floraberget rookery  
C: C17 Svartakstoppen  
D: D25 Basisfjellet; D26 Svartnestoppen  
E: E30; E32 Bergesenneset; E34 Kvitrevdalen; E36 Gjuvekallen; E37 Stegdalen; E38 Wordieodden; E39 Wordieodden; E40 Tyskehuset; E59  
G: G45 Ringgåsdaalen; G46 Innvikdalen; G47 Vikodden; G49 Stjerneblomdalen

Though this species is new to Nordaustlandet, it has been described from Vestspitsbergen on several occasions, recently by SUNDING (1961), and by SVEDBERG (1961); older records are given by SEIDENFADEN and SØRENSEN (1937), and a discussion of its interesting distribution has been given by RØNNING (1961).

*Draba lactea* ADAMS

- A: A1 Kløverbladbukta; A2 Oxfordhalvøya; A3 Bodleybukta; A5 North side of Wahlenbergfjorden  
B: B7 Snaddvika; B10 Floraberget; B11 Floraberget rookery  
C: C14 Westmanbukta; C15 Hansøya; C17 Svartakstoppen  
D: D20 Birddalen SE; D21 Birddalen SW; D24 Depotodden; D26 Svartnestoppen  
E: E30; E31 Gerri+zodden; E36 Gjuvekallen; E37 Stegdalen; E38 Wordieodden; E39 Wordieodden; E40 Tyskehuset; E42 Tjuvjomyra; E59  
G: G44 Innvika; G45 Ringgåsdaalen; G46 Innvikdalen; G47 Vikodden; G48 Louise Richardfjellet; G49 Stjerneblomdalen; G52 Polarklubben; G57 Bëhounekodden (D.G.G.)

*Draba micropetala* HOOK.

- A: A1 Kløverbladbukta  
B: B6 Triodalen; B8 Celsiusodden; B11 Floraberget rookery  
C: C15 Hansøya; C17 Svartakstoppen; C18 Storkobbodden  
D: D21 Birddalen SW; D24 Depotodden; D25 Basisfjellet; D26 Svartnestoppen  
E: E30; E32 Bergesenneset; E34 Kvitrevdalen; E36 Gjuvekallen; E37 Stegdalen; E38 Wordieodden; E39 Wordieodden; E40 Tyskehuset; E42 Tjuvjomyra; E59



G: G45 Ringgåsdaalen; G46 Innvikdalen; G47 Vikodden; G48 Louise Richardfjellet; G49 Stjerneblomdalen; G52 Polarklubben; G57 Bēhounekodden (D.G.G.)

In this we have included *Draba oblongata* R. BR.

*Draba nivalis* LILJEBL.

B: B10 Floraberget; B11 Floraberget rookery

C: C17 Svartakstoppen

D: D21 Birddalen SW; D24 Depotodden

E: E34 Kvitrevdalen; E36 Gjuvekallen; E37 Stegdalen; E59

G: G46 Innvikdalen; G48 Louise Richardfjellet; G49 Stjerneblomdalen; G51 Dokken; G52 Polarklubben

*Draba norvegica* GUNN.

G: G52

This extremely rare species has already been recorded by DAHL from Depotodden under the name *Draba rupestris*; in our locality it was growing on a very wet south-west facing slope together with *Melandrium apetalum* which was as abundant and luxuriant as I have seen it in Nordaustlandet.

*Draba subcapitata* SIMM.

A: A1 Kløverbladbukta; A3 Bodleybukta; A5 North side of Wahlenbergfjorden

B: B6 Triodalen; B7 Snaddvika; B9 Wargentindalen; B11 Floraberget rookery; B12 Kinnvika

C: C15 Hansøya; C17 Svartakstoppen; C18 Storkobbodden

D: D20 Birddalen SE; D21 Birddalen SW; D22 Snøtoppbreen moraine; D24 Depotodden; D25 Basisfjellet

E: E30; E31 Gerritzodden; E32 Bergesenneset; E36 Gjuvekallen; E37 Stegdalen; E40 Tyskehuset; E42 Tjuvjomyra; E43 Kapp Wrede

G: G45 Ringgåsdaalen; G52 Polarklubben; G55 Pollen; G57 Bēhounekodden (D.G.G.)

Caryophyllaceae  
*Cerastium arcticum* LGE.  
62 (68)

A: A1 Kløverbladbukta; A2 Oxfordhalvøya; A3 Bodleybukta; A5 North side of Wahlenbergfjorden

B: B6 Triodalen; B7 Snaddvika; B8 Celsiusodden; B9 Wargentindalen; B10 Floraberget; B11 Floraberget rookery; B12 Kinnvika; B13 Kinnvika

C: C14 Westmanbukta; C15 Hansøya; C17 Svartakstoppen; C18 Storkobbodden

D: D19 Sjølivhaugane; D20 Birddalen SE; D21 Birddalen SW; D22 Snøtoppbreen endmoraine; D23 Depotodden; D24 Depotodden; D25 Basisfjellet; D26 Svartnestoppen; D27

E: E29 Planciusdalen; E30; E31 Gerritzodden; E32 Bergesenneset; E33 Rjipelva; E34 Kvitrevdalen; E36 Gjuvekallen; E37 Stegdalen; E39 Wordieodden; E40 Tyskehuset; E41 Beistelva; E42 Tjuvjomyra; E43 Kapp Wrede; E58 Planciusbukta; E59; E60 Wordiebukta

G: G44 Innvika; G45 Ringgåsdaalen; G46 Innvikdalen; G47 Vikodden; G48 Louise Richardfjellet; G49 Stjerneblomdalen; G50 Dokkvatna; G51 Dokken; G52 Polarklubben; G54 Isåa; G55 Pollen; G57 Bēhounekodden (D.G.G.)

We use this in the broad sense for all races. A species with wide range of tolerance though apparently responding well also to high nitrogen.

*Cerastium regelii* OSTF.

53 (60)

- A: A1 Kløverbladbukta; A2 Oxfordhalvøya; A3 Bodleybukta; A4 Rijpdalen; A5 North side of Wahlenbergfjorden  
B: B6 Triodalen; B7 Snaddvika; B8 Celsiusodden; B9 Wargentindalen; B10 Floraberget; B11 Floraberget rookery; B13 Kinnvika  
C: C14 Westmanbukta; C15 Hansøya; C17 Svartakstoppen  
D: D20 Birddalen SE; D21 Birddalen SW; D24 Depotodden  
D: D20 Birddalen SE; D21 Birddalen SW; D24 Depotodden  
E: E29 Planciusdalen; E30; E31 Gerritzodden; E32 Bergesenneset; E33 Rjipelva; E34 Kvitrevdalen; E35 Kvitrevdalen; E38 Wordieodden; E39 Wordieodden; E40 Tyskehuset; E41 Beistelva; E42 Tjuvjomyra; E43 Kapp Wrede; E58 Planciusbukta; E59; E60 Wordiebukta  
G: G44 Innvika; G45 Ringgåsdaalen; G46 Innvikdalen; G47 Vikodden; G48 Louise Richardfjellet; G49 Stjerneblomdalen; G51 Dokken; G53 Godfreybukta; G54 Isåa; G55 Pollen

Very variable in appearance depending on habitat – usually sterile except in favourable localities such as the bed of Bodleyelva and on a small sheltered bank on the western shore of Finn Malmgrenfjorden. We cannot do better than quote the remarks of LYNGE (1923) in speaking of his Novaya Zemlya material. “It is a very hard plastic species that adapts itself wonderfully to its different substrata: on moist cold soil it develops the well known compact, often flowerless f. *caespitosa* MALMGR. If the soil is very unfavourable, only a few leaves are formed each year, and the persistent leaves from the preceding year are very conspicuous (always infested with microfungi). On the flower-hills the dense caespites relax, and branched, often many-flowered (normally 3–5, rarely up to 6–8 flowers each) stems are formed. It then attains some resemblance to *C. alpinum*.”

*Melandrium apetalum* (L.) FENZL ssp. *arcticum* (FR.) HULT.

21 (2)

- A: A1 Kløverbladbukta; A2 Oxfordhalvøya; A3 Bodleybukta; A5 North side of Wahlenbergfjorden  
B: B8 Celsiusodden; B9 Wargentindalen; B10 Floraberget  
C: C15 Hansøya; C17 Svartakstoppen  
D: D20 Birddalen SE  
E: E34 Kvitrevdalen; E36 Gjuvekallen; E37 Stegdalen; E39 Wordieodden; E40 Tyskehuset  
G: G47 Vikodden; G48 Louise Richardfjellet; G52 Polarklubben

Wet or at least damp slopes, with usually a favourable exposure – often associated with *Lycopodium selago* and *Carex misandra*.

*Minuartia biflora* (L.) SCHINZ. and THELL.

7

- A: A3 Bodleybukta  
B: B6 Triodalen; B9 Wargentindalen (M.T.); B10 Floraberget  
D: D21 Birddalen SW  
E: E37 Stegdalen

A fairly rare species found only on sunny south facing soil banks in sheltered localities.

*Minuartia rossii* (R. BR.) GRAEBN.

Not recorded by us, though described by SCHOLANDER from Rundhaugen, and by MALMGREN (1864) from Idunfjellet, both in Wahlenbergfjorden.

*Minuartia rubella* (WAHLENB.) HIERN.

39 (40)

- A: A1 Kløverbladbukta; A2 Oxfordhalvøya; A3 Bodleybukta; A5 North side of Wahlenbergfjorden  
B: B6 Triodalen; B7 Snaddvika; B8 Celsiusodden; B9 Wargentindalen; B11 Floraberget rookery; B12 Kinnvika; B13 Kinnvika  
C: C14 Westmanbukta; C15 Hansøya; C17 Svartakstoppen  
D: D20 Birddalen SE; D24 Depotodden; D25 Basisfjellet  
E: E29 Planciusdalen; E30; E32 Bergeseneseet; E36 Gjuvekallen; E37 Stegdalen; E38 Wordieodden; E39 Wordieodden; E40 Tyskehuset; E41 Beistelva; E42 Tjuvjomyra; E43 Kapp Wrede; E58 Planciusbukta; E59  
G: G46 Innvikdalen; G49 Stjerneblomdalen; G51 Dokken; G52 Polarklubben; G54 Isåa; G55 Pollen

A fairly common species usually preferring dry habitats. Some of the specimens collected near Kinnvika are completely glabrous but the sepals are clearly 3-veined and the leaves fleshy and prominently 3-veined; we therefore refer this to the above rather than to *M. stricta*.

*Sagina intermedia* FENZL.

39 (24)

- A: A1 Kløverbladbukta; A3 Bodleybukta; A5 North side of Wahlenbergfjorden  
B: B6 Triodalen; B7 Snaddvika; B9 Wargentindalen; B10 Floraberget; B11 Floraberget rookery  
C: C14 Westmanbukta; C15 Hansøya; C17 Svartakstoppen  
D: D20 Birddalen SE; D21 Birddalen SW; D24 Depotodden  
E: E29 Planciusdalen; E30; E32 Bergeseneseet; E33 Rijpelva; E38 Wordieodden; E39 Wordieodden; E40 Tyskehuset; E41 Beistelva; E42 Tjuvjomyra; E58 Planciusbukta  
G: G45 Ringgåsaldalen; G46 Innvikdalen; G47 Vikodden; G48 Louise Richardfjellet; G49 Stjerneblomdalen; G51 Dokken; G52 Polarklubben; G53 Godfreybukta; G54 Isåa; G55 Pollen

Usually near the sea but found in the drift sands at the eastern extremity of Dokken.

*Silene acaulis* (L.) JACQ.

18

- A: A1 Kløverbladbukta; A2 Oxfordhalvøya; A3 Bodleybukta; A5 North side of Wahlenbergfjorden  
B: B8 Celsiusodden; B10 Floraberget  
C: C17 Svartakstoppen  
D: D21 Birddalen SW  
E: E39 Wordieodden; E40 Tyskehuset; E59  
G: G45 Ringgåsaldalen; G46 Innvikdalen; G48 Louise Richardfjellet; G49 Stjerneblomdalen

This plant is given in a list prepared for 'Brandewijnebay' by NATHORST (1883) but as noted by SCHOLANDER (1934), no material to support this claim has been found. It was subsequently reported by KEITH from 'Brandy Bay', 8, 12/8/1936 (Specimen in British Museum). The first report with detailed localities is that of BRUUN 1958. It has been found by us in favourable localities over most of the area; we have not found it in Duvefjorden north of Louise Richardfjellet.

*Stellaria crassipes* HULT.

63 (60)

- A: A1 Kløverbladbukta; A2 Oxfordhalvøya; A3 Bodleybukta; A4 Rijpdalen; A5 North side of Wahlenbergfjorden  
B: B6 Triodalen; B7 Snaddvika; B8 Celsiusodden; B9 Wargentindalen; B10 Floraberget; B11 Floraberget rookery; B12 Kinnvika  
C: C14 Westmanbukta; C15 Hansøya; C17 Svartakstoppen; C18 Storkobbodden  
D: D20 Birddalen SE; D21 Birddalen SW; D22 Snotoppbreen endmoraine; D24 Depotodden; D25 Basisfjellet; D26 Svartnestoppen; D28 Birdvågen  
E: E29 Planciusdalen; E30; E31 Gerritzodden; E32 Bergesenneset; E33 Rijpelva; E34 Kvitrevdalen; E35 Kvitrevdalen; E36 Gjuvekallen; E37 Stegdalen; E38 Wordieodden; E39 Wordieodden; E40 Tyskehuset; E41 Beistelva; E42 Tjuvjomyra; E43 Kapp Wrede; E58 Planciusbukta; E59; E60 Wordiebukta  
G: G44 Innvika; G45 Ringgåsaldalen; G46 Innvikdalen; G47 Vikodden; G48 Louise Richardfjellet; G49 Stjerneblomdalen; G50 Dokkvatna; G51 Dokken; G52 Polarklubben; G53 Godfreybukta; G54 Isåa; G55 Pollen

A common species which does not generally flower except in favourable localities being in this respect like *Cerastium regelii*. We have noted flowering specimens on the north side of Wahlenbergfjorden, in Stegdalen, and near Bergesenneset.

*Stellaria humifusa* ROTTB.

4 (4)

- B: B11 Floraberget rookery  
D: D24 Depotodden; D27 Svartnestoppen  
G: G49 Stjerneblomdalen

An extremely rare species usually in sheltered areas near the sea; the locality near Svartneset appears to be a northern limit.

Polygonaceae

*Koenigia islandica* L.

Not found by us but recorded from Waldenøya by GREGORY in 7/8/1896 (Specimen in British Museum); this is a new species for Nordaustlandet.

*Oxyria digyna* (L.) HILL

45 (34)

- A: A1 Kløverbladbukta; A2 Oxfordhalvøya; A3 Bodleybukta; A5 North side of Wahlenbergfjorden  
B: B6 Triodalen; B7 Snaddvika; B8 Celsiusodden; B9 Wargentindalen; B10 Floraberget; B11 Floraberget rookery; B12 Kinnvika  
C: C14 Westmanbukta; C15 Hansøya; C17 Svartakstoppen  
D: D19 Sjølivhaugane; D20 Birddalen SE; D21 Birddalen SW; D24 Depotodden; D25 Basisfjellet  
E: E29 Planciusdalen; E32 Bergesenneset; E33 Rijpelva; E34 Kvitrevdalen; E36 Gjuvekallen; E37 Stegdalen; E38 Wordieodden; E39 Wordieodden; E40 Tyskehuset; E41 Beistelva; E42 Tjuvjomyra; E58 Planciusbukta; E59; E60 Wordiebukta  
G: G45 Ringgåsaldalen; G46 Innvikdalen; G47 Vikodden; G48 Louise Richardfjellet; G49 Stjerneblomdalen; G51 Dokken; G52 Polarklubben

Usually in relatively sheltered localities which are not too dry. Not common in Duvefjorden. In exposed areas the plants are deep red and almost prostrate, in favourable sites the plants are tall and green, e.g. Wordieodden 12–25 cm in height.

*Polygonum viviparum* L.

37 (22)

- A: A1 Kløverbladbukta; A2 Oxfordhalvøya; A3 Bodleybukta; A5 North side of Wahlenbergfjorden  
B: B6 Triodalen; B7 Snaddvika; B8 Celsiusodden; B9 Wargentindalen; B10 Floraberget; B11 Floraberget rookery; B12 Kinnvika  
C: C15 Hansøya; C17 Svartakstoppen  
D: D20 Birddalen SE; D21 Birddalen SW; D24 Depotodden; D25 Basisfjellet  
E: E34 Kvitrevdalen; E35 Kvitrevdalen; E36 Gjuvekallen; E37 Stegdalen; E39 Wordieodden; E40 Tyskehuset; E43 Kapp Wrede; E59; E60 Wordiebukta  
G: G45 Ringgåsdaalen; G46 Innvikdalen; G48 Louise Richardfjellet; G49 Stjerneblomdalen; G51 Dokken; G52 Polarklubben

As SCHOLANDER points out, usually in favourable soily areas, sometimes up to about 12 cm in height.

Salicaceae

*Salix polaris* WAHLENB.

55 (52)

- A: A1 Kløverbladbukta; A2 Oxfordhalvøya; A3 Bodleybukta; A5 North side of Wahlenbergfjorden  
B: B6 Triodalen; B7 Snaddvika; B8 Celsiusodden; B9 Wargentindalen; B10 Floraberget; B11 Floraberget rookery; B12 Kinnvika; B13 Kinnvika  
C: C14 Westmanbukta; C15 Hansøya; C17 Svartakstoppen; C18 Storkobbodden  
D: D19 Sjølivhaugane; D20 Birddalen SE; D21 Birddalen SW; D24 Depotodden; D25 Basisfjellet; D26 Svartnestoppen; D28 Birdvågen  
E: E29 Planciusdalen; E30; E31 Gerritzodden; E32 Bergesenneset; E33 Rjipelva; E37 Stegdalen; E38 Wordieodden; E39 Wordieodden; E40 Tyskehuset; E41 Beistelva; E42 Tjuvjomyra; E43 Kapp Wrede; E58 Planciusbukta; E59; E60 Wordiebukta  
G: G45 Ringgåsdaalen; G46 Innvikdalen; G47 Vikodden; G48 Louise Richardfjellet; G49 Stjerneblomdalen; G50 Dokkvatna; G51 Dokken; G52 Polarklubben; G57 Bêhounekodden (D.G.G.)

Scrophulariaceae

*Pedicularis hirsuta* L.

17 (8)

- A: A1 Kløverbladbukta; A2 Oxfordhalvøya; A3 Bodleybukta; A5 North side of Wahlenbergfjorden  
B: B11 Floraberget rookery  
C: C17 Svartakstoppen  
D: D19 Sjølivhaugane; D21 Birddalen SW; D24 Depotodden  
E: E33 Rjipelva; E36 Gjuvekallen; E39 Wordieodden; E59  
G: G48 Louise Richardfjellet; G51 Dokken; G52 Polarklubben

On sheltered scree slopes, usually fairly high up and often quite prolific in growth, each plant with several flowering stems, e.g. Wordieodden, and a small rookery on east side of Godfreybukta, not listed above.

Compositae  
*Erigeron eriocephalus* J. VAHL

1

D: D24 Depotodden

Found by us only in the same locality recorded by DAHL (1937), on dry sunny screes under the granite/dolerite boundary on Basisfjellet, in the company of *Alopecurus alpinus*.

*Taraxacum arcticum* (TRAUTV.) DAHLST.

24 (4)

A: A1 Kløverbladbukta; A5 North side of Wahlenbergfjorden

B: B10 Floraberget; B11 Floraberget rookery

C: C17 Svartakstoppen

D: D20 Birddalen SE; D21 Birddalen SW; D24 Depotodden; D25 Basisfjellet

E: E30; E34 Kvitrevdalen; E36 Gjuvekallen; E37 Stegdalen; E39 Wordieodden; E40 Tyskehuset; E59; E60 Wordiebukta

G: G46 Innvikdalen; G48 Louise Richardfjellet; G51 Dokken; G52 Polarklubben

Usually assumed nitrophilous but sometimes there are today no birds on localities where this species is prolific, e.g. Kløverbladbukta, Gjuvekallen.

MONOCOTYLEDONEAE

Juncaceae

*Juncus biglumis* L.

34 (26)

A: A1 Kløverbladbukta; A2 Oxfordhalvøya; A3 Bodleybukta; A5 North side of Wahlenbergfjorden

B: B6 Triodalen; B8 Celsiusodden; B9 Wargentindalen; B10 Floraberget; B11 Floraberget rookery; B12 Kinnvika

C: C14 Westmanbukta

E: E29 Planciusdalen; E32 Bergeseneseet; E33 Rjipelva; E35 Kvitrevdalen; E38 Wordieodden; E40 Tyskehuset; E41 Beistelva; E42 Tjuvjomyra; E59; E60 Wordiebukta

G: G45 Innvika; G46 Ringgåsaldalen; G49 Stjerneblomdalen; G51 Dokken; G52 Polarklubben; G53 Godfreybukta; G55 Pollen

A fairly common species in wet muddy places as far as the exposed south-west corner of Pollen. A late flowering species and often quite diminutive, less than 5 cm in height.

*Luzula arctica* BLYTT

46 (38)

A: A1 Kløverbladbukta; A2 Oxfordhalvøya; A3 Bodleybukta; A5 North side of Wahlenbergfjorden

B: B6 Triodalen; B7 Snaddvika; B8 Celsiusodden; B11 Floraberget rookery; B12 Kinnvika

C: C14 Westmanbukta; C15 Hansøya; C17 Svartakstoppen

D: D19 Sjølivhaugane; D20 Birddalen SE; D21 Birddalen SW; D23 Depotodden; D24 Depotodden; D28 Birdvågen

E: E29 Planciusdalen; E30; E31 Gerritzodden; E32 Bergeseneseet; E33 Rjipelva; E34 Kvitrevdalen; E35 Kvitrevdalen; E38 Wordieodden; E39 Wordieodden; E40 Tyskehuset; E42 Tjuvjomyra; E58 Planciusbukta; E59; E60 Wordiebukta

G: G45 Ringgåsdaalen; G46 Innvikdalen; G48 Louise Richardfjellet; G49 Stjerneblomdalen; G50 Dokkvatna; G51 Dokken; G53 Godfreybukta; G54 Isåa

Occupies rather wetter localities than *L.confusa* – densely tufted and usually altogether a smaller plant except in the characteristic broad leaves.

*Luzula confusa* (HARTM.) LINDEBL.

54 (58)

- A: A1 Kløverbladbukta; A2 Oxfordhalvøya; A3 Bodleybukta; A5 North side of Wahlenbergfjorden  
B: B6 Triodalen; B7 Snaddvika; B8 Celsiusodden; B10 Floraberget; B11 Floraberget rookery  
C: C14 Westmanbukta; C15 Hansøya; C17 Svartakstoppen; C18 Storkobbodden  
D: D19 Sjølvhaugane; D20 Birddalen SE; D21 Birddalen SW; D22 Snøtoppbreen moraine; D24 Depotodden; D25 Basisfjellet; D26 Svartnestoppen; D28 Birdvågen  
E: E29 Planciusdalen; E30; E31 Gerritzodden; E32 Bergeseneseet; E33 Rijpelva; E36 Gjuvekallen; E37 Stegdalen; E39 Wordieodden; E40 Tyskehuset; E42 Tjuvjomyra; E43 Kapp Wrede; E58 Planciusbukta; E59  
G: G44 Innvika; G45 Ringgåsdaalen; G46 Innvikdalen; G47 Vikodden; G48 Louise Richardfjellet; G49 Stjerneblomdalen; G50 Dokkvatna; G51 Dokken; G52 Polarklubben; G53 Godfreybukta; G54 Isåa; G55 Pollen; G56 Kapp Bruun (D.G.G.); G57 Bêhounekodden (D.G.G.)

An extremely robust species occupying even the most inhospitable areas such as the low-lying granite screes in Birdvågen and the inner part of Rijpfjorden. Prefers dry areas.

Cyperaceae

*Carex maritima* GUNN.

1 (2)

- B: B11 Floraberget rookery

This, our only locality is the one recorded also by SCHOLANDER.

*Carex misandra* R. BR.

32 (16)

- A: A1 Kløverbladbukta; A2 Oxfordhalvøya; A3 Bodleybukta; A5 North side of Wahlenbergfjorden  
B: B6 Triodalen; B8 Celsiusodden; B9 Wargentindalen; B10 Floraberget  
C: C15 Hansøya; C16; C17 Svartakstoppen  
E: E29 Planciusdalen; E32 Bergeseneseet; E34 Kvitrevdalen; E35 Kvitrevdalen; E36 Gjuvekallen; E37 Stegdalen; E39 Wordieodden; E40 Tyskehuset; E42 Tjuvjomyra; E59; E60 Wordiebukta  
G: G45 Ringgåsdaalen; G46 Innvikdalen; G47 Vikodden; G48 Louise Richardfjellet; G49 Stjerneblomdalen; G51 Dokken; G52 Polarklubben

Usually on damp or even wet sheltered areas throughout the area, though as yet missing from Brennevinsfjorden. Often in the same locality as *Lycopodium selago* and *Melandrium apetalum*.

*Carex nardina* FR.

13 (8)

- A: A1 Kløverbladbukta; A2 Oxfordhalvøya; A3 Bodleybukta; A5 North side of Wahlenbergfjorden  
B: B7 Snaddvika; B8 Celsiusodden; B9 Wargentindalen; B10 Floraberget  
C: C15 Hansøya; C17 Svartakstoppen  
D: D21 Birddalen SW  
G: G48 Louise Richardfjellet

Found only on dry sunny scree slopes – rare and usually represented only by a small number of plants.

*Carex rupestris* ALL.

9 (2)

- A: A1 Kløverbladbukta; A2 Oxfordhalvøya; A3 Bodleybukta; A5 North side of Wahlenbergfjorden  
E: E39 Wordieodden; E40 Tyskehuset; E42 Tjuvjomyra; E59; E60 Wordiebukta

Dense mats in very favourable localities, forming in Oxfordhalvøya and Stegdalen extensive areas of *Dryas* fjeldmark. Although a rare species we have found it significantly more often than might have been expected from SCHOLANDER's single locality in Murchisonfjorden – from which we have not recorded it!

*Carex subspathacea* WORMSK.

3

- B: B8 Celsiusodden (T.H.)  
E: E35 Kvitrevdalen; E38 Wordieodden

We have found only non-flowering material, in very dense mats of characteristically brown colour with long creeping rhizomes. In damp though non-littoral localities. Only previous record is that of DAHL (1937) from the inner part of Rjippfjorden.

*Eriophorum scheuchzeri* HOPPE

4 (2)

- A: A1 Kløverbladbukta; A2 Oxfordhalvøya  
E: E35 Kvitrevdalen  
G: G51 Dokken

In Wahlenbergfjorden in wet marshy places with standing water though the other localities are rather less wet. Recorded by DAHL (1937) also from the inner part of Rjippfjorden, probably the same locality as ours. The Dokken record appears to be a northern limit.

Gramineae

*Alopecurus alpinus* SM.

13 (22)

- A: A1 Kløverbladbukta; A2 Oxfordhalvøya  
B: B6 Triodalen; B11 Floraberget rookery  
C: C14 Westmanbukta; C17 Svartakstoppen  
D: D23 Depotodden; D24 Depotodden



E: E38 Wordieodden  
G: G45 Ringgåsdaalen; G52 Polarklubben

Usually in wet places, often associated with rookeries – wide spread though not common.

*Deschampsia alpina* (L.) R. and S.

22 (2)

A: A1 Kløverbladbukta; A2 Oxfordhalvøya; A3 Bodleybukta; A5 North side of Wahlenbergfjorden  
B: B9 Wargentindalen  
E: E33 Rjippelva; E35 Kvitrevdalen; E40 Tyskehuset; E41 Beistelva; E42 Tjuvjomyra; E59; E60 Wordiebukta  
G: G45 Ringgåsdaalen; G46 Innvikdalen; G47 Vikodden; G49 Stjerneblomdalen; G51 Dokken

Usually in very wet places, or in gently moving water. In soily areas with a favourable exposure – not uncommon except apparently in Brennevinsfjorden. This may be due to lack of suitable habitats. Likewise from Brennevinsfjorden we have failed to record *Ranunculus hyperboreus* which also favours similar places – the latter has, however, been recorded from Depotodden by BRUUN. Substantially more common than indicated by SCHOLANDER.

*Dupontia fisheri* R. BR.

16 (18)

A: A1 Kløverbladbukta; A2 Oxfordhalvøya; A5 North side of Wahlenbergfjorden  
B: B11 Floraberget rookery  
D: D24 Depotodden  
E: E33 Rjippelva; E35 Stegdalen; E38 Wordieodden; E40 Tyskehuset; E41; Beistelva; E42 Tjuvjomyra; E59; E60 Wordiebutka

Usually in damp or wet localities, and relatively common only in the inner part of Rjippfjorden and in Wahlenbergfjorden. Recorded by DAHL (1937) from the western side of Duvefjorden.

Since SCHOLANDER's paper the *Festuca* genus has been dealt with by several authors and two further species defined, viz. *Festuca baffinensis* POLUNIN and *Festuca hyperborea* HOLMEN. A very clear account of the Svalbard species and a key has been given by RØNNING (1961). Of these species we have found all except *Festuca hyperborea* which is known from Peary Land although it is fairly rare; it well may be, however, that we have overlooked this species and confounded it with *F. brachyphylla*. Dr. RØNNING has kindly informed us that existing Nordaustlandet material has been re-examined and that *F. baffinensis* has been found in material collected by SCHOLANDER on Floraberget and by BRUUN in the inner part of Wahlenbergfjorden. It will be seen that these are the only two localities we have for this species. In view of the relatively wide-spread occurrence of *F. vivipara*, found in all areas except Wahlenbergfjorden and Murchisonfjorden, we were surprised that it had not already been described from Nordaustlandet; it has recently been added to the vascular flora of Peary Land (FREDSKILD 1966).

*Festuca baffinensis* POLUNIN

12

- A: A2 Oxfordhalvøya  
B: B11 Floraberget rookery

Like all members of the genus seems to prefer dry localities; our two localities are merely those already noted by BRUUN and SCHOLANDER.

*Festuca brachyphylla* SCHULTES

8 (8)

- A: A1 Kløverbladbukta; A2 Oxfordhalvøya; A3 Bodleybukta; A5 North side of Wahlenbergfjorden  
B: B6 Triodalen; B8 Celsiusodden; B9 Wargentindalen  
C: C15 Hansøya

*Festuca richardsonii* R. BR. ssp. *cryophila* (KREZ. & BOBR.) L. & L.

2 (8)

- B: B11 Floraberget rookery  
C: C17 Svartakstoppen

*Festuca vivipara* (L.) SM.

- C: C17 Svartakstoppen  
D: D21 Birddalen SW  
E: E36 Gjuvekallen; E37 Stegdalen; E40 Tyskehuset; E59  
G: G51 Dokken; G52 Polarklubben

In 1965 found by us on screes below the dolerite sill in Jäderinfjorden – in 1966 also in all northern fjords usually on dry screes and almost dominant on Gjuvekallen. From the dolerite sill in Birddalen we have only the withered but characteristic straws from the previous year.

*Phippisia algida* (SOLAND.) R. BR.

59 (74)

- A: A1 Kløverbladbukta; A2 Oxfordhalvøya; A4 Rjipdalen; A5 North side of Wahlenbergfjorden  
B: B6 Triodalen; B7 Snaddvika; B9 Wargentindalen; B10 Floraberget; B11 Floraberget rookery; B12 Kinnvika; B13 Kinnvika  
C: C14 Westmanbukta; C15 Hansøya; C17 Svartakstoppen; C18 Storkobbodden  
D: D19 Sjølivhaugane; D21 Birddalen SW; D22 Snøtoppbreen moraine; D23 Depotodden; D24 Depotodden; D25 Basisfjellet; D26 Svartnestoppen; D27; D28 Birdvågen  
E: E29 Planciusdalen; E30; E32 Bergesenneset; E33 Rjipelva; E35 Kvitrevdalen; E36 Gjuvekallen; E38 Wordieodden; E40 Tyskehuset; E42 Tjuvjomyra; E43 Kapp Wrede; E58 Planciusbukta; E59; E60 Wordiebukta  
G: G44 Innvika; G45 Ringgåsaldalen; G46 Innvikdalen; G47 Vikodden; G48 Louise Richardfjellet; G49 Stjerneblomdalen; G50 Dokkvatna; G51 Dokken; G52 Polarklubben; G53 Godfreybukta; G54 Isåa; G55 Pollen; G56 Kapp Bruun (D.G.G.); G57 Bêhounekodden (D.G.G.)

An almost ubiquitous species usually in wet places – responds strongly to a high nitrogen supply, the rookery on Gjuvekallen being dominated by this species and *Saxifraga rivularis*.

*Phippsia concinna* (TH. FR.) LINDB.

4 (8)

- B: B9 Wargentindalen; B10 Floraberget  
C: C16 Mainland south of Hansøya  
E: E43 Kapp Wrede (M.T.)

A rare plant found on dry screes in the first two localities and on clay in Wargentindalen. Characterised by the open panicle, single-flowered spikelets and small glumes.

*Poa abbreviata* R. BR.

42 (38)

- A: A1 Kløverbladbukta; A2 Oxfordhalvøya; A3 Bodleybukta; A5 North side of Wahlenbergfjorden  
B: B6 Triodalen; B7 Snaddvika; B8 Celsiusodden; B9 Wargentindalen; B10 Floraberget; B11 Floraberget rookery; B12 Kinnvika; B13 Kinnvika  
C: C14 Westmanbukta; C15 Hansøya; C16; C17 Svartakstoppen  
E: E29 Planciusdalen; E30; E31 Gerritzodden; E32 Bergeseneseet; E34 Kvitrevdalen; E36 Gjuvekallen; E37 Stegdalen; E38 Wordiebukta; E39 Wordieodden; E40 Tyskehuset; E41 Beistelva; E42 Tjuvjomyra; E58 Planciusbukta; E59; E60 Wordiebukta  
G: G45 Ringgåsaldalen; G49 Stjerneblomdalen; G51 Dokken; G54 Isåa; G55 Pollen

Usually in dry localities, sometimes quite exposed, e.g. G54 at the southern end of Finn Malmgrenfjorden.

LINDMAN in LYNGE (1923) has classified the *Poae* with which we are now concerned into three groups, viz., *Poa alpina*, *Poa arctica*, and *Poa alpigena*; SCHOLANDER (1934) has further elucidated the problem especially with respect to viviparous forms and it is on his account that we base our classification. We shall not at all be concerned with the place of *Poa alpigena* in the *Poa pratensis* complex.

*Poa alpina* is extremely rare in our area and indeed is one of the few species not represented in our collection; in Svalbard, and possibly in the Arctic generally, this is represented only by a viviparous form.

The other groups have both viviparous and non-viviparous members, and it has been clearly pointed out both by SIMMONS (1906) and by SCHOLANDER (1934) that in the former there is a more or less continuous series connecting typical *Poa arctica* with *Poa alpigena*. In gross features *Poa arctica* is distinguished from *Poa alpigena* by its larger spikelets, few in number, and its open panicle with the lower branches freely spread; it is commonly densely tufted and is a wide-spread species generally preferring dry habitats. We have also a fairly substantial amount of material which corresponds to the above description but which has a much more contracted panicle, and a rather larger number of spikelets; in these it is rather more like *Poa alpigena* but distinguished from it both by the number and size of the spikelets. This is similar to what LINDMAN has designated as *Poa* (*alpina* x ?) *arctica*, and which he describes as "A coarse nearly viviparous form. . . . ."

A viviparous form closely following the above in other respects was found on two occasions, both near a rookery; this we give as *Poa arctica* var. *vivipara*, and

it corresponds rather closely to LYNGE's Novaya Zemlya material classified by LINDMAN as *Poa alpigena* x *arctica* and which he describes as ". . . . . like *Poa arctica*, except its large size and elongated panicle."

The *Poa alpigena* material is rather more variable and less easy to define closely; non-viviparous *Poa alpigena* seems to be a new species to Nordaustlandet, and was found by us only in one locality. This was the great rookery on Flora-berget; we found near the shore and below the quartzite cliff the turf remains of the foundations of a hut among whose debris we found ammunition dated 1911. In Greenland also this species is especially found near the ruins of Eskimo dwellings.

SCHOLANDER has clearly described *Poa alpigena* var. *colpodea*; this is readily identified by its small numerous spikelets, usually green, its contracted panicle and its long subterranean runners; in the autumn the plant is described as abundantly viviparous, with a characteristic bushy appearance. In our collection there is a substantial amount of quite definite material which is apparently non-viviparous; this has also been noted by SAVILE (1961) in specimens collected from Isachsen, Ellef Ringnes Island. There is also a larger amount of the viviparous form noted by SCHOLANDER. Both are widely distributed and indeed the latter was found on a small sandy area above the sea on the inhospitable western shore of Finn Malmgrenfjorden.

GELTING (1934) has written on this species which he has collected in Central East Greenland, and which he has called *Poa alpigena* var. *prolifera*; he points out that this must be the plant recorded by SIMMONS (1906) from Ellesmere Island as *Poa pratensis* var. *alpigena* f. *prolifera*. He goes on to say "To this species are referred viviparous specimens which, apart from the viviparous spikelets, agree in all essentials with *Poa alpigena*. . . . . To this must be added that the viviparous forms seem to be more or less hypertrophied, sometimes almost to monstrosity. This applies especially to the viviparous forms of *P. alpigena*, which further are at times etiolated over large parts of the stem and leaves." This description applies closely to some of our specimens which we originally felt might be referred to *P. alpigena* var. *vivipara*; we have, however, referred such hypertrophied plants to the above species even though they are less characteristically stoloniferous, and indeed in some respects do resemble *P. arctica* var. *vivipara*. We have, therefore, no material which we can with certainty refer to *P. alpigena* var. *vivipara* for which the only certain record from Nordaustlandet is that of SCHOLANDER from Raudstupet.

In summary, under *Poa alpigena* var. *colpodea* we have included: —

- (i) highly stoloniferous, though not clearly viviparous, material. Some withered straws from the previous year, however, carry bulbils; this has already been noted by SCHOLANDER.
- (ii) a freely viviparous material, of characteristic bushy appearance, also stoloniferous.
- (iii) a freely viviparous material, much less noticeably stoloniferous, sometimes rather densely tufted, with  $\pm$  small spikelets, and a  $\pm$  contracted panicle.

In figures 18.1 to 18.9 we reproduce photographs of the above and include some given by LINDMANN in LYNGE (1923).

- 18.1 *Poa arctica*  
Typical plant, Depotodden 15/7/1966 (SN 601)
- 18.2 *Poa arctica*  
Plant with  $\pm$  contracted panicle. Floraberget 24/8/1966 (SN 640)
- 18.3 *Poa (alpina x ?) arctica*  
From LINDMAN in LYNGE (1923), Plate XLVI fig. 3
- 18.4 *Poa arctica* var. *vivipara*  
Kapp Wrede 14/8/1966 (SN 637)
- 18.5 *Poa alpigena*  
Floraberget 25/7/1966 (SN 524)
- 18.6 *Poa alpigena x arctica*  
From LINDMAN in LYNGE (1923), Plate XLVI fig. 4
- 18.7 *Poa alpigena* var. *colpodea*  
Typical plant,  $\pm$  non-viviparous. Běhounekodden 12/8/1966 (SN 553)
- 18.8 *Poa alpigena* var. *colpodea*  
Typical viviparous plant. Celsiusodden 25/8/1966 (SN 643)
- 18.9 *Poa alpigena* var. *colpodea*  
Hypertrophied plant. Polarklubben 3/8/1966 (SN 629)

*Poa alpigena* (FR.) LINDM.

1

B: B11 Floraberget rookery

This is a new species for which this is the sole locality; the specimen is quite typical with a large number of small spikelets on a contracted panicle, Fig. 18.5.

*Poa alpigena* var. *vivipara* (MALMG.) SCHOL.

Noted by SCHOLANDER from Rundhaugen and Raudstupet but not by us, though as noted above some of our var. *colpodea* plants might with some justification be referred to this variety.

*Poa alpigena* var. *colpodea* (FR.) SCHOL.

35 (38)

A: A2 Oxfordhalvøya; A3 Bodleybukta; A5 North side of Wahlenbergfjorden

B: B9 Wargentindalen; B11 Floraberget rookery

C: C14 Westmanbukta; C18 Storkobbodden

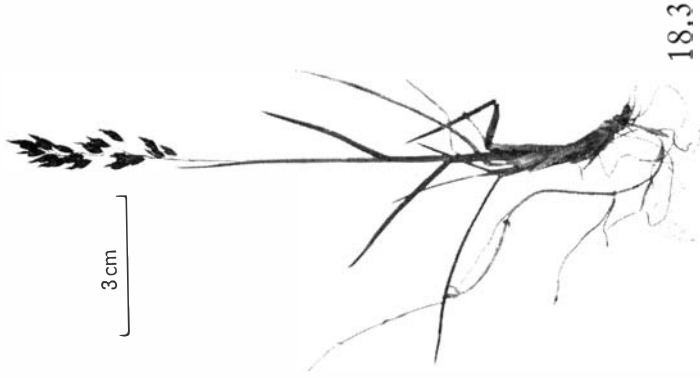
D: D19 Sjølivhaugane; D20 Birddalen SE; D21 Birddalen SW; D23 Depotodden; D24 Depotodden; D25 Basisfjellet

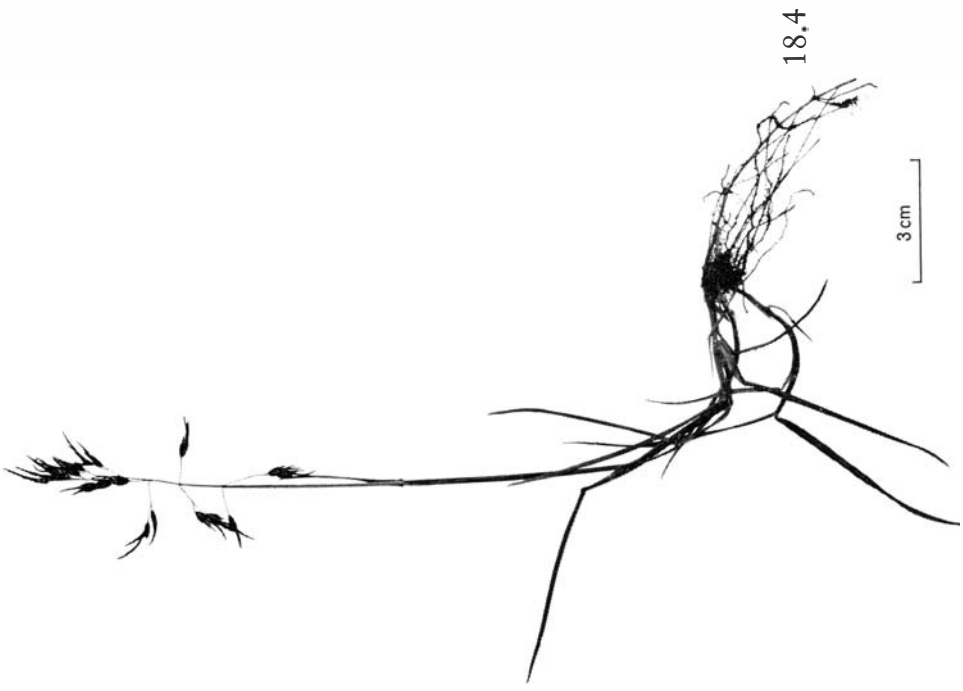
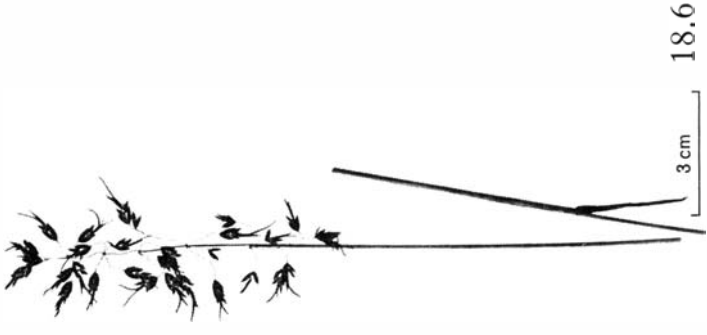
E: E30; E31 Gerritzodden; E36 Gjuvekallen; E37 Stegdalen; E41 Beistelva; E42 Tjuvjomyra; E43 Kapp Wrede; E60 Wordiebukta

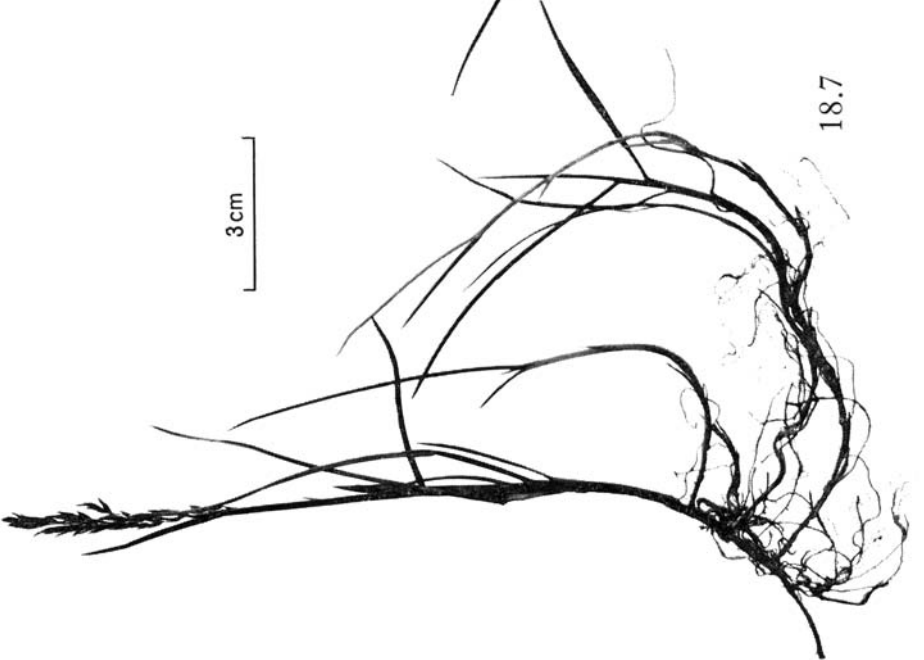
G: G45 Ringgåsdaalen; G46 Innvikdalen; G49 Stjerneblomdalen; G51 Dokken; G52 Polarklubben; G53 Godfreybukta; G54 Isåa; G57 Běhounekodden (D.G.G.)

*Poa alpina* L.

Not found by us – recorded by SCHOLANDER from Ismåsefjellet and Raudstupet.









*Poa arctica* R. BR.

47 (36)

- A: A1 Kløverbladbukta; A3 Bodleybukta; A5 North side of Wahlenbergfjorden  
B: B7 Snaddvika; B8 Celsiusodden; B9 Wargentindalen; B10 Floraberget; B11 Floraberget rookery  
C: C14 Westmanbukta; C15 Hansoya; C17 Svartakstoppen; C18 Storkobbodden  
D: D19 Sjølivhaugane; D20 Birddalen SE; D21 Birddalen SW; D23 Depotodden; D24 Depotodden; D25 Basisfjellet; D26 Svartnestoppen  
E: E30; E31 Gerritzodden; E32 Bergesenneset; E33 Rjipelva; E34 Kvitrevdalen; E36 Gjuvekallen; E37 Stegdalen; E39 Wordieodden; E40 Tyskehuset; E42 Tjuvjomyra; E43 Kapp Wrede; E59; E60 Wordiebukta  
G: G44 Innvika; G45 Ringgåsaldalen; G46 Innvikdalen; G48 Louise Richardfjellet; G49 Stjerneblomdalen; G51 Dokken; G55 Pollen

*Poa arctica* R. BR. var. *vivipara* HOOK.

2 (2)

- D: D25 Basisfjellet  
E: E43 Kapp Wrede

A very rare species previously recorded by SCHOLANDER from Floraberget; the Kapp Wrede specimen is quite typical, the other specimen rather less so and may be some way towards *Poa alpigena* var. *vivipara*. We may note that all specimens have been found on rookeries.

SCHOLANDER has given excellent descriptions of *Puccinellia angustata*, *Puccinellia vacillans*, and *Puccinellia vahliianum*; since his paper the last two have been transferred to the *Colpodium* genus, and SØRENSEN (1953) has shown that, in Greenland material the two genera are readily separated on the basis of the different shapes of leaf epidermal cells. He also showed that in this material the rachilla of *Colpodium vahliianum* – the only representative of the genus in Greenland – is much thinner than in *Puccinellia* species, and noticeably expanded at insertion of the floret. In Greenland the problem is in any event relieved by the absence of *C. vacillans*, since *C. vahliianum* is then distinguished from all *Puccinellia* species by the lanceolate glumes almost as long as the spikelet. The problem within Svalbard was subsequently taken up by RØNNING (1961), who showed conclusively that the leaf epidermal cells of *C. vacillans* have the uniform length already demonstrated by SØRENSEN in *C. vahliianum*. In addition he suggested that in Svalbard material separation of the two genera could again be based on the structure of the rachilla but we have not found this a useful character. Many specimens of undoubted *Puccinellia angustata* have a thin expanded rachilla indistinguishable from that of *Colpodium* species. It is of course obvious that a separation of the species cannot be made on the basis of glume length alone since *C. vacillans* has short glumes more or less like those of *Puccinellia* species. *Puccinellia angustata* may often be distinguished from *Colpodium vacillans* by the fact that whereas the latter is completely glabrous, the former is usually scabrous on the upper parts of the panicle branches. Ultimately of course the structure of the leaf epidermal cells used by SØRENSEN and RØNNING must be considered the most fundamental difference. It seems to us from field observations that *C. vacillans* is more likely at first sight to be taken for a *Phippisia*, being rather like *Phippisia concinna* in general

appearance though readily distinguished from it by being two – and not single-flowered. *Puccinellia angustata* and *Colpodium vahlianum* are similar both in their general appearance, and in their preference for clayey soil; the latter is, however, immediately distinguished by the much longer lanceolate glumes.

*Puccinellia angustata* (R. BR.) RAND and REDF.

- A: A1 Kløverbladbukta; A2 Oxfordhalvøya; A5 North side of Wahlenbergfjorden  
B: B6 Triodalen; B11 Floraberget rookery  
E: E32 Bergesenneset; E38 Wordiebukta; E40 Tyskehuset; E41 Beistelva; E42 Tjuvjomyra;  
E43 Kapp Wrede

Not a common species though more wide-spread than indicated in the above list – previously recorded by SCHOLANDER from Lady Franklinfjorden and by DAHL from Depotodden and the inner part of Rijpfjorden.

*Puccinellia phryganodes* (TRIN.) SCRIBN. & MERR.

16 (4)

- A: A3 Bodleybukta  
B: B10 Floraberget  
D: D19 Sjølivhaugane; D24 Depotodden  
E: E32 Bergesenneset (T.H.); E41 Beistelva; E60 Wordiebukta  
G: G49 Stjerneblomdalen; G51 Dokken (T.H.); G53 Godfleybukta; G56 Kapp Bruun (D.G.G.)

Much more common than suggested by SCHOLANDER – in sheltered bays, above high water and frequently sheltered by drift-wood. We have not seen other than sterile material.

*Colpodium vaccilans* (TH. FR.) POLUNIN

2 (10)

- B: B12 Kinnvika  
E: E38 Wordieodden

A very rare plant, found in fairly exposed but soily localities. We have already commented upon the appearance of the plant – it has previously been recorded also from Lady Franklinfjorden and Murchisonfjorden by SCHOLANDER (1934) and from Wahlenbergfjorden by MALMGREN (1864).

*Colpodium vahlianum* (LIEBM.) NEVSKI

5 (12)

- A: A2 Oxfordhalvøya  
B: B6 Triodalen; B8 Celsiusodden; B9 Wargentindalen; B11 Floraberget rookery

Also a rare plant preferring, like *Puccinellia angustata* clayey places usually close to the sea – confined apparently to the western fjords. Noted by SCHOLANDER from Lady Franklinfjorden, Murchisonfjorden and Wahlenbergfjorden.

*Trisetum spicatum* (L.) RICHT.

1

- C: C17 Svartakstoppen

An extremely rare species found only in the above locality though recorded previously by BRUUN from Bodleybukta. In our locality, on a dolerite sill rich in other fairly rare species such as *Festuca vivipara*, *Silene acaulis*, *Carex misandra*, and *Dryas octopetala*.

### Types of vegetation

SCHOLANDER (1934) has given an extensive account of the types of vegetation in Nordaustlandet and we have not a great deal to add to this though we tend to view certain of the observations rather differently. For Vestspitsbergen, HADAČ (1946) has given a more detailed account, based on field work in Sassenfjorden. For convenience we adopt the classification used in the original paper.

1. Shore vegetation. We cannot add a great deal to this although from our plant lists it will be seen that *Puccinellia phryganodes* is much better represented in our collection than in SCHOLANDER's; this is clearly shown by the distribution frequencies of 16% and 4%. This species occurs in all the areas, usually in sheltered places just above high water mark and frequently among driftwood; by contrast *Stellaria humifusa* is an extremely rare plant, found by us only three times and by SCHOLANDER only once. It was always associated with the former species.

2. Tundra vegetation. During the course of walking around we had the opportunity of examining a good deal of what SCHOLANDER has aptly called 'Luzula tundra' and in which both *Luzula confusa* and *Luzula nivalis* usually predominate. The sparseness of the vegetation in such areas is revealed by comparison with the more favourable areas which naturally attract attention and which are useful in giving an upper limit to the number of species which may be expected. We have made plant lists from several such areas, from the northern entrance to Birdvågen, the area on the east side of Rjipfjorden south of Kvitrev-elva, the upper part of Ringgåsdaalen, and the area in Dokkvatna north of Duve-breen. *Luzula confusa* is found in all these areas as the most common species, with *Luzula nivalis* only in wetter areas; the other typical species in such areas are:

*Saxifraga rivularis*, *Papaver dahlianum*, *Cardamine bellidifolia*, *Salix polaris*,

while in very wet snow bogs *Saxifraga foliolosa* may be dominant. *Cerastium arcticum* and *Phippisia algida* are in some areas very common but these species are essentially nitrophilous.

We investigated also the vegetation of the moraine of Snotoppbreen, expecting results rather similar to the above; this turned out not to be the case and our observations are briefly discussed below. The glacier has two lateral moraines about 30–50 metres a.s.l. and running approximately in a north/south direction. The dominant species on these moraines was *Saxifraga rivularis*, in parts displaced by *Saxifraga cernua*; all other species were extremely rare both here and on the lateral moraine. The following were represented in quite a large area by only one or two plants: *Saxifraga caespitosa*, *Papaver dahlianum*, *Cerastium arcticum*, *Stellaria crassipes*, *Draba subcapitata*, *Poa alpigena* var. *colpodea*. In view of what has been said above about the plant composition of *Luzula tundra* this list is rather surprising. In addition some patches of moss and some areas of *Solorina crocea* occurred on clayey snow patches; there appeared to be no other lichens.

3. Moving soil. We have little to add to SCHOLANDER's account. Surely the most typical plant of wet solifluction slopes is *Cerastium regelii*, in this unfavour-

able habitat being found only as the characteristic sterile rosettes whose description by LYNGE we have already quoted. The most miserable area we visited was certainly the central west part of Rijpdalen, just west of the lakes; there were few plants of any species here but the above was the most common and is indeed found in exactly similar places in Vestspitsbergen.

4. Marsh vegetation. Well developed marsh vegetation is very rare in Nordaustlandet and we thus classify only two areas, Oxfordhalvøya at the head of Wahlenbergfjorden and Tjuvjomyra in Rijpfjorden. One of the typical plants we might expect is *Eriophorum scheuchzeri* but this is in fact found only in the first of these localities, although it has been found by us in much drier and indeed less favourable localities in Kvitrevdalen and on the north side of Dokken. *Saxifraga hirculus* is found in both these localities though otherwise confined to the inner part of Rijpfjorden and Murchisonfjorden, and *Dupontia fisheri* is common both in these places and also again in the inner part of Rijpfjorden. *Equisetum arvense*, which is a new species to the flora of Nordaustlandet, was found only in Oxfordhalvøya and at the southern end of Wordiebukta. Our only locality for *Cardamine nymani* was the great marsh Tjuvjomyra, and was, as noted above, found only as sterile rosettes among the deep moss. In low-lying areas with shallow streams we found considerable amounts of *Deschampsia alpina*; this is in contrast to SCHOLANDER who found it only once in Wargentindalen and we suspect that suitable habitats are much less common in the areas in which he worked. *Juncus biglumis* was fairly common throughout the area in wet muddy localities though this late-flowering species, which is often quite diminutive and less than 5 cm in height, is readily overlooked.

5. Aquatic habitats. The only truly aquatic plant which we have found is *Ranunculus hyperboreus* and seems especially common in the eastern part of the area, presumably because of the large number of shallow pools and streams. The most luxuriant specimens I have ever seen occurred on some small pools at the southern end of Wordieodden where the floating leaves and stems almost covered the surface of the pools.

6. Cliff vegetation. There can be no question of the large numbers of species found near the great rookeries such as Floraberget, Depotodden and possibly Polarklubben. We feel, however, that the importance of the rookery has in the past been overestimated, since all of the above cliffs also have a favourable southern exposure, a point specifically raised by SUMMERHAYES and ELTON (1928). We have investigated the vegetation of the green mossy areas below several such rookeries of varying exposure, and we conclude that, although the growth of the plants is luxuriant, the number of species is relatively small compared to other areas above which there are no nests. The species which do occur are those which respond well to high nitrogen, *Saxifraga cernua*, *Saxifraga rivularis*, *Phippsia algida*, *Ranunculus sulphureus*, *Ranunculus pygmaeus*, *Poa alpigena*, *Cochlearia officinalis* var. *groenlandica*, and *Taraxacum arcticum*. The rookery on the north side of Gjuvekallen was completely dominated by *Phippsia algida* and *Saxifraga rivularis* and that on Polarklubben had great mats of luxuriant *Ranunculus pyg-*

*maeus*. As noted in the plant list we consumed large quantities of *Cochlearia officinalis* collected at Depotodden and on the rookery on the west side of Sætherbukta. Bird-cliffs with less favourable exposure, such as the east-facing rookery north of Gerritzodden, that in Innvikdalen facing north-east, and even the small south-facing cliff in Godfreybukta, have a relatively small number of species though members are usually large and robust. The same thing has been noted in Novaya Zemlya by LYNGE (1928), with respect to the lichen flora. He says: "We found hardly any locality so well stocked with individual plants as the rookery south of Archangel Bay. But the number of species was not so great." We suggest that the richest areas with respect to number of species are nearly always the drier, moss-free, south facing slopes where there are no nests and we suggest that in the past too much weight has been attached to the effect of high nitrogen supply in determining the number of species. A fairly dramatic example is provided by the southern slopes of Basisfjellet where the richest slopes occur on the well-drained screes below the granite/dolerite boundary, and somewhat east of the cliff on which the nests occur and which is quite covered in *Caloplaca elegans*; the number of species on the latter was 13 compared with 37 on the former. It must be emphasised, however, that we cannot conclude that because there are no nests on these cliffs at the present they have not been ancient rookeries; and maybe the high nitrogen levels still remaining enable a richer vegetation to be supported than would otherwise be the case. It is certainly a fact, however, that in general the greatest number of species is not necessarily associated with such localities. One of our richest localities was the flat area near the southern end of Kraemberbukta and this was surely not a rookery. There are, of course, some plants which are strongly nitrophilous and which are seldom or never found elsewhere; additional to species already mentioned are *Taraxacum arcticum* and *Chrysosplenium tetrandum*.

SCHOLANDER comments on the great barrenness of the dolomite areas, and a similar observation for the limestone areas of Ellesmere Island has been made by SIMMONS (1906). Certainly the low precipitation, poor water retention properties of the rock and the curious weathering which provides little or no shelter for plants have something to do with this, but we cannot at the moment say which is the dominant factor. We have investigated the area around the IGY base at Kinnvika; while the areas of schrapnel-like dolomite are indeed barren except for the odd tuft of *Saxifraga oppositifolia*, the small areas of soil which occur sporadically have a much richer vegetation than we had expected from SCHOLANDER's remarks. The above area at Kinnvika supported about 25 species including *Dryas octopetala*, *Minuartia rubella* and *Poa abbreviata*. What is undoubtedly true is that, compared to the rich flora of the inner part of the fjord, this is a relatively barren area – after eight days snow and fog-bound on Kapp Wrede, however, we were possibly the more readily impressed.

### Conclusions

Examination of the distribution frequencies shows that the following species are either new, or significantly better represented in our material than in SCHOLANDER's. In calculating frequencies we have used only SCHOLANDER's data,

but we use the term new species, in the sense of not previously known from other work up to and including that of BRUUN (1958).

New species	More frequent species	
<i>Equisetum arvense</i>	<i>Lycopodium selago</i>	10 (2)
<i>Saxifraga hieraciifolia</i>	<i>Melandrium apetalum</i>	21 (2)
<i>Draba gredinii</i>	<i>Deschampsia alpina</i>	22 (2)
<i>Draba daurica</i>	<i>Puccinellia phryganodes</i>	16 (4)
<i>Festuca vivipara</i>	<i>Taraxacum arcticum</i>	24 (4)
<i>Poa alpigena</i>	<i>Carex rupestris</i>	9 (2)

We suggest that this must primarily be due to inclusion of data from the rich localities in Rijpfjorden and Duvefjorden; this must certainly be the case with *Carex rupestris* which is indeed a rare species except in Rijpfjorden and Wahlenbergfjorden. *Deschampsia alpina* seems likewise to be common only in the eastern fjords, but we are surprised at the appearance of *Melandrium apetalum* and *Taraxacum arcticum* in this list; both seem to be fairly evenly distributed throughout Nordaustlandet, and it cannot be supposed that these species can readily be overlooked. Of the new species only *Festuca vivipara* can be considered to be at all common but seems to be absent from the western fjords; the other species are extremely rare and are, except for *Equisetum arvense*, represented by only one occurrence.

Of species not noted above, *Silene acaulis* is worthy of comment; this was first unambiguously recorded by KEITH in 1936, and subsequently noted by BRUUN (1958) from several localities in Wahlenbergfjorden, and from the inner part of Rijpfjorden; it seems to be fairly evenly distributed over the whole archipelago in favourable localities.

It is obvious that many Svalbard species will attain in Nordaustlandet their northern limits in Svalbard; for circumpolar plants, however, these will generally be found in the more northerly land masses of Peary Land and the Canadian Arctic Archipelago. The following northern limits are therefore tentative and occur only for species unknown in these last two areas.

		Lat. °N.	Long. °E.
<i>Chrysosplenium tetrandum</i>	Kapp Lovén	80°13'	21°51'
<i>Dechampsia alpina</i>	Dokken	80°15'	23°46'
<i>Minuartia biflora</i>	Birddalen SW	80°24'	19°41'
<i>Stellaria humifusa</i>	Svartneset	80°28'	19°26'

It seems to us that with the possible exception of *Colpodium vaccilans* there are no species in our area with strictly limited arctic distribution, and most are circumpolar at least in the sense of being known from Novaya Zemlya, Northern Greenland, and the Queen Elizabeth Islands.

## Index of genera of vascular plants

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Author's address:

Biology Building, University of Sussex, Falmer, Brighton, England



