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SOME PLANT RECORDS FROM SOUTHEAST GREENLAND

BY

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WITH 2 FIGURES

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INTRODUCTION

This paper is based on botanical collections from the Kûngmiut, Kangertítivatsiaq[1] and Tugtilik areas of southeast Greenland (Fig. 1) made on expeditions in 1966 and 1967.

The first was that of the Swiss Alpine Club in 1966 led by Hr. S. ANGERER. He, and other members of the expedition, made numerous nunatak collections which will be discussed in a later paper dealing with the nunatak flora of the area between the heads of the fjords and the inland ice. In addition he collected from a lower altitude at the head of Kangertítivatsiaq. Their collections, which one of us (G.H.[2]) has seen, are in the Botanical Museum of Copenhagen University.

In 1967, unaware of the botanical activities of the Swiss expedition, Mr. R. G. SWAINSON also collected from Kangertítivatsiaq and inland nunataks while participating in a climbing expedition organised by Imperial College, London.

The same summer, one of us (J.E.E.[3]) visited the region on an expedition from Newcastle-upon-Tyne University. Botanical collections were made in two main areas: in the middle part of Angmagssalik Fjord around Kûngmiut, and near the outer coast at Tugtilik.

[1] Former spelling: Kangerdlugssuatsiaq.

[2] Department of Biological Sciences, University of Lancaster.

[3] Royal Horticultural Society's Garden, Wisley, Surrey.

Collecting Localities

1. Kûngmiut.

This area was first botanised by KRUUSE in 1900, and in 1933 by BØGVAD on the 7th Thule Expedition (Locality 34 in BÖCHER 1938). KRUUSE (1912) specifically refers to a locality called 'Tunoq' which is the narrow fjord Torssukátak east of the present-day settlement. 113 of the 116 species which he lists from here can be accepted uncritically. The most interesting are *Callitriche palustris*, *Gnaphalium norvegicum*, *Luzula multiflora*, *Ranunculus acris*, *Rumex acetosella* and *Viola palustris*. BØGVAD's was a much smaller collection adding only three new species: *Angelica archangelica*, *Festuca rubra* and *Potentilla tridentata*.

Our own collections are from the settlement and extending about 3 km north along Angmagssalik Fjord and 6 km east along Torssukátak. Assuming, as seems likely, that KRUUSE's *Festuca ovina* refers to *F. vivipara*, and his *Erigeron alpinus* to *E. boreale*, we can add a further 10 species making a total of 126. Of these 10 new species the following are of particular interest: *Asplenium viride*, *Botrychium boreale*, *Dryas integrifolia*, *Listera cordata* and *Polygonum aviculare*.

The *Polygonum*, which was growing in some quantity around the settlement, was previously known in east Greenland only from the vicinity of Angmagssalik where, according to BÖCHER (1938), it was introduced by KRUUSE in 1902. Surprisingly it was not seen at the nearby settlement of Sermiligâq, on the east side of Sermiligâq fjord, although there is considerable traffic between here and Kûngmiut. However, the Dutch botanists F. J. A. DANIËLS, J. J. HOÓFT and J. G. DE MOLENAAR state (in lit.) that they found it at several settlements in the Angmagssalik area in 1968.

Both the *Botrychium* and the *Listera* finds represent considerable extensions of range in east Greenland. The Kûngmiut sites (65.52 N) are some 350 km northeast of their previous known northern limits, both in the Skjoldungen region (63.35 N, Figs. 17 & 22 in BÖCHER 1963). Only a few plants were found of the *Botrychium*, which was growing in partial shade on a south-facing scree slope about 3 km north of the settlement associated with *Bartsia alpina*, *Gentiana nivalis* and *Veronica fruticans*. The *Listera* was by a stream under a dense cover of *Salix glauca* and *Vaccinium uliginosum*, again on a south-facing slope and about 1.5 km

east of the settlement. The 1968 Dutch expedition also found this species at a number of localities in the Angmagssalik area. It is interesting that *Selaginella selaginoides*, found by both the 1966 and 1968 Dutch expeditions, also had its previous known northern limit in the Skjoldungen area.

2. Valley facing Griseøen, on west side of Angmagssalik Fjord opposite Kûngmiut (Maries Havn).

This is presumably Böcher's (1938) Locality 32 visited by Marie Hammer and Bøgvad. Our collection adds 10 new species to the 73 listed by Böcher.

3. Valley and lake southeast of Sioraq Fjelde on west side of inner Angmagssalik Fjord.

This locality, which lies about 8 km south of Böcher's (1938) Locality 33, has not previously been visited by botanists. 73 species were either represented in our collections or noted in the field. The two most important finds are *Cassiope tetragona*, occurring on an exposed col at about 250 m, and *Viola palustris*, which was growing by a stream in the valley bottom associated with *Veronica alpina.*

4. East side of the head of Kangertítivatsiaq near the snout of the Glacier de France.

The first records from the head of this fjord are of *Angelica archangelica* and *Empetrum hermaphroditum* noticed by Chapman (1932 pp. 30–31) in 1930 during the northward voyage of the "Quest" on the British Arctic Air Route Expedition. It was subsequently visited by Bøgvad in 1933. He found 28 species, including *Dryas integrifolia* and *Pedicularis hirsuta.* This is Böcher's (1938) Locality 46.

Of the 37 species collected by Angerer on the 1966 Swiss expedition, 25 were new. His find of *Chamaenerion angustifolium* represents a slight northward extension of its range but his most interesting discovery was *Saxifraga aizoides*, previously known from between Angmagssalik and Kangerdlugssuaq only from two outer coastal sites near Tugtilik. The Swiss collection was from rocky slopes and ledges above the snout of the Glacier de France at 380 m.

The location of Swainson's collection, made on the 1967 Imperial College Expedition, was essentially the same though slightly lower, 100 to 200 m above the fjord. Although he tells us that his collection was far from comprehensive, it is the largest so far comprising 41 species and bringing the total to 65. 11 of these are new, the most interesting being *Gnaphalium norvegicum*, *Hieracium groenlandicum*, *Platanthera hyperborea* and *Rumex acetosella.* With the exception of the *Rumex*, these species here reach their northern limit in east Greenland, 66.28 N. This

is true also of *Angelica archangelica*, originally noted by CHAPMAN and collected by SWAINSON.

It is curious that neither ANGERER nor SWAINSON were able to refind *Dryas* and *Pedicularis hirsuta*, but BÖCHER's map (1938 Fig. 13) indicates that BØGVAD's site was not quite at the head of the fjord. From the fjord the vegetation on the steep slopes on the eastern side looks very luxuriant and would certainly repay further investigation.

5. Nigertuluk[1] – Tugtilik (Fig. 2).

This area was first botanised by KRUUSE during the summer of 1899. He landed briefly on the north side of Nigertuluk just west of the entrance to Tugtilik. Here he found a very luxuriant vegetation, following the line of one of the igneous dykes so common in this area. His two most noteworthy finds were of *Alchemilla wichurae* and "*Hieracium nigrescens hyparcticum*". These will be discussed later. The same day he visited the northeast branch of Tugtilik, between the glacier at the head of the fjord and the promontory on the west side where once stood WATKIN's Mindesmærke.

Although the British Arctic Air Route Expedition called at the head of the northwest branch of Tugtilik, which they called "Lake Fjord", on both the northern and southern voyages of the "Quest" during the summer of 1930, CHAPMAN does not include this locality in his Botanical Appendix and the only species referred to in the text (p. 33) as occurring here are *Campanula rotundifolia*, *Chamaenerion latifolium* and "several kinds of saxifrages". However, BÖCHER (1938 pp. 70, 98, 193) refers to a verbal communication from CHAPMAN reporting the occurrence there of *Betula nana*, *Gnaphalium norvegicum* and *Papaver radicatum*.

Two years later, in 1932, BÖCHER himself visited "Lake Fjord" and the lake itself, Tugtilip Imia, lying a short distance inland from the head of the fjord. In his 1933 paper (pp. 18–19) he lists 81 species, an extremely high figure considering the general floristic poverty of this part of the east coast and also the fact that he was only there for a day. Many of the species which he found possess markedly disjunct distributions in southeast Greenland, for example *Carex atrata*, *C. microglochin*, *C. rufina* and *Saxifraga aizoides*. BØGVAD also landed in "Lake Fjord" in 1933 (BÖCHER's (1938) Localities 47 and 48) and added a further ten species to BÖCHER's own list. The English botanist H. G. WAGER visited "Lake Fjord" briefly in 1935 and collected 16 species of which *Koenigia islandica* and *Sagina* sp. were new. The *Koenigia* is in the British Museum but we have been unable to locate the *Sagina* and the record must therefore be disregarded. This brings the total number of species for Tugtilik to 95, or 101 if we include KRUUSE's Nigertuluk locality. In addition to

[1] Former spelling: Nigertussoq.

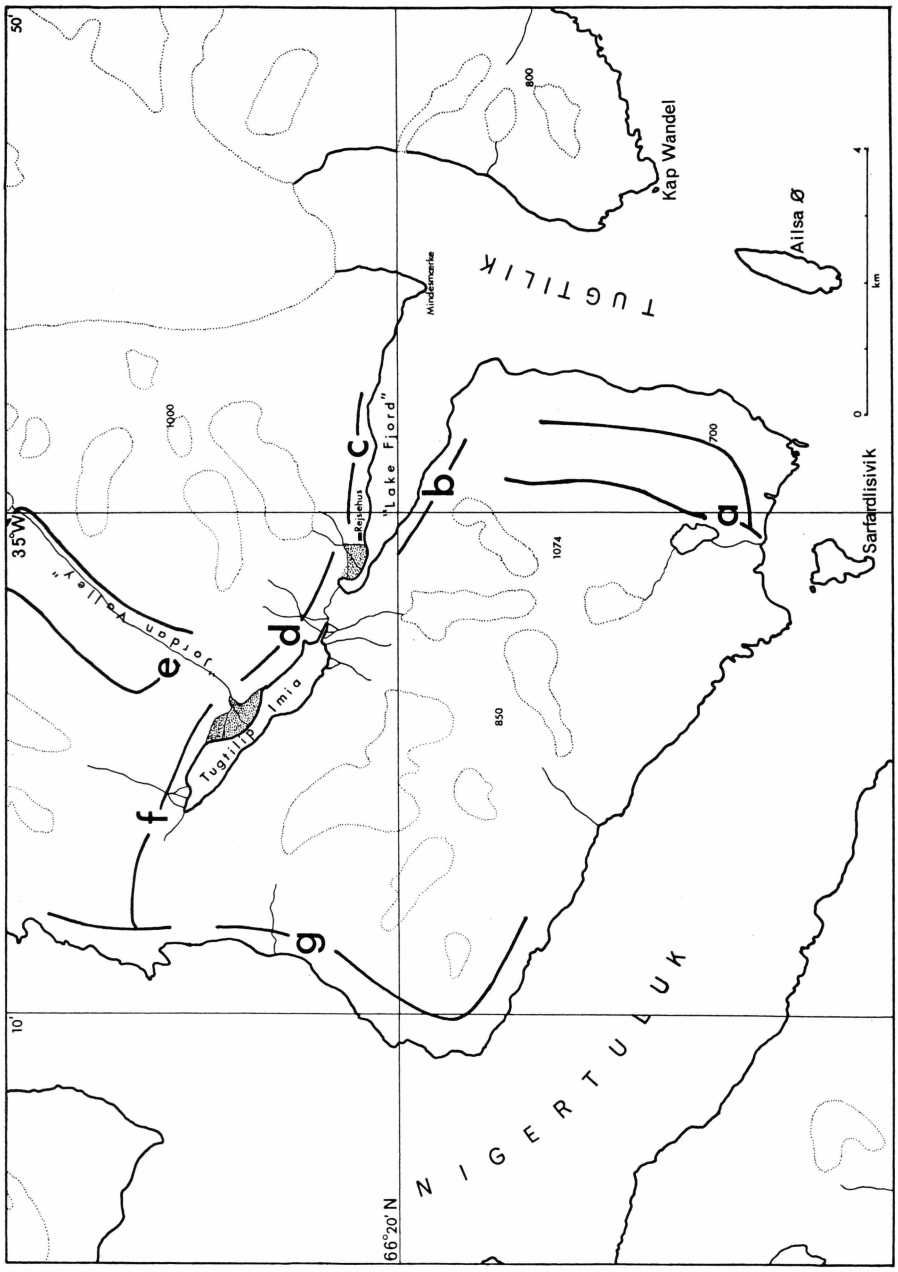
50'
35°W
10'
66°20'N
Kap Wandel
Ailsa Ø
TUGTILIK
Mindemarke
"Lake Fjord"
Rejsehus
Jordan Valley
Tugtilip Imia
Sarfardlisivik
NIGERTULUK
800
1000
700
1074
850
a
b
c
d
e
f
g
0
4
km

Fig. 2.

these there are four further records of KRUUSE's which require confirmation: *Poa pratensis*; *Festuca ovina*: it is apparent that BÖCHER's record (1933 p. 19) refers to *F. vivipara* (1938 p. 211), the same is probably true also of KRUUSE's; *Erigeron uniflorus* var. *pulchellus*, probably *E. humilis* noted by BØGVAD and us; *Erigeron alpinus*: there is a specimen of this in the Copenhagen herbarium, we have not seen it but it is possibly referable to *E. uniflorus*. The record of *Potentilla nivea* (BÖCHER 1956, p. 17) said to have been collected by the WAGER brothers at Tugtilik in 1936 is erroneous. The specimen at the British Museum is wrongly labelled; it was actually collected at Kangerdlugssuaq.

Our own collections are from the seven sites shown in Fig. 2. It is impossible to divide these up satisfactorily for comparison with either BÖCHER's Tugtilik lists or KRUUSE's from Nigertuluk and we are therefore pooling all the data. The sites are as follows:

a) North side of the mouth of Nigertuluk opposite Sarfardlisivik. Collections were made around the lake, along the poorly vegetated sides of the main north-south valley up to the col leading over to "Lake Fjord", and along the ridge separating the valley from Tugtilik.

b) Exposed north-facing slopes on south side of "Lake Fjord", with numerous snow-patches and associated meltwater areas.

c) Rich south-facing herb slopes on north side of "Lake Fjord" from the Rejsehus to about midway between it and WATKIN's Mindesmærke.

d) Marshy flats and heath between Rejsehus and the "Jordan Valley" river.

e) Both sides of the "Jordan Valley" ascending on the more richly vegetated western side to about 600 m, about 1 km beyond the northern limit of Fig. 2.

f) West from the "Jordan Valley" river to Nigertuluk and including part of the east coast of Nigertuluk; mostly rocky heath but with patches of relatively luxuriant vegetation in the more sheltered areas.

g) Rocky heath similar to 'f' by the northeast side of Nigertuluk.

122 species were recorded of which 22 were additional to the combined Nigertuluk and Tugtilik lists, making a total of 123. All the six species were found which had previously been recorded only from Nigertuluk but not from Tugtilik: *Alchemilla wichurae*, *Gentiana nivalis*, *Hieracium groenlandicum* (see below), *Sedum annuum*, *S. villosum* and *Woodsia*

glabella. Of these, only the *Alchemilla* appears to be restricted to Nigertuluk (site a). This was a most important find as it confirms KRUUSE's original record which, as BÖCHER (1956) has noted, is unsubstantiated by a specimen in the Botanical Museum at Copenhagen University. The identification of our material has been confirmed by Dr. S. M. WALTERS. It was found growing in a moist, shady gully on a south-facing cliff about 50 m above the shore and associated with a rich herb vegetation which included *Alchemilla alpina*, *Bartsia alpina*, *Empetrum* and *Thalictrum alpinum*. This is probably KRUUSE's original locality.

The three records based previously only on CHAPMAN's records have all been confirmed. Three colonies of *Betula nana* were found on the south-facing slope above "Lake Fjord" (site c), *Gnaphalium norvegicum* was growing nearby on a southeast-facing ridge at 250 m with *Empetrum* and *Salix*, while a few plants of *Papaver radicatum* were found at 600 m on an exposed ridge (site a).

This ridge was the only locality for a number of other northern and continental species which are very rare in southeast Greenland, occurring on nunataks in the interior. These include *Arnica alpina*, *Erigeron compositus* (both extremely scarce and, like the *Papaver*, restricted to the actual arête) and *Campanula uniflora*. To this category also belongs *Carex supina*, found only once on a scree slope at 600 m on the west side of the "Jordan Valley", and *Potentilla nivea*, a fragment of which was brought back by one of the Expedition members from the mountains behind the Rejsehus at about 1000 m. Unfortunately the specimen was mislaid.

With the exception of *H. alpinum*, all our *Hieracium* material from here together with that collected by SWAINSON at Kangertítivatsiaq we have determined as *H. groenlandicum*. The only species previously reported from the area (again with the exception of *H. alpinum*) was *H. hyparcticum*, found by KRUUSE at Nigertuluk. Although BÖCHER (1938) cites KRUUSE's record, his distribution maps (1963 Figs. 27 & 28) of *H. hyparcticum* and *H. groenlandicum* show only the latter occurring at Tugtilik. Dr. A. SKOVSTED has examined KRUUSE's material in the Copenhagen Herbarium. Apparently the original identification *H. lividorubens* has subsequently been changed to *H. groenlandicum*. Most of our material has two or three stem leaves and the upper parts of the stem and the inflorescence are covered with a dense tomentum of short stellate hairs, long spreading white hairs (black only at the base) and short glandular hairs. *H. hyparcticum* rarely has more than one stem leaf and the pubescence is mostly of conspicuous long spreading black hairs, many of which are glandular. Dr. SKOVSTED agrees with our identification. Other species which, like the *Hieracium*, we now know occur at Tugtilik and reach their northern limit at the head of Kangertítivatsiaq are

Chamaenerion angustifolium, *Gnaphalium norvegicum* and *Platanthera hyperborea*.

Our record for *Draba incana* represents an extension of its known east coast range northwards from the Angmagssalik area, and the records for *Asplenium viride*, *Botrychium lanceolatum* and *Leucorchis albida* fill major distributional gaps between Angmagssalik and Kangerdlugssuaq (*Asplenium* and *Leucorchis*) and Wiedemann Fjord (*Botrychium*). Also of considerable importance is the discovery of *Carex norvegica*. Böcher's map (1938 Fig. 119) shows a gap between Kap Daussy (68.44 N) and the head of Graahs Fjord (63.40 N). *C. norvegica* is now known from three localities within this area: a nunatak of the "Caledonian Alper" (66.08 N) inland from Angmagssalik (Gribbon 1968), Mikis Fjord (68.09 N, H. G. Wager 1936, specimens in British Museum and Lancaster University Herbarium) and Tugtilik, where it was found on dry exposed slopes at six of the seven sites. The record for *Carex bicolor* is an extension of its range south from Kangerdlugssuaq.

In Böcher's (1956) opinion, the rich flora of the Tugtilik area is largely attributable to the occurrence there of low-lying and coastal semi-nunataks during the maximum extension of the ice. He points out that the K. I. V. Steenstrups Bræer drain off most of the ice to the north of the area. Of the two tributary glaciers which enter the area from the north, one calves into the head of the northeast branch of Tugtilik and the other reaches the upper part of the "Jordan Valley". At its maximum, the latter would have reached the middle of the east-west transverse valley, linking "Lake Fjord" with Nigertuluk, where it would have branched into two. As a result, the sides of this link valley, particularly the steep slopes on the north towards "Lake Fjord", would have been largely ice-free. In addition, the area lying to the south of this valley would have had only a limited ice cover from glaciers formed locally. Böcher also comments on the occurrence in the area of coastal semi-nunataks, such as Kap Wandel, which on account of local topographical factors are unlikely to have been ice-covered.

Although, as elsewhere on this coast, the predominant rock is metamorphic acid gneiss, this is intersected by a complex system of Tertiary basalt dykes and a number of amphibolite lenses and sills. The latter contain lime-bearing plagioclase and weather rapidly to give a base-rich soil supporting luxuriant vegetation. The basalt dykes vary in the speed at which they weather and this is presumably related to their chemical composition. The harder dykes are important topographical features being more resistant than the surrounding gneiss. On the other hand, some of the dykes have weathered deeply to form conspicuous gullies such as those described by Kruuse at Nigertuluk; being damp and sheltered these usually present very favourable habitats.

Vascular Plants

The following is a list of records which are new or which confirm records previously considered doubtful; the latter are asterisked. The records for Localities 1, 2, 3 and 5 were made by J. E. ELSLEY; 4A and 4S denote records for Locality 4 contributed by S. ANGERER and R. G. SWAINSON respectively. The nomenclature follows BÖCHER, HOLMEN & JAKOBSEN (1968). The following Herbarium abbreviations are used:

C	The Botanical Museum, Copenhagen University
CAN	The National Museum of Canada, Ottawa
LANC	The Arctic Herbarium, Lancaster University
LCR	Leicester University
LE	The Komarov Botanical Institute, Leningrad
O	The Botanical Museum, Oslo University

Where no Herbarium is cited, the records are based on field observations, on material in J. E. ELSLEY's personal Herbarium, or on material which has subsequently not been retained.

Agrostis borealis 4A C
Alchemilla alpina 3 C, CAN, LANC; 4S C, LANC
Alchemilla filicaulis 4S C, LANC
Alchemilla glomerulans 3; 4A C
Alchemilla wichurae 5a* C, LANC, LCR, O
Angelica archangelica 4S* LANC
Antennaria canescens 3
Arabis alpina 3
Arnica alpina 5a C
Asplenium viride 1 LANC; 5c LANC, 5d, e, g
Bartsia alpina 3; 4A C, 4S LANC
Betula nana 5c* C
Botrychium boreale 1 C, LANC
Botrychium lanceolatum 5a LANC
Botrychium lunaria 5c LANC, 5g C, LCR, O
Campanula gieseckiana 4A C, 4S LE
Campanula uniflora 5a C, LANC
Cardamine bellidifolia 2 C, LANC; 3
Carex bicolor 5d C, LANC, LE
Carex bigelowii 3 CAN, LCR, O
Carex capitata 5a C, CAN, LANC, LCR, LE, O, 5d, f, g
Carex glacialis 5a, c, d, e, f C, LANC, LCR, 5g
Carex glareosa 2 C, LANC, LE; 3

Carex macloviana 5c, d, e C, LANC, 5f LE, O, 5g
Carex norvegica 5a, b LE, O, 5c, d, e C, CAN, LANC, 5g
Carex rariflora 3 CAN, LCR; 5a, c, d C, LANC, LE, 5g
Carex scirpoidea 3; 4A C, 4S LANC
Carex supina 5e C, CAN, LANC, LE, O
Cassiope tetragona 3; 5a C, LANC, LCR, LE, 5b, c, e, g
Cerastium alpinum 3
Cerastium cerastoides 3
Chamaenerion angustifolium 3; 4A C, 4S LANC
Chamaenerion latifolium 3 C, LANC, O
Cochlearia groenlandica 3 LANC
Comarum palustre 3
Coptis trifolia 3
Cystopteris fragilis 3; 4S
Diapensia lapponica 3
Diphasium alpinum 3; 4A C
Draba incana 5e C, LANC
Draba nivalis 2 LANC; 3; 5a C, 5c, e, f
Dryas integrifolia 1 C, CAN, LANC; 5a, b, c, d, e C, LANC, LE, 5f, g
Empetrum hermaphroditum 3
Epilobium anagallidifolium 3 LANC; 4A C
Equisetum arvense 3
Equisetum variegatum 1 C, LANC; O
Erigeron compositus 5a C, LANC
Eriophorum scheuchzeri 3 C, LANC, LE
Euphrasia frigida 1 LANC
Festuca rubra 4S LANC
Festuca vivipara 3; 4S LANC
Gentiana nivalis 2 LCR
Gnaphalium norvegicum 4S C; 5c* C, LANC
Harrimanella hypnoides 3
Hieracium alpinum 3; 4A C, 4S LANC
Hieracium groenlandicum 4S LANC; 5*e C, LANC, 5g LANC
Honkenya peploides 2; 3; 5g
Huperzia selago 3
Juncus trifidus 3 C, LANC, LE; 4A C
Juniperus communis 3
Kobresia myosuroides 5a, e, f
Leucorchis albida 5c C, CAN, LANC, LCR, O, 5g
Listera cordata 1 C, LANC
Loiseleuria procumbens 3
Luzula confusa 3
Luzula spicata 3; 4A C, 4S LANC

Lycopodium dubium 3
Minuartia biflora 3
Oxyria digyna 3
Papaver radicatum 5a* C, LANC
Pedicularis flammea 2 C, LANC; 3
Pedicularis hirsuta 3
Phegopteris connectilis 2
Phleum commutatum 3; 4A C, 4S CAN
Phyllodoce coerulea 3 LANC; 4A C
Pinguicula vulgaris 3; 4A C
Platanthera hyperborea 4S C, LANC; 5c C, CAN, LANC, O, 5f, g
Poa alpina 3; 4A C, 4S LANC
Poa arctica 4A C, 4S LANC
Polygonum aviculare 1 C, LANC
Polygonum viviparum 3
Potentilla crantzii 3; 4A C, 4S LE
Potentilla egedii 3 LANC
Potentilla nivea s.l. 5
Puccinellia coarctata 2; 3
Pyrola minor 3
Ranunculus glacialis 1; 3
Ranunculus pygmaeus 1 CAN, LANC
Rhododendron lapponicum 1 C, LANC
Rumex acetosella 4S C, LANC
Salix glauca 3
Salix herbacea 3
Saxifraga aizoides 4A C, 4S LANC
Saxifraga caespitosa 3; 4S LANC
Saxifraga cernua 3 C, LANC
Saxifraga nivalis 3
Saxifraga oppositifolia 3
Saxifraga stellaris 3 C, CAN, LANC
Saxifraga tenuis 2 LANC
Scirpus caespitosus 3
Sedum annuum 2 LANC, LE
Sedum rosea 3; 4A C, 4S LANC
Sibbaldia procumbens 3; 4A C
Silene acaulis 3
Stellaria humifusa 3 LANC
Taraxacum croceum 3 C, CAN; 4A C, 4S LANC
Thalictrum alpinum 3 LANC
Thymus praecox 3; 4A C, 4S LANC
Tofieldia pusilla 3; 4A C, 4S LE

Trisetum spicatum 3 C, LANC
Veronica alpina 3 C, LANC; 4A C
Veronica fruticans 4S LANC
Viola palustris 3
Viscaria alpina 3; 4A C, 4S
Woodsia ilvensis 3

The northern limit for *Thymus* on the east coast is not Kap Gustav Holm, as stated by Böcher (1938), but the mouth of Kangerdlugssuaq, where it was found by the Wagers in 1935 and 1936 in two localities: Kap Deichmann and the eastern shore between Hængefjæld and Skærgaardshalvø (68.08 N). Specimens from the latter are in the British Museum and the Lancaster University Herbarium.

Cryptogams

The following bryophytes were collected from the head of Kangertitivatsiaq (Swainson, Locality 4) and Tugtilik (J.E.E., Locality 5).

Aulacomnium palustre	4	C, LANC
Calliergon sarmentosum	4	LANC
Drepanocladus revolvens	4	C, LANC
Hygrohypnum alpestre	5	LANC
Paludella squarrosa	5	
Philonotis tomentella	4	C, LANC
Sphagnum warnstorfii	5	C, LANC

A short note on the lichens from Tugtilik has already been published (Hawksworth 1968).

Acknowledgements

We should like to express our thanks to Hr. S. Angerer, Dr. A. Skovsted and Mr. R. H. Swainson for their assistance, and to Mr. C. Sugden and Mr. P. Storey, the Leaders of the Newcastle University Expedition, for inviting one of us (J.E.E.) to join their expedition.

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Addendum

Since the above was written, *Platanthera hyperborea* has been found in 1969 by Dr. M. SLESSER and Dr. I. SMART by a warm spring in Rømers Fjord (69.44 N), 360 km north of its previous known northern limit at the head of Kangertítivatsiaq.

Færdig fra trykkeriet den 30. april 1971.

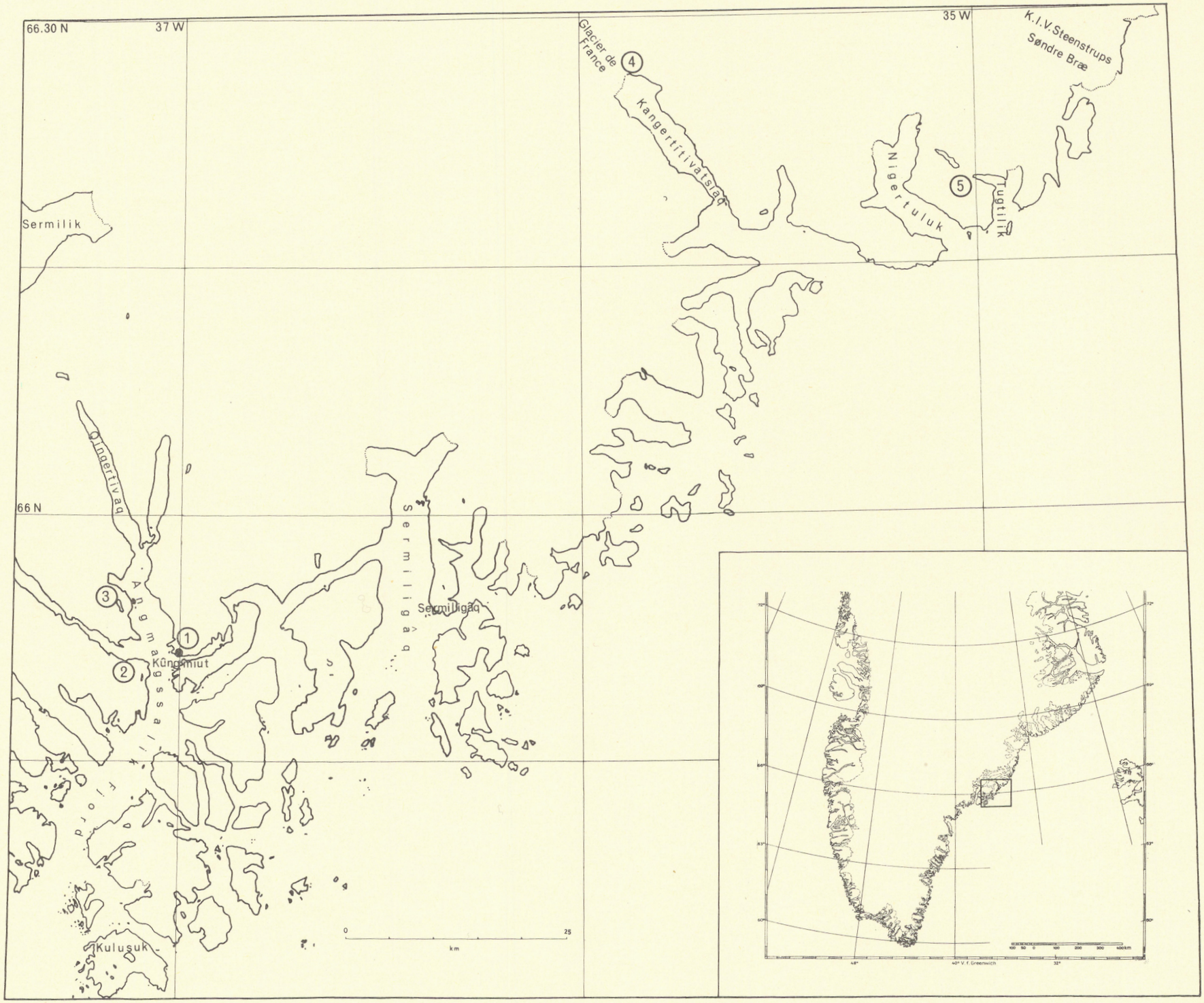
66.30 N
37 W
35 W
K.I.V. Steenstrups Søndre Bræ
Glacier de France
4
Kangerttitivatsiaq
Nigertuluk
5
Tugtilik
Sermilik
Qingertivaq
66 N
3
Angmagssa
1
Kûngmiut
2
Sermiligâq
Sermiligâq
Kulusuk
0
25
km

Fig. 1.