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Lichens from Central East Greenland

Eric Steen Hansen

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Editor
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Instructions to authors. – See page 3 of cover.

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A total of 600 samples of 167 species of macro- and microlichens were collected mainly by Pauline Topham and Geoffrey Halliday on botanical expeditions to Central East Greenland in the years 1961, 1962, 1968, 1971, 1974 and 1980. Three of the species, viz., *Caloplaca tornoensis* Magnusson, *Rhizocarpon pusillum* Runem, and *Verrucaria thalassina* (Zahlbr.) Zsch. are additions to the known lichen flora of Greenland. The following eleven species have not previously been reported from East Greenland: *Catillaria philippea* (Mont.) Massal., *Cladonia luteoalba* A. Wilson & Wheldon, *C. macroceras* (Delise) Ahti, *Coelocaulon divergens* (Ach.) R. H. Howe, *Diploschistes muscorum* (Scop.) R. Sant., *Leprocaulon subalbicans* (Lamb) Lamb & Ward, *Peltigera kristinssonii* Vitik., *Pertusaria octomela* (Norman) Erichsen, *Rhizocarpon intermediellum* Räsänen, *Solorina saccata* (L.) Ach. and *Thelidium papulare* (Fr.) Arnold.

Information is provided on climatic conditions at two meteorological stations situated in the area investigated. Thirtyeight collecting localities are listed, together with brief notes on their geology. The localities are situated between the southernmost part of Liverpool Land and Jameson Land, c. 70°N, and the middle of Lyell Land and Traill Ø, c. 73°N.

A survey is given of some important ecological, phytosociological and distributional characteristics for the lichen species, together with information on the presence of perithecia or apothecia.

Lichens of particular interest are discussed in the special part of the paper.

A number of commonly used synonyms are listed in the Appendix.

Eric Steen Hansen, Botanical Museum, University of Copenhagen, Gothersgade 130, DK-1123 Copenhagen, Denmark.

Introduction

Although there has been considerable lichenological research in Greenland, particularly during the last decades, there are still areas, where the lichen flora is comparatively little known, including large areas of Central East Greenland. Miss Pauline Topham, Dundee, Scotland, made extensive collections of lichens in the Mesters Vig area (c. 72°N) in East Greenland in 1968. Dr. Geoffrey Halliday, Lancaster, England, also collected a large number of lichens of great interest during expeditions to Kong Oscar Fjord and surrounding regions in 1961, 1962, 1971, 1974 and 1980, although he concentrated mostly on vascular plants and mosses. These collections of lichens were kindly given to the present author for determination, and they are now deposited partly at the Botanical Museum, University of Copenhagen (C) and partly at British Museum (Natural History), Department of Botany, London (BM). The collections supplement each other very well, as those of Halliday are rather rich in macrolichens, while the group of microlichens are best represented in the collections of Topham. Altogether, the collections contribute considerably to our knowledge of the lichen flora of this part of East Greenland.

Lynge & Scholander (1932) have outlined the previous lichenological research work in North East Greenland. The most important publications dealing with these investigations are mentioned on p. 11. Recently, in 1962 and 1963, M. F. Baad, N. P. Lasca, K. Schmidt and D. R. Spearing, Michigan, USA, collected lichens in Skeldal, a set of which was deposited in the Copenhagen herbarium. A summary of lichen collecting activities in South East Greenland has been given by the present author (1978a).

Fig. 1. Airial view of the Mesters Vig district, showing many of the localities visited by P. Topham and G. Halliday, e.g., Skeldal (foreground), Hesteskoen (A), Blyklippen (B), Noret (C), Deltadal (D). Photo No. 12307, 653G-Ø; 1950. The Geodetic Institute, Copenhagen.

Table 1. Mean monthly temperatures (°C) and precipitation (mm) in Kap Tobin and Mesters Vig (Danish Meteorological Institute 1961–1973).

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
Mean temperatures:													
Kap Tobin	−16.4	−18.1	−18.1	−11.9	−3.9	0.6	2.6	2.9	−0.8	−6.8	−12.5	−15.1	−8.1
Mesters Vig	−22.0	−23.7	−22.6	−14.7	−4.3	2.5	5.8	5.4	−0.5	−9.8	−18.0	−20.3	−10.2
Precipitation:													
Kap Tobin	53.8	35.7	41.7	29.1	30.0	28.5	34.3	51.9	43.8	56.7	35.6	47.9	489.2
Mesters Vig	27.2	17.1	20.5	9.3	13.9	21.4	21.7	27.4	34.2	29.7	18.9	30.9	273.0

Climatic conditions at two stations in Central East Greenland

Meteorological data illustrating the climate of the Kong Oscar Fjord region are relatively few. Table 1 shows that the climate of the two meteorological stations from which meteorological data are available, Kap Tobin (70°25'N 21°58'W) and Mesters Vig (72°15'N 23°54'W) (Fig. 2A, B), is characterized by low winter temperatures (c. –24°C in Febr. at Mesters Vig and c. –18°C in Febr. and March at Kap Tobin) and average summer temperatures, which do not exceed c. 7°C. The summer temperatures at Kap Tobin (c. 3°C in August), which is situated on the outer coast, are lower than at the inland station Mesters Vig. The summer is of short duration: only three months, June, July and August, have average temperatures above 0°C. The annual precipitation is rather low (c. 490 mm at Kap Tobin and c. 270 mm at Mesters Vig).

No meteorological data are available to illustrate the climate of Traill Ø and the areas along the inner part of Kong Oscar Fjord.

List of localities

The localities, where lichens were collected in 1961, 1962, 1968, 1971, 1974 and 1980, are indicated by dots in Fig. 2. For convenience, some of these dots represent more than one collecting site, and in certain cases the localities include several lichen biotopes (e.g., loc. 19, 20 and 21). The large area surrounding Mesters Vig (Fig. 1), where several mountains reach altitudes above 1,000 m a.s.l., were intensively investigated by Topham in the summer of 1968 (loc. 17–29, except of loc. 24). Loc. 3 was visited by Mrs. Irene Waterston, who collected some lichens there in 1971. All the other localities are those investigated by Halliday (1961, 1962, 1971, 1974 and 1980). He also collected some lichens at loc. 25, 26 and 29 in the Mesters Vig area (indicated by G.H. at the sites concerned). Information on the geological conditions and on the habitats are given in the description of the localities.

Liverpool Land

The bedrock in the southern part of Liverpool Land is composed of light coloured gneisses of normal granitic composition. Basic and ultrabasic lenses are, however, found in some places. The area is covered with extensive and thick moraine, which is partly of allochthonous character. Most of the boulders occurring in southern Liverpool Land are composed of crystalline rocks, but a large part of the finer fraction may be derived from Mesozoic sediments on Jameson Land.

1. The vicinity of the Kap Swainson trapper's hut. 70°26'N 21°43'W, 30 August 1971. Stony solifluction ground.

2. Inugsukajik. 70°27'N 21°53'W. Max. alt. 282 m a.s.l., 28 August 1971. a: North-facing slope of Point 282; b: Boulder field below south-facing slopes of Point 282.

3. Upper part of valley south of Lillefjord. 70°33'N 21°48'W, July 1971.

Jameson Land

4. Flakkerhuk trapper's cabin. 70°26'N 23°07'W, 24 August 1971. Lower Cretaceous sandstone with layers of fine-grained, micaceous siltstone (the Hesteelv formation). The region is covered partly by till of mostly local origin.

5. 6 km north-east of Flakkerhuk trapper's cabin. 70°27'N 23°04'W, 24 August 1971. Poor flushes. (The Hesteelv formation, cf. loc. 4).

6. 13 km south of estuary of Falsterselv. 70°47'N 24°10'W, 20 August 1971. Upper Jurassic shale with intercalations of sandstone and scattered concretions of quartzite rich in Fe and carbonate (the Hareelv formation). Extensive moraine cover.

7. Tarn east of Gurreholm hut. 71°14'N 24°33'W, 18 August 1971. Upper Jurassic sandstone with layers of micaceous shale (The Neill Klinter formation). Extensive till cover of limnic-deltaic character.

Renland

8. Edward Bay Dal. 71°20'N 27°33'W, 9 August 1971. Boulders near river. Coarse-grained, micaceous migmatite and micachist.

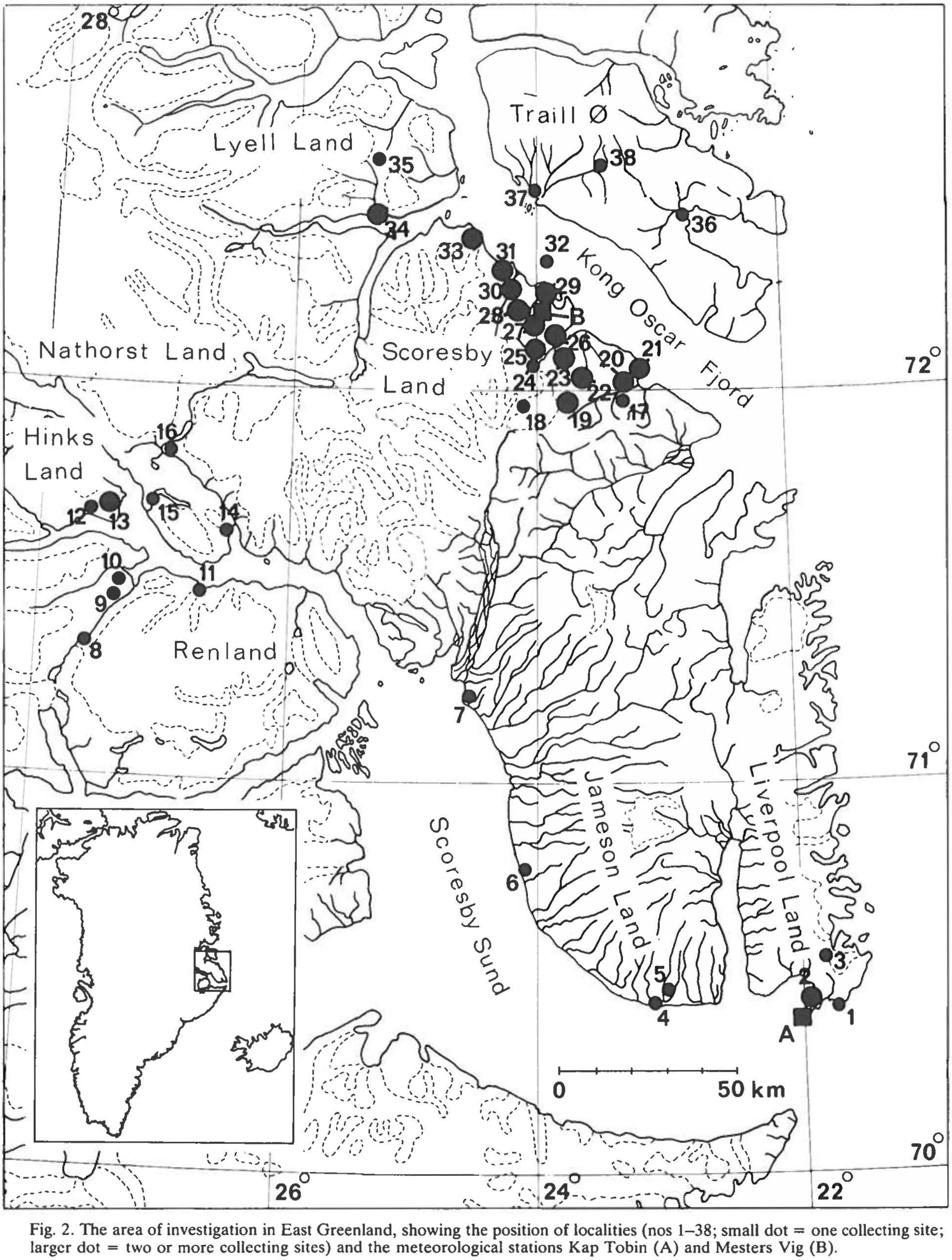


Fig. 2. The area of investigation in East Greenland, showing the position of localities (nos 1–38; small dot = one collecting site; larger dot = two or more collecting sites) and the meteorological stations Kap Tobin (A) and Mesters Vig (B).

9. North-east ridge of Point 1340, north of Edward Bay Dal. 71°27'N 27°21'W. Max. alt. 1340 m a.s.l., 12 August 1971. Coarse-grained garnet-micachist with scattered horizons of amphibolites rich in Fe and Mg.

10. Upper slope of Point 1621. 71°28'N 27°15'W. Alt. c. 1300 m a.s.l., 12 August 1971. The geology of the area agrees with that of loc. 9.

11. In front of glacier on north side of Renland. 71°28'N 26°41'W, 14 August 1971. The bedrock is composed of migmatite rich in felspar and quartz and with scattered horizons of Ca-silicate. The till cover consists of the same types of rocks and in addition quartzite transported to the coast by the glaciers.

Hinks Land

The bedrock at Flyverfjord (loc. 12 and 13) is composed of banded gneiss (of Archaean age) of granitic composition and with horizons of amphibolite. Coarse-grained quartz-felspar-pegmatites occur abundantly.

12. Bay on north side of Flyverfjord. 71°37'N 27°42'W, 6 August 1971.

13. a: Upper part of valley and (b:) plateau on north side of Flyverfjord. c: Plateau above eastern end of Flyverfjord. C. 71°40'N 27°37'W. Max. alt. c. 1400 m a.s.l., 3 August 1971.

Nathorst Land

14. Nordbugten. 71°36'N 26°30'W, 30 July 1971. Quartzitic gneiss rich in K-felspar and mica.

15. Head of valley near western part of T-Sø. 71°41'N 27°10'W, 25 July 1971. The basement geology is similar to that described at loc. 12 and 13. Horizons of amphibolite are, however, rare.

16. Valley on east side of Trianglen. 71°51'N 26°59'W. Alt. c. 700 m a.s.l., 27 July 1971. The basement geology agrees with that of Flyverfjord (loc. 12, 13). Occurrences of marble are, however, found in some places.

Scoresby Land

Geologically, the areas around loc. 17–23 are characterized by marine Middle Jurassic to Upper Permian deposits. These consist of sandstones and shales to the southeast, while intercalations of limestone and gypsum (rich in Ca) occur in the northwest in the vicinity of Mesters Vig. Loc. 24–31 are, however, situated in continental molasse deposits of Carboniferous to Lower Permian age. These rocks are relatively uniform sandstones and arkoses. Ran Øer (loc. 32) are composed of dolerite. Loc. 33 at Kap Petersen trapper's station is situated in Late Proterozoic Eleonore Bay-group dolomite and limestone, i.e., in an extremely Ca- and Mg-rich environment. Geochemically, however, this is a simplified picture. First of all basalt (dolerite) dykes and sills rich in Fe and to some degree Mg occur scattered in the whole region. Secondly, a variety of alkaline and basic intrusions of Tertiary age occur in the region of loc. 17–22. There are two main groups of intrusions, one in Werner Bjerge and one in Pictet Bjerge. Debris from these intrusive complexes contain large amounts of alkaline minerals and hence introduce Fe, Mg, K, Na, Ti and Sr and in addition tracers such as Mn, Zr, Nb, Mo and F.

17. Claudius Clavus Bjerge. C. 71°58'N 23°30'W. Alt. 230–300 m a.s.l., 9–10 August 1968. Reindeer skull, among mosses on soil.

18. Wernerbjerge. C. 71°56'N 24°10'W. Alt. 1220 m a.s.l., 25 August 1968. Moraine beside glacier.

19. Mountain north of Blomsterdal. 71°58'N 23°43'W. Max. alt. 1085 m a.s.l., 11–14 and 16–18 August 1968. a: Mossy flush with *Salix arctica* Pall. and *Harrimanella hypnoides* (L.) Coville. b: Side of moss tussock in flush. c: Melt water channel in flush. d: Snow-patches. e: Heath dominated by *Cassiope tetragona* (L.) D. Don. on bouldery slope. f: Sheltered slope. g: Crevices of rocks and boulders. h: Bird rocks and -stones. i: Basalt rocks. j: Bones.

20. Kolledalen (including Slugtdal). C. 72°00'N 23°21'W, 6–11 and 15–18 August 1968. a: Damp, mossy tussocks. b: Mossy hummock influenced by geese near edge of lake. c: *Cassiope*-heath. d: Plant remains and soil rich in humus. e: Sheltered slope. f: Sandy moraine mounds. g: Stems of *Dryas octopetala* L. on the summit of moraine mound. h: Moraine gravel. i: Shingle on moraine mound and at the foot of bird stone. j: Pebbles on scree at the side of frost polygons. k: Stones in mossy depression, in snow-patch, near lake and in small stream (temporary dry stones as well as inundated stones). l: Bird stone. m: Basalt sill. n: Dry, earthy crack in low rock. o: Cliff below bird's nests. p: Sea shells associated with raised beach. q: Reindeer antlers, occurring in vegetation dominated by *Salix herbacea* L. and different species of mosses close to lake. r: Bones.

21. Head of Antarctic Havn and Vildthorn. C. 72°01'N 23°13'W. Max. alt. 963 m a.s.l., 3–8 August 1968. a: Stony *Cassiope*-heath. b: Plant remains. c: Shingle flat on raised beach. d: Pebble in small stream in raised beach. e: Sandy patches in scree. f: Boulders in screes. g: Bird stone. h: Boulder composed of sandstone. i: Driftwood. j: Antlers occurring on raised beach. – The following biotopes and habitats of lichens were investigated on Vildthorn, only, k: South-facing slopes in the lower zone. l: Screes occurring at different altitudes. m: Bare soil on ridge (c. 900 m a.s.l.). n: Boulders and rocks at the summit of Vildthorn (above 900 m a.s.l.). o: Old stem of *Salix glauca* L. p: Bones, including bone of musk ox (*Ovibos moschatus*). q: Hare droppings.

22. Oksehorn. 72°01'N 23°40'W. Max. alt. 1148 m a.s.l., 14 August 1968. a: Boulder in scree (300 m a.s.l.). b: Bird rocks near syenite intrusion. c: Syenite rocks on ridge (450 m a.s.l.). d: Scree near ridge (600 m a.s.l.). e: Earthy patch on ridge (900 m a.s.l.). – The remaining lichen biotopes investigated on Oksehorn occur at an altitude of 1000 m a.s.l. f: Soil, boulders and rocks on summit ridge (some of these rocks are composed of sandstone). g: Vertical crevices of summit rocks.

23. Oksedal. 72°04'N 23°45'W, 17–19 August 1968. a: Soil. b: Bird stone.

Fig. 3. Edward Bay Dal (loc. 8). Dwarf shrub heath with patches of vegetation dominated by sedges, grasses and lichens (foreground). Photo by G. Halliday.

Fig. 4. Frost polygons on the north side of Flyverfjord (loc. 12). The boulders and stones are covered mainly by crustaceous lichens, whereas various fruticose lichens are of great importance on the soil between the stones. Photo by G. Halliday.

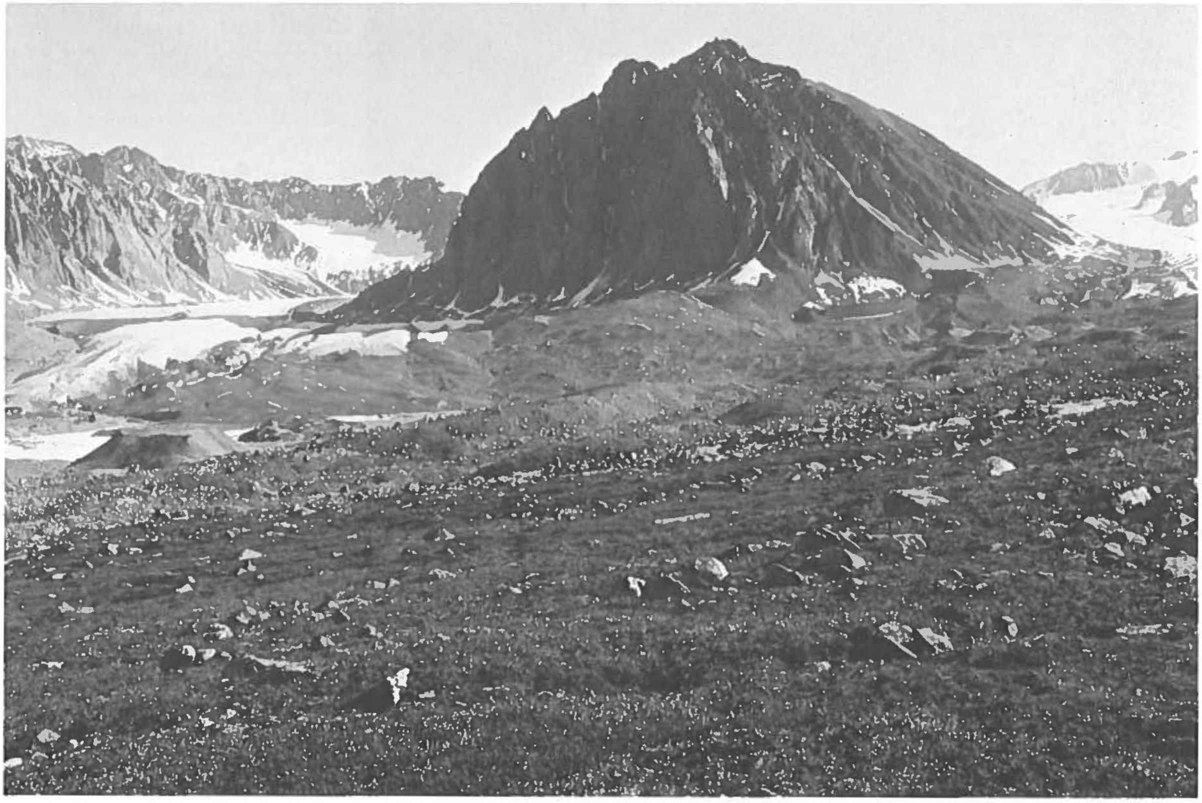


Fig. 5. Head of Deltadal (loc. 24) and the mountain Kolossen. Photo by G. Halliday.

24. Head of Deltadal. 72°04'N 24°03'W, 12 July 1971. Morainic rocks (G.H.).

25. Nedre Funddal and Sortebjerg. 72°05'N 24°05'W. Max. alt. 1100 m a.s.l., 22–25 August 1968; July 1974. a: Soil and plant residues in heath dominated by *Cassiope tetragona* and moraine terraces. b: Stony and rocky *Cassiope*-heath. c: Mosses in crevice in sandstone cliff. d: Mosses and soil in crevices in bird stones and sandstone rocks. e: (G.H.) Mosses and soil on boulders and rocks by glacial stream. f: Sandy, gravelly and rocky banks by glacial stream. g: Dry as well as moist sandstone rocks. h: Sandstone boulder rich in iron. i: Stones and rocks by waterfall. j: Projecting part of cliff and lower surfaces of overhanging sandstone rocks in gully. k: Erratic block. l: Bird rock. m: (G.H.) Dolerite sill. n: Bone. – The lichen-biotopes investigated on Sortebjerg: o: Soil and boulder in *Cassiope*-heath. p: Bird stone and pebbles at the foot of bird stone.

26. Mesters Vig. C. 72°08'N 23°50'W. Alt. 0–15 m a.s.l., August 1961; 20, 22 August 1968. a: Fireplace. b: Bank of sand on the side of moraine mound near watercourse. c: Shingle on terrace on raised beach. d: (G.H.) Boulder and soil on boulder. e: Bird stone.

27. Blyklippen, near the mine. 72°10'N 24°07'W, 27, 29 August 1968. a: Soil on boulder. b: Boulder influenced by guano of snowy owls (*Nyctea scandiaca*). c: Pebble (from conglomerate) in dry glacial stream and on rather stable scree (450 m a.s.l.). d: Excrements of musk ox (600 m a.s.l.). e: Soil (in fissures) and (f:) mosses on basalt dyke (750 m a.s.l.).

28. Hesteskoen. 72°12'N 24°10'W. Max. alt. 1100 m a.s.l., 29 August 1968. a: Soil and (b:) stones on exposed ridge (900 m a.s.l.).

29. Heath north of Noret and area near airstrip west of Noret. C. 72°14'N 23°50'W, 25 July, 9 September 1962; 2, 30 August 1968. a: (G.H.) Alkaline soil between rocks and sandy soil in *Cassiope*-heath (30 m a.s.l.). b: Mosses and dead plant fragments. c: Tussock on sandy bank. d: Sheltered depressions between rocks (30 m a.s.l.). e: Soil at the foot of bird rocks (30 m a.s.l.). f: Boulders and rock (30 m a.s.l.). g: Scree. h: Bird stone. i: Vertical, shady surface of bird rock (15 m a.s.l.).

30. East of entrance to Skeldal and east side of Skeldal. C. 72°16'N 24°12'W, 24 July, 5–6 September 1961; 28, 30 July, 7 September 1962; 12 July 1971. a: Tussocks dominated by *Cassiope tetragona* and *Dryas octopetala* in flushes. b: *Cassiope*-heaths on dolerite hills. c: Ledges on dolerite cliff. d: Morainic rocks. e: Dolerite hill.

31. Head of "Menanders Bugt". 72°19'N 24°14'W, 2–3 September 1961. a: Vegetation dominated by *Dryas octopetala* and *Carex rupestris* All. b: *Cassiope*-heath.

32. Ran Øer; the outermost island. 72°19'N 23°56'W, 25 August 1980. Tern breeding site.

33. Between Kap Petersen trapper's station and the snout of Skjoldungebræ. C. 72°24'N 24°30'W, 26 July, 28 August, 1 September 1961; August and 1 September 1962. a: Heath. b: Stony flats of beach. c: Dolomite boulders and -hill.

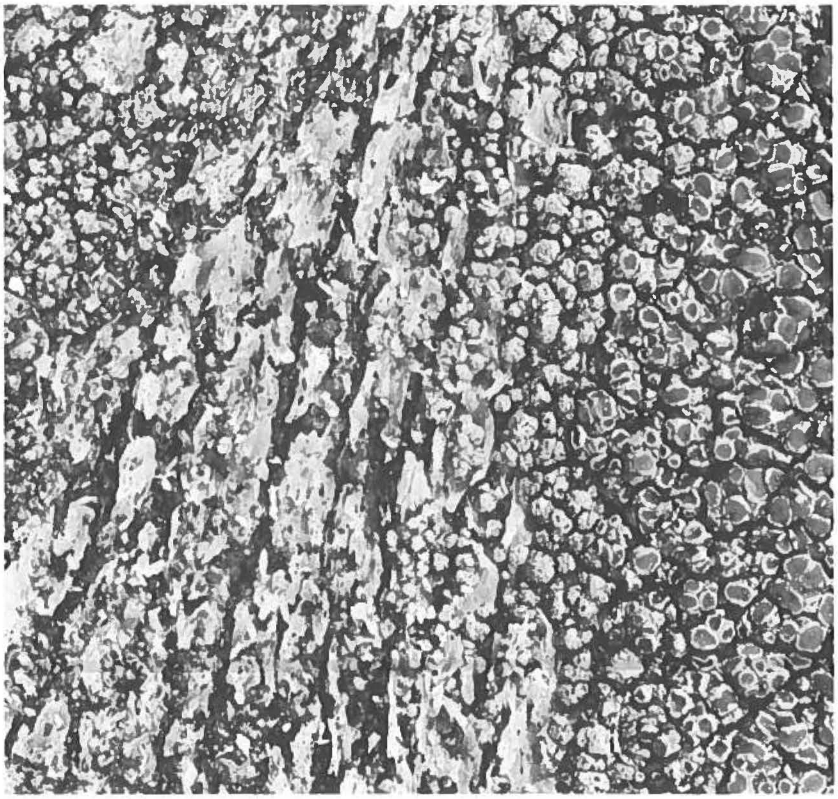


Fig. 6. *Lecanora behringii* Nyl. (right) and *Lecidella euphorea* (Flörke) Hertel (left) growing on an old bone. Coll. No. 361. Mountain north of Blomsterdal (loc. 19j). Photo by Jørgen Andersen and the author, × 6.

Lyell Land

The area around Polhem Dal is characterized by large occurrences of siltstone and quartzite, but minor amounts of limestone and dolomite are also found.

34. East side of entrance to Polhem Dal. 72°27'N 25°20'W, 1 August 1961. a: Heath dominated by *Betula nana* L. b: *Dryas octopetala-Carex rupestris* community on sandy terrace.

35. Col between Nordelv and Sydelv, Polhem Dal. 72°36'N 25°20'W, 31 July 1961. Vegetation dominated by *Dryas octopetala* and *Carex rupestris.*

Traill Ø

While the region around the head of Mountnorris Fjord is dominated, geologically, by marine shales, sandstones and conglomerates of Lower Cretaceous age (cut through by dolerite sills rich in Fe and Mg), the area just north of Holm Bugt and the central and upper part of the Karupelv area are characterized by the following continental Permo-Carboniferous deposits: shales, sandstones, arkoses and conglomerates, together with scattered occurrences of dolerite rocks.

36. Head of Mountnorris Fjord. 72°25'N 22°50'W, 10, 11 August 1962. Mainly dolerite rocks.

37. Holm Bugt. 72°31'N 24°00'W, 21 August 1962. Vegetation with *Minuartia stricta* (Sw.) Hiern. and *Arenaria humifusa* Wahlenb.

38. Karupelv. 72°36'N 23°24'W, 24 August 1962. Dolerite rocks.

Survey of flora and ecology

In this section an annotated survey will be given of the 167 species of lichens collected in East Greenland by P. B. Topham, I. Waterston and G. Halliday (Table 2). The total number of lichens in the present area are, however, supposed to be somewhat larger. It is beyond the scope of this paper to mention all lichen species known from Central East Greenland, as several species reported by Lynge & Scholander (1932) and Lynge (1940) from areas close to the present investigation area are in need of critical revision. All reliable and correctly identified species will, however, be included in a checklist of the lichen-forming fungi of Greenland, which at present is being prepared by the present author.

The system of lichen classification used is in accordance with that adopted by Ozenda & Clauzade (1970), and the nomenclature generally follows that of Hawksworth, James and Coppins (1980).

For each species, reference numbers of the localities and sites are given, together with information on the presence of perithecia (c.pe.) or apothecia (c.ap.). The typical habitat of the species are mentioned along with the Greenland plant communities, in which they occur, and the most important associated lichens are listed. The notes on the distribution of the species in Greenland are based upon unpublished collections of lichens deposited at the Botanical Museum of Copenhagen, and upon information in the following publications: South and South West Greenland: Dahl (1950), Hansen (1971), Hansen (1978b). – West and Central West Greenland: Lynge (1937), Hansen (1962). – North West Greenland: Hansen (1980). – North Greenland: Lynge (1923). – South East Greenland: Lynge (1932), Dahl, Lynge & Scholander (1937), Daniëls (1975), Hansen (1978a). – Central East Greenland: Branth (1894). – North East Greenland: Lynge & Scholander (1932), Lynge (1940).

Special part

In this part, lichens of particular interest are briefly discussed. Some species are new to the lichen flora of Greenland or have been very rarely collected in Greenland, while others are considered to be interesting from a phytogeographical, ecological or taxonomical point of view. The distinction between microlichens and macrolichens are based upon the three main growth forms: crustose (micro.), foliose and fruticose (macro.).

Microlichens

Acarospora schleicheri (Ach.) Massal. (Fig. 12)

In Greenland, *Acarospora schleicheri* has previously been reported only from some localities situated around Scoresby Sund, Kong Oscar Fjord and Kejser Franz Joseph Fjord (Branth 1894, Magnusson 1935, Lynge 1940). The new site is located within this region. The Greenland populations of *A. schleicheri* are of great phytosociological interest, as the species belongs to the very characteristic group of lichens occurring on dry, alkaline soil in the Mediterranean area (see, e.g., Poelt & Vězda 1977). In southern Europe, *A. schleicheri* often grows parasitically on *Diploschistes albescens* Lettau and *D. steppicus* Reickert. The plant collected by Topham grows, however, on *Diploschistes muscorum* (Fig. 12).

Caloplaca epithallina Lynge

This species has previously been reported from 3 localities in West Greenland and five localities in North East Greenland (Lynge 1940, Alstrup 1979). The apothecia of the present specimen are small (0.2–0.3 mm), plane and more or less conglomerate; the disk is ferrugineous, and the margins are blackish. Spores: 10–11 × 5–6 μm, septum: 2–3 μm.

Caloplaca tornoensis Magnusson

The species has not previously been reported from Greenland, but is known from other northern areas, e.g., Spitsbergen and Lapland (Magnusson 1944, 1952. Poelt 1969). It has small apothecia (less than 0.3 mm) with dark reddish brown disk and black margins.

Catillaria philippea (Mont.) Massal.

This species is new to the lichen flora of East Greenland. The thallus of the present specimen is light greyish brown-ochraceous; the apothecia are lecideine. The epithecium is brownish, and the hypothecium is dark brown. The paraphyses are free, with darker, swollen ends. The spores are hyaline, l-septate (10–12 × 5 μm).

Coniocybe furfuracea (L.) Ach.

The present plants are not quite typical, as their thalli are much dispersed, often reduced to scattered granules on the moss leaves, and their apothecia rather short-stalked (< 1 mm). However, the specimens can hardly be referred to *Coniocybe sulphurea* (Retz.) Nyl., as the thallus is not immersed. Capitulum and stalk are totally covered by a yellow-green pruina in both species, and they both have a distinct preference for rather humid and shady localities (Tibell 1978). *C. furfuracea* seems, however, to have the lowest substrate specificity, although in Greenland it most frequently occurs on soil in hollows, e.g., below overhanging rocks, and on mosses and dead plant fragments on the ground (Hansen 1978a). *C. sulphurea,* which has a preference for bark and wood, has not yet been reported from Greenland. It could probably be found growing on stumps or dead trunks of *Betula, Salix* or *Alnus* in South West Greenland.

Lecidea speirea (Ach.) Ach. (Fig. 13)

In Greenland, the species has previously been reported from a few localities on Disko (West Greenland) and in the Scoresby Sund region on the east coast (Branth 1894, Lynge 1937). In herbarium C there is also a specimen (no. 13996) definitely belonging to this species, collected by P. Gelting on Tupilak island (68°42′N 52°53′W) in the Egedesminde area on the west coast.

Table 2. Annotated list of lichens collected in Central East Greenland by P. B. Topham, I. Waterston and G. Halliday.

A: New to Greenland
B: New to E Greenland
C: New to present invest. area
D: N-most rec. E Greenland

	A	B	C	D	Localities and collecting sites (see p. 5 ff)	State of fertility ap = apothecia pe = perithecia st = sterile
Order Pyrenocarpales						
Verrucariaceae						
1. *Staurothele fuscocuprea* (Nyl.) Zsch.					19c, 20k, 27c.	c.pe.
2. *S. perradiata* Lynge					20k (Fig. 20).	c.pe.
3. *Thelidium papulare* (Fr.) Arnold		x			20k.	c.pe.
4. *Verrucaria aethiobola* Wahlenb.					20k.	c.pe.
5. *V. thalassina* (Zahlbr.) Zsch.	x				20p.	c.pe.
Dermatocarpaceae						
6. *Catapyrenium lachneum* (Ach.) R. Sant.					26d, 29a.	c.pe.
7. *Dermatocarpon intestiniforme* (Körber) Hasse			x		25g.	c.pe.
Order Coniocarpales						
Caliciaceae						
8. *Coniocybe furfuracea* (L.) Ach.			x	x	25c.	c.ap.
9. *Sphaerophorus fragilis* (L.) Pers.			x?		2a, 31b.	st.
10. *S. globosus* (Huds.) Vainio					2a.	st.
Order Cyclocarpales						
Diploschistaceae						
11. *Diploschistes muscorum* (Scop.) R. Sant.		x			29a.	c.ap.
12. *D. scruposus* (Schreber) Norman					19g,h, 27e,f.	c.ap.
Pyrenopsidaceae						
13. *Pyrenopsis pulvinata* (Schaerer) Th. Fr.					25j.	c.ap.
Lichinaceae						
14. *Placynthium asperellum* (Ach.) Trevisan					19h, 21c, 25b (Fig. 15).	c.ap. (19h: st)
Collemataceae						
15. *Leptogium lichenoides* (L.) Zahlbr.					22a, 25g.	st.
Pannariaceae						
16. *Pannaria pezizoides* (Weber) Trevisan					19a, 20a.	c.ap.
17. *Parmeliella praetermissa* (Nyl.) P. James					21k, 25d.	st.
18. *Psoroma hypnorum* (Vahl) Gray					2a, 11, 20d, 21b.	c.ap.
Peltigeraceae						
19. *Peltigera aphthosa* (L.) Willd.			x	x	2a.	st.
20. *P. canina* (L.) Willd.			x?	x	2a, 3, 5.	st.
21. *P. kristinssonii* Vitik.		x			17, 21b, 37.	c.ap.
22. *P. lepidophora* (Nyl. ex Vainio) Bitter					19d, 20f, 21k, 22e, 23a, 29a.	st.
23. *P. leucophlebia* (Nyl.) Gyelnik					4, 5, 7, 9, 19f, 21l, 25a, 30e, 31a, 35, 36.	st. (35: c.ap.)

Associated lichens. Nos refer to present list	Typical habitat and plant community in Greenland	Distribution in Greenland and frequency of the species: N, E, W, S = north to south; C = central; n = not reported from; w = widely distributed; c = common; o = occasional; r = rare; v = very
2, 4	Siliceous stones and rocks temporarily moistened by seeping water; rocks in glacial streams.	w (generally c–o; N, n; NW, n).
1	Hab. like 1 (Disko: basalt).	w? (generally o, rarer to the south).
102	Calcareous stones and rocks in somewhat shady places.	CE, vr; CW, r.
1	Hab. like 1.	w (generally c–o; N, n; NW, n).
	Sea shells on raised beaches.	CE, vr; CW, vr.
29, 57, 74	Calcareous soil.	w (generally c–o; NW, n).
15	Calcareous rocks near watercourses; rocks moistened by seeping water.	w (generally o; distribution, however, incompletely known).
	Dead plant fragments, humus soil and mosses in sheltered, somewhat shady places (SE Greenland: peat in tombs and abandoned peat-cottages).	w (N, n; NE, n; CE, r; SE, o; NW, n; CW, o; SW, o).
	Sloping to vertical surfaces of siliceous boulders and rocks; stony and gravelly soil.	w (N, n; NE, r; CE, r; SE, c; NW, r; CW, c; SW, c).
61	Sloping surfaces of siliceous boulders and rocks; slightly moist soil in fell-fields and in dwarf shrub heaths.	w (N, n; NE, n; CE, r; SE, c; W, c).
	Dry, calcareous soil (present loc.); mosses and rocks in moist places (S Greenland, Alstrup 1979).	CE, vr; SW, r.
	Mainly siliceous boulders and rocks with or without visible influence of guano (loc. 27: basalt dyke).	w (generally o; N, n; NW, n).
	Siliceous rocks with seeping water.	w? (N, n; NE, n; CE, r; SE, r; W, c–o).
53, 150	Both calcareous rocks and rocks with very low contents of Ca; ± influence of guano.	w (generally c, even in N-most Greenland).
7	Calcareous rocks and soil, often among mosses in moist places.	w (N, n; NE, o; CE, o; SE, r; NW, n; CW, c–o; SW, c).
	Moist soil rich in humus and over mosses in the following plant communities: herb slopes, wet flushes, snowbeds and dwarf shrub heaths.	w (generally c; N, n; NW, n).
	Calcareous rocks and soil, often on humus or among mosses.	w (N, n; NE, c; CE, c; SE, r; NW, n; CW, c; SW, c).
	Dead plant fragments, humus soil and mosses, usually in sheltered, moist places: under willow-shrubs, on herb slopes, in wet flushes, in showbeds, in dwarf shrub heaths and in less exposed fell-fields.	w (generally c).
20	Dead plant fragments, humus soil and mosses, often in somewhat shady and moist places in the communities mentioned in connection with 18; greatly competitive in such habitats.	w (generally c–o, rarer to the north).
19	Hab. and plant communities: see 18 and 19.	w (distribution mainly like 19).
	Soil and mosses.	Distribution incompletely known.
27	Pioneer on open, bare, calcareous soil.	w (N, n; NE, o; CE, c; SE, o; NW, n; CW, c; SW, o).
	Among mosses on calcareous soil in somewhat shady and moist places.	w (generally c; NE, vc; CE, vc).

Table 2: continued

A: New to Greenland B: New to E Greenland C: New to present invest. area D: N-most rec. E Greenland	A	B	C	D	Localities and collecting sites (see p. 5 ff)	State of fertility ap = apothecia pe = perithecia st = sterile
24. *P. malacea* (Ach.) Funck					3, 11, 14, 20f, 21q, 25a.	st.
25. *P. polydactyla* (Necker) Hoffm.					30a, 34a.	30a: st.; 34a: c.ap.
26. *P. rufescens* (Weis.) Humb.					10, 21l, 25b,o, 26b, 30b.	st. (10: c.ap.)
27. *P. spuria* (Ach.) DC.					8, 21k, 26a, 30b.	st.
28. *P. venosa* (L.) Hoffm.					19b, 20b.	c.ap.
29. *Solorina bispora* Nyl.					29a, 34b.	c.ap.
30. *S. crocea* (L.) Ach.					2a, 3, 10, 11, 23a, 31b, 35, 36.	c.ap.
31. *S. octospora* Arn.					30c.	c.ap.
32. *S. saccata* (L.) Ach.					12.	c.ap.
Lecideaceae						
33. *Arthrorhaphis citrinella* (Ach.) Poelt					21e,m, 22f.	21 e,m: c.ap.; 22f: st.
34. *Catillaria philippea* (Mont.) Massal.		×			25g.	c.ap.
35. *Huilia macrocarpa* (DC.) Hertel			×?		21f, 27c.	c.ap.
36. *Lecidea atrobrunnea* (Ram.) Schaerer					19h,i, 20l, 21g,h, 25j,l,p, 29h (Fig. 10).	c.ap.
37. *L. auriculata* Th. Fr.					21n, 22f, 25k.	c.ap.
38. *L. lapicida* (Ach.) Ach.					21c,n.	c.ap.
39. *L. limosa* Ach.					19e, 20d,g, 21q, 25a, 29a,b, 33a, 34b.	c.ap.
40. *L. marginata* Schaerer					25g (Fig. 14).	c.ap.
41. *L. speirea* (Ach.) Ach.					21c, 25b.	c.ap.
42. *L. vernalis* (L.) Ach.					19e, 20a.	c.ap.
43. *Lecidella euphorea* (Flörke) Hertel					19j, 20q,r, 21i,j,p (Fig. 6).	c.ap.
44. *Lepidoma demissum* (Rutström) Ach.					21m, 25a,b.	c.ap.
45. *Lopadium coralloideum* (Nyl.) Lynge					21k.	c.ap.
46. *L. pezizoideum* (Ach.) Körber				×	20d.	c.ap.
47. *Psora decipiens* (Hedw.) Hoffm.					19d,g,h, 25a, 33c, 35 (Fig. 8).	c.ap.
48. *P. rubiformis* (Ach.) Hook.					13b, 19g, 25d, 30e (Fig. 7).	c.ap.
49. *Rhizocarpon crystalligenum* Lynge			×		21c, 29f (Fig. 16).	c.ap.
50. *R. geminatum* Körber					10, 19h, 20i,j,k,l, 21c,f, 22a,f, 25i, 26c, 29f,g.	c.ap.
51. *R. geographicum* (L.) DC.					10, 16, 19f,g,h, 20e,i,j,k,l,m,o, 21c,f,g,h,l,n, 22a,b,c,f, 27b,c (Fig. 9, 10).	c.ap.
52. *R. grande* (Flörke ex Flotow) Arnold					19h, 21c,f,n, 22g, 25f (Fig. 18).	c.ap.
53. *R. intermediellum* Räsänen		×			19h.	c.ap.
54. *R. jemtlandicum* Malme					22f, 25b.	c.ap.
55. *R. pusillum* Runem.	×				21f (Fig. 17).	c.ap.
56. *R. superficiale* (Schaerer) Vainio					18, 22f, 28b.	c.ap.
57. *Toninia lobulata* (Sommerf.) Lynge					20b, 29a.	c.ap.

Associated lichens. Nos refer to present list	Typical habitat and plant community in Greenland	Distribution in Greenland and frequency of the species: N, E, W, S = north to south; C = central; n = not reported from; w = widely distributed; c = common; o = occasional; r = rare; v = very
	Soil and mosses in many plant communities, e.g., dwarf shrub heaths and fell-fields.	w (generally c, rarer to the north).
	Soil and mosses in snowbeds, moist dwarf shrub heaths and flushes.	w (N, n; NE, r; CE, r; SE, c; NW, n; CW, o; SW, c).
	Open, dry, calcareous soil and silicate soil rich in base-minerals in many plant communities, especially dwarf shrub heaths, fell-fields and steppe-like associations; also in disturbed localities near human settlements.	w (generally c–vc, even in N-most Greenland).
22	Basic soil and among mosses under willow shrubs and in dwarf shrub heaths; often in somewhat disturbed localities.	w (generally c; N, n; NW, n).
	Calcareous and otherwise nutritious soil in rock fissures, often among mosses in somewhat shady and moist places.	w (many localities, but generally r; N, n).
6, 74	Hab. like 28.	w (generally o–r; NE, vc!).
	Bare, unstable soil along watercourses and on talus slopes and landslides.	w (generally c–vc in coastal areas; NE, o–r).
	Calcareous soil, usually among mosses.	w (N, o; NE, c–o; CE, o; SE, n; NW, n; CW, o (Disko, c); SW, r).
	Hab. like 28.	w (generally o–r; N, n; SE, n; NW, n).
59	Pioneer on fresh, acid soil on talus slopes, landslides and in fell-fields, but also on humus soil in dwarf shrub heaths, often in somewhat moist places.	w (generally c–o; NW, n).
40	Calcareous rocks.	CE, vr.
	Rocks; broad ecological tolerance (Thomson 1979).	Distribution incompletely known.
51, 103	Siliceous rocks and other types of rocks, often with visible influence of guano; broad ecological tolerance?, see Creveld (1981).	w (generally c–o; N, n).
	Exposed, siliceous rocks, often along small fissures.	w (generally o).
	Exposed, siliceous rocks ± rich in iron.	w (generally c–vc).
105, 143, 145, 152, 163	Dead plant fragments, soil and mosses under shrubs of *Betula* and *Salix* and in heaths.	w (N, n; NE, c; CE, c; SE, n; NW, n; CW, c–o; SW, o; possibly somewhat neglected).
34	Calcareous rocks of many types, including almost pure calcite ($CaCO_3$).	w (N, c; NE, c; CE, c–o; SE, n; NW, n; CW, o; SW, n).
	Slightly calcareous rocks, usually in somewhat moist places.	CE, o; CW, o.
161	Dead plant fragments, humus soil and mosses.	w (generally c–o; NW, n).
104, 115, 143, 145, 146	Dead twigs, drift wood and bones of, e.g., whale, reindeer and musk ox.	w (N, n; NE, o; CE, o; SE, r; NW, n; CW, o; SW, n).
	Sandy soil and humus in fell-fields and dwarf shrub heaths.	w (N, n; NE, o–r; CE, o; SE, vc; NW, n; CW, c; SW, c).
	Dead plant fragments, humus and mosses.	w (generally o–r; Disko, c).
	Hab. like 45.	Distribution mainly like 45; possibly somewhat overlooked.
48, 74	Calcareous soil.	w (generally o; NE, vc; NW, n).
47	± Calcareous soil over rocks and in rock fissures.	w (generally c–o; NW, n).
	Siliceous rocks.	w (generally r; NW, n; CW, c).
52, 101, 150	Broad ecological tolerance: exposed, siliceous rocks, often influenced by guano or nutritious dust; also calcareous rocks. Moisture-indifferent (on dry as well as moist surfaces of rocks).	w (generally c–vc).
36, 86, 90, 100, 103, 109, 137, 155.	Siliceous rocks and calcareous rocks, even rocks with high content of calcite.	w (generally vc).
50, 154	Siliceous rocks.	w (N, n; NE, r; CE, c; SE, vr; NW, n; CW, c; SW, o).
14	Calcareous rocks and basic eruptive minerals.	N, vr; CE, vr.
	Exposed, siliceous rocks.	w (generally o–r; NW, n; CW, c).
	Parasitic on *Sporastatia testudinea*, on rocks.	N, o; CE, vr.
	Exposed, siliceous rocks.	w (generally o–r; SW, n).
6	Calcareous soil, often on mosses.	w (N, c; NE, c; CE, c; SE, n; NW, n; CW, c; SW, r).

Table 2: continued

A: New to Greenland B: New to E Greenland C: New to present invest. area D: N-most rec. E Greenland	A	B	C	D	Localities and collecting sites (see p. 5 ff)	State of fertility ap = apothecia pe = perithecia st = sterile
58. *Tremolecia atrata* (Ach.) Hertel					21c,f, 22c, 25g,h.	c.ap.
Cladoniaceae						
59. *Baeomyces roseus* Pers.					20c, 21m.	st.
60. *Cladonia acuminata* (Ach.) Norrlin					20d.	st.
61. *C. amaurocraea* (Flörke) Schaerer			*		1, 2a, 3, 20c,e,n, 30d, 31b, 36.	st.
62. *C. cariosa* (Ach.) Sprengel					23a.	c.ap.
63. *C. chlorophaea* (Flörke ex Sommerf.) Sprengel					30a.	st.
64. *C. coccifera* (L.) Willd.					1, 2a, 3, 9, 19f, 21f, 24, 25a, 29d, 36.	st. (25a: c.ap.)
65. *C. cornuta* (L.) Hoffm.					2a, 20c, 25a, 30b, 36.	st. (20c: c.ap.)
66. *C. cyanipes* (Sommerf.) Nyl.					30b, 36.	st.
67. *C. fimbriata* (L.) Fr.					20d.	st.
68. *C. luteoalba* A. Wilson & Wheldon					20d, 28a.	st.
69. *C. macroceras* (Delise) Ahti					6, 20e, 30b.	st.
70. *C. macrophyllodes* Nyl.			*		25a.	c.ap.
71. *C. mitis* Sandst.					2a,b, 19e, 21a,m, 30b, 31b, 36.	st.
72. *C. phyllophora* Ehrh. ex Hoffm.			*		21k, 26b.	st.
73. *C. pleurota* (Flörke) Schaerer			*		2a, 20e, 25b.	st.
74. *C. pocillum* (Ach.) O.-J. Rich.					9, 10, 12, 19e, 20c, 23a, 25a,o, 29a, 30c, 31a, 33c, 34b, 35, 37.	st.
75. *C. pyxidata* (L.) Hoffm.					1, 2a, 11, 20a,e, 21k, 24, 25a, 28a, 29d, 30a, 31b, 36.	st. (25a: c.ap.)
76. *C. stricta* (Nyl.) Nyl.					6, 21a.	st.
77. *C. sulphurina* (Michaux) Fr.			*	*	2a.	st.
Stereocaulaceae						
78. *Stereocaulon alpinum* Laurer					2a, 5, 20e, 21a, 25f, 29a, 32, 34a.	st. (2a, 25f, 32: c.ap.)
79. *S. botryosum* Ach. em. Frey					11.	st.
80. *S. rivulorum* Magnusson					11, 13b, 22f, 29e.	st.
81. *S. vesuvianum* Pers.					3, 21l.	st.
Umbilicariaceae						
82. *Umbilicaria arctica* (Ach.) Nyl.					11, 29h, 32.	c.ap.
83. *U. cylindrica* (L.) Delise ex Duby					2b, 11, 20l, 21l, 22f, 25l, 29f, 36.	c.ap.
84. *U. decussata* (Vill.) Frey					16, 18, 20l, 22b, 25l,p, 29h, 32, 36.	st. (20l: c.ap.)
85. *U. deusta* (L.) Baumg.					19e, 25b.	st.
86. *U. hyperborea* (Ach.) Hoffm.					2b, 8, 19f, 20i, 21f,n, 24, 25k.	c.ap. (2b, 8: st.)
87. *U. krascheninnikovii* (Savicz) Lamb					21f.	c.ap.

Associated lichens. Nos refer to present list	Typical habitat and plant community in Greenland	Distribution in Greenland and frequency of the species: N, E, W, S = north to south; C = central; n = not reported from; w = widely distributed; c = common; o = occasional; r = rare; v = very
137	Hab. like 38.	w (generally c–vc; NE, r; NW, n).
33	Bare soil in, e.g., open dwarf shrub heaths.	w (N, n; NE, o; CE, o; SE, n; NW, n; CW, c; SW, o–r).
	Calcareous soil and humus soil.	w (generally o–r; N, n; NW, n).
10, 122, 123, 134	Poor soil in, e.g., fell-fields and dwarf shrub heaths, often among mosses (occasionally on nutritious soil).	w (generally c–vc; N, n; NE, n).
	Basic soil (± rich in Ca) and soil rich in humus.	w (generally o–r; N, n; NW, n).
	Broad edaphic tolerance: mineral soil and humus soil; occasionally on calcareous soil.	w (generally c–vc).
71, 75, 78	Mineral soil and humus soil in many types of plant communities (see Hansen 1978a).	w (generally c–vc).
	Sandy soil and humus, often among mosses, under shrubs of *Salix* and *Betula* and in dwarf shrub heaths.	w (generally c–o; N, n; NW, n).
	Humus soil and raw humus, usually among mosses, under shrubs of *Salix* and *Betula* and in sheltered places in dwarf shrub heaths.	w (N, n; NE, n; CE, o; SE, r; NW, r; CW, c; SW, c).
	Mineral soil and humus soil; decaying branches of *Betula*.	w (generally o, rarer to the north; N, n; NW, n).
	Dead plant fragments, humus soil and mosses.	CE, r; SW, r.
	± Calcareous soil in dwarf shrub heaths.	Distribution incompletely known.
	Moist soil near snowbeds, in fell-fields and in dwarf shrub heaths.	w? (N, n; NE, n; CE, r; SE, c; NW, n; CW, c; SW, c in coastal areas).
64, 75, 78	Mineral soil and humus soil in lichen heaths, dwarf shrub heaths etc. (see Hansen 1978a).	w (generally c–vc; N, n; NE, r).
	Mineral soil and humus soil in, e.g., dwarf shrub heaths.	w? (N, n; NE, n; CE, r; SE, o; NW, n; CW, c; SW, c).
	Hab. like 72.	w (N, n; NE, n; CE, o; SE, c; NW, r; CW, c; SW, c).
6, 29, 47	Calcareous soil.	w (generally N, c; S, o–r; CE, vc).
64, 71, 78	Broad ecological tolerance: mineral soil, humus soil, raw humus and mosses; also on rocks and boulders. Occurs in many types of plant communities, e.g., fell-fields and dwarf shrub heaths.	w (c–vc in all parts of Greenland).
120	Moist soil in snowbeds and depressions in dwarf shrub heaths.	w (generally c–o in coastal areas; N, n; NW, n).
	Humus soil in dwarf shrub heaths and under willow-shrubs.	w (N, n; NE, n; CE, vr; SE, c; NW, r; CW, c; SW, c).
64, 71, 75	Soil and among mosses in many types of plant communities (see Hansen 1978a).	w (vc in all parts of Greenland).
	Siliceous rocks.	w (N, n; NE, o; CE, o; SE, o; NW, n; CW, c–o; SW, c).
	Bare (and often unstable) soil on slopes with a snow cover of long duration and along watercourses.	w (known from all parts of Greenland; S, o; N, c; CE, c).
	Siliceous rocks.	w (N, n; NE, vr; CE, o; SE, c; NW, n; CW, c; SW, c).
	Top and subapical surfaces of bird stones and rocks more or less influenced by guano.	w (N, r; NE, o; CE, o; SE, c; NW, o; CW, c; SW, c).
86, 89,90	Siliceous rocks.	w (vc in all parts of Greenland).
150	Bird stones and rocks more or less influenced by guano.	w (previously reported from all parts of Greenland; N, c–vc; S, o–r; CE, c).
	Seepage surfaces of rocks and flooded boulders.	w (N, n; NE, n; CE, o; SE, c; NW, n; CW, c–o; SW, c).
51, 83, 89, 90, 109, 137, 155	Siliceous rocks and boulders.	w (generally c–vc; N, n).
	Rocks and boulders.	w (generally o; SW, n).

Table 2: continued

A: New to Greenland B: New to E Greenland C: New to present invest. area D: N-most rec. E Greenland	A	B	C	D	Localities and collecting sites (see p. 5 ff)	State of fertility ap = apothecia pe = perithecia st = sterile
88. *U. lyngei* Schol.					11, 20k, 21f, 22d, 28b, 29f.	st.
89. *U. proboscidea* (L.) Schrader					2b, 21c, 22f.	c.ap.
90. *U. torrefacta* (Lightf.) Schrader					2b, 20i,l, 21f.	c.ap. (2b: st.)
91. *U. vellea* (L.) Ach.					20k, 25i.	st.
92. *U. virginis* Schaerer					3, 8, 15, 19h, 20l.	c.ap.
Acarosporaceae						
93. *Acarospora chlorophana* (Wahlenb.) Massal.					16, 19g, 22g.	c.ap. (19g: st.)
94. *A. schleicheri* (Ach.) Massal.					29e (Fig. 12).	c.ap.
95. *Sporastatia testudinea* (Ach.) Massal.					16, 21f, 29f,i (Fig. 17).	c.ap.
Pertusariaceae						
96. *Pertusaria coriaceae* (Th. Fr.) Th. Fr.					25e.	c.ap.
97. *P. dactylina* (Ach.) Nyl.					21a.	st.
98. *P. octomela* (Norman) Erichsen		x			12, 20g.	c.ap.
99. *P. oculata* (Dickson) Th. Fr.					21i, 29b.	21i: st.; 29b: c.ap.
Lecanoraceae						
100. *Aspicilia cinereorufescens* (Ach.) Massal.				x	19g (Fig. 9).	c.ap.
101. *A. perradiata* (Nyl.) Hue					20l.	c.ap.
102. *Ionaspis suaveolens* (Schaerer) Th. Fr.					20k.	c.ap.
103. *Lecanora badia* (Pers.) Ach.					19h, 20l, 21g (Fig. 10).	c.ap.
104. *L. behringii* Nyl.					19j, 20q,r, 21j,p (Fig. 6).	c.ap.
105. *L. castanea* (Hepp) Th. Fr.					21q, 25a.	c.ap.
106. *L. epibryon* (Ach.) Ach.					12, 16, 21b, 25a, 29a, 30b, 31a, 33a, 34b, 36.	c.ap.
107. *L. frustulosa* (Dickson) Ach., incl. f. *argopholis* (Ach.) Link					19h, 21f.	c.ap.
108. *L. melanophthalma* (Ram.) Ram.					8, 11, 20l,o, 21g, 25l,p, 29h, 32.	c.ap.
109. *L. polytropa* (Hoffm.) Rabenh.					13c, 18, 19h, 20h,i,j,k, 21f,g,h,l,n, 22a,d,f, 25g,h,i,j,k,o,p, 32.	c.ap.
110. *Ochrolechia frigida* (Swartz) Lynge					1, 2a, 20a.	st. (20a: c.ap.)
111. *O. geminipara* (Th. Fr.) Vainio					20d, 25a.	st.
112. *O. lapuensis* Räsänen			x		21b, 29b.	st.
113. *O. upsaliensis* (L.) Massal.					12, 30e.	c.ap.
114. *Placopsis gelida* (L.) Lindsay			x		21c.	st.
Candelariaceae						
115. *Candelariella aurella* (Hoffm.) Zahlbr.					17, 19e,j, 20l,q,r, 21b, 29b.	c.ap.
116. *C. placodizans* (Nyl.) Magnusson					19g,h, 21a, 25a,o, 26a, 30b,e, 35.	st.

Associated lichens. Nos refer to present list	Typical habitat and plant community in Greenland	Distribution in Greenland and frequency of the species: N, E, W, S = north to south; C = central; n = not reported from; w = widely distributed; c = common; o = occasional; r = rare; v = very
155	Siliceous rocks and boulders.	w (N, r; NE, o; CE, c–o; SE, o; NW, o; CW, c; SW, r).
83, 86, 90	Siliceous rocks and boulders.	w (generally c–o in all parts of Greenland).
51, 83, 86, 89, 109, 137, 155	Siliceous rocks and boulders, especially in very wind exposed places.	w (generally vc–c; N, n).
	Vertical and very steep surfaces of siliceous rocks influenced by seeping water.	w (N, n; NE, n; CE, o; SE, c; NW, n; CW, c–o; SW, c).
	Siliceous rocks and boulders.	w (generally N, c; S, o–r; CE, c).
	Siliceous rocks; distinct preference for somewhat shady places in small rocky caves, below overhanging rocks and in rock crevices; these rock surfaces are often influenced by guano and nutritious dust.	w (generally o; possibly somewhat neglected).
	Parasitic on *Diploschistes muscorum*; dry, calcareous soil.	CE, o.
	Siliceous rocks and rocks with high contents of Ca.	w (generally N, c; S, o–r; CE, c).
	Dead plant fragments, humus soil and mosses in, e.g., dwarf shrub heaths.	w (generally c–o; SE, n).
	Hab. like 96.	w (generally o; N, n).
	Dead twigs of *Salix, Dryas* etc. and other plant remains; also on mosses and calcareous soil.	CE, r; CW, r.
	Decaying mosses and other plant fragments and humus soil in moist and semi-moist habitats, e.g., snowbeds, river valleys and depressions in dwarf shrub heaths.	w (N, n; NE, n; CE, o; SE, c; NW, r; CW, c; SW, c–o).
51, 109	Siliceous rocks.	w? (S, o; rare or absent in more northern parts of Greenland; possibly overlooked).
50, 150	Bird stones and bird rocks.	w? (N, n; NE, c; CE, c; SE, n; NW, n; CW, c–o; SW, n).
3	Periodically irrigated stones in stream beds.	NE, vr; CE, vr.
36, 51	Siliceous rocks and boulders influenced by guano.	w (generally c–o; N, n; NW, n).
43, 115, 143, 145	Old bones.	w (generally c–o; N, n).
39, 143, 145, 152, 163	Dead plant fragments, mosses and humus soil.	w (generally o; r in more northern parts of Greenland).
152	Dead plant fragments, mosses and base-rich soil in dwarf shrub heaths dominated by, e.g., *Dryas integrifolia* or *D. octopetala*; under shrubs of *Betula* and *Salix* in SW Greenland.	w (generally c–vc; SE, n!).
	Often steep surfaces of siliceous and calcareous rocks.	w (generally c–o; N, n; NW, n).
129, 149, 150, 158, 159	Top of bird stones and projecting rocks.	w (c in all parts of Greenland).
51, 86, 90, 100, 137, 155	Siliceous rocks and stones.	w (vc in all parts of Greenland).
	Dead plant fragments, mosses, humus and soil in many types of plant communities (see Hansen 1978a).	w (vc–c in all parts of Greenland).
	Soil rich in humus and dead mosses in dwarf shrub heaths.	w (generally o; N, n; NW, n).
	Hab. like 111.	CE, o; SE, o; CW, c.
	Dead plant fragments, mosses and ± calcareous soil in dwarf shrub heaths, under shrubs of *Betula* and *Salix* etc..	w (N, r; NE, o; CE, c–o; SE, n; NW, n; CW, c; SW, r).
	Siliceous rocks and stones.	w (N, n; NE, n; CE, vr; SE, c; NW, n; CW, c–o; SW, c).
43, 104, 143, 145.	Calcareous rocks, bird stones and old bones.	w (generally o).
	± Basic soil and over mosses in open, exposed places in fell-fields, landslides and dwarf shrub heaths.	w (c–o in all parts of Greenland).

Table 2: continued

A: New to Greenland B: New to E Greenland C: New to present invest. area D: N-most rec. E Greenland	A	B	C	D	Localities and collecting sites (see p. 5 ff)	State of fertility ap = apothecia pe = perithecia st = sterile
117. *C. vitellina* (Hoffm.) Müll. Arg.					19j, 21i, 22f.	c.ap.
118. *C. xanthostigma* (Ach.) Lettau					21l.	st.
Parmeliaceae						
119. *Cetraria cucullata* (Bellardi) Ach.					2a, 10, 11, 21a, 25a, 30b, 31b, 32.	st.
120. *C. delisei* (Borrer ex Schaerer) Nyl.					1, 2a, 3, 10, 20a,f, 21a, 29d, 30a, 31b, 32, 33b, 34a.	st. (21a: c.ap.)
121. *C. hepatizon* (Ach.) Vainio					11, 21f, 25l, 33b.	st. (21f: c.ap.)
122. *C. islandica* (L.) Ach.					2a, 3, 5, 6, 7, 19f, 20e, 21l, 25a, 29a, 30b, 31b, 33a, 34a, 36.	st.
123. *C. nivalis* (L.) Ach.					1, 2a, 3, 8, 10, 11, 13a,b, 16, 19e, 20e, 21k, 26b, 29a, 30e, 33a,c, 35.	st.
124. *Coelocaulon aculeatum* (Schreber) Link (subsp. *hispidum* (Crombie) D. Hawksw.)					11, 21a, 29c, 31a, 33c.	st.
125. *C. divergens* (Ach.) R. H. Howe		x			2a.	st.
126. *Hypogymnia oroarctica* Krog					8, 9, 10, 13c, 20l, 25l,p, 33b.	st.
127. *Parmelia alpicola* Th. Fr.					2b.	c.ap.
128. *P. disjuncta* Erichsen					20l.	st.
129. *P. infumata* Nyl.					8, 19h, 20l, 21g, 25l,m, 29h.	st.
130. *P. saxatilis* (L.) Ach.					29f.	st.
131. *P. sorediosa* Almb.					21l.	st.
132. *P. substygia* Räsänen			x		21l.	st.
133. *P. sulcata* Taylor					20m, 29h.	st.
Usneaceae						
134. *Alectoria nigricans* (Ach.) Nyl.					1, 2a, 16, 20e, 29d, 30e, 32, 33b, 36.	st.
135. *Bryoria chalybeiformis* (L.) Brodo & D. Hawksw.					2a, 20i, 38.	st.
136. *Neuropogon sulphureus* (König) Hellbom					2a, 3, 22f.	st.
137. *Pseudephebe minuscula* (Nyl. ex Arnold) Brodo & D. Hawksw.					2a, 16, 18, 19h, 20h,i, 21c,i,n, 22f, 25h,l,m, 28b, 29g.	st. (25h: c.ap.)
138. *P. pubescens* (L.) Choisy					10, 11.	st.
Teloschistaceae						
139. *Caloplaca epithallina* Lynge			x		22c.	c.ap.
140. *C. fraudans* (Th. Fr.) Oliv.					25i, j.	c.ap.
141. *C. jungermanniae* (Vahl) Th. Fr.					19e, 29b.	c.ap.
142. *C. leucoraea* (Ach.) Branth					25d.	c.ap.
143. *C. stillicidiorum* (Vahl) Lynge					19e,j, 20d,g,r, 21q, 25a,n, 27d, 29b.	c.ap.
144. *C. tetraspora* (Nyl.) Oliv.					9, 21b,q (Fig. 11).	c.ap.
145. *C. tiroliensis* Zahlbr.					10, 19j, 20r, 21j,p,q, 25a,n, 27d, 29b, 33a, 34a,b.	c.ap.
146. *C. tornoensis* Magnusson	x				21i.	c.ap.

Associated lichens. Nos refer to present list	Typical habitat and plant community in Greenland	Distribution in Greenland and frequency of the species: N, E, W, S = north to south; C = central; n = not reported from; w = widely distributed; c = common; o = occasional; r = rare; v = very
	Broad ecological tolerance: ± manured rocks, drift wood and bones.	w (c–vc in all parts of Greenland).
	Humus and decaying twigs of, e.g., *Salix glauca*.	w (o–r in all parts of Greenland).
	Soil and among mosses in dwarf shrub heaths and lichen heaths.	w (c–o in all parts of Greenland).
76	Depressions and mossy tussocks in coastal dwarf shrub heaths; temporary overflow patches along glacial streams and sites with a prolonged snowcover.	w (c–vc in all parts of Greenland).
126	Exposed, siliceous rocks.	w (generally c–vc; NW, n).
61, 123, 134	Broad ecological amplitude: dry or moist soil more or less rich in nutrients in many types of plant communities, e.g., dwarf shrub heaths, fell-fields and snowbeds.	w (generally c–vc; NE, r–o).
61, 122, 134, 167	Hab. like 122.	w (c–vc in all parts of Greenland).
167	Humus soil and mineral soil (including calcareous soil) in dwarf shrub heaths, fell-fields and patches with steppe-like vegetation.	w (c in all parts of Greenland).
135	Gravelly, exposed fell-fields, often among mosses.	w? (CE, r; W, o).
121	Siliceous rocks and stones ± influenced by guano.	w (c in all parts of Greenland).
	Siliceous rocks and boulders.	w (S, c–o; rare or absent in the northernmost parts of Greenland; CE, r).
	Siliceous rocks and boulders.	w (generally c–o; N, n).
108, 150, 158, 159.	Bird rocks and bird stones.	w (c in all parts of Greenland).
	Siliceous rocks and boulders.	w (c–vc in all parts of Greenland).
	Dry, exposed siliceous rocks and boulders.	w (generally o–r; N, n; NW, n).
	Siliceous boulders influenced by guano.	Distribution incompletely known.
149	Bird rocks and bird stones; bark of *Betula* (SW Greenland).	w (generally c–o; N, n).
61, 122, 123	Soil and humus in fell-fields, open dwarf shrub heath and patches with steppe-like vegetation.	w (c–vc in all parts of Greenland).
125	Exposed rocks ± influenced by guano; occasionally on ± calcareous soil; rarely on branches of *Betula* (SW Greenland).	w (c–o in all parts of Greenland).
	Rocks and boulders.	w (N, c; rare or absent in more southern parts of Greenland).
51, 58, 86, 90, 109, 155	Wind exposed rocks and boulders ± influenced by guano; gravelly fell-fields.	w (c–o in all parts of Greenland).
	Siliceous rocks and boulders; gravelly fell-fields.	w (generally S, c–vc and N, o–r; CE, c–o).
	Parasitic on different crustaceous lichens and macrolichens.	NE, o; CE, r; CW, o.
	Rocks and old bones.	w? (NE, o; CE, o; CW, o).
160	Dead plant fragments and mosses, usually on highly nutrient-enriched substrates.	w (generally o–r; NW, n).
	Hab. like 141.	r in more northern parts of Greenland, absent (overlooked?) to the south.
39, 43, 104, 105, 115, 145, 152, 163	Dead plant fragments, humus soil and old bones.	w (c–vc in all parts of Greenland).
	Dead plant fragments, humus and old excrements.	w (generally o–r; NW, n; SW, n; possibly somewhat overlooked).
39, 43, 104, 105, 115, 143, 152, 163	Hab. like 144 (see also Lynge 1940).	w (c–vc in all parts of Greenland).
43	Drift wood.	CE, vr.

Table 2: continued

A: New to Greenland B: New to E Greenland C: New to present invest. area D: N-most rec. E Greenland	A	B	C	D	Localities and collecting sites (see p. 5 ff)	State of fertility ap = apothecia pe = perithecia st = sterile
147. *Fulgensia bracteata* (Hoffm.) Räsänen					29a.	st.
148. *Protoblastenia rupestris* (Scop.) Steiner					25g.	c.ap.
149. *Xanthoria candelaria* (L.) Th. Fr.					20l, 29h, 32.	st.
150. *X. elegans* (Link) Th. Fr.					10, 16, 18, 19h, 20l,o, 21g, 25e,l,p, 27b, 33c.	10, 16, 18, 19h: st. 20l,o, 21g,p, 25e,l,p 27b, 33c: c.ap.
151. *X. sorediata* (Vain.) Poelt					21l, 22c.	st.
Buelliaceae						
152. *Buellia disciformis* (Fr.) Mudd					2a, 21b, 25a, 33a.	c.ap.
153. *B. geophila* (Flörke ex Sommerf.) Lynge					11, 12, 27e,f.	c.ap.
154. *Dimelaena oreina* (Ach.) Norman					19h, 20l, 21c (Fig. 18).	c.ap.
155. *Orphniospora atrata* (Sm.) Poelt			x		18, 20i, 28b.	c.ap.
156. *Phaeophyscia constipata* (Norrl. et Nyl.) Moberg			x		19h, 27b.	st.
157. *P. sciastra* (Ach.) Moberg					11, 19h, 21g, 33c.	st.
158. *Physcia caesia* (Hoffm.) Fürnrohr					19h, 20l, 21g, 22b,c, 23b, 26e, 27b, 32, 33c.	st. (19h: c.ap.)
159. *P. dubia* (Hoffm.) Lettau					19h, 20l, 27b.	st.
160. *Physconia muscigena* (Ach.) Poelt					19e,h, 20l, 21g, 25a,d, 27a, 29h, 33c, 34b, 35.	st. (19h: c.ap.)
161. *Rinodina cinnamomea* (Th. Fr.) Räsänen					20a.	c.ap.
162. *R. roscida* (Sommerf.) Arnold					19j, 29b.	c.ap.
163. *R. turfacea* (Wahlenb.) Körber					19g, 20d, 21i,o, 25a, 29a,c,d, 33a.	c.ap.
Lichenes Imperfecti						
164. *Crocynia arctica* Lynge					9, 16, 25a, 29a, 33c, 34b.	st.
165. *C. neglecta* Hue					3.	st.
166. *Leprocaulon subalbicans* (Lamb) Lamb et Ward		x			19g.	st.
167. *Thamnolia subuliformis* (Ehrh.) Culb.					1, 2a, 10, 19c, 20f, 29a, 30e, 33c.	st.

Associated lichens. Nos refer to present list	Typical habitat and plant community in Greenland	Distribution in Greenland and frequency of the species: N, E, W, S = north to south; C = central; n = not reported from; w = widely distributed; c = common; o = occasional; r = rare; v = very
	Calcareous soil.	w (N, o–r; NE, o; CE, o; SE, n; NW, n; CW, o; SW, r).
	Calcareous rocks.	w (generally o; NW, n).
108, 129, 133, 150, 158, 159	Bird rocks and bird stones.	w (generally c; N, n).
14, 50, 84, 101, 108, 129, 149, 157, 158, 159	Calcareous rocks and siliceous rocks with lower contents of Ca, but inpregnated by nutritive mineral particles or influenced by various excrements; occasionally on mosses and soil.	w (vc in all parts of Greenland).
	Calcareous rocks and bird rocks, often on very steep surfaces and under overhanging rocks.	w (generally o–r; N, n; NW, n).
39, 105, 106, 143, 145, 163	Dead plant fragments and mosses in, e.g., dwarf shrub heaths.	w (c–o in all parts of Greenland).
	Soil and mosses.	Distribution incompletely known.
52	Bird stones and bird rocks.	w (generally o–r; NW, n).
51, 86, 88, 90, 109, 137	Siliceous rocks and stones.	w (c–vc in all parts of Greenland).
	Exposed, dry habitats rich in nutrients: calcareous soil or bird stones (here on a thin layer of soil), often among mosses.	w? (N, r; NE, o; CE, o; SE, n; NW, n; CW, o; SW, n).
150	Broad ecological amplitude: siliceous rocks ± influenced by guano and calcareous rocks; on rocks moistened by seeping water, but also on more permanently dry surfaces of rocks.	w (generally c–o; NW, n).
108, 129, 149, 150	Basic substrates rich in nutrients: bird stones, calcareous rocks and old bones.	w (c in all parts of Greenland).
108, 129, 149, 150, 158	Bird stones, old bones and other substrates rich in nutrients.	w (generally c–o; N, n).
141	Dry, calcareous soil, basic soil on bird stones, humus, dead plant fragments and over mosses.	w (c in all parts of Greenland).
42	Soil rich in humus and turf hummocks.	w? (only NE, r; CE, r; CW, r).
	Dead plant fragments, humus, old dung and old bones.	w (N, o; NE, c; CE, c–o; SE, n; NW, n; CW, c; SW, n).
39, 105, 143, 145, 152	Dead plant fragments, humus and mosses; occasionally on drift wood.	w (c in all parts of Greenland).
	Dead plant fragments, humus, mosses and soil.	w (N, o; NE, o–r; CE, c; SE, c; NW, n; CW, o; SW, o–r).
	Rocks and boulders, usually over mosses.	w (generally c–o; N, n).
	Hab. like 165.	w? (only CE, vr; CW, o; SW, o).
123	Especially soil among boulders and stones in fell-fields, but also occurring in other types of plant communities, e.g., dwarf shrub heaths and patches in steppe-like vegetation.	w (c in all parts of Greenland).

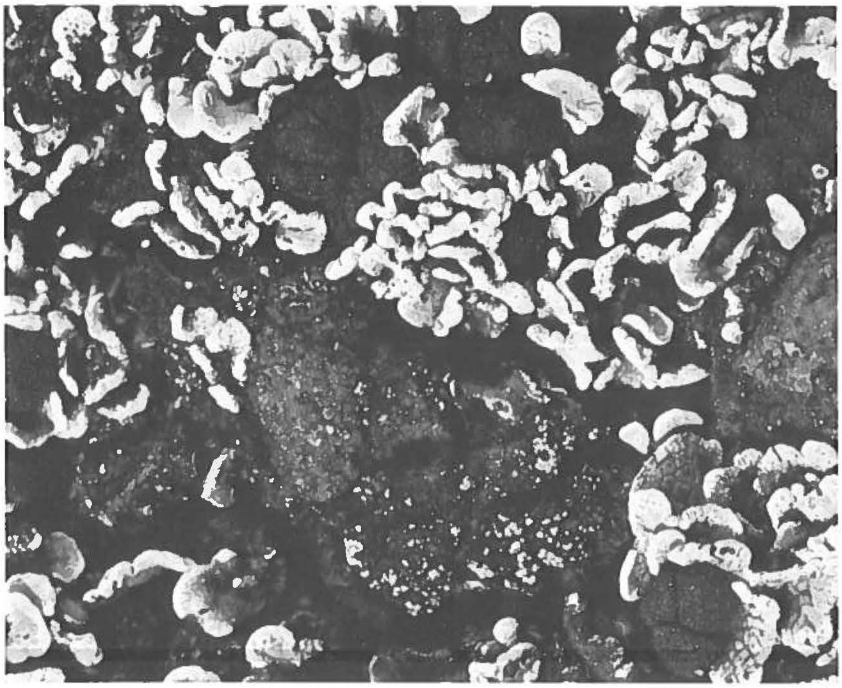


Fig. 7. *Psora rubiformis* (Ach.) Hook. growing on soil in fissures of a bird rock on a mountain north of Blomsterdal (loc. 19g). Coll. No. 353. Photo by Jørgen Andersen and the author, × 6.

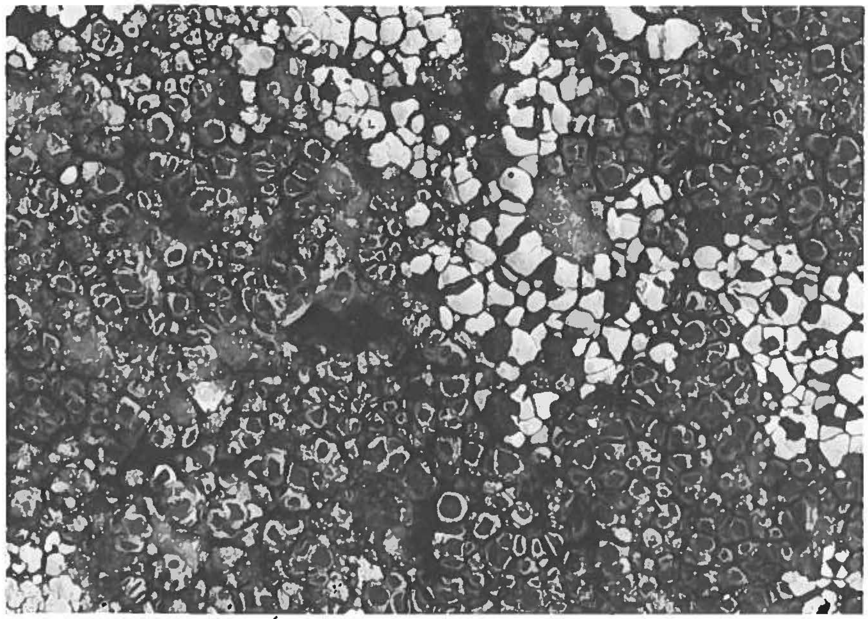
The present specimens are characterized by their bluish white, chalky thallus (medulla I+ blue, K–) and their slightly pruinose, flat apothecia (max. 2 mm broad). The external layer of the exciple is dark brown to black. The epithecium is olive green to greenish black, and the hypothecium is chestnut brown to almost black. The hymenium is 60–70 µm. The spores are hyaline, simple, 9–12 × 5–6 µm.

Pertusaria octomela (Norman) Erichsen

This species is an addition to the known lichen flora of East Greenland. In West Greenland it has previously been collected by P. Gelting, who found it growing on mosses and dead twigs of *Salix* on boggy ground near the Arctic Station, University of Copenhagen, at Godhavn, Disko (69°15'N 53°32'W).

Fig. 8. *Psora decipiens* (Hedw.) Hoffm. growing on calcareous soil on rocks by a river in Nedre Funddal (loc. 25a). Coll. No. 456. Photo by Jørgen Andersen and the author, × 6.

Fig. 9. *Aspicilia cinereorufescens* (Ach.) Massal. (dark) and *Rhizocarpon geographicum* (L.) DC. (light) growing on boulders on a mountain north of Blomsterdal (loc. 19g). Coll. No. 309. Photo by Jørgen Andersen and the author, × 6.



The thallus of *Pertusaria octomela* reacts K+ red, P+ yellowish (orange), and the epithecium reacts K+ violet.

Rhizocarpon intermediellum Räsänen (Fig. 15)

This species has previously been reported from the mountains of Fennoscandia, the Alps and one locality in North Greenland, viz., Centrum Ø (leg. Th. Wulff). The present specimen has angular, sulphurous yellow thallus areoles, which react I+ blue (medulla). The spores are muriform with transverse septa and sometimes also a longitudinal septum.

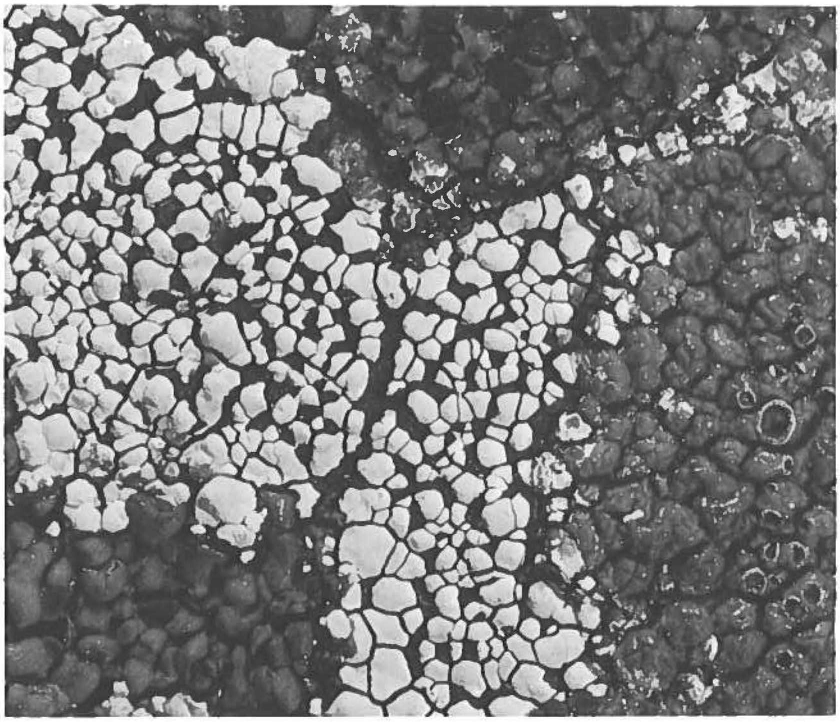


Fig. 10. *Rhizocarpon geographicum* (L.) DC. (middle, light), *Lecidea atrobrunnea* (Ram.) Schaerer (below, left and upper right) and *Lecanora badia* (Pers.) Ach. (lower right); on the top of a bird stone. Coll. No. 349. Mountain north of Blomsterdal (loc. 19 h). Photo by Jørgen Andersen and the author, × 6.

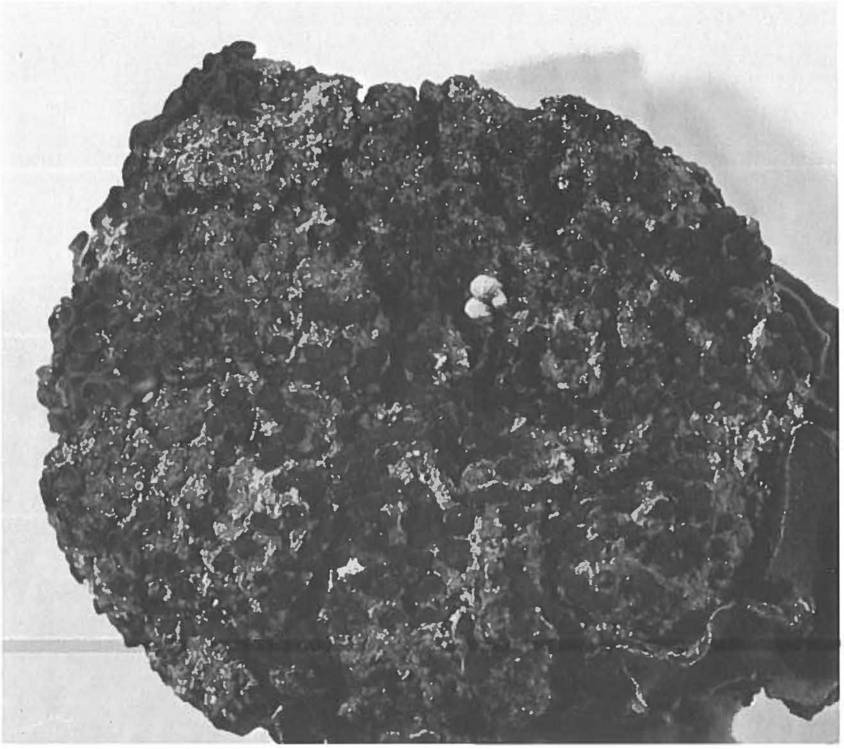


Fig. 11. *Caloplaca tetraspora* (Nyl.) Oliv. growing on old hare droppings on the flank of Vildthorn (loc. 21q). Coll. No. 160. Photo by Jørgen Andersen and the author, × 6.

Rhizocarpon pusillum Runem. (Fig. 17)

This species is new to the lichen flora of Greenland. It is known from the Alps, the Pyrenees and the Iberian Peninsula, and has recently been reported from North America (Thomson 1979). The present specimens essentially conform to the description given by Runemark (1956).

Verrucaria thalassina (Zahlbr.) Zsch. (Fig. 19)

This species has not previously been reported from Greenland. It was, however, collected in 1951 by Dr. P. Gelting at Qivitut in Diskofjord (69°27'N 53°38'W). These specimens (Nos 14180 and 14187, Botanical Museum, Copenhagen) are well developed and richly fertile. Usually the greyish brown thallus is rather

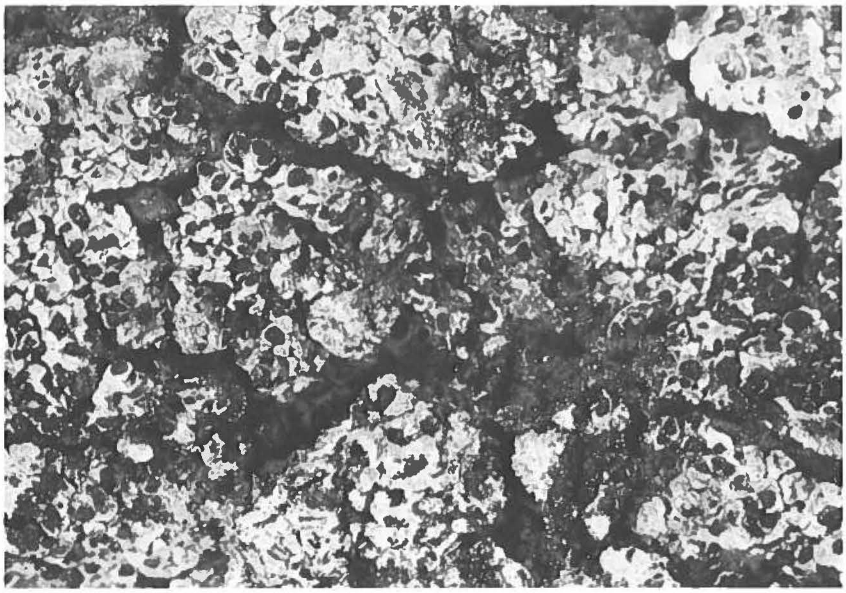
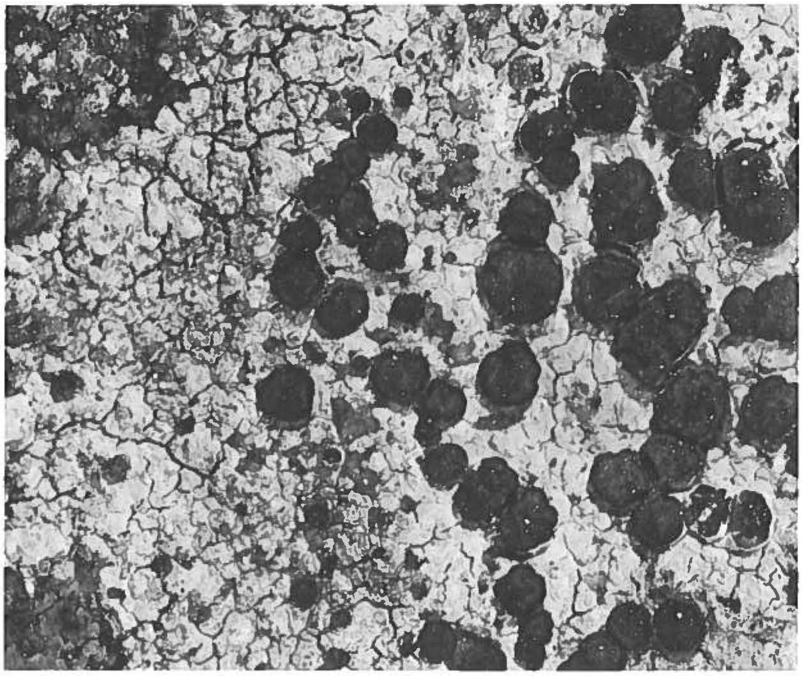


Fig. 12. *Acarospora schleicheri* (Ach.) Massal. growing on the thallus of *Diploschistes muscorum* (Scop.) R. Sant. Coll. No. 477. Area near the airstrip west of Noret (loc. 29a). Photo by Jørgen Andersen and the author, × 6.

Fig. 13. *Lecidea speirea* (Ach.) Ach. growing on stones on marine foreland near Antarctic Havn (loc. 21 c). Coll. No. 205. Photo by Jørgen Andersen and the author, × 6.



strongly divided up into smaller parts (Galløe 1972, vol. 10, plate 95), which preferably are situated along concentric fissures and in small hollows in the calcareous substrate (sea shells). The hemispherical perithecia (0.2–0.4 mm) are somewhat immersed in the shells, leaving pits when decayed. The upper part of the involucrellum is black, the lower part paler and more diffuse. Spores: 17 × 8.5 µm.

The specimens collected by Topham correspond rather well with this description.

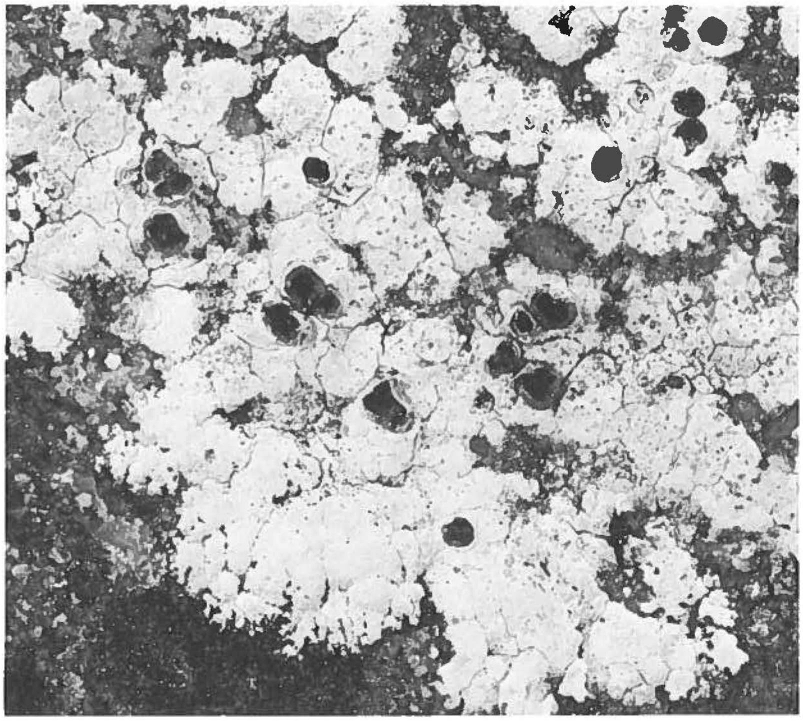


Fig. 14. *Lecidea marginata* Schaerer growing on a sandstone cliff in Nedre Funddal (loc. 25 g). Coll. No. 421. Photo by Jørgen Andersen and the author, × 6.

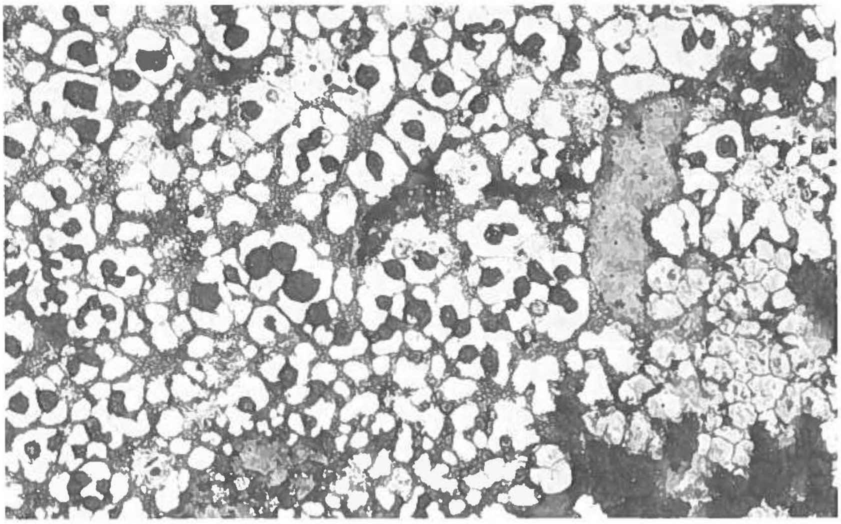


Fig. 15. *Rhizocarpon intermediellum* Räsänen and *Placynthium asperellum* (Ach.) Trevisan (right) growing on a dolerite bird stone on a talus slope of a mountain north of Blomsterdal (loc. 19h). Coll. No. 356. Photo by Jørgen Andersen and the author, × 6.

Macrolichens

Cladonia luteoalba A. Wilson & Wheldon

This species appears to have a wide, but disjunct distribution in Europe and Alaska (Østhagen 1974). In Greenland it has previously been reported from two localities in the Godthåb District on the west coast (Alstrup 1979). These finds and the present additional records support the assumption that the species belongs to the group of more or less circumpolar species (Dahl & Krog 1970, Østhagen 1972).

The specimens were found growing on dead lichens and soil. They have ascending-revolute basal squamules with the yellow and arachnoid underside exposed. Podetia were not found. The thallus is UV+.

Coelocaulon divergens (Ach.) R. H. Howe

This species is an interesting new addition to the known lichen flora of East Greenland. Branth (1894) reported the species from the Scoresby Sund area, but these specimens, which were collected by N. Hartz and subsequently referred to "*Cornicularia divergens* Ach. formae *minores*", in fact belong to *Coelocaulon aculeatum* (Lynge & Scholander 1932, Dahl, Lynge & Scholander 1937). The specimen collected by Halliday is, however, quite typical. The thallus is fruticose, shiny, chestnut brown and 4–5 cm tall. The branches are somewhat angular and lacunose, with numerous pseudocyphellae. The medulla reacts P–, K–, C+ red, KC+ red (olivetoric acid). Apothecia are lacking.

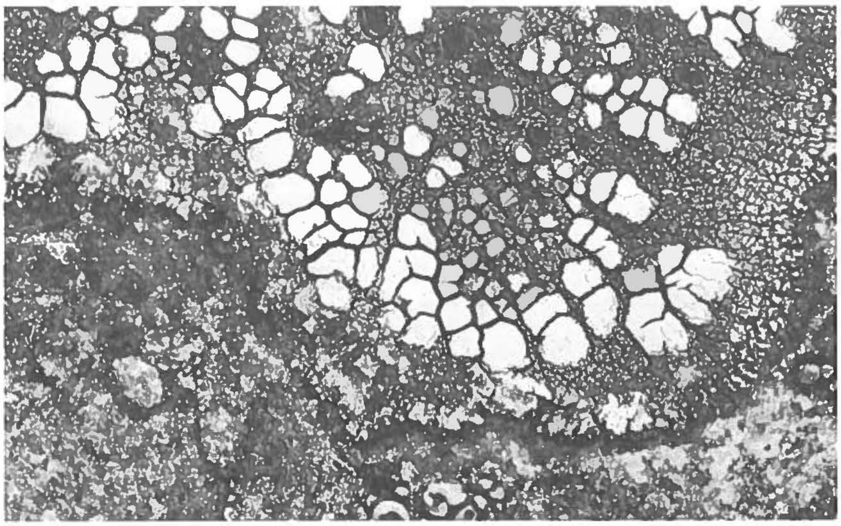
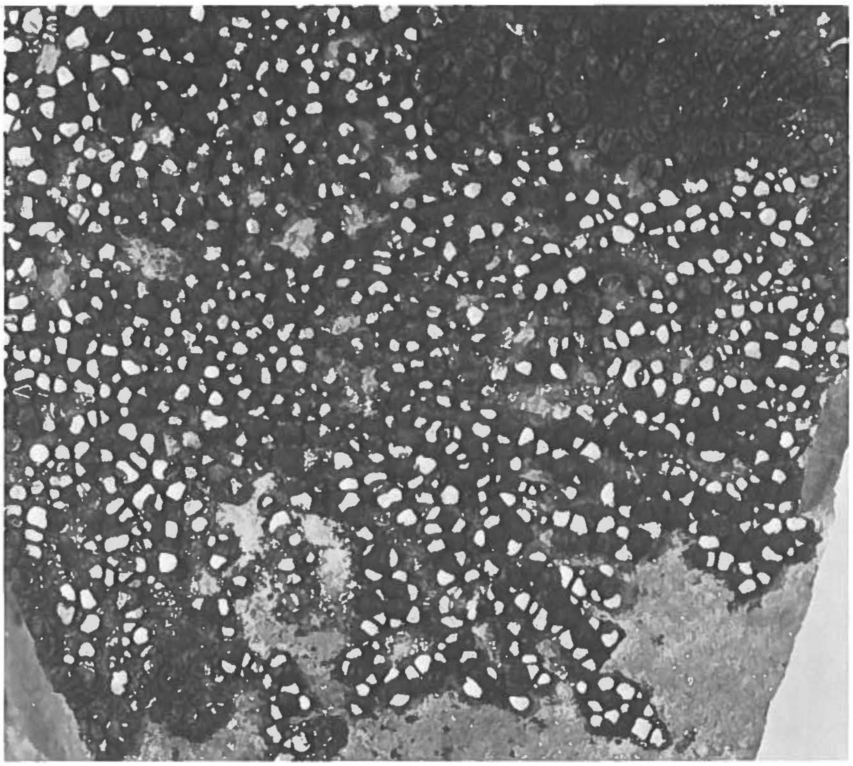


Fig. 16. *Rhizocarpon crystalligenum* Lynge growing on stones on coastal foreland at Antarctic Havn (loc. 21c). Coll. No. 132. Photo by Jørgen Andersen and the author, × 6.

Fig. 17. *Rhizocarpon pusillum* Runem. growing parasitically on *Sporastatia testudinea* (Ach.) Massal. on a boulder composed of dolerite in a scree at Antarctic Havn (loc. 21f). Coll. No. 242. Photo by Jørgen Andersen and the author, × 6.



Dermatocarpon intestiniforme (Körber) Hasse

The species is characterized by its polyphyllous thallus with involute margins and its globose-ovoid spores, while the closely related *Dermatocarpon miniatum* (L.) Mann. var. *complicatum* (Lightf.) Hellbom has ascending thallus margins and ellipsoid spores. A large part of the Greenland collections belonging to "the *Dermatocarpon miniatum*-complex" is in need of critical revision (cf. Lynge & Scholander 1932, Lynge 1940, Dahl 1950).

Leprocaulon subalbicans (Lamb) Lamb et Ward

The species is an addition to the known lichen flora of East Greenland. The thallus reacts P+ intense yellow; accordingly, the specimen can be referred to Strain IV (Lamb & Ward 1974).

Leprocaulon subalbicans has previously been reported from a few localities in South and West Greenland (Lamb & Ward 1974, Hansen 1978b).

Neuropogon sulphureus (König) Hellbom

Although this species is usually considered to be a northern lichen in Greenland (Lynge 1941), it has recently been collected by Dan Olsen at Nákâlâq (60°59'N 45°55'W) in South West Greenland (1400 m a.s.l.; the specimen is deposited in herbarium C). There are, however, very few records south of Disko on the west coast of Greenland. The Lindbergh Fjelde in the

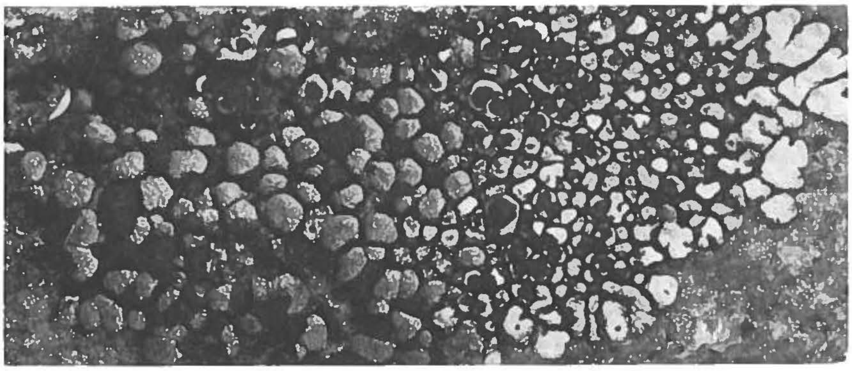


Fig. 18. *Rhizocarpon grande* (Flörke ex Flotow) Arnold (left) and *Dimelaena oreina* (Ach.) Norman (right) from the habitat mentioned in the text to Fig. 16 (loc. 21c). Coll. No. 356. Photo by Jørgen Andersen and the author, × 6.

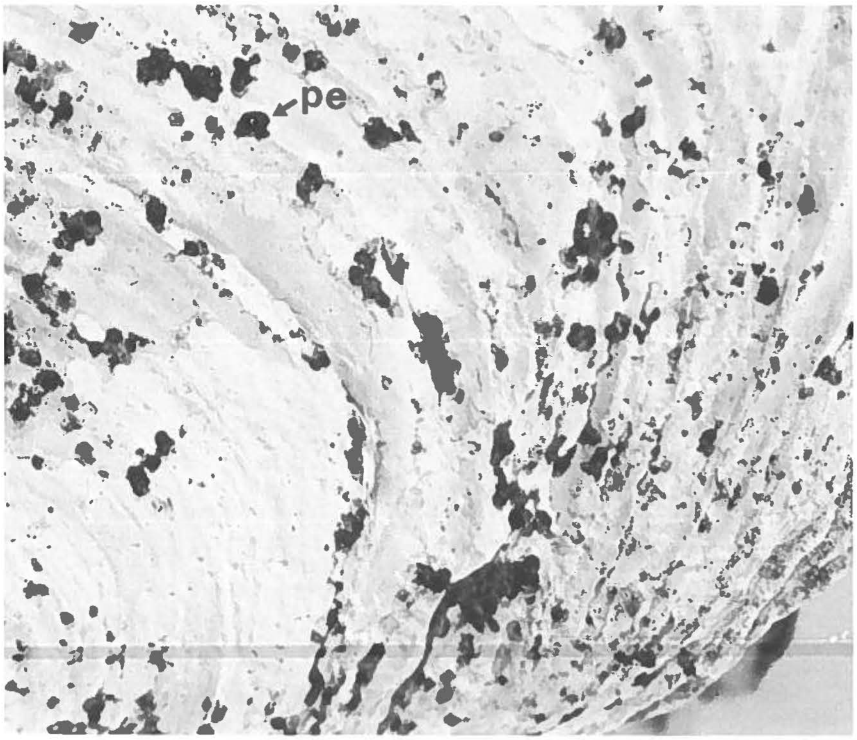


Fig. 19. *Verrucaria thalassina* (Zahlbr.) Zsch. growing on a sea shell (pe = perithecium). Coll. No. 226. Kolledalen (loc. 20 p). Photo by Jørgen Andersen and the author, × 6.

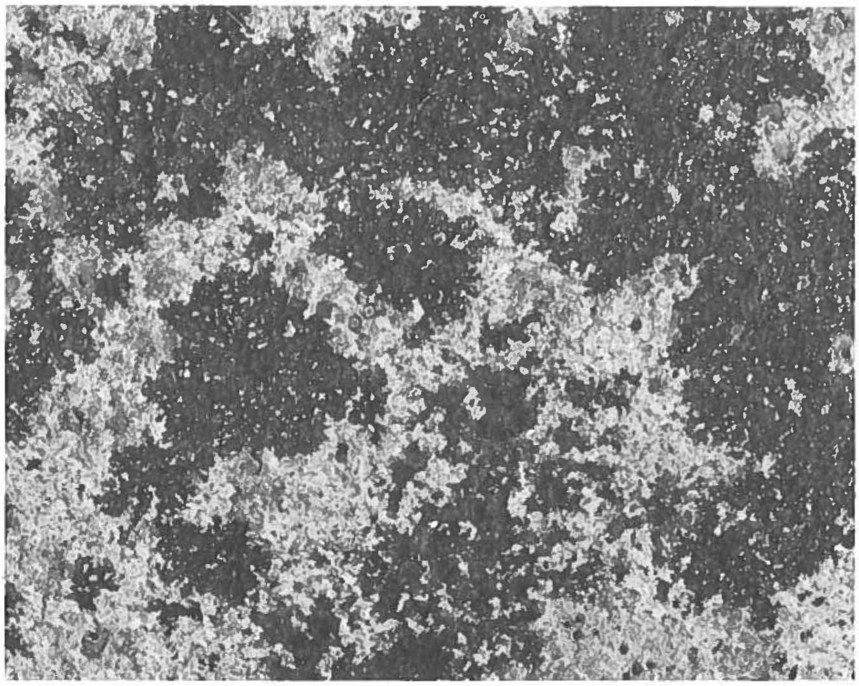


Fig. 20. *Staurothele perradiata* Lynge. Coll. No. 289. Kolledalen (loc. 20 k). Photo by Jørgen Andersen and the author, × 6.

Kangerdlugssuaq region is the southernmost known locality for *N. sulphureus* on the east coast (Lamb 1940). Here it was found at an altitude of c. 1400 m a.s.l.

Parmelia sorediosa Almb.

This species differs from the related *P. disjuncta* in that it has small, capitate soralia located at the end of short, ascending lobes, while the latter has small, slightly convex, laminal soralia (Krog et al. 1980). The single new locality does not change Lynge & Scholander's (1932) statement that "In North East Greenland it (*P. sorediosa*) is a rare lowland plant". The additional passage: "It prefers low depressions in the rocks that are occasionally irrigated", is not, however, generally valid for *P. sorediosa* in Greenland. In my opinion it would be more correct to say that the species has a distinct preference for dry, exposed rocks (see also Dahl 1950).

Parmelia substygia Räsänen

Like *Parmelia sorediosa, P. substygia* is rather closely related to *P. disjuncta,* but differs from these two species by its more convex lobes and a distinct C+ rose reaction (medulla). The occurrence of *P. substygia* in Greenland has recently been reported by Esslinger (1977).

Parmeliella praetermissa (Nyl.) P. James

Judging from the large material deposited at the Botanical Museum in Copenhagen and the many literature records (e.g., Branth & Grønlund 1888, Branth 1894, Vainio 1905, Lynge 1923, 1937, 1940, Dahl 1950, Gelting 1955), *Parmeliella praetermissa* is one of the commonest lichens on mosses and soil in calcareous or otherwise enriched environments in Greenland. The species has not been reported from the large areas dominated by granodioritic gneisses in South East Greenland, but it has possibly been overlooked, as niches influenced by calcareous rocks do occur in this region (Hansen 1978a).

Peltigera kristinssonii Vitik.

P. kristinssonii is distinguished from *P. scabrosa* Th. Fr. by its dark brown, somewhat distended and downy veins on the under-surface of thallus and by lacking lichen acids. The true *P. scabrosa,* which is absent in the present collections, has lighter and more indistinct veins. Recently Dr. Orvo Vitikainen has revised (unpublished; C) a large part of the Greenland material of *P. scabrosa* s.lat., and saw some specimens collected by K. Hansen and Gelting in South and West Greenland, which also belong to *P. kristinssonii.*

Peltigera lepidophora (Nyl. ex Vainio) Bitter

Generally the present specimens are extremely well-developed (though sterile), having large, cup-shaped thallus lobes with numerous, dark brown squamules. A specimen of *P. lepidophora* from Vildthorn was infested by the parasitic, imperfect fungus *Illosporium carneum* Fr., which was often found associated with *Peltigera spuria* in South East Greenland (Hansen 1978a).

Solorina saccata (L.) Ach.

Presumably the plant collected by Halliday is the first certain record of *Solorina saccata* from the east coast of Greenland. It has asci with four spores, and the colonies of *Nostoc* occur scattered within the thallus. A specimen collected by Hartz in Gåseland, Scoresby Sund, and referred to *Solorina saccata* (Branth 1894, Hartz 1895, Dahl 1950) belongs to *Solorina spongiosa* (Sm.) Anzi, as the apothecia are surrounded by clusters of cephalodia with *Nostoc,* and the asci contain four spores.

Acknowledgements

I am grateful to Miss P. B. Topham (Scottish Horticultural Research Institute, Dundee) and Dr. G. Halliday* for placing their lichen collections from East Greenland at my disposal and for reading and commenting on the manuscript. I also thank Dr. P. W. James** for allowing me access to material deposited in BM. Furthermore I wish to thank Dr. G. Nielsen (Danish Meteorological Institute) for climatic information from Kap Tobin and Mesters Vig, and Dr. J. D. Friderichsen (Geological Survey of Greenland), who kindly revised and supplemented the geological information given in the list of localities.

*(Dept. of Biological Sciences, University of Lancaster).

**(Dept. of Botany, British Museum, Natural History).

Appendix

List of names used with synonyms

Arthrorhaphis citrinella (Ach.) Poelt = *Bacidia flavovirescens* (Dickson) Anzi

Aspicilia cinereorufescens (Ach.) Massal. = *Lecanora cinereorufescens* (Ach.) Hepp

Bryoria chalybeiformis (L.) Brodo & D. Hawksw. = *Alectoria chalybeiformis* (L.) Gray

Buellia geophila (Flörke ex Sommerf.) Lynge = *B. disciformis* (Fr.) Mudd var. *triphragmia* Nyl.
Caloplaca tetraspora (Nyl.) Oliv. = *Blastenia tetraspora* (Nyl.) Rehm.
Caloplaca tiroliensis Zahlbr. = *C. subolivacea* (Th. Fr.) Lynge
Candelariella aurella (Hoffm.) Zahlbr. = *C. epixantha* (Ach.) Sandst.
Candelariella xanthostigma (Ach.) Lettau = *C. vitellina* (Hoffm.) Müll. Arg. var. *xanthostigma* (Ach.) Elenkin
Catapyrenium lachneum (Ach.) R. Sant. = *Dermatocarpon rufescens* (Ach.) Th. Fr.
Catillaria philippea (Mont.) Massal. = *C. lutosa* Massal.
Cetraria delisei (Borrer ex Schaerer) Nyl. = *C. hiascens* (Fr.) Th. Fr.
Cetraria hepatizon (Ach.) Vainio = *C. fahlunensis* auct. non (L.) Vainio
Cladonia mitis Sandst. = *Cladina mitis* (Sandst.) Halc & Culb.
Cladonia phyllophora Ehrh. ex Hoffm. = *C. degenerans* (Flörke) Sprengel
Cladonia pleurota (Flörke) Schaerer = *C. coccifera* (L.) Willd. var. *pleurota* (Flörke) Schaerer
Cladonia pocillum (Ach.) O.-J. Rich. = *C. pyxidata* (L.) Hoffm. var. *pocillum* (Ach.) Flotow
Cladonia stricta (Nyl.) Nyl. = *C. lepidota* (Ach.) Nyl.
Cladonia sulphurina (Michaux) Fr. = *C. gonecha* (Ach.) Asah.
Coelocaulon divergens (Ach.) R. H. Howe = *Alectoria divergens* (Ach.) Nyl.
Crocynia arctica Lynge = *Lepraria arctica* (Lynge) Wetm.
Crocynia neglecta Hue = *Lepraria neglecta* (Nyl.) Erichs.
Dermatocarpon intestiniforme (Körber) Hasse = *D. polyphyllum* Dalla Torre & Sarnth.
Dimelaena oreina (Ach.) Norman = *Rinodina oreina* (Ach.) Massal.
Diploschistes muscorum (Scop.) R. Sant. = *D. bryophilus* (Ehrh. ex Ach.) Zahlbr.
Huilia macrocarpa (DC.) Hertel) = *Lecidea macrocarpa* (DC.) Steudel
Ionaspis suaveolens (Schaerer) Th. Fr. = *Aspicilia chrysophana* Körber
Lecanora behringii Nyl. = *L. hageni* (Ach.) Ach. var. *behringii* (Nyl.) Lynge
Lecanora epibryon (Ach.) Ach. = *L. subfusca* (L.) Ach. var. *epibryon* (Ach.) Sommerf.
Lecanora melanophthalma (Ram.) Ram. = *L. rubina* (Vill.) Ach. var. *melanophthalma* (Ram.) Zahlbr.
Lecidea marginata Schaerer = *L. elata* Schaerer
Lecidea speirea (Ach.) Ach. = *L. cinerascens* A. L. Sm. non Nyl.
Lecidella euphorea (Flörke) Hertel = *Lecidea glomerulosa* (DC.) Steudel
Lepidoma demissum (Rutström) Choisy = *Lecidea demissa* (Rutström) Ach.
Leptogium lichenoides (L.) Zahlbr. = *L. lacerum* (Retz.) Gray
Neuropogon sulphureus (König) Hellbom = *Usnea sulphurea* (König) Th. Fr.
Ochrolechia lapuensis Räsänen = *O. tartarea* (L.) Massal. var. *lapuensis* Räsänen
Orphniospora atrata (Sm.) Poelt = *Buellia moriopsis* (Massal.) Th. Fr.
Parmelia disjuncta Erichsen = *P. granulosa* Lynge
Parmelia sorediosa Almb. = *P. sorediata* (Ach.) Th. Fr.
Parmelia substygia Räsänen = *P. saximontana* R. Anderson & W. A. Weber
Parmeliella praetermissa (Nyl.) P. James = *P. lepidiota* (Sommerf.) Vainio
Peltigera leucophlebia (Nyl.) Gyelnik = *P. variolosa* (Massal.) Gyelnik
Peltigera spuria (Ach.) DC. = *P. erumpens* (Taylor) Elenkin
Phaeophyscia constipata (Norrl. et Nyl.) Moberg = *Physcia constipata* Norrl. et Nyl.
Phaeophyscia sciastra (Ach.) Moberg = *Physcia sciastra* (Ach.) Du Rietz
Physcia dubia (Hoffm.) Lettau = *P. intermedia* Vain.
Physconia muscigena (Ach.) Poelt = *Physcia muscigena* (Ach.) Nyl.
Placopsis gelida (L.) Lindsay = *Lecanora gelida* (L.) Ach.
Placynthium asperellum (Ach.) Trevisan = *P. aspratile* (Ach.) Henssen
Protoblastenia rupestris (Scop.) Steiner = *Placodium rupestre* (Scop.) Branth & Rostrup
Pseudephebe minuscula (Nyl. ex Arnold) Brodo & D. Hawksw. = *Alectoria minuscula* Nyl. ex Arnold
Pseudephebe pubescens (L.) Choisy = *Alectoria pubescens* (L.) R. H. Howe
Psora decipiens (Hedw.) Hoffm. = *Lecidea decipiens* (Hedw.) Ach.
Psora rubiformis (Ach.) Hook. = *Lecidea rubiformis* (Ach.) Wahlenb.
Rhizocarpon superficiale (Schaerer) Vainio = *R. occidentale* Lynge
Rinodina cinnamomea (Th. Fr.) Räsänen = *R. mniaraea* (Ach.) Körber var. *cinnamomea* Th. Fr.
Sporastatia testudinea (Ach.) Massal. = *Biatorella testudinea* (Ach.) Massal.
Stereocaulon botryosum Ach. em. Frey = *S. fastigiatum* Anzi
Stereocaulon vesuvianum Pers. = *S. denudatum* Flörke
Toninia lobulata (Sommerf.) Lynge = *T. syncomista* (Flörke) Th. Fr.
Tremolecia atrata (Ach.) Hertel = *Lecidea dicksonii* auct. non (J. F. Gmelin) Ach.
Umbilicaria decussata (Vill.) Frey = *Omphalodiscus decussatus* (Vill.) Schol.

Umbilicaria krascheninnikovii (Savicz) Lamb = *Gyrophora polaris* Schol.
Umbilicaria lyngei Schol. = *Agyrophora lyngei* (Schol.) Llano
Umbilicaria torrefacta (Lightf.) Schrader = *U. erosa* (Weber) Hoffm.
Umbilicaria virginis Schaerer = *Omphalodiscus virginis* (Schaerer) Schol.
Xanthoria candelaria (L.) Th. Fr. = *X. lychnea* (Ach.) Th. Fr.
Xanthoria elegans (Link) Th. Fr. = *Placodium elegans* (Link) DC.
Xanthoria sorediata (Vain.) Poelt = *Caloplaca sorediata* (Vain.) Du Rietz

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1980

3. H. Meltofte, M. Elander and C. Hjort:
»Ornithological observations in Northeast Greenland between 74°30′ and 76°00′ N. lat. 1976«. 53 pp.

The results of one summer's work in central Northeast Greenland are presented. The avifauna in the country traversed on several extensive survey trips is described. More intensive studies were made in an 18.2 km² census area on southernmost Hochstetter Forland. Here the populations were followed throughout the breeding season, and information on arrival, pre-laying period, population densities, habitat and nest site selection, breeding schedule, clutch size, hatching success, re-nesting, non-breeders, moult, post-breeding activities and departure is given. Special attention is given to *Clangula hyemalis, Somateria spectabilis, Anser brachyrhynchus, Arenaria interpres, Calidris maritima, Calidris alpina, Calidris alba, Phalaropus fulicarius* and *Stercorarius longicaudus.* An extremely high predation pressure was caused by *Alopex lagopus,* and this is discussed in relation to lemming abundance and environmental conditions.

1981

4. Peter Milan Petersen:
»Variation of the population structure of Polygonum viviparum L. in relation to certain environmental conditions«. 19 pp.

Populations of *Polygonum viviparum* L. have been studied at Godhavn in Greenland (69° 14′ N, 53° 31′ W), at 30 sites within an investigation area of approx. six km². At each site, the age structure of the population was described after the individuals had been classified on the basis of the morphology of the rhizome. Other population parameters investigated are the total number of individuals (1 – 2,860 per m²), number of recently established individuals (0 – 1,720 per m²), number of flowering individuals (0 – 850 per m²), number of bulbils produced (0 – 17,870 per m²), and dry weight of standing crop (0.6 – 281 g per m²); the numbers in the brackets give the total range for the 30 sites. The flowering individuals have been characterized by the age class in which flowering first occurs, the mean dry weight of the vegetative parts (0.06 – 0.94 g) and the mean number of bulbils (9± 4 – 114 ± 46). – The environmental parameters studied include height above sea level, slope and direction of slope, soil water content, loss on ignition, bulk density, pH, exchangeable K, 0.2 N H_2SO_4-soluble P, C/N, soil temperature, time of disappearance of the snow, soil movement, and degree of cover of the vegetation. The sites have been assigned to six groups which are defined with emphasis on those factors which are assumed to be limiting: 1. Sites with soil movement, 2. Sites where the snow is late in disappearing, 3. Sites with waterlogged soil, 4. Well-drained sites on level or slightly sloping ground, 5. Steep slopes, exposed to the sun, and 6. Sites where competition for light is an important factor. Within each of the groups, the sites show a number of common features, especially as regards relative values referring to the population structure, and various features characterizing the plants. It is suggested that the large variation in the population parameters mentioned above occurs mainly because individuals of *Polygonum viviparum* of a different age are in a different way and to a different degree influenced by the environmental conditions. At the same time, the bulbil gain from and loss to the surroundings is stressed as important for the size of a population.

1981

5. Ole G. Norden Andersen:
»The annual cycle of temperature, salinity, currents and water masses in Disko Bugt and adjacent waters, West Greenland«. 33 pp.

All available data on bathymetry, temperature, salinity and currents up until and including 1975 are used in describing the seasonal changes and dynamics of the hydrography of Disko Bugt, the Vaigat and adjacent glacier and non glacier fjords. From a winter situation with well mixed ÷1.75°C cold water in the upper c. 100 m.

steep halo- and thermoclines develop during the summer between freshened and heated surface water leaving Disko Bugt and deeper more saline water entering from the West Greenland Current. Huge ice bergs have a decisive cooling effect upon the upper 150–200 m affecting the outflowing current as well as the inflowing water which is responsible for the high bottom temperatures and salinities (up to 3.5°C and 34–34.5‰ at 300–500 m) found the year round, and which contributes to raising the temperature in the upper 200 m in the summer, especially in the southern and eastern part of the bay and even into the Vaigat. Surface temperatures reach 12°C in the offshore waters of the bay where salinities may drop to 30‰, and inshore in the more diluted waters of Disko Fjord temperatures may even reach 14°C, whereas in the glacier fjords, where surface salinities come close to zero, 4°C is the highest temperature recorded and subzero temperatures are found even in July. An extensive upwelling of W Greenland water occurs in the northern part of the bay during the summer and fall and similar phenomena occur in Disko Fjord, driven by winds and apparently linked to tidal rhythms. Although TS diagrams show that deep Disko Bugt water and Baffin Bay water is of common origin, no water seems to enter Disko Bugt from Baffin Bay or from the Baffin Current.

1981

6. Ole G. Norden Andersen:
»The annual cycle of phytoplankton primary production and hydrography in the Disko Bugt area, West Greenland«. 65 pp.

The distribution and size of phytoplankton production and biomass in relation to physical and chemical parameters in the upper 50 m at Godhavn and in Kangikerdlak in the inner part of Disko Fjord was investigated through 2½ years (1973–75). Some data from other parts of Disko Bugt are presented.

In both locations the hydrography alternates between an unstable winter situation with isothermal (÷1.75°C) and isohaline (33.5–34.0‰) conditions throughout, and a highly stable summer situation when dilution and heating, especially of the upper 20–30 m, raise the temperature at the surface to 9.9°C and at 50 m to 3.8°C at Godhavn, and to 12°C and 3.5°C respectively in Kangikerdlak. Salinities drop correspondingly to 30.6‰ in Kangikerdlak.

The 1% depth for green light is greatly reduced beneath ice and snow. During the ice free period at Godhavn it varies from 12 m during the spring phytoplankton bloom to more than 60 m from Oct. through the winter. In Kangikerdlak the 1% depth reaches only 40 m in winter, and outflowing turbid fresh water creates 1% depths of as little as 4–5 m in June–Aug.

At Godhavn NO_3-N reaches highs of 10.05 μgat/liter and 10.15 μgat/liter at 0 and 50 m respectively in winter, whereas during the summer, depletion to less than 0.01 μgat/liter occurs in the upper 40 m and to 1.0 μgat/liter at 50 m. PO_4-P is similarly reduced from 0.8 μgat/liter and 1.1 μgat/liter to less than 0.01 μgat/liter in the upper 20 m and to 0.21 μgat/liter at 50 m. The N:P ratio drops from 13 to less than 0.01 in the upper 30 m and to 1.0 at 50 m. In Kangikerdlak depletion of NO_3-N is similar to conditions at Godhavn, whereas PO_4-P reaches a low of 0.1 μgat/liter only, while in mid summer it reaches 1.88 μgat/liter at the surface, giving an N:P ratio which is below 0.1 in the upper 5 m only.

At Godhavn primary production is about 90 gC · m^{-2} · yr^{-1} (75–104 g) with a maximum of about 5.5 gC · m^{-3} · yr^{-1} at 5–10 m, whereas in Kangikerdlak production was concentrated near the surface with about 6.0 gC · m^{-3} · yr^{-1} and a total of 35 gC · m^{-2} · yr^{-1} at most. Production at Jacobshavn off the glacier fjord is probably greater than at Godhavn, whereas at Christianshåb and Egedesminde it is definitely lower.

Phytoplankters larger than 56 μ contribute about 50% of annual and up to 90% of daily production.

Due to the great stability, production usually extends no deeper than compensation depth, and most of the chlorophyll is usually in the nutrient rich water below this depth, where it sinks, is consumed, or degrades into phaeopigment. P/B is highest where there is least chlorophyll. Light reduces production in the upper 5–10 m, and inhibition may extend to 30 m. Correlations between production, P/B, or P/B/light and nutrients reveal possible saturation values of 0.08–0.78 μgat NO_3-N/liter and 0.17–0.22 μgat PO_4-P/liter. PO_4-P seems to be the limiting nutrient in some cases, although NO_3-N is most quickly and thoroughly depleted.

Dark fixation at Godhavn is about 24 gC · m^{-2} · yr^{-1}, and at Kangikerdlak about 15 gC · m^{-2} · yr^{-1}. 55–60% of dark fixation is presumed to be biotic and 16–64% is associated with particulate matter larger than 56 μ.

Although oxygen is never at a minimum in Disko Bugt, saturation as well as absolute O_2 values and pH show profiles in the bay that clearly reflect the high degree of stratification compared to waters south of the bay.

1981

7. J. de Korte, C. A. W. Bosman & H. Meltofte:
»Observations on waders (Charadriidae) at Scoresby Sund, East Greenland«. 21 pp.

Populations of waders in three census areas at Scoresby Sund, central East Greenland, were studied during the three breeding seasons of 1973, 1974 and 1975. Ringed Plover (*Charadrius hiaticula*), Golden Plover (*Pluvialis apricaria*), Turnstone (*Arenaria interpres*), Knot (*Calidris canutus*), Dunlin (*Calidris alpina*) and Sanderling (*Calidris alba*) bred in the census areas, while Purple Sandpiper (*Calidris maritima*) and Red-necked Phalarope (*Phalaropus lobatus*) bred elsewhere in the region. Population densities were very low, compared to other areas further north in high arctic Greenland. Extensive, deep and late-thawing snow cover prevents waders from utilizing large areas in June. Time of breeding showed a high correlation with the snow melting conditions in the respective areas and years. Breeding success was generally low; only Ringed Plover had more than 50% nest and egg survival. Nest failures were probably mostly due to predation by Arctic Foxes (*Alopex lagopus*). Observation and examination of individuals from post-breeding flocks in the second half of July indicated that these flocks contained mainly non-breeders, but failed and successful breeders were also present. Measurements on eggs, pulli and adults are presented.

1982

8. Helge Abildhauge Thomsen:
»Planktonic choanoflagellates from Disko Bugt, West Greenland, with a survey of the marine nanoplankton of the area«. 35 pp.

Light and electron microscopy of whole mounts prepared from water samples collected in July and August 1977 at thirteen stations in the vicinity of Godhavn (Disko Bugt, West Greenland), has led to the enumeration of approximately 100 nanoplanktonic taxa. A full account is given of field and laboratory methods. The most conspicuous algal class was the Prymnesiophyceae with more than 38 species. Among the heterotrophic organisms listed the Choanoflagellida was the most important single group, comprising 28 species. Two new choanoflagellate taxa are described on the basis of West Greenland material: *Conion groenlandicum* gen. et sp.nov. and *Diaphanoeca undulata* sp.nov.

In order to facilitate immediate comparison of closely related taxa *Diaphanoeca sphaerica* sp.nov. is described on the basis of Danish material.

Thirteen of the loricate choanoflagellate species listed are new recordings for West Greenland. A summary of previous findings of the choanoflagellate species encountered in the Disko Bugt samples show that three species (*Conion groenlandicum, Pleurasiga caudata* and *Parvicorbicula serratula*) are so far known from arctic and subarctic localities only. A pronounced vertical distribution pattern of choanoflagellate species was observed at one station southeast of Godhavn. Three distinct species associations occurred in this particular water column (0–300 m).

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