

DET NORSKE VIDENSKAPS-AKADEMI I OSLO

RESULTATER
AV DE NORSKE STATSUNDERSTØTTEDE
SPITSBERGENEKSPEDITIONER

BIND I

Nr. 9

BERNT LYNGE:
LICHENS FROM BEAR ISLAND (BJØRNØYA)

COLLECTED BY
NORWEGIAN AND SWEDISH EXPEDITIONS,
CHIEFLY BY TH. M. FRIES DURING THE SWEDISH
POLAR EXPEDITION OF 1868

UTGITT PÅ
DEN NORSKE STATS BEKOSTNING
VED SPITSBERGENKOMITEEN

REDAKTØR: ADOLF HOEL

OSLO
I KOMMISJON HOS JACOB DYBWAD
1926

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WITH ONE MAP AND TWO PLATES

Introduction.

Bear Island is situated not far from the coast of Finmarken. This highly interesting coast has attracted the interest of lichenologists from the earliest days of lichenological investigation in this country. But Bear Island has escaped their attention to a remarkable degree. The records that have reached us on its lichen flora are so few and so incomplete that it must still be regarded as a virgin country.

The first contribution to the flora of Bear Island is due to B. M. KEILHAU, the Norwegian geologist, who made a short stay on Bear Island in 1827, from August 20th to 23rd. His voyage was mentioned by CHRISTOPHER HANSTEEN¹ in a note in *Magazin for Naturvidenskaberne*. KEILHAU has described the voyage in his itinerary². His botanical collections were determined by SØREN CHRISTIAN SOMMERFELT³. SOMMERFELT records the following lichens from Bear Island: *Cetraria nivalis*, *Parmelia Hypnorum*, *P. tartarea* γ and δ ACH. (γ is "*L. upsaliensis*", δ is "*L. tumidula*" ACH. *Lich. Univ.* (1810), p. 371), *Cladonia coccifera*, *C. rangiferina*, ε . *sylvatica* c. *sphagni*, *Sphaerophoron coralloides*, *U. proboscidea* γ . *arctica*, and *U. hyperborea*, in all 8 lichens.

LINDBLOM's Förteckning⁴ only quotes SOMMERFELT, it adds nothing to our knowledge.

The First Oxford University Expedition to Spitsbergen spent 10 days on Bear Island: June 13th—23rd, 1921. Mr. R. PAULSON identified their lichens. SUMMERHAYES and ELTON⁵ record the following Bear Island lichens, without special stations:

¹ HANSTEEN [CHRISTOPHER]. Vore reisende unge Lærde. *Magazin for Naturvidenskaberne*, vol. VIII, p. 343, Christiania 1828.

² KEILHAU, B. M. *Reise i Øst- og Vest-Finmarken samt til Beeren-Eiland og Spitsbergen i Aarene 1827 og 1828*, Christiania 1831.

³ SOMMERFELT, CHRIST. *Bidrag til Spitsbergens og Beeren-Eilands Flora, efter Herbarier, medbragte af M. Keilhau*. *Magazin for Naturvidenskaberne*, vol. XI, p. 232—252, Christiania 1833.

⁴ LINDBLOM, AL. ED. *Förteckning öfver de på Spetsbergen och Beeren Eiland anmärkta vexter*. *Bot. Not.* 1839—1840, p. 153—158, Lund.

⁵ SUMMERHAYES, V. S. and C. L. ELTON. *Contributions to the Ecology of Spitsbergen and Bear Island*. *The Journal of Ecology*, vol. XI, p. 214—286, Cambridge 1923.

- p. 220: *Acarospora* sp.
Alectoria bicolor NYL.
— *nigricans* NYL.
Gyrophora hyperborea ACH.
— *proboscidea* ACH.
Lecidea confluens ACH.
— *pantherina* TH. FR.
Rhizocarpon geographicum DC. f.
Verrucaria nigrescens
PERS.
- p. 221: *Cladonia rangiferina* WEB.
Cetraria islandica ACH.
— *aculeata* FR.
Peltigera canina WILLD.
— *rufescens* HOFFM.
- p. 223: *Cladonia sylvatica* HOFFM.
Alectoria ochroleuca NYL.
Biatorina Regeliana KÖRB.
Cetraria aculeata f. *hispidula*.
Cladonia furcata SCHRAD.
var. *spinosa* LEIGHT.
— *rangiferina*.
Lecanora epibryon ACH.
— *tartarea* ACH.
Sphaerophorus globosus
WAIN.
- p. 224: *Cetraria nivalis* ACH.
Cladonia rangiformis
HOFFM.
- p. 225: *Gyrophora erosa* ACH.
Lecanora galactina subsp.
dispersa NYL.
— *polytropia* SCHAER.
- p. 225: *Lecidea goniophila*
SCHAER.
— *pantherina*.
Placodium cerinum EHRH.
— *elegans* DC.
— *rupestre* BRANTH et
ROSTR.
— — var. *calvum* A. L. SM.
Polyblastia intercedens
LÖNNR.
Rhizocarpon calcareum
TH. FR.
— *geographicum*.
Thelidium pyrenophorum
MASSAL.
Cetraria hiaseus TH. FR.
— *islandica* var. *tenuifolia* WAIN.
Cladonia bellidiflora
SCHAER.
— *foliacea* WILLD.
— *furcata*.
— *gracilis* WILLD.
- p. 226: — *pyxidata* HOFFM.
— *sylvatica*.
Lecanora tartarea.
Parmelia omphalodes.
Peltigera canina.
Sphaerophorus globosus.
Stereocaulon paschale FR.
- p. 227: *Cladonia rangiferina*.
Lecidea vernalis ACH.
Stereocaulon alpinum
LAUR.

In all they enumerate 42 different species, a very considerable addition to our knowledge of the lichen flora of Bear Island. — I have not seen their lichens myself, and I have therefore not considered it correct to enter their plants in the systematical part of this paper.

Their *Cladonia furcata* var. *spinosa*, *Cl. rangiformis* and *Alectoria bicolor* are interesting, if correctly determined. The last-mentioned plant does not grow north of the Dovre Mt. in Norway, and *Cl. rangiformis* has never been collected north of Lofoten. Their *Cl. gracilis* is supposed to be the *elongata*, so common in the Arctis. Their

Lecanora galactina subsp. *dispersa* should be compared with *Lecanora Nordenskiöldi* or *L. torrida*. I was glad to find mention made of *Caloplaca elegans*, lacking in the other Bear Island collections, but their statements do not exclude *C. granulosa*, so common in the Arctic rookeries, or *C. soredata*.

I venture the assertion that their *Cladonia foliacea* is absolutely impossible. Even in Norway that species (*C. alcicornis*) is a southern species, found only on the beach, and not occurring farther north than Bergen.

I have found no other literary record of Bear Island lichens.

Professor JENS HOLMBOE has published a record of the exploration of the vascular plants of Bear Island¹.

But fortunately we possess very important collections of Bear Island lichens, hitherto not determined.

In 1868 TH. M. FRIES, the Swedish botanist, visited Bear Island. (Svenska Polar-Expeditionen År 1868). He only spent a few days there, from July 22nd—27th, but during these 5 days he brought together one of the largest and most important collections of lichens ever seen from Arctic regions. It is so considerable and it contains so many interesting and critical lichens that I could hardly have identified his lichens in 5 months, even if I had been able to devote my time entirely to that work. His collection will for ever remain the real foundation of our knowledge of the Bear Island lichen flora. Though almost 60 years old the plants were still in excellent condition. — TH. M. FRIES'S stations were:

Sorhamna:	July 23rd
Mt. Misery:	- 24th and 25th
"Irrfärden":	- 25th
Nordhamna:	- 25th
Kulbukta:	- 27th
Between Nordhamna and Kulbukta: 27th.	

It will be seen from this list that his station "Irrfärden" (When I lost my way) must have been situated somewhere near Mt. Misery. Unfortunately I have not had access to his diaries, and I have been unable to locate this "Irrfärd" accurately, I have therefore retained this curious name, so characteristic of the traveller's life on this foggy island.

To bring together a collection like this during these few days is only possible in a country where there is no night. It also tells us something of the man who did it.

¹ OLAF HANSEN and JENS HOLMBOE. The Vascular Plants of Bear Island. Nyt Magazin for Naturvidenskaberne vol. LXII, p. 210—235, Oslo 1925.

FRIES could not possibly devote equal attention to all lichens; he evidently concentrated his work on the more interesting small crustaceous lichens and neglected large and conspicuous plants such as *Parmeliae* and *Gyrophorae*, which anyone can find. There are most probably valuable notes on them in his diaries. Some large lichens that are otherwise too common in Arctic to be lacking in Bear Island, were not found in his collections at all, evidently for the same reason.

Though this paper is supposed to give a fairly good idea of the lichen flora of Bear Island, it is, accordingly, far from exhaustive.

It is almost incredible, but yet true, that TH. M. FRIES could also manage to collect vascular plants, assisted by the other botanist of the expedition, Sv. BERGGREN.

Their plants belong to the Botanical Department of Naturhistoriska Riksmuseet, Stockholm. I am glad to express my gratitude to the director of that institution, Professor Dr. G. SAMUELSSON, for his permission to determine these lichens, and for all the assistance which he has rendered me during my work.

In 1899 Dr. J. G. ANDERSSON, the Swedish geologist (The Swedish Expedition to Beeren-Eiland in the Summer of 1899), collected a few lichens at the large rookery (most probably near Cape Bull) on July 12th, at Oswald Promontory on July 6th, and at Mt. Misery on June 6th.

More important was the collection brought home by JOHANNES LID, custos at the Oslo Botanical Museum. He visited Bear Island in 1920 and 1924 (De norske Svalbardekspeditioner) bound for Spitsbergen, and collected lichens at the following stations:

Mt. Misery and Cape Levin: 1924, Sept. 9th.

Tunheim: 1920, June 6th, and 1924, July 11th and Sept. 5th.

Kulbukta, Engelskelva and Cape Forsberg: 1924, July 11th.

His lichens are preserved in the herb. Oslo.

OVE ARBO HØEG, Norwegian palaeobotanist, collected a few lichens at Tunheim, in July and Sept. 1924 (De norske Svalbardekspeditioner. Herb. Oslo).

Mr. OLAF HANSEN, in the employ of the Bjørnøen A/S coal-mining company, and much interested in every branch of natural science, collected a considerable number of lichens in 1923, at the following stations: Ellasjøen, Mt. Misery, Scree between Revleodden and Cape Nordenskiöld, Engelskelva, Østervaag and Laksvatnet. (Herb. Bergen).

I am glad to express my profound gratitude to several institutions and colleagues that have lent me material for comparison: The Botanical Museums of Bergen, Copenhagen, Helsingfors, Leiden, the British Museum in London, Stockholm and Upsala; Dr. G. EINAR DU RIETZ, Upsala; Mr. A. H. MAGNUSSON, Gothenburg; Dr. GUST. O. A: N MALME, Stockholm; and Dr. E. A. VAINIO, Åbo. I have also profited largely

from the great knowledge and experience on lichens, from the good advice and happy suggestions, so readily placed at my disposal by my botanical friends, Dr. DU RIETZ, Mr. MAGNUSSON, Dr. ZAHLBRUCKNER, and especially Dr. MALME. The Vega collections belong to the Riksmuseum where Dr. MALME is working, and his comparisons between these lichens and mine gave excellent results.

Plants living under Arctic conditions of life, must either be well adapted to it or profoundly modified. Many lichens must be well adapted to such inattractive stations, for they develop splendid thalli, e. g. *Caloplacae*, *Cetrariae* and *Gyrophorae*, often nitrophilous lichens. But many lichens are distinctly damaged, and the morphological modification is much more visible in the lichens than in the vascular plants. This is easily understood, for during the long and severe winter the latter wisely retire underground. But the lichens always cover the ground, more or less protected by the winter snow, but yet much exposed to the trying influence of low temperature and frequent irrigations with very cold water. Some lichens are then altered beyond recognition, e. g. crustaceous *Lecideae* and *Rhizocarpons*. Species that in more temperate countries develop fine thalli with continuous plane areolae, only separated by minute cracks in the thick thallus, are reduced to hardly anything, some apothecia and scattered thin areolae, often developed as low verrucae or pyramids. In my Novaya Zemlya collections I have found it almost impossible to determine many lichens from the nunataks. But the few vascular plants found in the upper part of the screes under the nunataks looked as usual.

Soredia and isidia are very poorly developed in Arctic lichens.

In this devastation the apothecia, their structure, colours and spores remain fairly constant, as do also the chemical reactions.

This involves a never-ceasing sectioning and much microscopical work which is not so necessary where thalline characters are more reliable. It will also be understood that it causes much uncertainty with respect to the limitation of the species. A herbarium botanist will easily be induced to limit his species more restrictedly than a man who has also studied the plants in the field under their natural conditions.

A botanist of the necessary comprehensive mind would find interesting problems of high importance in a study of these things. First a careful study of the lichens in the field and next the microscopical investigation in the laboratory. The investigation would necessitate a very homogeneous material, well determined down to the elementary species. — But, unfortunately, scientists of the biological schools often

look with some disregard on the work of the describing taxonomist and the latter are not interested in biological problems.

The distribution of the lichens in the Arctic is a question of deep interest, as is also a comparison of Arctic and Antarctic lichens¹.

But, unfortunately, few problems are less ripe for discussion than these. To make a really valuable investigation of a lichen flora it is absolutely necessary to be a well-trained lichenologist. But how many lichenologists have travelled in the Arctic or in the Antarctic? An ordinary member of an expedition will not be able to detect so many of the inconspicuous lichens that his collections will give any adequate idea of the lichen flora in question, even if he is an excellent florist, not to speak of the collections of ordinary seafarers, however interested they may have been, or of such scientific travellers as are chiefly interested in the physical problems of the Arctic and Antarctic.

And if the collections themselves afford but little material for comparison the scientific publications on them make things infinitely worse. The determinations of a modern botanist are not comparable to the same name in a paper published by authors who worked before the time of NYLANDER and the other great men who formed our conception of a lichen species.

The different quality of the papers is, however, the greatest obstacle to statistical discussions like those mentioned above. There are the publications of NYLANDER, TH. M. FRIES and VAINIO, standard works that have moved the milestones of our knowledge and which will retain their fundamental value for very long periods. There are, on the other hand, some works where the commonest and most trivial lichens have a good chance of being misunderstood, and where critical species are confused in a most perplexing manner.

If such works are consulted for the discussions the result is obvious. It will be a waste of printer's ink, a very interesting eloquence without any scientific value. The indispensable foundation for such discussions is a great number of monographs on special families or on special regions. And the identification of the species must be reliable.

Oslo, Botanical Museum.

February 19th, 1926.

Bernt Lynge.

¹ DARBISHIRE, O. V. British Antarctic ("Terra Nova") Expedition, 1910. Botany. Part III, p. 29—76, London 1923; -- literature on the problem is carefully quoted there.

Special part.

Verrucaria WIGG.

Verrucaria aethiobola WBG.

var. *cataleptoides* (NYL.) VAIN.

Mt. Misery (TH. FR.), and between Nordhamna and Kulbukta (TH. FR.).
Several plants from the latter station. Spores (16) $18-26 \times$
 $12-13 \mu$.

Verrucaria ceuthocarpa WBG.

Nordhamna (TH. FR.).

Only two plants, but perfectly developed. Spores $8-10 \times 6-7 \mu$.

Verrucaria deversa VAIN.

VAINIO Lich. Fenn. I, pag. 49, in Acta Soc. pro Fauna et Flora
Fenn. 49, (1921) No. 2.

Mt. Misery (TH. FR.) and Sørhamna (TH. FR.). Ad rupes calcareas.

Thallus endolitheus, tenuissimus vel vulgo omnino evanescens.

Perithecia dispersa, protuberantia, basi solum substrato
immersa, globosa, parva, diam. 0.2—0.3 mm., vertice subconvexa vel
dein \pm crateriformiter impressa. Excipulum crassum, circum
ostiolum crassius, integrum, omnino carbonaceum. Asci ventricosi,
ca. $80 \times 25-30 \mu$, membrana gelatinosa fere aequaliter incrassata. Sporae
octonae, distichae, guttulis oleosis repletae, incoloratae, simplices, $21-24$
(29) $\times 12-15 \mu$.

Nucleus J e dilute caeruleo mox (interdum impure) rubescens.

Well characterized by its small prominent perithecia. They are
not foveolate, only slightly immersed at the base.

VAINIO's diagnosis is almost identical with the diagnosis which
I had drawn up after my investigation of these specimens, before I had
seen his authentic specimens. Dr. VAINIO has kindly allowed me to see
one of his plants, and I can see no difference.

The spore size varied in the same perithecium: 22×12 , 24×13 , and
 24×14 , 21×13 , 28×15 , 24×13 , 29×13 (Mt. Misery specimens), and
 30×11 , 26×11 , 20×12 (Sørhamna). This size agrees with the var.
meizospora of VAINIO; in my plants spores smaller than 20μ looked
immature.

Verrucaria maura WBG.

Sørhamna (TH. FR.), Mt. Misery (TH. FR.), between Revleodden and Cape Nordenskiöld (O. H.), Kulbukta (TH. FR.), between Kulbukta and Nordhamna (TH. FR.).

TH. FRIES did not collect many plants, but the above stations indicate its wide distribution, and there is no reason to doubt of its frequency.

The thallus is often very poorly developed, in OLAV HANSEN'S plants almost lacking. The perithecia are then more prominent than usual.

The excipulum is quite dark, the nucleus J wine-red, the spores $14-18 \times 8-9 \mu$. (ZSCHACKE Die mitteleur. Verr. IV p. 49: $10-19 \times 7-8 \mu$).

The collection also contained a *Cyanophycé*: *Calothrix scopulorum* AG. "Common at the top of the tide, and a little higher. Recorded from the Murman coast, Spitsbergen, Greenland and the Norwegian Arctic coast" (det. KAARE MÜNSTER STRØM).

Verrucaria nigrescens PERS.

Sørhamna (TH. FR.).

Two plants, on chalk. Spores $17-21 \times 8 \mu$.

Verrucaria scotina WEDD.

Kulbukta (TH. FR.), and Nordhamna (TH. FR.).

There were several plants. They agree entirely with our Norwegian plants from Honningsvaag (det. ZSCHACKE).

The excipulum is quite dark, the spores $13-18 \times 6-9$ (ZSCHACKE: $10-17 \times 5-9$).

The nucleus is stained wine-red with J, with blue maculae (young asci ?).

Its scabrid thallus with the irregular fissures ("occasionally cracked") distinguishes it habitually from *V. maura*, which is densely cracked with small regular areolae.

Verrucaria, sp. e. vicinitate*V. fraudulosae* NYL.

ZAHLBRUCKNER Catalogus I p. 41.

Sørhamna, on chalk, with *Caloplaca murorum* var. *obliterata* (TH. FR.).

Thallus maculas parvas, diam. usque 5 mm. format, areolatus, areolis fusciscentibus, subdiscretis, sat tenuibus, hypothallo obscuro obsitis. Perithecia minuta, diam. 0.25—0.3 mm., thallo immersa, ostiolo convexo solum prominentia. Involucrellum integrum, valde crassum, omnino nigrum. Sporae $16-20 \times 8-12 \mu$. Nucleus J flavo-rubescens.

The plant was submitted to the eminent expert on pyrenocarpous lichens, Dr. H. ZSCHACKE who suggested this determination.

The plant has larger, especially broader spores than *V. fraudulosa*: $12-18 \times 5-6 \mu$, sec. HUE *Add. nova* p. 280. *V. fraudulosa* is a southern lichen. Most probably the Bear Island plant is a new species, but more material should be examined, before it is described as such.

Thelidium MASS.

Thelidium denudatum n. sp. ad int.

An *Thelidium cataractarum* LÖNNR.?

Mt. Misery ad saxa calcarea, et Sørhamna (TH. FR.).

Thallus endolitheus, non visibilis, vel tenuissimus, nigrescens.

Perithecia minuta, diam. $150-160 \mu$, subglobosa, protuberantia, basi substrato immersa, vertice convexa, non impressa; excipulum integrum, fuligineum, crassum. Sporae incoloratae, triseptatae, $20-25 (32) \times 8-11 \mu$.

Nucleus J e caeruleo in rubescentem coloratur.

The spores were generally poorly developed and often shrunken, but fortunately I detected some mature and well developed spores.

Thelidium papulare has been found in Arctic Norway (Tromsø, det. ZSCHACKE). Its perithecia are larger and pale at their basis, and its spores are much larger ($28-52 \times 12-18 \mu$, sec. ZSCHACKE *Thelidium* pag. 146).

I am not so convinced of its specific difference from *Thelidium cataractarum* LÖNNR. This species has the same minute apothecia, and its spores are not much larger ($24-36 \times 9.5-14$, sec. ZSCHACKE l. c. pag. 142). According to ZSCHACKE l. c. its excipulum is "schwarzbraun, nach unten zumeist blasser". I could confirm this statement on a section from a Dublin plant which I have received from Miss M. C. KNOWLES.

Thelidium pyrenophorum (ACH.) TH. FR.

TH. FRIES Spitsb. pag. 49; VAINIO *Adjum.* II pag. 171, *Lich. Fenn.* I pag. 125; ZSCHACKE *Thelidium* pag. 126; ubi syn.

Sørhamna, ad saxa calcarea. (TH. FR.).

Thallus tenuissimus, cinereus vel cinereo-fuscescens, zona obscuriora inconspicua cinctus.

Perithecia numerosa, subglobosa, diam. $600-650 \mu$, protuberantia, basi calcem immersa, apice umbilicato-depressa. Involucrellum distinctum, crassum, nigrum, dimidiam partem excipuli obtegens, parte inferne ab excipulo divaricatum. Excipulum nigrum, basi dilutius coloratum : fuscum.

Sporae incoloratae, uni-septatae, septo levissime constrictae, 30—34 \times 13—15 μ .

Nucleus J rubescens.

The excipulum was brownish at its base, paler than under the involucrellum.

In all the perithecia examined the asci were very young and their contents generally not formed into spores. But in all of them some evidently ripe 1-septate spores were detected. At first the possibility could not be rejected that these spores were young and that they would ultimately become 3-septate. That would suggest *Th. papulare*. But not a single 3-septate spore was found.

Th. methoricum has been found on hard irrigated rocks in Arctic Norway. It has a well developed thallus, and according to ZSCHACKE l. c. it is paraplectenchymatous. The thallus of the Bjørnøy plant was so poorly developed that I could not obtain a section of it.

Polyblastia (MASS.) LÖNNR.

TH. FRIES was very interested in this genus and collected largely. But his large collection would not have been possible if it had not been a very abundant and widespread genus in Bear Island.

Polyblastia bryophila LÖNNR.

Only collected at Sørhamna. A considerable number of plants.

Distinguished from *P. Sendtneri* by its larger spores, I have measured 20—40 \times 15—18 μ . Nucleus red with J.

The Bear Island plants agree perfectly with a fine Norwegian material in our herbarium, revised by ZSCHACKE.

Polyblastia gelatinosa TH. FR.

Mt. Misery (TH. FR.), only one plant.

Spores uncoloured, large: 35—42 \times 21—26 μ . Nucleus red with J.

Polyblastia Henscheliana (KBR.) LÖNNR.

Irrfärden (TH. FR.).

Only two plants. The thallus is very poorly developed, almost lacking. A section through the young apothecia proved that they are immersed into thalline verrucae. The plant accordingly belongs to the section *Sporodictyon*.

The spores were multiloculated, uncoloured or later on \pm darkened, their size 45—65 \times 21—32, this agrees well with this species, in *P. theleodes* they are larger. The perithecium was dark and entire, the nucleus wine-red with J.

Polyblastia hyperborea TH. FR.

TH. FRIES Arctoi pag. 266, Spitsb. pag. 49; VAIN. Lich. Fenn. I pag. 105; LYNGE Spitsb. I pag. 18.

var. *typica* LYNGE.

- 1) Sørhamna and Mt. Misery (TH. FR.)

var. *macrospora* LYNGE.

- 2) Nordhamna — Kulbukta (TH. FR.), vide infra.

Evidently one of the commonest Pyrenocarpous lichens on the chalky rocks of this island.

It is variable: Sometimes the perithecia are only immersed with their base, occasionally they are quite immersed in deep foveoli. But even then the foveoli are open, and the whole upper part of the perithecia visible. They are never endolitious, with only their ostiolum visible.

The spore size deserves attention. I have examined more than 20 plants from Bjørnøya and some from Spitsbergen and from Norway proper. The spore length is generally about 25 μ , up to 30 μ . The same length was measured in Spitsbergen plants and in our Arctic Norwegian ones, collected and determined by TH. FRIES himself.

But VAINIO measured larger spores: 30—45 \times 16—20 μ (l. c. pag. 106).

In one plant from Bjørnøya (Nordhamna—Kulbukta) I was much astonished to find larger spores: 32—45 \times 18—24 μ , and in another from Sørhamna 30—37 \times 14—17 μ , agreeing more with VAINIO's measurements.

This difference is to me so considerable that it suggests a specific difference. But only these two plants were found, and I have not had access to VAINIO's plants. I will therefore only describe the large-spored plants as a variety and reserve the final decision until more material has been found.

var. *typica* LYNGE.

Sporae minores: 25—27 (30) \times 13—17 μ . Involucrellum nigrum, crassum, dimidiatum, inferne ab excipulo divergens. Excipulum parte inferiore dilutius coloratum, vel fere incoloratum.

var. *macrospora* LYNGE.

Sporae majores: 30—45 \times (14) 17—28 μ .

An propria species?

Polyblastia scotinospora (NYL.) HELLB.f. *monstrum* (KBR.).

Mt. Misery, on sandstone (TH. FRIES).

Hardly any thallus visible. — Spores muriform, dark, $25-32 \times 16-17 \mu$. Nucleus red by J.*Polyblastia Sendtneri* KPLH.

Sørhamna (TH. FR.).

Spores $16-25 (30) \times 11-19 \mu$.*Polyblastia terrestris* TH. FR.

Mt. Misery (TH. FR.).

Polyblastia theleodes (SOMRFT.) TH. FR.

Mt. Misery (TH. FR.).

The multiloculated, muriform, dark spores are very large: $68-80 \times 37-45 \mu$.

The genus *Staurothele* was expected from Bear Island, but no specimen could be detected.

Microglæna LÖNNR.*Microglæna muscorum* (FR.) TH. FR.

Mt. Misery (TH. FR.), and Irrvägen (TH. FR.).

Asci narrow, 4-spored, spores uncoloured, with 6—10 transverse septa and 1—2 (3) longitudinal septa, in one perithecium $32-34 \times 10-13 \mu$, in another up to $50-60 \mu$ long. Paraphyses persistent. Nucleus uncoloured or impurely yellow with iodine, the apices of the asci first intensely blue, then red.Few scattered small half immersed perithecia; in *M. sphinctrinoides* they are larger, and more prominent.The spores are very variable: $40-52 \times 11-14$ (TH. FR. Lich. Arct. p. 262), $24-94 \times 7-28$ (VAIN. Lich. Fenn. I p. 158).*Dermatocarpon* ESCHW.*Dermatocarpon cinereum* (PERS.) TH. FR.

Sørhamna (TH. FR.), Mt. Misery (TH. FR.), and between Nordhamna and Kulbukta (TH. FR.).

Several plants, evidently common in Bear Island as in other Arctic regions.

Dermatocarpon rufescens (ACH.) TH. FR.

Sørhamna (TH. FR.).

Only one poorly developed plant.

Sphaerophorus PERS.*Sphaerophorus globosus* (HUDS.) VAIN.

Beeren Eiland (KEILHAU), Sørhamna (TH. FR.), Mt. Misery (TH. FR.), Irrfärden (TH. FR.), Cape Levin (LID), Tunheim (LID), Cape Forsberg (LID), and Nordhamna (TH. FR.).

Common and widespread in Bear Island, as in other Arctic countries. The plants were sterile, but well developed.

Ionaspis TH. FR.*Ionaspis schismatopis* (NYL.) HUE.

Syn. *Lecanora schismatopis* NYL. Flora 1884 p. 315. Nyl. Freti Behringii 1888 pag. 31. ZAHLBR. Catalogus II p. 692, ubi syn.

Sørhamna (TH. FR.), Mt. Misery (TH. FR.) and between Nordhamna and Kulbukta (TH. FR.).

The number of plants was considerable.

Thallus indeterminatus, crassitudine mediocri vel tenui (sec. Nyl. l. c. 0.4 mm. vel tenuior), irregulariter rimoso-areolatus, areolis diametro variante: (0.2) 0.3—0.5 (0.8) mm. Thallus mollis, sub microscop. visus minute granulatus vel rugulosus, colore subalbido vel pallide roseo vel carneo. Gonidia pachydermatica, diam. vulgo ca. 25 μ , sed etiam usque 40 μ .

Apothecia numerosa, dispersa vel in areolis 2nae vel 3nae et tum fere composita videntur, thallo si tenui adpressa, si crassiore areolis innata, diam. 0.3—0.5, rarius usque 0.7 mm. Discus concavus vel etiam urceolatus, primo pallide carneus, thallo fere concolor et margine thalino concolore, elevato, crasso vel etiam tumido cinctus, dein nigrescens et margine pallido, elevato, persistente, molli, subintegro cinctus. Excipulum hypotheciumque omnino incolorata. Hymenium 60—70 (80) μ altum, in apotheciis carneis incoloratum, in apotheciis atris granulis minutis smaragdulis pulchre coloratum. Paraphyses cohaerentes, tenues, apice haud incrassatae, crebre septatae, KOH si addito fere moniliformes videntur. Asci (maturi) pyriformes vel saccati, octospori. Sporae simplices, incoloratae, ellipsoideae vel subglobosae, 9—12 (rarius usque 16) \times (5) 7—10 μ .

Pycnides minutae, diam. ca. 70—80 μ , ostium atrum videtur, perifulcrum parte dimidia superiore smaragdulum. Pycnoconidia recta, cylindrica, 4.5—5.5 μ .

Hymenium J e dilute caeruleo mox vinosum. Thallus KOH immutatus.

Ad saxa calcarea socio *Blasteniae rupestris*, *Polyblastiae hyperboreae*, *Rhizoc. chionidis* et al.

The colour of the disk evidently changes from pale fleshy to purely black. In some plants there were only the pale apothecia, in others only the black ones, and I first supposed them to be specifically distinct. I then detected plants with either type in the same specimen. The internal structure of the apothecia is identical in either type, apart of the colour of the hymenium, and the asci, which are narrower in the pale apothecia. — Evidently the change of colour is rapid, for no intermediate colour was observed.

Granules of chalk were often found with the hyphae throughout the thallus.

Ionaspis rhodopis (SMRFT.) TH. FR. has a considerably thicker thallus, narrow asci, larger spores (I measured up to $17 \times 12 \mu$), and a much higher hymenium (up to 160μ). SOMMERFELT's material is not pure, there is also a *Gyalecta* (?) with 3-septate spores.

In some plants the thallus was well developed; they agree perfectly with NYLANDER's authentic specimen. In other Bjørnøy-plants the thallus is very poorly developed, as is often the case with lichens from this weather-broken island.

Gyalecta (ACH.) A. ZAHLBR.

Gyalecta foveolaris (ACH.) SCHAEER.

Mt. Misery (TH. FR.).

The crusta was well developed, but not so thick as I have seen it in Arctic Norway.

Gyalecta geoica (WBG.) ACH.

Sørhamna (TH. FR.) and Nordhamna—Kulbukta (TH. FR.).

It was better represented in the collection than the former species. Usually the apothecia were empty, the hymenium is dehiscient.

Sagiolechia MASS.

Sagiolechia protuberans (ACH.) MASS.

Sørhamna (TH. FR.), and Mt. Misery (TH. FR.).

Hypothecium uncoloured, hymenium $100-110 \mu$ high, pale yellowish-brown at its upper part. Paraphyses stout, septate, branched, brownish at their apices. Spores with a hyaline epispore, uncoloured, triseptate, $18-26 \times 6-8 \mu$.

Lecidea (ACH.) TH. FR.*Lecidea arctica* SOMRFT.

Mt. Misery (TH. FR.), Irrfärden (TH. FR.), between Nordhamna and Kulbukta (TH. FR.).

A number of plants suggests it to be quite as common in Bear Island as in other Arctic countries. It is generally well fertile, but the thalline verrucae are often low and small, thinner than in Norwegian plants.

Lecidea armeniaca (DC.) E. FR.

Sørhamna (TH. FR.).

Only one plant. The chemical reaction (KOH) distinct.

Lecidea aspicilioidea TH. FR.

Sørhamna (TH. FR.).

Only one plant which was, however, well developed and well fertile. Hymenium high: 130—140 μ . Excipulum in part darkened, hypothecium quite uncoloured. Paraphyses articulated like a necklace (moniliformiter articulatae). Spores undivided, but often with oil drops, large: 21—24 \times 10—14 μ .

Medulla J \div ; hymenium first blue, then vinous red with J.

I refer the plant to *β. dovrina* TH. FR. Lich. Scand. II p. 542.

Lecidea assimilata NYL.

Sørhamna (TH. FR.), Mt. Misery (TH. FR.), Irrfärden (TH. FR.).

Several plants. Hypothecium very dark, KOH violet or paler in other plants. Upper part of hymenium smaragdine, hymenium J first blue, then vinous red. Spores simple, 10—16 \times 2.5—4 or even 6 μ , often miserably developed.

The thallus varies from almost lacking to very well developed.

Lecidea atrofusca (Fw.) MUDD.

ZAHLBRUCKNER Catalogus III p. 736, ubi syn.

Sørhamna (TH. FR.).

Only a few plants. — Hypothecium and excipulum very dark. Hymenium of a pale reddish or yellowish-brown colour, especially at its upper part, narrow: 60—80 μ , with numerous scattered violet or blue granules. Spores 13—16 \times 6 μ . — Thalline colour pale brownish, not white or grey. (Cfr. *Lecidea ramulosa*).

Lecidea atrocarpoides VAIN.

Vainio Adjum. Lich. Lap. II p. 52.

Mt. Misery (TH. FR.).

Only two herbarium plants. In one of them the hypothecium had the dark colour (fusco-nigricans) of VAINIO's diagnosis, in the other it was considerably paler. The colour of the hypothecium is evidently quite variable in this section of *Lecidea*. I have seen no authentic plant, but the Bear Island plants agreed so well with VAINIO's diagnosis that I have ventured the determination. The spores are too large for the other species of this section.

Medulla intensely blue with J, KOH ÷. Hymenium high, up to 130 μ . Spores thick-walled, 10—16 \times (7) 8—10 μ .

Lecidea auriculata TH. FR.

β . *diducens* (NYL.) TH. FR.

Mt. Misery (TH. FR.), Laksevatnet (O. H.).

Evidently quite common, for there were many plants.

The excipulum is distinctly violet, more intensely so if KOH is applied. Hymenium narrow, 50—55 μ , more or less smaragdine, hypothecium brownish, spores poorly developed, I only found a few ones: 9 \times 2.5 μ . Medulla J blue (under the hypothecium). — The large, plane, crenate apothecia are so characteristic that it can be determined habitually with considerable certainty.

Lecidea Berengeriana (MASS.) TH. FR.

Sørhamna (TH. FR.), and Mt. Misery (TH. FR.).

Only a few plants. Hypothecium reddish-brown, hymenium of the same colour at its upper part. Paraphyses coherent, incrassated at their upper part. Asci narrow, spores poorly developed, I have measured a few ones only: 15—17 \times 4—4.5 μ . — Hymenium J vinous red.

Thallus thinner than in Norwegian plants.

Lecidea confluens FR.

Sørhamna (TH. FR.).

One plant only, fertile, quite typical and tolerably well developed. Hypothecium very dark, spores 8—10 \times 7—9 μ . Medulla J + blue, KOH ÷.

Lecidea consentiens NYL.

Irrfärden (TH. FR.); several plants.

I have been able to examine the type plants of *L. pelobotrya* (leg. G. WAHLENBERG at Rastegaise in Finnmark, Norway, now in herb. Upsala) and of *L. consentiens* (leg. E. LAMY at Mt. Doré in France, now in herb. Helsingfors). I found the structure of the apothecia quite identical, but there was a spore difference: $21-24 \times 13-17 \mu$ in the former $28-32 \times 18-21 \mu$ in the latter species. But unfortunately their spore size is very variable: I have measured $27-31 \times 16$ in *L. pelobotrya* from Moster (leg. HAVAAS), $42-45 \times 13-14$ in plants from Mortensnes (leg. TH. FRIES). The spores of the Bear Island *L. consentiens* plants measured $30-32 \times 16-18 \mu$.

The apothecia of *L. consentiens* contained no gonidia, in HAVAAS'S *L. pelobotrya* from Mosterhavn I found some marginal gonidia; this plant also had a very high, insperse *Aspicilia*-hymenium, almost 250μ high.

There is no real distinction between the two genera *Lecanora* and *Lecidea*, they only represent a physiological differentiation and the line of demarcation between them is crossed by many species that could with equal right be referred to either of them. *Lecidea consentiens*, *Lecanora pelobotrya* and *Lecidea panaeola* form a very natural section, characterized by their cephalodia, dark hypothecium, large thick-walled spores and general habitus. They agree so well that I would unhesitatingly refer the *pelobotrya* to the genus *Lecidea*, in spite of the few marginal gonidia, often seen in young apothecia, and generally lacking in old ones.

I have drawn up a description of the apothecia of *L. consentiens*, based on NYLANDER'S type plants, the Bear Island plants and TH. FRIES'S description in Lich. Scand. II p. 504:

Apothecia numerosa, ad 1—1.5 mm. lata, interdum adeo immersa, ut margine thallope cincta appareant, concava vel dein planiuscula, margine integro elevato vulgo cincta, nuda. Discus fusco-nigricans, madefactus fuscescens. Apothecia distincte lecideina. Excipulum carbonaceum, cum hypothecio atro confluens. Hymenium altissimum: 180—200 vel etiam usque ad 250μ altum, incolor, superne tantum dilutissime flavescens; epithecium granulosum. Paraphyses distinctae, graciles, ramosae, interdum ramoso-connexae, KOH si addito apicem versus leviter clavatae et distincte constrictae septatae videntur. Asci quam hymenio multo breviores, inflati, octospori, membrana apice normaliter incrassata. Sporae magnae vel maximae: $28-32 \times 16-21 \mu$, episporium crassum: $2-2.5 \mu$. — Pycnides fertiles frustra quasitae.

- I. Apothecia immersed in thalline verrucae (aspicilioid), profusely developed.
1. Thallus C +. *Lecidea pelobotrya* (WBG.) LYNGE
 2. Thallus C ÷. *Lecidea consentiens* NYL.
- II. Apothecia large, appressed between the thalline verrucae with a proper black margin (lecidine), very rare. *Lecidea panaeola* ACH.

Lecidea panaeola has confluent thick bullate areolae and darker red kephalodia than *L. pelobotrya*.

L. consentiens has more confluent and less convex (often quite plane) areolae than *L. pelobotrya*. But I have not found that character constant enough for morphological distinction; the southern coast plants of *L. pelobotrya* often much resemble the other species. They are evidently often found at the same stations, for I have repeatedly detected them together on the same herbarium paper.

L. panaeola is so common in Norway that it is not necessary to state its distribution more accurately.

I have tested the whole Scandinavian material of *L. consentiens* and *L. pelobotrya* that was accessible to me with hypochlorite of lime. The test was made after MAGNUSSON'S excellent method: the hypochlorite is always kept dry in a bottle. A few grains of hypochlorite is added to a drop of water on the glass and the section is placed in it. To be sure of a negative reaction it is necessary to see the section under a microscope (low power), for the soft adspersed hyphae are often protected against the hypochlorite by an air bubble.

Lecidea consentiens.

Norway. Finmark: Berlevaag (TH. FR.) and Skarsvaag (TH. FR.). Troms: Fløifjell (TH. FR.) and Bardufossen (NORM.). Nordland: Salt-dalen (SOMRFT.) and Gildeskaal (NORM.).

Nordtrøndelag: Meraker (M. N. BL.). Tevledalen—Dalvola (M. N. BL.), and Sulutind (M. N. BL.). Sørtrøndelag: Skruenfjell (M. N. BL.).

Sogn og Fjordane: Eivindvik (HAVAAS). Hordaland: Fagradal, on Vidda (HAVAAS).

Rogaland: Rækedal (HAVAAS).

Sweden. Torne Lappmark: Vassitjåkko, 7—900 m. s. m. (MAGN.), Njurajavre, 450 m. s. m. (MAGN.) and Kornöjökeln (TH. C. E. FR.).

Lule Lappmark: Vallivarre near Quickjock (HELLB.).

Lycksele Lappmark: Långfjellet, 650 m. s. m. (MAGN.), Strimasund 450 m. s. m. and Björkfors, 300 m. s. m. (MAGN.).

Jämtland: Jormlifjällen (STENH.), Stenfjäll (VRANG), Ullån (INDEBETOU), Skäckerfjällen (INDEBETOU); Skurdalsfjäll (S. ALMQUIST, MALME), and Enafors (MALME, Lich. Suec. 271).

Lecidea pelobotrya.

Norway. Finmark: "Finmarkia ejusque distr. Tanensis in lateribus montis alpini Rastekaissa d. 29. Julii 1802. Urceolaria pelobotria" (WBG., type plant), and Mortensnes (TH. FR.). Nordland: Bodø (HAVAAS), Saltdalen (SOMRFT.), Rødøy, at Tjong (NORM.), and Rana: Roglia (M. N. BL.).

Nordtrøndelag: Sparbu (M. N. BL.), Tevledalen (M. N. BL.), Dalvola (M. N. BL.) and Stenvola (M. N. BL.). Sørtrøndelag: "Trondhjem" (KOERBER s. n. *Aspicilia panaeola*), Ilsvika (KINDT), Melhus: Vassfjell (KINDT), and Skruen (M. N. BL.).

Opland: Gjeiteryggen (TH. FR.).

Møre: Sulufjell at Aalesund (TH. FR.), and Merok in Geiranger (HAVAAS).

Sogn og Fjordane: Dalsbo (HAVAAS) and Eivindvik (HAVAAS). Hordaland: Voss (M. N. BL.), Brynsbrø (HAVAAS), Radøen (HAVAAS), Isdalen (HAVAAS), Askøen (HAVAAS), Søfteland: Møsnuken (B. L.), Samnanger at Aadland (HAVAAS) and Mosterhavn (HAVAAS).

Rogaland: Stavanger (MOE, pl. not seen), Sogndal (HAVAAS) and Rækedal (HAVAAS). Telemark: "Tellemarchia" (SOMRFT. sec. TH. FR., pl. not seen).

Sweden. Lule Lappmark: Vallivarre (HELLB.), Snjærrak (HELLB.), and Dundret near Gellivarre 800 m. s. m. (MAGN.).

Lycksele Lappmark at Tärna: Brandfjället 650 m. s. m. (MAGN.), Strimasund 500 m. s. m. (MAGN.) and Rivovardo (MAGN.).

Jämtland: Skurdalsfjället (S. ALMQU.), Kallsjön (S. ALMQU.), Stenfjället (VRANG), Åreskutan (S. ALMQU., INDEBETOU), Skatan (S. ALMQU.), Handöl (S. ALMQU.), Enafors (DU RIETZ) and Storlien (MALME Lich. Suec. 921).

Härjedalen: Funnedsalsberget (S. ALMQU., HELLB., HULTING).

This enumeration shows that either species has a wide distribution in our peninsula from Finmark farthest north and down to the central mountains, especially in the regio alpina and regio subalpina. But there is a remarkable difference on the Norwegian west coast where *L. pelobotrya* is known from numerous stations, *L. consentiens* only from a few ones.

Lecidea cuprea SOMRFT.

Irrfärden (TH. FR.).

Many plants, several of them with a parasitic fungus in the apothecia. The plants were typically developed.

Lecidea demissa (RUTSTR.) ACH.

Irrfärden (TH. FR.) and between Nordhamna and Kulbukta (TH. FR.). Many well developed plants, it is evidently common.

Lecidea Dicksonii ACH.

Mt. Misery (TH. FR.), Irrfärden (TH. FR.), between Cape Norden-skiöld and Revleodden (O. H.), Tunheim (HØEG), and Laksevatnet (O. H.).

This is one of the commonest Arctic lichens, and the number of stations and plants suggests the same to be the case in Bear Island, as was to be expected. It is especially plentiful on the small rounded stones of the strand-walls (perhaps a quick grower?). It is often found immixed on stones, collected for the sake of other, more conspicuous lichens.

Like other Arctic crustaceous lichens it often has a poorly developed thallus. But even if the thallus is only seen like a shadow it is easily determined, also habitually, by its numerous small black concave apothecia on a rusty-brown thallus. *Rhizocarpon Oederi* has gyrose apothecia, and it is very rare in Arctic collections. I have never seen it from the Arctis, but DARBISHIRE mentions Greenland plants (Sec. Arct. Exp. Fram p. 23).

Lecidea epiphaea NYL.

Sørhamna, very scarce, only one plant with a few apothecia (TH. FR.).

Excipulum entirely uncoloured, hypothecium the same. Hymenium narrow, 65 μ , pale yellowish at its upper part, otherwise uncoloured. Paraphyses (KOH) distinctly capitate, articulate and septate, coherent. Spores more than 8 in each ascus, (10)—12—16, narrowly elliptical: 8—10 \times (2) 2.5—3.5 μ .

Asci more or less persistently blue with jodine, hymenium generally impurely vinous.

The convex apothecia and the narrow spores suggested this species and not *L. septentrionalis*. But unfortunately the asci generally contained no ripe spores, and I had to cut several of the few apothecia and examine all my sections very carefully, till at last I detected a few asci where the 16 ripe spores could be seen with absolute certainty.

Lecidea flavocaerulescens (HORNEM.).

Mt. Misery (TH. FR.), Irrfärden (TH. FR.), between Cape Norden-skiöld and Revleodden (O. H.), and Laksevatnet (O. H.).

It covers rocks and stones extensively, OLAV HANSEN brought home stones worthy of a place in a show collection.

Lecidea glomerulosa DC.

var. *euphorea* (FLK.) VAIN.

Mt. Misery (TH. FR.), on drift-wood.

var. *Wulfenii* (HEPP) VAIN.

Sørhamna (TH. FR.), and Mt. Misery (TH. FR.). Several plants. Perhaps a proper species?

Lecidea goniophila FLK.var. *granulosa* (ARN.) VAIN.

Vainio Pitlekai p. 133.

Syn. *Lecidea elaeochroma* β *pilularis* (DAV.) TH. FR. Lich. Scand. II p. 543.

Sørhamna (TH. FR.), Mt. Misery (TH. FR.), Irrfärden (TH. FR.), between Kulbukta and Nordhamna (TH. FR.), and at Nordhamna (TH. FR.).

To judge from the number of plants this must be a very common species.

The hypothecium is uncoloured or only pale yellowish-brown, and the paraphyses are easily discrete, with incrassated tips. The colour of the hymenium is more variable, from smaragdine to more or less violet. The spores are broad, their size is variable, especially their length: (8) 13—18 \times 6—9 μ .var. *pungens* (KBR.) VAIN.

Mt. Misery (TH. FR.), and Irrfärden (TH. FR.).

I have felt much inclined to regard the *pungens* a proper species, but that is hardly possible in the Arctis. The thallus of var. *granulosa* is often so miserable that the distinction between them is reduced to a matter of tact.In Bear Island the athalline var. *pungens* is by far not so common as var. *granulosa*.*Lecidea impavida* (TH. FR.).

Sørhamna (TH. FR.).

There was only one plant in the collection. In Novaya Zemlya it was quite common, but it is very inconspicuous.

Hypothecium dark; spores 9—10 \times 5—6 μ . Thallus J \div , hymenium J bluish.*Lecidea lapicida* (ACH.) ARN.

Mt. Misery (TH. FR.), and Tunheim (HØEG).

It is by far less common than *L. pantherina* in the Arctis, from Bear Island there were only these two plants.*Lecidea latypea* ACH.

Mt. Misery (TH. FR.), and Irrfärden (TH. FR.).

Only a few plants, it cannot be common.

Paraphyses easily discrete, hypothecium brownish-black, hymenium smaragdine, spores 12—13 \times 6—7.5 μ .

Lecidea lepadina SOMRFT.

Lecidea lepadina SOMRFT. Suppl. Fl. Lapp. (1826) p. 145, cfr. TH. M. FRIES Lich. Scand. II (1874) p. 485.

Parmelia lepadina FR. Lich. Eur. (1831) p. 193.

Mt. Misery (TH. FR.), several plants.

The authentic specimens, collected by SOMMERFELT in Skjerstad ("in rupibus cacumine Hekkeltind") in Nordland, have a very peculiar habitus. In some plants there is a thin grey (plumbeous) rimose crusta which is quite lacking in other plants. The greater part of the thallus consists of large and high, pyramidal, cracked glebulae, of a diam. up to almost 10 mm., and of a monstrous habitus. On the flat parts of the thallus, and — though not quite constantly — also on the glebulae, there are numerous rounded or lirelliform minute (0.1—0.2 mm. large) perforations of the cortex, looking like aborted soredia. The Bear Island plants lack the large glebulae, which are "modo areolae luxuriantes", according to TH. M. FR. l. c.

A few of the Bear Island plants are fertile. The apothecia are black, very convex, disk rugose, epruinose, with a thin, disappearing margin. The hypothecium is black, the paraphyses incrassated at their apices, the spores (lacking in some apothecia) 11—14.5 × 4—5 μ . The medulla is intensely blue with jodine.

The species belongs to the *L. confluens*-section, as stated by TH. M. FRIES. It differs from *L. confluens* itself by its lirelliform perforations of the cortex and by its narrower spores.

It has generally been regarded only as a monstrous plant. But I think that its perfectly developed apothecia justify its specific rank. That so luxuriant things as the thalline glebulae should be lacking in the Bear Island plants is only natural, the poor development of many Arctic lichen thalli is a well established fact.

Lecidea leucophaea (FLK.) TH. FR.

Irrfärden (TH. FR.), only a few plants, on quartzite.

I have generally regarded *L. lulensis* as specifically well distinct from this species. But the Bear Island plants agree so much that the chemical reaction is almost the only distinctive character of importance. The spores of this *L. leucophaea* are poorly developed, they are a little larger than in the Bear Island *L. lulensis*: 11—13 × 5 μ against 8—10 × 4—5 μ . The hymenium is smaragdine, uncoloured in *L. lulensis*. The paraphyses are capitate in either species. The apothecia of *L. leucophaea* are large and crenate, suggesting the β *griseoatra* (FW.) TH. FR. Lich. Scand. II p. 460. The hypothecium of *L. lulensis* is quite uncoloured, but in the Bear Island *L. leucophaea* it is brown in one plant, in another very dark. MALME'S *L. leucophaea* in his Lich. Suec. No. 646 has an

uncoloured hypothecium, but that plant is the α -*genuina* (KÖRB.) TH. FR. Lich. Scand. II p. 459. The colour of the Bear Island hypothecium is a serious objection to the determination, but MALME has examined my plant, and he writes that it is "the alpine form of *L. leucophaea* which habitually approach much the *L. subplumbea* = *L. obnubila* TH. FR. et HELLB." in TH. FR. Lich. Scand. II p. 459. *L. lulensis* is supposed to be more common in the Arctis than *L. leucophaea*.

Probably the Bear Island *L. leucophaea* has been damaged by irrigation.

Lecidea cfr. *limosa* ACH.

Irrfärden (TH. FR.), and between Nordhamna and Kulbukta.

Only a few plants.

Hypothecium uncoloured or yellowish-brown, hymenium almost of the same colour, paraphyses conglutinated, incrassated at their tips. Spores 10-12 \times 5-6.5 μ . Hardly any thallus. — The determination is not quite certain, the spores are too broad and the hypothecium too dark in one of the plants.

Lecidea lithophila (ACH.) TH. FR.

f. *aberrans*.

Mt. Misery (TH. FR.).

A quite safe determination of these plants is very difficult. There is no continuous thallus, only small scattered dots. Their colour is greyish-white (destroyed or damaged cortex?). The apothecia are well developed, diam. 0.15-1 mm., with plane pruinose disk, thick margin, more or less crenate or entire.

Excipulum and hypothecium are uncoloured, hymenium dark at its upper part, paraphyses rather coherent. Spores (8) 10-13 \times 4.5-5.5 μ .

Medulla J \div , hymenium J bluish-black.

F. subnudus FR. has a "thallus tenuis, cinerascens, continuus vel rimosus vel etiam obsoletus" (VAIN., Adjum. II p. 59). HAVAAS Lich. Norv. No. 132, has a very thin, but almost continuous thallus, the scattered dots of the Bear Island plants are not so thin.

The differences between the Bear Island plants and the Norwegian *Lecidea lithophila* are obvious, and the determination approximate. Being well aware of the tendency of variation in Arctic lichens, I must claim very decisive characters to justify the creation of a new species.

Lecidea lulensis (HELLB.) STIZ.

MALME Lich. Suec. 449, ubi syn.

Mt. Misery (TH. FR.).

The thalline verrucae are a little pale than in MALME 449, otherwise the habitus agrees perfectly. Hypothecium uncoloured. The hymenium is low, 50-55 μ , upper part almost uncoloured. Paraphyses

branched, not concrete, capitate at their tips. Spores small: $8-10 \times 4-4.5 \mu$. Medulla J \div , KOH after some time precipitates fasciculate red crystals. Hymenium stained persistently blue with J. — Cfr. *L. leuco-phaea* (FLK.) TH. FR.

Lecidea minutissima n. sp.

Sørhamna, ad saxa quartzosa (TH. FR.).

Thallus fere evanescens, maculas parvas obscuras vel lineas inconspicuas inter granulas quartzosas formans.

Apothecia arcte adpressa, minuta: diam. 0.2—0.3 mm. Discus ater, planus, epruinus, margine concolore, integro, persistente, tumido vel dein tenuius cinctus. Excipulum hypotheciumque omnino incolorata; hymenium superne cinereo-fuscescens (non caeruleum), angustum: $40-50 \mu$ altum, strato incolorato amorpho tectum. Paraphyses concretæ, validæ, apice clavato-incrassatæ et (KOH si addito) constrictæ septatæ. Asci late pyriformes, e. g. $32 \times 16 \mu$, octospori. Sporæ ellipsoideæ, parvæ: $9-11 (13) \times 4.5-6 (6.5) \mu$.

Pycnides non visæ.

Medulla J et KOH immutata; hymenium J intense et persistenter caerulescens.

It is so inconspicuous that in the field it would have escaped the attention of every common lichenologist, it is hardly visible without a lens. I refer it to the section *Lecideae sylvicolæ* of TH. M. FRIES Lich. Scand. II p. 555. This section contains a rather heterogeneous number of *Lecideae* with small apothecia and (generally) small spores, but the internal structure of the apothecia varies much. This species much resembles *Lecidea conferenda* NYL., but that is only habitually, for *Lecidea conferenda* has a quite different texture of the apothecia: very dark excipulum and hypothecium, blue colour of the hymenium, narrower spores: $9-13 \times 3-4 \mu$, and another reaction of the hymenium (wine-red with Jodine).

At Sørhamna the ground is calcareous, probably this lichen has been found on an erratic stone.

Lecidea Miseriæ n. sp.

Mt. Misery ad terram supra muscos, quæ opprimantur (TH. M. FRIES).

Crusta bene evoluta, crassitudine mediocri, subgelatinosa, irregulariter rimosa, cinerea vel in fuscescentem vergens.

Apothecia adpressa, vulgo minuta, diam. 0.2—0.3 mm. vel interdum majora, diam. usque 0.7 mm. Discus semper et persistenter planus, epruinus, ater, margine concolori tumido integro persistente cinctus. Excipulum crassum, smaragdulum vel violaceum, parte exteriori hyphis superficiei parallelibus formatum. Hypothecium incolor vel subincolor. Hymenium angustum, $40-50 \mu$ altum, lineis perpendicularibus violaceis

transitum. Paraphyses sat concreatæ, saltem non facile discretæ, asci octospori, membrana apice incrassata. Sporæ anguste ellipsoideæ, fere cylindrico-ellipsoideæ, $10-13 \times 3-4 \mu$.

Pycnides non inventæ.

Medulla J et KOH immutata, hymenium J intense vinosum, KOH smaragdulum, HCl intense caerulescens.

The dark excipulum is only developed along the margin of the apothecia, at their central lower part the apothecia are uncoloured.

The violet stripes of the apothecia might suggest *Lecidea atrofusca* or *Lecidea ementiens*. But either of these species has violet granules, more rarely stripes, the apothecia are normally or at least in age convex; the hypothecium of *Lecidea atrofusca* is dark.

I have not seen *Lecidea turficola* (HELLB.) TH. FR. Lich. Scand. II pag. 475. But the thallus of our species is not granulous, its spores are considerably narrower, and the reaction of the hymenium with Jodine is different (intensely blue in *Lecidea turficola*).

VAINIO's *Lecidea subdepressa* has subturbinate or adpressed apothecia and the same hymenial reaction with Jodine as *Lecidea turficola*.

Lecidea neglecta NYL.

Mt. Misery (TH. FR.), and between Nordhamna and Kulbukta (TH. FR.). Only a few plants, sterile as usual, but with well developed thallus.

Lecidea pantherina (ACH.) TH. FR.

Sørhamna (TH. FR.), Mt. Misery (TH. FR., J. G. ANDERSSON), Tunheim (HØEG), and between Nordhamna and Kulbukta (TH. FR.).

A plant from Mt. Misery, leg. N. G. ANDERSSON 1899, was infested with *Tichothecium pygmaeum* KÖRB. (det. Dr. KARL KEISSLER, Wien).

One of the commonest Arctic *Lecideae*, also in Bear Island. Its habitus is very variable, but fortunately it is easily determined, owing to its chemical reaction (J blue, KOH red).

Lecidea pauperula TH. FR.

Irrfärden (TH. FR.).

Only one plant. Hypothecium very dark, hymenium narrow, 80μ high. Spores $11-13 \times 6-6.5 \mu$. The *Lecideae* of the *pauperula* tribus are much in want of a monographical treatment. Their affinity to the species of the *fuscoatra* tribus deserves attention.

Lecidea petrosa ARN.

α *nuda* TH. FR.

Sørhamna (TH. FR.), Mt. Misery (TH. FR.), and between Nordhamna and Kulbukta (TH. FR.).

This species is supposed to have a wide distribution in Arctic countries, I also found it in Novaya Zemlya. But there were only 4 plants in the Bear Island collection. Is it rare there?

Thallus practically lacking. The hypothecium is very dark, black, hymenium smaragdine, darker at its upper part, high: 100—130 μ . Paraphyses coherent, asci very thick-walled with transverse stripes, especially distinct on the evacuated asci if KOH is applied. Spores large with a thick hyaline epispore (halonate), large: 18—30 \times 10—11 μ , in one apothecium exclusive of the hyaline epispore 18—25 \times 10—11 μ .

Lecidea ramulosa TH. FR.

var. *evoluta* TH. FR.

North of the rookery (near Cape Bull?, J. G. ANDERSSON); Sørhamna (TH. FR.), Mt. Misery (TH. FR.), Irrfärden (TH. FR.), and between Nordhamna and Kulbukta (TH. FR.).

A very characteristic plant, of a Pertusarioid habitus. Some plants were fertile, spores 9—11 \times 3—3.5 μ .

DARBISHIRE determined a "*Lecidea ramulosa*" from Harbour-Fjord (Sec. Arct. Exp. Fram, p. 17). I do not think this determination correct, it is more like an *Ochrolechia*, but the plant is miserable.

var. *depressa* TH. FR. Lich. Scand. II p. 521.

Syn. *Lecidea ementiens* NYL. Lichenes novi e Freto Behringii. Flora (1884) p. 222; NYLANDER Enum. Lich. Freti Behringii (1886) p. 22.

Lecidea subdepressa VAIN. Lich. Pittekai (1909) p. 128.

Sørhamna (TH. FR.), Mt. Misery (TH. FR.), Irrfärden (TH. FR.), and between Nordhamna and Kulbukta.

Growing on mosses; a number of plants, especially from the first and the last mentioned stations.

MALME has called my attention to *Lecidea ementiens* NYL. and to *L. subdepressa* VAIN. According to TH. FRIES, NYLANDER and VAINIO the difference between these species may be thus expressed:

- | | |
|---------------------------------------------------|-----------------------|
| 1. Hypothecium rubricosofuscens. | <i>L. ramulosa</i> |
| 1*. — incolor. | |
| 2. Epithecium aeruginoso-fuligineum aut nigricans | |
| (hymenium punctis fuligineis destitutum?). | <i>L. subdepressa</i> |
| 2*. — incolor, hymenium punctis fuligineis | |
| inspersum. | <i>L. ementiens</i> |

In the Bear Island collection of TH. FRIES there were a number of plants belonging to this tribus, and it soon became necessary to reconsider them.

Firstly there were several plants of the typical *L. ramulosa* var. *evoluta* TH. FR., habitually agreeing entirely with TH. FRIES'S own plant in our herb., collected by him at Tromsø in Norway in 1864. They were generally sterile, but there were also a few apothecia. The hymenium was pale violet, almost black at the upper part. The excipulum was distinctly plectenchymatous. In the whole apothecium there were some scattered violet grains or stripes. The hypothecium was decidedly uncoloured, paler even than the hymenium itself. — I then examined an apothecium of TH. FRIES'S above mentioned type plant. The hymenium had a slightly intenser colour, but the hypothecium was uncoloured. TH. FRIES himself remarks: "Hypothecium . . . minus intense coloratum quam in *L. assimilata*" (Lich. Scand. II p. 521).

Secondly there were a still greater number of plants with a "crusta tenuior, e granulis minutis . . . contexta". I examined a large number of them, and found an uncoloured hypothecium in each and every one of them, either absolutely uncoloured or with a faint tinge of the violet colour which is so characteristic of the hymenium. The excipulum was uncoloured.

But in all the plants there were in varying development grains or stripes of a more intense violet colour, sometimes colouring large parts of the excipulum and hymenium, especially the epithecium, in other apothecia more scantily developed. Also at the excipulum their development was variable, and I hardly found one apothecium with a quite uncoloured epithecium.

Accordingly I find it impossible to maintain a specific difference between these 3 species, based on the their apothecia. When TH. FRIES wrote his first diagnosis he evidently examined an apothecium with a hypothecium that was more "shaded" than usual. And it seems to me that the difference between *L. subdepressa* and *L. ementiens* depends upon individual variation. I cannot consider these two *Lecideae* to be specifically distinct from *L. ramulosa* β *depressa* TH. FR. — A specific difference between α *evoluta* and β *depressa* is more probable.

In his Catalogus Lichenum III p. 682 ZAHLBRUCKNER refers *L. ementiens* NYL. as a synonym to *L. ramulosa*, but he acknowledges *L. subdepressa* to be a proper species.

The thallus of the β *depressa* is appressed to the mosses, and it is generally so thin that it takes the form of the mosses beneath, generally it does not hide them by a continuous crusta above them. If the thallus is thicker, its habitus approaches an *Ochrolechia*. The colour is grey or almost white, much paler than in *L. atrofusca*.

The apothecia are small, diam. about 0.5 mm., sometimes a little larger. They quickly become convex and no margin is then visible. Their colour is very dark, almost black, their disk is epruinose. The paraphyses are very coherent, almost imperceptibly club-shaped at their

tips. The coloured grains are not dissolved by KOH. The hymenium is about $80\ \mu$ high. The spores are often poorly developed, generally shorter and especially narrower than in *L. atrofusca*: $10-13 \times 3-3.5$ ($4\ \mu$). I have also seen a few broader, ellipsoid spores: $10-14 \times 6\ \mu$.

The chemical reaction of the hymenium is somewhat variable (after the development of the asci?): Dark blue or almost black with Jodine, and the hypothecium reddish, or hymenium first blue, then impurely bluish-red (sordide decoloratur) with persistently blue asci. The thallus is not stained with KOH.

Owing to the coloured grains it is easily mistaken for *L. atrofusca* or *L. sanguineo-atra*, which has convex apothecia. But it is well separated from those species by its pale excipulum, hypothecium and epithecium. NYLANDER refers it to the tribus *L. vernalis*, its apothecia are, however, much darker than the other species of that tribus, mentioned in TH. FRIES Lichenographia Scandinavica.

Lecidea rhaetica HEPP.

Sørhamna (TH. FR.), Mt. Misery (TH. FR.) and between Nordhamna and Kulbukta (TH. FR.), on calcareous rocks.

The plants from Sørhamna and from Nordhamna—Kulbukta agree entirely with plants in our herb. which ARNOLD collected on Schlern (white thallus). The (only) plant from Mt. Misery has a darker thallus, but the structure of the apothecia agrees with this species (det. MALME).

The excipulum is carbonised, hypothecium black, hymenium high: $115-130\ \mu$. Paraphyses (in KOH) branched and connected (ramoso-connexae), articulated, hardly incrassated at their tips. Asci with distinct transversal stripes, spores large: $18-23 \times 9-12\ \mu$.

Its affinity with *Lecidea petrosa* is obvious, and TH. FRIES is not quite convinced of their specific difference: (of *L. rhaetica*) "forsan sit hujus (i. e. *L. petrosae*) forma crusta maxime evoluta." (Lich. Scand. II p. 514). But typical *Lecidea rhaetica* is widely distributed in the Arctis, I have also found it in Novaya Zemlya. If it were only a *L. petrosa* with a better developed thallus, we would not have expected it to be so well developed in the Arctis, where crustaceous lichens are so often almost acrustaceous. In my opinion the two species are distinct.

Lecidea septentrionalis TH. FR.

Sørhamna, only two plants, on mosses (TH. FR.).

Hypothecium entirely uncoloured. Paraphyses distinctly capitate, brownish, coherent. Asci narrow, spores $8-10 \times 4.5-7\ \mu$. Hymenium J first smaragdine, then rapidly wine-red.

Lecidea rufofusca has larger spores: $13-18 \times 6-8.5\ \mu$, not or at least less capitate paraphyses, and another chemical reaction: "Jodo praecipue circa ascos intense caerulescit" (TH. FR. Lich. Scand. II p. 476).

Lecidea speirea ACH.

Sørhamna (TH. FR.), Mt. Misery (TH. FR.), Tunheim (HØEG), and Østervaag (O. H.).

The plants from Sørhamna and Mt. Misery have the typical colour of the species, in some plants the thallus is perfectly developed, in others very thin, almost disappearing. The plants from Tunheim and Østervaag have a darker, clay-coloured thallus, — damaged by cold water? But the structure of the apothecia agrees with the typical *L. speirea*.

Hypothecium black, reddish with KOH. Hymenium 90 μ high, smaragdine or bluish-black at its upper part; paraphyses coherent, clavate at their tips, spores 11—14 \times 6—9 μ .

Medulla J blue, KOH unchanged, hymenium persistently blue with J.

Lecidea steriza (ACH.) VAIN.

VAINIO Lich. Pitlekai (1909) p. 144, ubi syn.

Syn. *Lecidea macrocarpa* (DC.) TH. FR. Lich. Scand. II (1874) p. 505.

f. *contigua* NYL.

Syn. var. *superba* (KBR.) TH. FR. Lich. Scand. II (1874) p. 505.

Sørhamna (TH. FR.), and Tunheim (HØEG).

It has the verrucose, more or less contiguous areolae, described by TH. FR. l. c. Hymenium high: 110—140 μ , spores 17—18 \times 7—8 μ .

f. *platycarpa* ACH.

Mt. Misery (TH. FR.), Irrfärden (TH. FR.), and Tunheim (HØEG).

Quite typical plants, with obsolete thallus, from Mt. Misery and Irrfärden, poor thalli, approaching f. *subconvexa* VAIN. from Irrfärden and Tunheim.

f. *oxydata* KBR.

Mt. Misery (TH. FR.), Irrfärden (TH. FR.), and between Nordhamna and Kulbukta (TH. FR.).

Lecidea Ursina n. sp.

Irrfärden (TH. FR.), on hard clay.

Thallus cinereo-lutescens, crassus, mollis, rimoso-areolatus; areolis crenatis subconvexis vel rugosis. Thallus sorediis isidiisque destitutus.

Apothecia dispersa, quam areolis multo majora, diam. usque 1.5 mm., sessilia, mox convexa vel semiglobosa, discus ater, epruinosis, margine tenui, \pm pruinosis, mox excluso circumdatus. Excipulum rufo-fuscum. Hymenium 100—110 μ altum, smaragdulum, superne fere nigrescens, inferne dilutius coloratum et in hypothecio concolori transiens. Paraphyses valde conglutinatae, indistinctae, apice non incrassatae, haud ramosae. Asci hymenio parum breviores, 14—18 μ crassi,

octospori. Sporae indivisae, incoloratae, guttulis oleosis repletae, ellipsoidae vel subfusiformes, (16) 18—26 (28) \times 8—10 μ .

Medulla J et KOH incolorata, hymenium J persistenter caerulescens. Pycnides frustra quaesitae.

I refer the species to the stirps *Lecidea alpestris* TH. FR. Lich. Scand. II p. 536. — The cortex is very soft, as is the whole thallus; its hyphae are little distinct.

Lecidea vernalis (L.) ACH.

Sørhamna (TH. FR.), Mt. Misery (TH. FR.), Irrfärden (TH. FR.), between Nordhamna and Kulbukta (TH. FR.) and at Nordhamna (TH. FR.).

An ubiquitous plant in the Arctis. To judge from the number of plants it must be equally common in Bear Island as elsewhere.

Fertile, and well developed.

A plant from Mt. Misery, growing on thin twigs of a *Salix*, might be referred to this species. Its apothecia are paler than usual, resembling the colour of *L. porphyrospoda*.

Bacidia (DN_{TRS.}) ZAHLBR.

Bacidia coprodes KÖRB.

Mt. Misery (TH. FR.).

The thallus varies from almost lacking to a well developed crusta, granulate or even areolate.

Hypothecium very dark, hymenium smaragdine at its upper part, narrow: 45—55 μ . Paraphyses branched. Spores 3-septate, 10·5—17 \times 3·5—4 (5) μ , suggesting the α *normalis* TH. FR. Hymenium J intensely wine-red, the tips of the asci only persistently blue; medulla J \div .

Bacidia microcarpa (TH. FR.).

Sørhamna (TH. FR.), Mt. Misery (TH. FR.), and between Nordhamna and Kulbukta (TH. FR.).

Bacidia microcarpa is supposed to be common in Bear Island. I also found it in Novaya Zemlya.

Apothecia small, diam. rarely above 0·5 mm., globose, black or (moistened) brownish-black. Hypothecium uncoloured or brownish, paraphyses branched, not coherent, rather stout, clavate at their tips. Spores 3-septate, rarely 4 or even 7-septate, uncoloured, 19—29 (37) \times 5—6 μ . Asci persistently blue with J. One plant from Mt. Misery had generally more than 3-septate spores, up to 7-septate. The spores were longer than usual, obtuse, in well developed spores from 20—40 \times 5 μ . This determination is not certain, perhaps *B. accedens* ARN.?

According to VAINIO Adjum. II p. 8 this species is a synonym of NYLANDER'S *Lecidea meiobola* in NORRLIN Flora Kareliae Onegensis (1876) p. 30. But that name is a nomen nudum.

Bacidia muscorum (Sw.) Arn.

Bacidia atosanguinea (SCHAER.) TH. FR. var. *muscorum* (Sw.) TH. FR. Lich. Scand. II (1874) p. 354, ubi syn. VAINIO Lich. Piteikai (1909) p. 103.

Exsic. MALME Lich. Suec. 588 et 889.

Sørhamna (TH. FR.) and Mt. Misery (TH. FR.).

Only a few plants.

Excipulum reddish-violet, hypothecium very dark. Hymenium narrow, 40—50 μ , smaragdine at its upper part; paraphyses stoutish, articulate (KOH added). Spores straight, linear, 35—47 \times 2 μ . Hymenium J wine-red, hymenium and excipulum HCl. more intensely violet.

Bacidia subfuscula (NYL.) LYNGE comb. nov.

Bilimbia subfuscula (NYL.) TH. FR. Lich. Scand. II (1874) p. 378 ubi syn.

Sørhamna (TH. FR.) and Mt. Misery (TH. FR.).

Some *Bacidiae* differed from the common *B. microcarpa* by their narrower spores: 13—30 \times 3—4 (5) μ , a few spores 3—7-septate against generally 3-septate in *Bacidia microcarpa*. The hymenium was 50—80 μ high, the hypothecium uncoloured. All the apothecia were convex, without margin.

The muscicolous plant was submitted to MALME who suggested *Bilimbia subfuscula* (NYL.) TH. FR. MALME has been kind enough to compare the Bear Island plant with TH. FRIES's plant from Vardø, in herb. Upsala. This plant has paler apothecia, but as MALME remarks, that character is variable in *Bacidia*.

TH. FRIES writes (Lich. Scand. II p. 378): "Jodo vinose rubet." I have found: "Hymenium J caeruleo-nigricans." This difference may possibly depend on the number of ripe asci, they are generally stained persistently blue with Jodine.

The Bear Island plants are almost acrustaceous, indicating the var. *venusta* (HEPP).

A plant growing on decayed wood could not be separated from the muscicolous plant.

In the collection there was also a *Bacidia* from Mt. Misery, growing on chalk. I could find no distinctive characters of specific value between it and the muscicolous *Bacidia subfuscula*. But on account of the different substratum I will give a fuller description of the saxicolous plant:

Thallus granulis parvis, dispersis, albidis formatus. Apothecia parva, diam. 0.3—0.6 mm., convexa, atra, nuda, nitida, immarginata.

Excipulum plectenchymaticum, hypothecium incoloratum, hyphis \pm horizontalibus, dense conglomeratis, contextum. Hymenium angustum, 50—55 μ altum, dilute violaceum, superne saltem p. p. obscurius, fere nigrescens. Paraphyses haud concretæ, apice non incrassatæ, indivisæ.

Sporae bacillares, rectae vel subrectae, triseptatae, rarissime nonnullas usque septem-septatas vidimus, 17—24 (28) \times 3—4 μ .

Asci J persistenter caerulescentes, hymenium KOH roseo-violascens, HNO₃ violascens.

The final revision of the determinations vindicated for *B. subfuscula* some plants that were at first supposed to be *B. microcarpa*. The material is not large, but it suggests the former species to be quite as common as the latter.

Toninia (MASS.) TH. FR.

Toninia lobulata (SOMRFT.).

Syn. *Toninia syncomista* (FLK.) TH. FR.

Sørhamna (TH. FR.), Mt. Misery (TH. FR.), and between Nordhamna and Kulbukta (TH. FR.).

There were several plants, it is evidently quite as common in Bear Island as in other Arctic countries.

Spores 16—24 \times 5—6 μ , often one-septate (f. *Theobaldi* (KBR.) TH. FR.).

Lecidea lobulata was described by SOMMERFELT in his Phys.-oekon. Beskrivelse over Saltdalen, Kgl. Norske Vid.-Selsk. Skr. vol. II (1824—27) p. 54. *Lecidea sabuletorum* β *syncomista* FLK. is older: Berl. Mag. (1803) p. 310, but SOMMERFELT's name was the first specific name for our plant.

Unfortunately there is no specimen preserved in hb. SOMMERFELT in Oslo, but his excellent description leaves no doubt as to the identity.

Lopadium KÖRB.

Lopadium muscicola (SOMRFT.) KBR.

var. *coralloidea* NYL.

Sørhamna (TH. FR.).

Only one plant. It is quite probable that this variety deserves the rank of a proper species.

Rhizocarpon (RAM.) TH. FR.

Rhizocarpon badioatrum (FLK.) TH. FR.

Between Cape Nordenskiöld and Revleodden (O. H.).

Not found in TH. FRIES's collection. TH. FRIES being much interested in this genus we may perhaps conclude that it has a sporadic distribution in Bear Island. — MALME's *Rh. jemtlanicum* was not found in these collections, nor in the Spitsbergen collections which I determined. (LYNGE Lich. from Spitsb. I p. 18—19). It was abundant in my Novaia Zemlya material; is it an eastern Arctic and northern species?

Rhizocarpon chioneum (NORM.) TH. FR.

Mt. Misery (TH. FR.).

There were several plants. This species has appeared in several Arctic collections, from Spitsbergen as well as from Novaya Zemlya, it must have a wide distribution and be rather common. It grows on calcareous rocks, with *Blastenia rupestris*, *Polyblastia hyperborea* a. o.

Rhizocarpon chioneum forms small (diam. 2—3 mm.), scattered white thalli, rather thick, sometimes more or less confluent. The thalli are thinner in Arctic plants than in our Norwegian ones, but not smaller. The medulla is $K \div$ and $J \div$.

The internal parts of the hymenium agree well with the data, given by NORMAN, TH. FRIES and MALME: The upper part of the hymenium is violet, often intensely and more intensely if KOH is applied. The spores are one-septate and somewhat constricted at the septum, uncoloured, with a thick halo. Their size is (13) $16-18 \times 8-10.5$ without the halo, $21-24 \times 12-13$ including the halo.

Rhizocarpon Copelandi (KBR.) TH. FR.

Syn. *Rh. hyperboreum* VAIN. Lich. Fenn. II p. 331, ubi syn.

Irrfärden (TH. FR.).

I only detected two small plants.

In his diagnosis of *Buellia Copelandi*¹ KOERBER made no mention of its chemical reaction. TH. FRIES observed the different chemical reaction of plants which he referred to his *Rhizocarpon Copelandii*, but he did not attribute specific value to this difference: "Verrucae K vulgo plus minus sordide fuscescunt, interdum (in formis fuscescentibus, rarioribus) non mutantur, raro demum ferrugineo-rubent"². — MALME reserved KOERBER'S name for plants with positive medullary reaction³. VAINIO reserved KOERBER'S name for plants with negative medullary reaction⁴ and introduced a new name *Lecidea* or *Rhizocarpon hyperboreum* for the plant with positive reaction.

The director of 's Rijksherbarium in Leiden kindly allowed me to investigate KOERBER'S authentic plant from Shannon Island, Greenland. Its chemical reaction was very distinctly "KOH e flavo rubescens (crystalla rubra praecipituntur)." Accordingly MALME is right in reserving KOERBER'S name for this plant, and VAINIO'S *Rh. hyperboreum* is identical with KOERBER'S *Buellia Copelandi*. VAINIO'S *Rh. Copelandi* must then be renamed, and I propose the name *Rhizocarpon Vainioense* LYNGE nom. nov.

¹ KOERBER, Flechten, in Zweite Deutsche Polar Exp. (1874) p. 79.

² TH. M. FRIES: Lich. Scand. II (1874) p. 616.

³ MALME: Västre Jämtl. Rhiz. (1914) p. 277; Lich. Suec. 275, 422.

⁴ VAINIO: Adj. Lich. Lapp. II (1883) p. 129.

Rhizocarpon Copelandi in my Spitsbergen work¹ is the same plant with positive medullary reaction. — I have also identified several plants in my Novaya Zemlya collection. It must have a wide distribution in the Arctis; I have not seen *Rh. Vainioense* from the Arctis.

The verrucae of KOERBER'S type plant are very "discrete", otherwise all the Arctic plants agree perfectly.

Rhizocarpon expallescens TH. FR.

Irrfärden (TH. FR.), and Mt. Misery (TH. FR.).

There were only two plants in the collections. Rare or not, it has a wide distribution in Arctic countries.

The plants of *Rh. expallescens* which I have seen, generally have a pale leaden or greyish colour, whitish plants are rare (e. g. the plant from Mt. Misery). *Rh. chioneum* is "albissimus, farinoso-suffusus".

The best distinctive character is the colour of the upper part of the hymenium: violet in *Rh. chioneum*, emerald-blue in *Rh. expallescens*.

Rhizocarpon geminatum (FLOT.) KBR.

Syn. *Rhizocarpon concretum* (ACH.) ELENK.

Sørhamna (TH. FR.), Mt. Misery (TH. FR.), scree between Cape Nordenskiöld and Revleodden (O. H.), Østervaag (O. H.), and between Nordhamna and Kulbugta (TH. FR.).

Evidently quite as common in Bear Island as in other Arctic countries. The Bear Island plants were small, with low scattered areolae on the dark protothallus.

Rhizocarpon geographicum (L.) DC.

Sørhamna (TH. FR.), Mt. Misery (TH. FR., O. H., J. G. ANDERSSON), at the coal mines (LID), between Cape Nordenskiöld and Revleodden (O. H.), Østervaag (O. H.), and between Nordhamna and Kulbukta (TH. FR.).

A considerable number of plants indicate it to be a common species, as was to be expected.

Rhizocarpon grande (FLK.) ARN.

Mt. Misery (J. G. ANDERSSON), between Cape Nordenskiöld and Revleodden (O. H.).

Lacking in TH. FRIES'S collection.

¹ LYNGE: Lichens from Spitsbergen (1924) p. 18.

Rhizocarpon Hochstetteri (KBR.) VAIN.

Syn. *Rh. Massalongii* (KBR.) MALME.

Scree at Mt. Misery (O. H.), between Cape Nordenskiöld and Revleodden (O. H.), and at Laksevatne (O. H.).

This species was lacking in TH. FRIES's collection. It requires a very long and intense investigation to ascertain the full number of lichens in a given area, however small it is. The number of species which TH. FRIES collected during these few days was quite astonishing. It really suggests a lichen flora, almost as rich as in a corresponding area of our own Finmarken.

The thallus of the Bear Island plants was extremely poorly developed, it would hardly have been possible to determine them if they had been sterile. Fortunately there were some apothecia, and the carpological characters proved constant enough, as usual: Upper part of hymenium emerald blue, paraphyses dark, distinctly clavate at their tips; spores uncoloured, one-septate, rarely developed, size in the few mature ones $17 \times 9 \mu$. No thalline reaction with KOH.

Rhizocarpon obscuratum (ACH.) MASS.

Sørhamna (TH. FR.), Mt. Misery (TH. FR.), Irrfärden (TH. FR.), between Cape Nordenskiöld and Revleodden (O. H.), and Østervaag (O. H.).

The plants were miserably developed, in some of them there was hardly any thallus visible. But the apothecia were developed and their internal structure agreed with this species: Apothecia small, 0.3—0.5 mm. in diam.; hymenium 110—120 μ high, its upper part emerald blue (smaragdulum); spores uncoloured, muriform, $23-31 (35) \times 10-11 (16) \mu$ large.

Rhizocarpon pseudospeireum (TH. FR.).

Syn. *Rh. calcareum* (WEIS) TH. FR. α *Weisii* (MASS.) TH. FR. f. *pseudospeireum* TH. FR. Lich. Scand. II (1874) p. 632.

Mt. Misery (TH. FR.) and between Nordhamna and Kulbukta (TH. FR.).

At the latter station a number of plants were collected. It will be interesting to trace its distribution in the Arctis; I collected it in Novaya Zemlya.

We might have expected some other *Rhizocarpons* that were lacking in the collections, e. g. *Rh. jemtlandicum* and *Rh. chionophilum*.

Baeomyces PERS.*Baeomyces placophyllus* WBG.

Irrfärden (TH. FR.).

Only two sterile plants, but the thallus was quite well developed.

Cladonia (HILL) VAIN.*Cladonia bellidiflora* (ACH.) SCHAER.

Mt. Misery (O. H.), Irrfärden (TH. FR.), Cape Levin (LID), and between Nordhamna and Kulbukta (TH. FR.).

A considerable number of plants were collected, and it is most probably quite common in Bear Island. It has a very wide distribution in Arctic countries, but it is not equally frequent everywhere. In Novaya Zemlya I only found a few plants.

The Bear Island plants were generally sterile, with their apices destroyed, but some plants were fertile. Generally the squamules were well developed, as in Norwegian plants.

Cladonia coccifera (L.) WILLD.var. *pleurota* (FLK.) SCHAER.

Nordhamna (TH. FR.).

var. *stemmatina* ACH.

Mt. Misery (TH. FR.), Irrfärden (TH. FR.), west of Cape Norden-skiöld in a scree (O. H.), and at Tunheim (LID and HØEG).

As usual in Arctic collections var. *stemmatina* was better represented than var. *pleurota*, soredia are evidently badly adapted to Arctic conditions. There were few plants in the collections, and they were not well developed. The podetia were short and the scyphi often damaged, with ± regenerating squamules.

Cladonia coccifera, leg. KEILHAU, was lacking in hb. SOMRFT.

Cladonia Delessertii (NYL.) VAIN.

Irrfärden (TH. FR.), and between Nordhamna and Kulbukta (TH. FR.).

At the former station a number of specimens were collected, somewhat slender, but otherwise typical and perfectly developed. Some plants had their apices stunted and destroyed, a common phenomenon with Arctic *Cladoniae*. Such plants are easily confused with *Cl. degenerans*. Most probably a considerable part of "*Cladonia degenerans*" from Arctic countries is *Cl. Delessertii*.

Cladonia elongata (JACQ.) HOFFM.

Sørhamna (TH. FR.), Mt. Misery (TH. FR.), Irrfärden (TH. FR.), Cape Levin (LID), Tunheim (HØEG), Engelskelva (LID), and Nordhamna (TH. FR.).

The numerous stations and the great number of plants indicate it to be common and universally distributed all over the island. It is one of the few *Cladoniae* that are really plentiful in Arctic countries.

The plants from Nordhamna were magnificent, otherwise the podetia were generally coarse, short and stunted, with damaged apices. The podetia are often dark and maculated.

Its peculiar habitus, chemical reaction and geographical distribution justify its specific rank.

Cladonia Floerkeana (FR.) SOMRFT.

Cape Levin (LID).

Supposed to be rare, for only one plant was collected. It is entirely esorediate; sorediate lichens are rare in Arctic countries. The squamules are appressed to the podetia, they are more like small crenate verrucae than squamules. The plant is intermediate between var. *chloroides* (FLK.) VAIN. and var. *carcata* (ACH.) NYL., as represented in MALME Lich. Suec. 579, perhaps nearer to the former. The red apothecia are small.

Cladonia gracilis (L.) WILLD.

var. *chordalis* (FLK.) SCHAER.

Cape Levin (LID).

Only one plant, but well developed and quite typical.

Cladonia lepidota NYL.

DU RIETZ Flechtensyst. Stud. III, Bot. Not. (1924), p. 66, ubi syn. Mt. Misery (TH. FR.), Irrfärden (TH. FR.), Cape Levin (LID), between Nordhamna and Kulbukta (TH. FR.).

It prefers moist places between stones in subalpine and alpine positions, and these demands fully explain its frequency in this island, as in other Arctic countries.

The more I have seen of this species in nature the less I am able to acknowledge the specific difference between the *Cl. gracilescens* VAIN. and *Cl. cerasphora* VAIN. = *Cl. stricta* NYL. sec. DR. l. c. The latter plant is a much more northern one than the former. It is in good accordance with this well known fact that practically the whole Bear Island material must be referred to var. *stricta* (NYL.) DR. Only two plants, one from Mt. Misery and one from Cape Levin, have so well

developed scyphi that they could with some right be referred to var. *gracilescens*. The greater part of the plants have well developed squamose podetia: f. *pterophora* VAIN.; from Mt. Misery, Irrfärden and Nordhamna—Kulbukta. f. *hypophylla* VAIN. with short podetia and pulvinate persistent primary thallus was found between Nordhamna and Kulbukta by TH. FRIES. They agree entirely with plants which I collected in Novaya Zemlya, and with SANDSTEDE was kind enough to determine for me.

Cladonia mitis SANDST.

“Beeren Eiland” (KEILHAU; SOMFRT. s. n. *C. rangiferina* E. *sylvatica* c. *sphagni*).

Sørhamna (TH. FR.), Mt. Misery (TH. FR.), Cape Levin (LID), Tunheim (LID), Cape Forsberg (LID), and Nordhamna (TH. FR.).

This petite espèce is well known to be the commonest one of the *Cl. silvatica* tribus in Arctic Norway. The entire material from Bear Island was *Cl. mitis*, some doubtful plants were kindly determined by SANDSTEDE.

The material is large, indicating a common species. TH. FRIES collected quite magnificent plants, entirely agreeing with our Finmark ones, which SANDSTEDE determined for me. They have the characteristic yellowish colour and their apical branches turn in the same direction, but they are not pendulous. Young branches have a smooth cortex, old twigs and the stems of old plants a more or less uneven cortex. The taste is not bitter.

Cladonia pyxidata (L.) FR.

var. *neglecta* (FLK.) MASS.

Sørhamna (TH. FR.), Irrfärden (TH. FR.), and between Nordhamna and Kulbukta (TH. FR.).

The first mentioned plant only had basal squamules and no podetia, the last one had densely squamose podetia (f. *lophyra* ACH.).

Evidently a rare plant. Var. *chlorophaea* was not found in the collection.

var. *Pocillum* (ACH.) FLOT.

Sørhamna (TH. FR.), and between Nordhamna and Kulbukta (TH. FR.).

Most probably common in slaty and chalky regions, as usual in Arctic countries.

Cladonia rangiferina (L.) WEB.

Tundra at Mt. Misery, pluribi (LID and O. H.), Irrfärden (TH. FR.), Cape Levin (LID).

Development as in Arctic Norway, some of the plants were very large.

Cladonia uncialis (L.) WEB.

Sørhamna (TH. FR.), M. Misery (TH. FR.), Irrfärden (TH. FR.), Cape Levin (LID), between Cape Nordenskiöld and Revleodden (O. H.), Tunheim (LID), Engelskelva (LID), Cape Forsberg (LID), Kulbukta (TH. FR.), and Nordhamna (TH. FR.).

Certainly a common and widespread species in Bear Island, as in other Arctic countries.

The apices of the podetia are often more or less damaged or quite destroyed, the plants are then short, coarse and more densely cespitose than usual.

Stereocaulon SCHREB.*Stereocaulon alpinum* LAUR.

Sørhamna (TH. FR.), Mt. Misery (TH. FR.), Irrfärden (TH. FR.), Kulbukta (TH. FR.), Østervaag (O. H.), and Nordhamna (TH. FR.).

Many plants from several stations indicate a common and widespread species.

Stereocaulon denudatum FLK.

Sørhamna (TH. FR.), Mt. Misery (TH. FR.), Cape Forsberg (LID), Nordhamna—Kulbukta (TH. FR.).

It is widely distributed in Bear Island, as in other Arctic countries. But I was astonished to find so few plants. Is it rare or is it so common that FRIES did not care to collect more plants?

Stereocaulon fastigiatum ANZI.

Irrfärden (TH. FR.).

This species has hitherto been somewhat neglected in Scandinavian literature. In Lich. Scand. TH. FR. refers it to *S. evolutum* GRAEWE as a subspecies. This is a very wide conception of that species. In my opinion *S. fastigiatum* is a good proper species, easily recognized at least when found in nature. It was so well described in ANZI Lich. Sond. p. 11 that I have little to add.

Its variability is considerable in two directions: 1) Its podetia vary from terete to \pm compressed. 2) The cortex of its phyllocladia is weak and often breaks up, forming \pm distinct soredia.

Plants with "spathulate" podetia and sorediate phyllocladia were called *S. spathuliferum* by VAINIO (Lich. Pitlek. p. 36). I have seen HAVAAS' plants from the loc. clas. and more or less typical plants from several stations in Northern Norway as well as from Novaya Zemlya. I cannot subscribe to VAINIO's opinion on that point and I would refer his species to *S. fastigiatum* as a variety: *S. fastigiatum* var. *spathuliferum* (VAIN.). My Swedish friends G. EINAR DU RIETZ and

A. H. MAGNUSSON who have given a very keen attention to this difficult genus, are also of the same opinion.

Stereocaulon fastigiatum is a common plant on the mountains of Northern Norway, possibly (probably?) also on our southern mountains, but its distribution is not so well known there. It is also well represented in my Novaya Zemlya collection.

It is always closely affixed to its substratum, hard rocks, large stones, never on gravel or sand. TH. FRIES's Bear Island plant (there was only one) was detached with a piece of the stone, by a chisel; if detached by a knife its habitus is easily destroyed, for its ramification is basal.

Stereocaulon glareosum SAV.

Mt. Misery (TH. FR.).

Only one poor plant, but MAGNUSSON could determine it. "A distinct yellowish exterior cylinder observed. Cephalodia present, with chains of NOSTOC". Magn. in sched.

The full diagnosis of the species will be published in MAGNUSSON's monograph on the Swedish species of *Stereocaulon*.

Stereocaulon paschale (L.) FR.

Scree north of Engelskelva (O. H.), and between Nordhamna and Kulbukta (TH. FR.).

The first mentioned plant is quite typical, the other is not so certain, it approaches *S. alpinum*. But I consider it to be *paschale*, on account of the development of its apical tomentum and its more incise phyllocladia.

Gyrophora ACH.

Gyrophora arctica ACH.

"Beeren Eiland" (KEILHAU).

Sørhamna (TH. FR.), Mt. Misery (TH. FR.), Irrfärden (TH. FR.), between Cape Nordenskiöld and Revleodden (O. H.), Kulbukta (LID), Tunheim (HØEG), Cape Forsberg (LID), Cape Levin (LID), and Nordhamna (TH. FR.).

Gyrophora arctica is well known to be a strongly nitrophilous species, and it was only to be expected that it should be very abundant in this island where sea-birds abound. No other *Gyrophora* was so well represented in the collections.

The greater part of the plants is of the common coarse type, and some of them are really magnificent, up to 12—13 or even 20 cm. large. But some of them are of a smaller type, much resembling *G. hyperborea* which is, in Arctic countries, not always easy of distinction from *G. arctica*. Apart of the different size and the darker lower surface of

G. hyperborea attention may be called to the more lacerate margins of the latter species.

Generally *G. arctica* is typically monophyllous, but a few plants can be referred to NYLANDER'S f. *plicata*, Lich. Lapp. orient. p. 123, but this is only supposed to be an insignificant forma. Old large plants are often \pm stipitate, a common variation in this genus (e. g. *G. rugifera*).

Gyrophora cylindrica (L.) ACH.

Mt. Misery (TH. FR.), Tunheim (HØEG), Cape Forsberg (LID).

var. *Delisei* (DESPR.) TH. FR.

Mt. Misery (TH. FR.), Cape Levin (LID), Tunheim (HØEG).

These were only a few plants of the typical *G. cylindrica*, but about 20 fine herbarium specimens of the large f. *Delisei*, which is densely fibrillose over its entire lower surface.

In the Arctis var. *Delisei* is so constant and so different from the typical *G. cylindrica* that it suggests a proper species.

Some plants were infested with a parasite that was submitted to Dr. KARL KEISSLER, Vienna: "Alte Perithechien eines Flechtenparasiten, ohne Spur eines Inhaltes. Vermutlich *Tichothecium grossum* KÖRB. (= *Discothecium grossum* VOUAUX)."

Gyrophora erosa (WEB.) ACH.

Mt. Misery (TH. FR.), between Cape Nordenskiöld and Revleodden (O. H.), Tunheim (LID and HØEG), Engelske stauren (LID), and Østervaag (O. H.).

Some plants were very lacerate at their margins. — TH. FRIES'S plants from Mt. Misery were fibrillose on the lower surface and slightly trabeculate, indicating var. *torrefacta* (SCHRAD.) TH. FR.; but the C-reaction was negative, and the plants were not larger than the efibrillose ones.

Gyrophora hyperborea ACH.

Beeren Eiland (KEILHAU).

Sørhamna (TH. FR.), Mt. Misery (TH. FR.), and Tunheim (HØEG).

Not supposed to be common. There were but a few plants, and they were not always typical, some of them approached *G. arctica* very much.

Gyrophora proboscidea ACH.

Mt. Misery (TH. FR.), Irrfärden (TH. FR.), Tunheim (LID), and between Nordhamna and Kulbukta (TH. FR.).

Evidently a common species in Bear Island, as in other Arctic countries. Occasionally very marked wrinkles spread over the whole thallus, if the upper surface is pale, the plant may resemble *G. discolor*, from which it is easily distinguished by its pale under surface.

Biatorella (DNOTRS.) TH. FR.*Biatorella coracina* (SOMRFT.).

Irrfärden (TH. FR.) and Tunheim (HØEG).

Biatorella coracina is widespread and common in the Arctis, and I was much astonished to find so few plants in the Bear Island collections.

Acarospora MASS.*Acarospora scabrida* (HEDL.) H. MAGN.

Bear Island, without indication of station (TH. FR., det. H. MAGN.).

Leciophysma TH. FR.*Leciophysma finmarkicum* TH. FR.

ZAHLBRUCKNER Catalogus III p. 12, ubi lit.

Sørhamna (TH. FR.), Mt. Misery (TH. FR.).

There were in all more than 20 herbarium plants, and it was also found together with other muscicolous lichens. This suggests a common lichen.

Recorded from Spitsbergen: Lovéns Berg (leg. A. J. MALMGREN 1861), and (probably) from Brandewijne Bay, (leg. CHYDENIUS) — hb. Ups.

In my Novaya Zemlya collections I have hitherto identified it from the following stations:

South Island: North Side of Gribovii Bay, and at the foot of Mt. Lasareff, and near the Kara Sea entrance.

North Island: Chalhonic Valley, at the foot of Mt. Syernaia and in Belushii Bay in the Matotchkin Shar district. Fram Bay and Mt. Tveten in Mashigin Fjord. Admiralty Peninsula. Mainland east of Lichutin Island and Northern Kristovii Island in the Archangel Bay district.

I have a lot of plants, it is quite common in Novaya Zemlya.

Known from the following stations in the Scandinavian peninsula:

Norway. Varanger: Sjaaholmen (typus, TH. FR.), and Nesseby (TH. FR.), Tana: Berlevaag (TH. FR.), Troms: Fløifjell (TH. FR.) and Mt. Drangen (B. L.).

Sweden. Torne Lappmark: Jebrinjok on Torne Träsk (MAGN.), Abisko (MAGN.) and Kopparåsen (MAGN.), Härjedalen: Midtåkleppen (HULTING), the latter being the most southerly station recorded.

Collema (HILL.) A. ZAHLBR.*Collema arcticum* LYNGE.

Syn. *Collema verrucaeforme* (ACH.) in TH. FRIES Lich. Arct. (1860) p. 279, and *C. ceranoides* (BORR.) MUDD in TH. FRIES Lich. Spitsb. (1867) p. 52. An syn. *C. auriculatum* var. *ceranoides* NYL.?

Sørhamna (TH. FR.), Mt. Misery (TH. FR.), Irrfärden (TH. FR.), and between Nordhamna and Kulbukta (TH. FR.).

Widely distributed over the island, and one of the most plentiful plants in the collection, about 40 good herbarium specimens.

It is hardly possible to extract its correct name from literature alone, without a careful study of authentic specimens. I have seen TH. FRIES' plants in Upsala, (*Collema ceranoides*), and it is quite identical with my plant.

But unfortunately this plant is not identical with BORRER's plant. I am indebted to Miss A. L. SMITH, London, for permission to see a part of BORRER's type plant. Habitually this plant differs from the Arctic ones in its more dilated, flatter laciniae. The plant seen was so fragmental that it could give no idea of its habitus, but evidently it is not pulvinate; the pulvinate habitus of the Arctic plant is, however, one of its most characteristic features. Perhaps the best character of the Arctic plant is its deeply urceolate apothecia, but BORRER's plant has "rather large, plane" apothecia, as also stated by A. L. SMITH Brit. Lich. I pag. 57.

The British type plant was so small that I did not venture to section it. But it is sufficient to quote A. L. SMITH l. c. "spores 17—25 μ long, 7—9 μ thick". The Arctic plant has spores "truncato-ellipsoideae, murales 0.023—24 . 16—18 μ "; (TH. FR. l. c.); I have also measured still broader spores, in one apothecium 23—24 \times 18—22 μ .

Professor ELFVING, Helsingfors, has allowed me to see a type plant of NYLANDER's *Collema ceraniscum*. It is a minute plant, only 5—6 mm. large, and quite sterile. But it differs from the Arctic species so much that they can hardly be identical, and this view is also confirmed by the descriptions in the British floras.

As stated in CROMBIE's as well as in A. L. SMITH's British Lichens the thallus of the type plant is "laciniato-divided, dark olive-greenish or olive-brown, divisions subrotundato-compressed, ceranoideo-dissected, somewhat obtuse and nodulose at the apices, erect or ascending" (CROMBIE l. c. pag. 42). The plant is compared with a *Synalissa*; and if profoundly incise the almost cylindrical laciniae of the type plant almost resemble a *Sphaerophorus fragilis*.

The Arctic plant is larger, densely pulvinate and its colour pale brown. The laciniae are not erect, they more resemble a small *Collema multifidum*, but generally there are so many apothecia that the thallus is completely hidden, or some nodulose apices are occasionally seen. The spores agree with those of *C. ceraniscum*, but according to the descriptions that species has "small, somewhat concave . . . [apothecia], the margin thin, smootish".

HARMAND (Lich. France pag. 86), and ZAHLBRUCKNER (Catalogus III, pag. 65) refer the *ceranoides* to *Collema auriculatum* HOFFM., or to its synonym *C. granosum* (SCHREB.) RABH. as a variety. The Arctic lichen is, however, so different from anything which I have seen of *C. granosum* (e. g. ANZI Lich. It. sup. No. 8, ARNOLD Lich. Exsic. No. 867, and MASS. Lich. Ital. No. 215), that any such combination seems impossible to me. The Arctic "*Collema ceranoides*" must be specifically distinct from *C. granosum*.

I have, accordingly, found it necessary to rename the Arctic "*Collema ceranoides*", and I have called it *Collema arcticum*, on account of its wide distribution in the Arctis. (I also found it to be quite common in Novaya Zemlya).

The plant which DARBISHIRE calls *Collema aggregatum* (Lichens, Sec. Norw. Arct. Exp. Fram (1909) p. 45, or "*Synechoblastus aggregatus*" on the label, has no affinity with that species. It is no *Synechoblastus*, but an *EuCollema*, it agrees entirely with my species.

Planta orbicularis, depresso-pulvinata, parva: diam. 20—30 mm. Thallus apotheciis numerosissimis ideo tectus, ut laciniae vulgo parum visibiles sunt. Laciniae fuscescentes vel nigro-fuscescentes, microphyllinae, subadscendentes, varie incisae et margine verrucosae. Gonidia *Nostocacea*.

Apothecia diam. 0.25—0.50, rarius usque 1.0 mm., urceolata vel concava, rarissime (ap. majora) dein subplana. Margo crassus, persistens, vulgo crenatus vel etiam subappendiculatus, quam disco pallidius coloratus. Discus siccus thallo subconcolor vel eo obscurior, madefactus dilute fuscescens. Excipulum ecorticatum. Hypothecium impure flavescens, hyphis subplectenchymaticis, superficiei disci ± parallelibus contextum. Hymenium altum, usque 150—160 μ , parte exteriori dilute fuscescens, praeterea incoloratum. Paraphyses coherentes, distinctae, apicem versus clavato-incrassatae, (usque 5 μ) et constrictae septatae. Asci anguste ellipsoidei vel subcylindrici, normaliter tetraspori, interdum sporas abortivas continentes et tum bi vel tri-spori, ascos quinquesporos rarissime vidimus. Sporae uniserialiter dispositae, subquadrangulares vel obtuse vel etiam subtruncato-ellipsoideae, incoloratae, murales, dein 10—16 cellulae visae. Sporae 23—34 \times 16—22 μ , vulgo 26—28 \times 16—19 μ .

Thallus, excipulum hypotheciumque J fere immutata, (non rube-scentia), totum hymenium J intense et persistenter caerulescens vel caeruleo-nigrescens.

Collema multifidum (SCOP.) RABH.

Sørhamna (TH. FR.), and Mt. Misery (TH. FR.).

Thallus sterile, ecorticate; medulla not red with J.

The determination of the Sørhamna plants is not quite certain, for the plants were sterile and small. But its habitus agrees well with this species, as I have seen it in Northern Norway, where it is common on chalky rocks. The underground at Sørhamna is chalky, but the plants were muscicolous. In such plants the laciniae are not so well developed, they are more incise or even papillose. — The plants from Mt. Misery were well developed, though sterile.

Arctomia TH. FR.

Arctomia delicatula TH. FR.

Sørhamna (TH. FR.) and Mt. Misery (TH. FR.).

Several well fertile plants.

Recorded from: Greenland: Serketnoua (DEICHM. BR. et GRØNL Grønl. Lich. Fl. (1887) p. 475).

Iceland. Möðruvellir (STEF., vide DEICHM. BR. et GRØNL. Lich. Isl. (1903) p. 207).

Spitsbergen. Red Bay and Treurenburg Bay (MALMGR.), and Hornsund (NORDENSK.), sec. TH. FRIES Lich. Arct. (1860) p. 287, and Lich. Spitsb. (1867) p. 17.

Novaya Zemlya (in my collections). Matotchkin Shar: Belushii Bay, and south side of the Kara Sea entrance; Mashigin Fjord: Sun Bay.

Siberia. Pitlekai (Vega Expedition. Vain. Lich. Pitl. (1909) p. 98).

Finland. Iivara par. Kuusamo (VAIN. Adj. I (1881) p. 142).

Sweden. Torne Lappmark: Luovare (DU RIETZ). Lule Lappmark: Snjærrak (HELLB.) and Sautsasnjarga (DU RIETZ), Ångermanland: Renberget (HELLB.), Härjedalen: Mittåkläppen (HULTING), Dalarne: Städjan (HEDLUND), Västergötland: Tostared (HULTING).

Norway. Varanger: Elvenes (TH. FR.), Aldajokka (TH. FR.), Nesseby (TH. FR.) and Mortensnes (TH. FR.). Tana: Berlevaag (TH. FR.). Magerøy: Gjesvær (TH. FR.). Troms: Tromsø (TH. FR., NORM.), Fløifjell (TH. FR., NORM.). Dovre: Vaarstien (TH. FR.).

Scotland. South Grampians and Ben Lawers (CROMBIE Brit. Lich. I (1894) p. 345).

Ireland. Connemara (CROMBIE l. c.).

It has a wider known distribution than *Leciophysma*, but in Novaya Zemlya as well as in Bear Island the latter plant is supposed to be much more common.

Leptogium S. GRAY.

Leptogium lichenoides (L.) A. ZAHLBR.

var. *pulvinatum* (HOFFM.) A. ZAHLBR.

Sørhamna (TH. FR.).

Only one miserable plant, infested with a parasitic microfungus: *Didymella pulposa* (ZOPF.) VOUAUX (det. Dr. KARL KEISSLER).

Parmeliella MÜLL. ARG.

Parmeliella arctophila (TH. FR.) MALME.

Pannaria arctophila TH. FR. Nya lafarter. Bot. Not. (1863) p. 8.
TH. FRIES Lich. Spitsb. (1867) p. 17.

Pannaria deficiens NYL. Lich. Lapp. orient. Not. Sölsk. pro F. et Fl. F. Förh. (1866) p. 124. VAIN. Adj. Lich. Lapp. I (1881) p. 141.

Parmeliella deficiens (NYL.) MALME. MALME Lich. Suec. (1914) No. 415. *Parmeliella arctophila* (TH. FR.) MALME. MALME Lich. Exsic. (SCHEDAË) Svensk Bot. Tidsskr. (1915) p. 121.

Sørhamna (TH. FR.), Mt. Misery (TH. FR.), between Nordhamna and Kulbukta (TH. FR.).

The above mentioned stations suggest a wide distribution in Bear Island. Hardly any other species was found in such abundance in the collection, almost 60 good herbarium specimens, indicating it to be very plentiful.

In the Bear Island plants I measured the spores to be 15—17·7—10 μ , slightly smaller than TH. FRIES'S measures. The apothecia were abundant.

var. *microspora* nov. var.

Between Nordhamna and Kulbukta (TH. FR.).

Differt a typo sporis minoribus: 9·5—12 \times 5—5·5 μ , et hymenio angustiori: 65—70 μ , in typo: 90—95 μ . Episorium tenue, rugulosum.

The apothecia are less convex and smaller than in the type, and almost immersed in the thallus. There was only one plant, against the numerous plants of the type. The systematical value of the stated differences is not easily correctly estimated, it may be an insignificant variation or perhaps specific characters.

Parmeliella lepidiota (SOMRFT.) VAIN.

Sørhamna (TH. FR.), and Mt. Misery (TH. FR.).

Only one plant from either station, well developed, but sterile, as usual. The colour was dark, indicating the var. *tristis* TH. FR., especially in the former plant.

Placynthium S. GRAY.*Placynthium asperellum* (ACH.) TREV.

Sørhamna (TH. FR.), Mt. Misery (TH. FR.), Irrfärden (TH. FR.).

Much more common in Arctic countries than *Pl. nigrum*. All statements of *Pl. nigrum* in Arctis should be reconsidered, *Pl. nigrum* in DARBISHIRE Lichens of the 2nd Norw. Exp. in the Fram is *Pl. asperellum*.

These two species are distinct. But they are not at all easy of distinction, especially if the plants are poorly developed, as they frequently are in the Arctis. TH. FRIES described the distinction with wonted mastery in his Lich. Arct. p. 286.

NYLANDER and ZAHLBRUCKNER (Catalogus III p. 1) refer *Pl. asperellum* to the genus *Pterygium*, which is a *Lichinacé* with *Rivularia*-gonidia, whereas *Placynthium* is a *Pannariacé* with *Scytonema* (ZAHLBR. Lichenes, in ENGLER-PRANTL p. 114). I am unable to determine the deformed gonidia of this species myself, and I have seen no competent statement in literature. But I think it very unnatural to refer these two species to two different families.

Pannaria DEL.*Pannaria pezizoides* (WEB.) TREV.

Mt. Misery (TH. FR.).

Several fine plants, well developed and fertile. Otherwise it is much less common in the Arctis than two other *Pannariae*, viz. *P. elaeina* and *P. Hookeri* that were lacking in these collections.

Psoroma (ACH.) NYL.*Psoroma hypnorum* (DICKS.) HOFFM.

Beeren Eiland (KEILHAU), Sørhamna (TH. FR.), Mt. Misery (TH. FR.), Cape Levin (LID), and between Nordhamna and Kulbukta (TH. FR.).

Many plants, fertile and well developed.

Solorina ACH.*Solorina bispora* NYL.

Sørhamna (TH. FR.).

This species is widely distributed in the Arctis on chalky and slaty ground. It is much more common than *S. saccata*, and many statements of *S. saccata* is due to a confusion these between these two species. In his work on the 2nd Norw. Exp. in the Fram DARBISHIRE records *S. saccata* from several stations. There are 4 specimens of them in our herb. Only one of them, simply labeled "Ellesmereland 8. 8. 1900" is really that species; the other 3, from North Devon, Goose Fjord and Muskox Fjord are typical *S. bispora*.

Solorina crocea (L.) ACH.

Mt. Misery (TH. FR.), and Irrfärden (TH. FR.); North of Oswald's promontory (J. G. ANDERSSON).

Several well developed plants. It has a great predilection for stations irrigated by the water from melting snow. It has a wide distribution in the Arctis, but it is evidently not one of the commonest lichens there.

Solorina spongiosa (SM.) CARROLL.

Sørhamna (TH. FR.).

On mossy ground, several plants.

Peltigera PERS.*Peltigera aphthosa* (L.) WILLD.

Mt. Misery (TH. FR.).

Only a few plants, small and sterile.

Peltigera canina (L.) WILLD.

Sørhamna (TH. FR.), Mt. Misery (TH. FR., LID, O. H.), Cape Forsberg (LID), and Nordhamna (TH. FR.).

var. *rufescens* (NECK.) MUDD.

Sørhamna (TH. FR.), and Cape Forsberg (LID).

The typical plant, the thin f. *membranacea* DUBY was better represented in this collection than it generally is from the Arctis, by plants from Mt. Misery and Nordhamna. The others were coarser, more or less crisp and darker, in my opinion intermediate to var. *rufescens*.

There were many plants of *P. canina*, indicating a common plant.

We may expect to find *P. polydactyla* and *P. scabrosa* in Bear Island.

Pertusaria DC.*Pertusaria oculata* (DICKS.) TH. FR.

Irrfärden (TH. FR.).

The plants were quite typical, well developed, and some of them fertile. We may expect more *Pertusariae* from Bear Island.

Lecanora ACH.*Lecanora alpina* SOMRFT.

Mt. Misery (TH. FR.).

The (few) plants show a considerable variation with respect to their areolae, they vary from the common discrete type to \pm contiguous.

Lecanora argopholis ACH.

Sørhamna (TH. FR.).

Only one plant, but a quite magnificent one.

Lecanora atra ACH.

Sørhamna (TH. FR.).

Several plants, typical and well developed.

Lecanora atrosulphurea (WBG.) ACH.

Sørhamna (TH. FR.), Mt. Misery (TH. FR.), Tunheim (HØEG), between Cape Nordenskiöld and Revleodden (O. H.), between Nordhamna and Kulbukta (TH. FR.), and at Nordhamna (TH. FR.).

Very few other lichens were collected in such quantities as this species; more than $\frac{1}{3}$ of the whole *Lecanora* material was *L. atrosulphurea*.

As usual with Arctic crustaceous lichens the thallus is often poorly developed, with low, almost plane, discrete areolae.

The development of the gonidia in the apothecia is worthy of much attention. Young apothecia generally have a more or less distinct margin with gonidia, but the margin soon disappears, it is not always visible in young apothecia. Old apothecia look quite lecideine and it is then necessary to stain with zink chlor iodine to detect the few dead or dying gonidia. At the first arrangement of the raw material some plants of this genus are easily placed with the genus *Lecidea* ("*Lecidea sulphurella*" TH. FR. Lich. Arct. p. 220).

The smaragdulous colour of the upper part of the hymenium is very characteristic. The paraphyses are coherent. I have measured the following spore size: 9—13 \times 4—6.5, which agrees entirely with

TH. FRIES's statements in Lich. Scand. p. 258: $8-13 \times 4-6 \mu$. The hypothecium is either uncoloured or pale yellowish(-brown).

J stains the hymenium persistently blue; KOH stains the thallus yellow.

Lecanora badia (PERS.) ACH.

Mt. Misery (TH. FR.).

Only from this place, but there were 10 good herbarium specimens; there is no reason to suppose that it should be rare.

The thallus is miserable, the areolae are often discrete and so thin that the plant looks almost acrustaceous.

Lecanora castanea (HEPP) TH. FR.

Mt. Misery (TH. FR.).

There were several plants. Its plane apothecia and long narrow spores (I measured $21-24 \times 5-8 \mu$) are very characteristic of this species. The colour of its apothecia agrees with that of *Parmeliella arctophila*.

Lecanora cinerea (L.) SOMRFT.

Mt. Misery (TH. FR.).

Decidedly rare, only one plant in the Bear Island collections. The thallus is well developed, towards the circumference areolato-radiating. The apothecia are more prominent than usual with this species, approaching the *L. gibbosa*-type, but the positive KOH reaction is distinct enough.

Lecanora cinereorufescens (ACH.) TH. FR.

Mt. Misery (TH. FR.).

The thallus is poorly developed between the prominent and very numerous apothecia. Only two small plants.

Lecanora contractula NYL.

Østervaag, in a scree (O. H.).

An inconspicuous lichen, consisting of the small apothecia with scattered thalline granules, not much larger than the apothecia.

Prof. ELFVING, Helsingfors, has kindly lent me authentic specimens for comparison.

Lecanora epibrya (ACH.) NYL.

Sørhamna (TH. FR.), and Mt. Misery (TH. FR.).

An ubiquitous lichen in the Arctis.

Lecanora flavida HEPP.

Mt. Misery (TH. FR.) and Irrfärden (TH. FR.).

One of the most inconspicuous of Arctic lichens, but it could not escape the eye of TH. FRIES. It is easily identified by the intense blue colour of the upper part of the hymenium.

Lecanora gelida (L.) ACH.

Mt. Misery, in a scree (O. H.), Irrfärden (TH. FR.), and Tunheim (LID).

Many plants in TH. FRIES'S collection; it is a common and widely distributed species in the Arctic, rarely lacking in the collections.

Lecanora "gibbosa (ACH.) NYL. var. *squamata* (FW.) TH. FR."

Lich. Spitsb. (1867) p. 23.

Mt. Misery, only one poor fragment (TH. FR.).

In my Lichens from Spitsbergen I (1924) p. 12 I wrote: "This is an excellent species, quite distinct from *Lecanora gibbosa*. It is very common on Novaya Zemlya, and evidently also on Spitsbergen." Dr. ZAHLBRUCKNER, Vienna, will determine my Novaya Zemlya *Lecanorae*, and he will name it if he agrees with me on this point.

Lecanora Hageni (ACH.) KBR.

var. *Behringii* (NYL.) LYNGE.

Sørhamna (TH. FR.).

Lecanora Behringii NYL. Lich. nov. e Freto Behringii. Flora (1885) p. 439. Enumeratio Lich. Fret. Behr. (1888) p. 56. VAINIO Lich. Pitlekai (1909) p. 47.

On naked wood. Habitually the plants agree well with SOMMERFELT Pl. crypt. Norv. No. 146, cited by TH. FRIES Lich. Scand. p. 250.

Hymenium very low, about 50—55 (70) μ high, brownish at the upper part. Paraphyses stout, capitate, coherent. Spores small: 9—11 (13) μ : 4.5—5 μ , profusely developed.

Asci coloured persistently blue with Jodine, thallus not coloured with KOH.

MALME has called my attention to *Lecanora Behringii* NYL. — According to VAINIO l. c. this species agrees with *Lecanora umbrina* (= *L. Hageni*) in the texture of the cortex: "stratum corticale excipuli ex hyphis verticalibus formatum." I have examined VAINIO'S plant from Pitlekai, kindly sent to me by MALME, and NYLANDER & NORRLIN Herb. Lich. Fenn. No. 521: *Lecanora umbrina* f. *populina* VAIN., and I can only confirm VAINIO'S observation on that point. VAINIO further writes: "In summo margine apotheciorum autem strato corticale in *Lecanora Behringii* distincte evolutum et in *L. umbrina* deficiens." My observation on the former species agrees with VAINIO'S. In the latter

species I found the stratum gonidiale extending far into the margin, somewhat indistinct in unprepared sections, as if the hyphae were adspersed (air?), the cortex was then hardly perceptible in the "summo margine". But if the section was cleared up with KOH, washed with water, and stained with zink chlor iodide (Chlorzinkjod), I found a distinct cortex, thin, but well developed up to the very border of the hymenium.

If this observation is correct I find the specific distinction between *Lecanora Behringii* and *Lecanora Hageni* contestable.

Habitually the Bear Island plants agree better with the Pitlekai plant (*L. Behringii*) than with the Finnish H. L. F. No. 521. This latter plant has considerably smaller apothecia, a paler disk, a more conspicuous white margin, which is more crenate than in the Arctic plants.

MALME (in lit.) is not convinced that the saxicolous Pitlekai plants of *Lecanora Behringii* are identical with the corticolous plants.

Lecanora heteroplaca A. ZAHLBR.

f. *ursina* LYNGE n. f.

Mt. Misery (TH. FR.).

Differt a typo Zahlbruckneriano apotheciis vulgo compositis videntur, columnis excipularibus in loculis divisis. Hymenium superne violaceum, vel aeruginosum, praeterea incolor, inspersum, altum, 150—160 μ . Paraphyses conglutinatae, valde ramosae, apice levissime (vel non) incrassatae. Asci clavati, membrana superne \pm incrassata cincti, 100—120 \times 22—25 μ . Sporae octonae, distichae, 21—28 \times 12—15 μ .

Medulla J et KOH non colorata, pars inferior hypothecii J intense caerulescens, hymenium J e caeruleo sordide rubescens (etiam asci), pars superior obscurius manet.

I have also found this species in Novaya Zemlya. Dr. ZAHLBRUCKNER in Wien will determine my material of *Lecanora* from that expedition. We agree in considering it a good new species of the *Lecanora gibbosa* section. Its habitus is not unlike that of *Lecanora laevata*. Dr. ZAHLBRUCKNER will give the description of the new species in his work on the said material.

My Novaya Zemlya plants were found on moist rocks, near lakes, and the like.

The spores are slightly shorter in the type than in my forma: 15—21 against 21—28 μ , and the apothecia are generally not loculate by the columns from the excipulum.

Lecanora laevata (ACH.) NYL.

Mt. Misery (TH. FR.).

After long and futile search at last a fertile pycnide became the prey of my investigation. The pycnoconidia were arcuate, 18—21 μ long.

The hymenium is high, as usual in the *Lecanora gibbosa* section: 130 μ ; the spores 19—23 \times 11—12 μ .

The hymenium is persistently blue with J, the medulla is J \pm , medulla, excipulum and epithecium KOH \pm .

The thallus is thinner than in Norwegian plants; in one plant it was almost lacking.

Lecanora leptacina SOMRFT.

Irrfärden (TH. FR.), and between Nordhamna and Kulbukta (TH. FR.).

From the former station a number of plants were present; they were fertile and typical.

Lecanora mastrucata (WBG.) ACH.

Mt. Misery (TH. FR.), only one plant.

Lecanora Nordenskiöldii VAIN.

Lecanora Nordenskiöldii VAINIO Lich. Pitlekai, (1909) p. 46.

Sörhamna (TH. FR.) and Mt. Misery (TH. FR.), on chalk.

Habitually it much resembles *L. torrida*, but that species has a much better developed thallus (in the Bear Island plants). I found no spore difference, and about the same colour of the epithecium in either species. But the texture of the excipulum is very different, as stated by VAINIO: in *L. Nordenskiöldii* plectenchymatous, with a well developed cortex and very pachydermatous hyphae, in *L. torrida* not plectenchymatous, without any well marked cortex and with leptodermatous hyphae. The apothecia of *L. torrida* are appressed, those of the other species almost peltate (sections!), though the lower part of the excipulum is somewhat immersed into the thallus. *L. torrida* has scattered apothecia with a quite black disk, *L. Nordenskiöldii* more aggregated apothecia with a brown disk.

These observations only confirm the excellent diagnoses, given by VAINIO.

The record of the presence of these species of the *L. crenulata* section in Bear Island is an interesting extension of their known range. I am much indebted to dr. MALME, Stockholm, for their identification.

Lecanora polytropa (EHRH.) TH. FR.

var. *vulgaris* FLOT.

Nordhamna—Kulbukta (TH. FR.).

var. *illusoria* ACH.

Mt. Misery (TH. FR.), Irrfärden (TH. FR.), between Cape Norden-skiöld and Revleodden (O. H.).

Supposed to be quite as common in Bear Island as in other Arctic countries, especially var. *illusoria*. But TH. FRIES did not collect many herbarium specimens.

Lecanora quartzina NYL.

Tunheim (HØEG).

Perhaps rare in the Arctis, only one plant known from Bear Island.

Lecanora subfusca (L.) ACH.

cfr. var. *angustata* ACH.

Sørhamna (TH. FR.).

Only one plant, on drift wood. It resembles the Arctic forms of *L. Hageni*. In these old plants the white thallus often takes a yellow colour, and the positive KOH-reaction is then not too distinct. But the spores of *L. subfusca* are much larger, in these plants $14-19 \times 7-9 \mu$, against $9-11 \times 4.5-5$ (6) μ in *L. Hageni*.

Lecanora torrida VAIN.

Lecanora torrida VAIN. Lich. Pitlekai (1909) p. 45.

Sørhamna (TH. FR.), on chalk.

There were several plants in TH. FRIES'S collection. The thallus is often perfectly developed, MALME writes that (in the finest Bear Island plants), it is better developed than in VAINIO'S Pitlekai plants; others have a poorer thallus, down to plants with a very poor thallus developed around the apothecia. Such plants much resemble SOMMERFELT'S β *macra* of *Lecanora Sommerfeltiana* FLK., SOMRFT. Suppl. (1826) p. 84.

The margin of the apothecia is often pruinose. The hymenium is $70-80 \mu$ high. I have measured a little larger spores than VAINIO: $8-13 \times 5-7 \mu$, and I have found that (in thin sections) the asci alone are persistently blue with Jodine. It is a faithful companion of *Candelariella cerinella*, *Polyblastia hyperborea*, and *Caloplaca murorum* var. *obliterata*.

Lecanora verrucosa (ACH.) LAUR.

Mt. Misery (TH. FR.), and Irrfärden (TH. FR.).

A considerable number of plants suggests it to be common in Bear Island, as in other Arctic countries.

Ochrolechia MASS.

Ochrolechia tartarea (L.) MASS.

"Beeren Eiland" (KEILHAU), at the rookery (near Cape Bull?) (J. G. ANDERSSON), Sørhamna (TH. FR.), Mt. Misery (TH. FR.), Cape Levin (LID), Tunheim (LID), Cape Forsberg (LID), between Nordhamna and Kulbukta (TH. FR.).

Ubiquitous in Bear Island, as in other Arctic countries, and often well fertile. It often varies towards f. *thelephoroides*, quite typical f. *thelephoroides* from Mt. Misery (leg. LID).

Lecania (MASS.) A. ZAHLBR.

Lecania aipospila (WBG.) TH. FR.

Mt. Misery, on granitic rocks (TH. FR.).

Thallus cinereus, rimoso-diffractus, areolis crenatis, ambitusaepe subradiantibus, convexis, sed non "verrucosis vel subpapillato-rugosis" ut in specie typico.

Structura apotheciorum cum typo congruit. Sporae parcissime evolutae, incoloratae et constrictae septatae, 14—15 × 6—7 μ .

Owing to its peculiar colour and its low areolae its habitus is not a little different from the Norwegian *Lecania aipospila*, it might suggest an *Aspicilia*. *Lecania aipospila* which is quite common on our Arctic Norwegian coast generally has a darker, chestnut-brown or even blackish-brown colour.

Candelariella MÜLL. ARG.

Candelariella cerinella (FLK.) A. ZAHLBR.

Sørhamna (TH. FR.).

Only few plants from the chalk at Sørhamna. As is often the case the asci were generally empty, but a few octosporous ones were detected. Generally associated with *Caloplaca murorum* var. *obliterata* and *Lecanora torrida*.

Candelariella vitellina (EHRH.) MÜLL. ARG.

Between Nordhamna and Kulbukta (TH. FR.).

On rocks, sandstone. Only two small specimens; but certainly this is not representative of the Bear Island distribution of this species which is almost ubiquitous in the Arctis.

We might have expected *Haematomma ventosum* from Bear Island.

Parmelia (ACH.) DE NOTRS.

This genus was very poorly represented in the collections. MR. JOHS. LID, who has seen Bear Island as well as Spitsbergen, is of opinion that there are really few *Parmeliae* in the former Island. It is also possible that TH. FRIES considered these well known plants so trivial that he reserved his attention to more interesting plants during his very short visit. — Unfortunately his diary has not been accessible to me.

Parmelia alpicola TH. FR.

Mt. Misery (TH. FR.), Irrfärden (TH. FR.), Cape Levin (LID), Tunheim (HØEG), and Cape Forsberg (LID).

Few plants, but well developed.

Parmelia omphalodes (L.) ACH.

Sørhamna (TH. FR.), Mt. Misery (LID), Tunheim (LID and HØEG), and Cape Forsberg (LID).

Very few plants, small and sterile; but JOHS. LID says that "*P. saxatilis*" is common in Bear Island. This statement is extremely probable and it evidently also includes *P. omphalodes*. The nitrophilous *P. sulcata* was not found in the collection, there is every reason to suppose that it will be found in Bear Island.

Parmelia pubescens (L.) VAIN.

Mt. Misery (TH. FR.), Cape Levin (LID), between Cape Nordenskiöld and Revleodden (O. H.), and at Tunheim (HØEG).

Well developed, I also detected one apothecium.

A few plants of *Alectoria jubata* f. *chalybeiformis* had so short internodes that they might have been confused with this species. But it is paler of colour, its cortex lacunose and its cortical hyphae longitudinal (in a spiral line).

Parmelia saxatilis (L.) ACH.

Mt. Misery (LID), Cape Levin (LID), Tunheim (HØEG), and Cape Forsberg (LID).

LID has told me that this species was common which is very probable. TH. FRIES evidently considered it too trivial for collecting.

Cetraria ACH.*Cetraria crispa* (ACH.) NYL.

"Beeren Eiland" (KEILHAU), Mt. Misery (TH. FR.), Tunheim (LID).

In Arctic countries this species is evidently more common than *C. islandica*. The specimens were sterile.

Cetraria Delisei (BORY) TH. FR.

Syn. *Cetraria hiascens* (FR.) TH. FR.

Sørhamna (TH. FR.), Mt. Misery (LID), Irrfärden (TH. FR.), Cape Levin (LID), between Cape Nordenskiöld and Revleodden (O. H.), Tun-

heim (LID and HØEG), Cape Forsberg (LID), Kulbukta (TH. FR.), Nordhamna (TH. FR.).

It was only to be expected that this hydrophilous lichen should be very plentiful in the "Fog Island". It is evidently the commonest *Cetraria* in the island.

By far the greater part of the material must be referred to the type of the species, as represented in NYL. et NORRL. Herb. Lich. Fenn. No. 482 (*Cetraria hiascens* var. *Delisei*). Generally the Bear Island plants are still more narrow-leaved and lacinate than this plant, especially at their apices. Very broad-leaved plants were collected at Nordhamna by TH. FRIES, they are 10—15 and up to 20 mm. broad. They are broader than the plant in NYL. et NORRL. Herb. Lich. Fenn. 481, and can safely be referred to VAINIO'S var. *dilatata*, Lich. Pittekai p. 22. Some plants from Nordhamna approach var. *fastigiata* (DEL.) VAIN. very much. — The colour is very variable, from dark brown to pale yellowish-brown.

Several plants were fertile. See LYNGE Studies p. 184 for description of the internal parts of the apothecia.

Cetraria hepatizon (ACH.) VAIN.

Cape Levin (LID).

This species is plentiful in Arctic Norway, Novaya Zemlya, and evidently also in Spitsbergen. It was not found in TH. FRIES'S collection from Bear Island. The explanation is, perhaps, that he only stayed a few days in the island, and during this short visit he concentrated his attention on the small crustaceus lichens.

Cetraria islandica (L.) ACH.

Mt. Misery (TH. FR.), Cape Levin (LID).

Typical *C. islandica* is evidently rare in Arctic countries. The Bear Island plants are canaliculate, not flat; they approach var. *subtubulosa* of *C. crispa*. The more I have seen of Arctic *C. crispa* and *C. islandica*, the more difficult have I found it to maintain the specific difference between them.

Cetraria nivalis (L.) ACH.

"Beeren Eiland" (KEILHAU), Sørhamna (TH. FR.), Mt. Misery (TH. FR.), and Cape Forsberg (LID).

There were but a few plants of this species; and *C. cucullata* which is still more common in Arctic countries was not represented.

Cetraria tenuissima (L.) VAIN.

var. *campestris* SCHAER.

Sørhamna (TH. FR.), Mt. Misery (TH. FR.), Cape Levin (LID), Tunheim (LID), Cape Forsberg (LID).

Alectoria ACH.*Alectoria jubata* (L.) ACH. f. *chalybeiformis* (L.).

Mt. Misery (TH. FR.).

Only a few plants, small, but typical.

Alectoria nigricans (ACH.) NYL.

Mt. Misery (TH. FR.), Irrfärden (TH. FR.), Cape Levin (LID), Tunheim (LID), and between Nordhamna and Kulbukta (TH. FR.).

A considerable number of plants indicate this species to be common in Bear Island. In our Norwegian Finmark it is by far the commonest of the three field *Alectoriae*: *A. ochroleuca*, *A. divergens* and *A. nigricans*.

 Curiously enough *Thamnotia vermicularis* has never been recorded from Bear Island. There is no reason to doubt of its presence there.
Blastenia (MASS.) TH. FR.*Blastenia arctica* n. sp.

Mt. Misery ad saxa arenaria (TH. FR.).

Thallus crassitudine variante, subobsoletus usque bene evolutus, mollis, irregulariter rimoso-diffractus, colore pallide flavo-fuscescens vel cinereo-fuscescens.

Apothecia numerosa, diam. 0.3—0.6 (0.7) mm., juniora fusco-ferruginea, plana, margine atro sat crasso integro instructa, demum obscuriora et ultimo subnigricantia, convexa et margine excluso. Discus epruinosis, rugosus. Apothecia gonidiis carentia, biatorina. Hypothecium incoloratum, hymenium 80—90 μ altum, superne flavo-inspersum. Paraphyses cohaerentes, tenues, apice \pm incrassatae, interdum nigro-capitatae, KOH si addito, septatae et apice interdum ramosae visae. Asci saccati, 20—33 μ crassi, octospori. Sporae late ellipsoideae, medio non constrictae, apice rotundatae, polari-dyblastae, loculi parvi septo crasso separati et isthmo distincto connecti. Sporae 14—18 \times 9—12 μ , septum 5—8 μ , vulgo 5—7 μ crassum (sporae e. g. 17 \times 11.5, 17 \times 10.5, 18 \times 10, 16 \times 11, 14 \times 11, 16 \times 12 μ).

Pycnides frustra quaesivimus.

Hymenium J intense et persistenter caerulescens, KOH intense roseum. Thallus KOH immutatus.

It is related to *B. rupestris* on account of its broad spores a. o. characters, but differs from that species by its young ferruginous apothecia with dark thick margin. In *B. rupestris* I have never seen apothecia of that colour and even in young apothecia there is hardly any margin developed, the marginal parts being paler than the disk, not darker.

The thalline colour of *B. rupestris* is very variable, but I have not seen it agreeing with my species. The structure of the thallus is much the same in either species.

Blastenia rupestris (SCOP.) A. ZAHLBR.

Sørhamna (TH. FR.), Mt. Misery (TH. FR.), and between Nordhamna and Kulbukta (TH. FR.).

Evidently abundant on the chalk at Sørhamna; from the other stations it was very scarce. — In Novaya Zemlya perhaps the commonest lichen on chalk.

Blastenia tetraspora (NYL.) TH. FR.

Sørhamna (TH. FR.), Mt. Misery (TH. FR.), and between Kulbukta and Nordhamna (TH. FR.).

A great number of plants proves it to be the same abundant species in Bear Island as in other Arctic countries. In Arctis it substitutes *Bl. leucoraea*.

Caloplaca TH. FR.

Caloplaca amniospila (WBG.) OLIV.

OLIVIER Lich. Eur. II (1909), p. 136 (108).

Sørhamna (TH. FR.).

On drift wood, and evidently scarce, for there was only one plant in the collection.

The apothecium examined contained no spores, but under the hypothecium there were a lot of glomerate gonidia. The species is, accordingly, a *Caloplaca*, not a *Blastenia*.

My own material from Novaya Zemlya is better, and I intend to give a fuller description in my paper on that collection.

Caloplaca bracteata (ACH.) JATTA.

Nordhamna—Kulbukta (TH. FR.).

The material was scarce. It was sterile, as usual in the Arctis.

Caloplaca caesiorufa (ACH.?) A. ZAHLBR.

Lichen caesiorufus ACHARIUS Prodomus (1798) p. 45 (non 44).

Lecidea caesiorufa ACHARIUS Methodus (1803) p. 71; HUE Lich. Morph. et Anat. (1910) p. 147, fig. 55—57, ubi syn.

Lecanora caesiorufa NYLANDER Addenda Nova, Flora (1880) p. 388; Lich. Fret. Behr. (1888) p. 5, 8, 16, 28, 44, 86; CROMBIE, Mon. Brit. Lich. (1894) p. 378.

Placodium ferrugineum var. *caesiorufa* (NYL.) VAINIO Lich. Cauc. (1899) p. 298; Lich. Pitlekai (1909) p. 66, ubi syn.

Exsic. ARNOLD 883 (et 1652?); *Herb. Lich. Fenn.* VI, 272; *Krypt. Exsic. Vind.* 250, ubi syn.; ZWACK 575.

Mt. Misery (TH. FR.).

The thallus of this species is extremely variable. NORRL. et NYL. *Herb. Lich. Fenn.* 272 has a very thick areolate thallus, *Krypt. Exsic. Vind.* 250 is practically athalline. It is unnecessary to say that the Bear Island plants are athalline. In that respect they agree entirely with NYLANDER'S Vega-plant from Konyam Bay, as they also do with respect to the apothecia.

NYLANDER was the first to observe the peculiar development of the hypothecium which is a characteristic difference between this species and *Blastenia ferruginea*. He expressed this in his wonted lapidar style: "Distinguitur a *L. ferruginea* hypothecio alio." In CROMBIE'S Monograph he gave a suggestion of this difference, which was then accurately described by ZAHLBRUCKNER and HUE (l.c.). I can only confirm their descriptions of the "pseudoparenchymatous" hypothecium of *C. caesiurufa*.

The apothecia are small, 0.3—0.5 mm., rusty—orange-coloured, at first plane with a distinct margin, then slightly convex with a disappearing margin, and a biatorine habitus. They contained a very varying number of gonidia, referring the species to *Caloplaca*, as stated by ZAHLBRUCKNER l.c. But most probably the difference between these two genera is quite as problematical as the corresponding difference between *Lecanora* and *Lecidea*.

I found the hymenium ca. 80 μ high, brownish, darker at the upper part, KOH +; spores not constricted at the septum, 11—15 \times 6.5—8 μ (NYLANDER *Fret. Behr.* p. 44: 14—16 \times 7—9), septum thick: 4—5.5 μ , with a distinct pore.

Caloplaca cinnamomea (TH. FR.) OLIV.

OLIVIER l.c. p. 137 (109).

Sørhamna (TH. FR.), and Mt. Misery (TH. FR.).

This species also contains numerous gonidia in its excipulum. They are not always conspicuous, owing to the air in the sections, but if the air is expelled, and zink chlor iodide is added, they are easily seen.

Evidently common on mosses and the like, with *Blastenia tetraspora*, *Caloplaca Jungermanniae*, *Pannaria arctophila*, *Collema arcticum*, and other muscicolous lichens, at Sørhamna also on drift wood.

TH. FRIES writes (*Lich. Scand.* p. 183) "sporaе angustae, oblonga", p. 185 he explains the spore difference: "ellipsoideae ovoideae (0.010—17 mm. longae et 0.006—9 mm. crassae) vel angustae, oblongae (0.012—15 mm. longae et 0.005—6 mm. crassae)". I have examined many apothecia of muscicolous plants and I always found the spores to be of the

broad type, in one apothecium e. g. $12-16 \times 8-9 \mu$. — I was much astonished to find narrow spores in the plant on drift wood: $13-16 \times 5 \mu$. Attention is called to this difference; if it is constant, the name *cinnamomea* perhaps covers two species.

Caloplaca fraudans (TH. FR.) OLIV.

OLIVIER l. c. p. 138 (110).

Mt. Misery (TH. FR.).

There are several plants (3 herb. plants); and they agree entirely with the authentic specimens from herb. Upsala, which I have seen.

Caloplaca gilva (HOFFM.) A. ZAHLBR.

Sørhamna (TH. FR.).

Only few plants, on drift-wood.

Caloplaca granulosa (MÜLL. ARG.) STEINER.

Cfr. MALME Lich. Suec. 774, ubi syn.

Ellasjøen (O. H.), and Mt. Misery (TH. FR.).

An extremely ornithocoprophilous species, rarely lacking in Arctic rookeries. The Arctic rookery-plants are generally paler than the plant in MALME'S Lich. Suec. OLAV HANSEN'S specimens were quite magnificent.

Caloplaca Jungermanniae (VAHL) TH. FR.

var. *subolivacea* TH. FR.

Mt. Misery (TH. FR.).

It is so different from the var. *genuina* TH. FR. that it possibly ought to be treated as a proper species.

"*Caloplaca pyracea*" from Ellesmereland: Vendomkap (det. DARBI-SHIRE Sec. Arct. Exp. Fram p. 31) is this species.

Caloplaca murorum (HOFFM.) TH. FR.

var. *obliterata* (PERS.).

Mt. Misery (TH. FR.).

Several plants, they agree entirely with VAINIO'S *Placodium murorum* var. *obliterata* from Jinretlen, which I have seen (Lich. Pitl. p. 63).

On chalky rocks, with *Lecanora torrida*, *Candelariella cerinella*, *Polyblastia hyperborea* a. o.

Hymenium 65μ high. Spores not constricted at the septum, $10.5-13 \times 5.2-7 \mu$, the septum $3-5.5 \mu$ thick. (VAINIO l. c.: $12-14 \times 5-6$, septum $5-6 \mu$).

Caloplaca nigricans (TUCK.?) OLIV.

OLIVIER l. c. p. 137 (109). Vide TH. FR. Lich. Scand. I (1871) p. 184.

Mt. Misery (TH. FR.).

Only one plant, growing on mosses. — It requires verification whether TUCKERMAN'S plant is really identical with the Arctic plant; I have not seen his type.

Caloplaca sorediata (VAIN.) DU RIETZ.

DU RIETZ Lich. Fragm. II p. 477, ubi syn.

Mt. Misery (TH. FR.).

It is astonishing that there was not a single specimen of *Caloplaca elegans* in the collection and only a few plants of this species (one good herbarium unit). Is *C. elegans* really lacking in Bear Island or is it so common that THORE FRIES did not care to collect it?

Caloplaca stillicidiorum (HORNEM.).

Sørhamna (TH. FR.), and Mt. Misery (TH. FR.).

Evidently common in Bear Island, as in other Arctic countries. At Sørhamna also on naked wood.

"*Blastenia leucoraea*" from Ellesmereland: Goosefjord (det. DARB. Sec. Arct. Exp. Fram, p. 30) is this species.

Caloplaca (sect. *Pyrenodesmia*) *ursina* n. sp.

Mt. Misery (TH. FR.).

Thallus crustaceus, bene evolutus, in spec. 65 mm. latus, pallide cinereus, prothallo molybdino angusto circumdatus, ambitu radiatim ruptus, praeterea magis irregulariter ruptus, areolis vulgo planis, interdum dein margine crenatis.

Apothecia sessilia, adpressa, diam. 0.5—1 mm., margine thalode sat crasso, crenulato vel crenato instructa. Discus planus vel leviter convexus, epruinosis, ater vel atro-brunneus, madefactus dilutius (magis in brunnescentem vergens) coloratur. Gonidia in margine et sub hypothecio evoluta. Hypothecium omnino incoloratum, plectenchymaticum, 25—40 μ . altum. Epithecium minute granulatum. Hymenium altum: 110—130 μ , superne dilute olivaceum vel fere incoloratum. Paraphyses crassitudine mediocri, apice leviter solum incrassatae, (KOH si addito) clavato-incrassatae et \pm constrictae septatae. Asci clavati (16—18 μ crassi), octospori, membrana apice normaliter incrassata. Sporae medio non constrictae, polari-dyblastae, cellulae rotundatae, isthmo distincto connectae, membrana in apice sporarum tenuis, septum 4—5 μ . Sporae late ellipsoideae, 16—18 \times 8—9 μ .

Pycnides frustra quaesivimus.

React.: Thallus et epithecium KOH omnino immutata, thallus CaCl_2O_2 immutatus. Asci, (praecipue) apices ascorum J intense et persistenter caerulescentes.

Owing to the thick thalline margin of its apothecia and its blackish disk it has a lecanorine habitus. It much resembles the "*Lecanora diphyodes* NYL." as represented in HARM. Lich. Gall. 126, but it differs from that species by its negative KOH-reaction, one of its best characters. Its dark apothecia refer it to the subgenus *Pyrenodesmia*. — It is quite a rare thing to find an Arctic *Caloplaca* with a thallus, which is so well developed that it must be called thick or at least thickish.

Buellia DNOTRS.

Buellia atrata (SM.) MUDD.

Vide VAINIO Lich. Pitlek. p. 89, ubi syn.

Irrfärden (TH. FR.).

Very scarce, with *Rhizocarpon Copelandi*.

Buellia coniops (WBG.) TH. FR.

Sørhamna (TH. FR.), and Ellasjøen (O. H.).

In considerable abundance from the former station. It is variable with respect to its colour and the development of its thallus, but easily recognized by its pycnoconidia and fertile pycnides are very common.

From Sørhamna there were also a few plants, growing on drift-wood. Its pycnoconidia prove the correctness of the determination.

Buellia disciformis (FR.) DEICHM. BRANTH et ROSTRUP.

Mt. Misery (TH. FR.).

Very scarce, on drift-wood.

var. *muscorum* (SCHAER.) VAIN.

Sørhamna (TH. FR.), Mt. Misery (TH. FR.) and between Nordhamna and Kulbukta.

From the last mentioned station there were several plants of this variety, which is so common in Arctic countries. Well developed fertile specimens.

Perhaps a proper species.

Buellia Malmei n. sp.

Mt. Misery (TH. FR.).

Thallus crustaceus, uniformis, minutus, diam. ca. 10 mm., tenuis, cinereus, tessellato-areolatus, areolis planis, angulatis, contiguis, fissuris separatis, minutis, diam. 0.2—0.45 mm. Hypothallus niger parce evolutus.

Apothecia minuta, diam. 0.1—0.4 mm., areolis immersa. Discus niger, epruinosis, concavus vel subplanus, margine integro, crasso,

thallum leviter superante, circumdatus. Hypothecium omnino incoloratum. Hymenium angustum, 55 μ altum, superne aeruginosum; paraphyses cohaerentes, apice incrassatae, constrictae septatae (KOH). Sporae dyblastae, obscurae, medio constrictae, 11–15 \times 6.5–8 μ . Membrana sporarum aequaliter incrassata.

Pycnides non visae.

Medulla J intense caerulea, KOH omnino immutata.

Owing to the immersed apothecia and their thick margin the plant habitually resembles an *Aspicilia*. It must be referred to the Sect. *Semibuellia* of VAINIO's genus *Melanaspicilia*¹. The chemical reaction of these species offers excellent characters. To judge from VAINIO's descriptions, our species is nearest related to *Melanaspicilia ectolechoides* VAIN., but that species has "areolis . . . dispersis, . . . obscure griseis . . ., hypothallo nigro, saepe radiante" (VAINIO l. c. p. 77).

It was only one small plant, but as all essential parts were well developed, I have ventured to describe it. I take great pleasure in naming this species in honour of dr. G. O. MALME, Stockholm, who has been kind enough to revise and to determine many critical plants for me. His vast knowledge, and the generous manner in which he has placed his experience at my disposal has been of inestimable importance for this work.

Buellia punctiformis (HOFFM.) MASS.

var. *punctata* (KBR.) VAIN.

Mt. Misery (TH. FR.).

Very scarce.

The apothecia are very small, diam. 0.2–0.3 mm. The hymenium is narrow, 55–60 μ high, brownish at its upper part. Hypothecium very dark. Paraphyses coherent, branched, and septate at their upper part, capitate and dark at their apices. Spores brown, hardly constricted at the septum, 10.5–12 \times 6.5–8 μ ; membrane rather thin, equally incrassated.

I have felt much inclined to regard this plant as well as the var. *muscorum* of *Buellia disciformis* as a proper species. But it is difficult to decide how much of their peculiar characters is due to the substratum. The judgement is therefore not a little subjective, and we may quite as well accept VAINIO's view.

¹ VAINIO Lich. Pitlek. (1909) p. 76.

Rinodina (MASS.) STIZ.*Rinodina archaea* (ACH.) VAIN. Lich. Pitlek. (1909) p. 73.Syn. *R. laevigata* (ACH.) MALME.

Only a minute fragment of a plant was detected on a small dead twig (SALIX?), that was half overgrown by an *Ochrolechia*. But fortunately the *Rinodina* was fertile: apothecia plane, spores not constricted at the septum, with an unequally incrassated episporium, size 18—21 \times 8—10.5 μ . *Rinodina mniaræa* as well as *R. orbata* (= *R. turfacea*) have larger spores: 20—31 \times 11—14, resp. 22—29 \times 10—12 μ .

Rinodina balanina (WBG.) VAIN.

VAINIO Lich. Pitlek. (1909) p. 69, ubi syn.

Sørhamna (TH. FR.).

Only a few small plants. We might have expected more of this extremely nitrophilous species.

Rinodina mniaræa (ACH.) TH. FR.

Sørhamna (TH. FR.), Mt. Misery (TH. FR.), and between Nordhamna and Kulbukta (TH. FR.).

The number of plants indicate a common and widespread species.

Rinodina orbata (ACH.) VAIN.Syn. *R. turfacea* (WBG.) TH. FR.

Vide VAINIO Lich. Pitlek. (1909) p. 71, ubi syn.

Sørhamna (TH. FR.) and Mt. Misery (TH. FR.).

TH. FRIES only collected it at these two stations, but the number of plants suggest it to be a common species in Bear Island as in other Arctic countries.

Rinodina roscida (SOMRFT.).

Sørhamna (TH. FR.) and Mt. Misery (TH. FR.).

I was astonished to find only a few small plants of this species which is otherwise quite common in Arctic countries on moss at chalky and slaty stations.

Rinodina cacuminum which is so common in Finmark, was not found in the collection.

Physcia (SCHREB.) VAIN.*Physcia marina* (E. NYL.) LYNGE.

Kryptog. Vind. 1366.

Mt. Misery (TH. FR.).

There were several plants of this interesting species.

Lichenologists have judged differently of this species; see my Mon. Norw. Phyc. p. 41, ubi syn. I frankly state that I am not yet quite convinced of its specific rank. There are but few and not too significant characters, separating it from *Ph. tenella*. Especially old herbarium plants are sometimes difficult of separation. But in cases of doubt studies in nature must be decisive, and in its natural stations it is a very distinct lichen, owing to its well-known habitus, colour and manner of growth. It has also a much wider distribution than *Ph. tenella*, but that is often the case with saxicolous lichens compared with their arboricolous relatives.

Physcia muscigena (ACH.) NYL.

Sørhamna (TH. FR.), and Mt. Misery (TH. FR.).
Only a few plants, with densely imbricate laciniae.

Resumé.

In this paper the following lichens are recorded from Bear Island:

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| <p style="text-align: center;"><i>Verrucaria</i> WIGG.</p> <p>1. <i>Verrucaria aethiobola</i> WBG.
var. <i>cataleptoides</i> (NYL.)
VAIN.</p> <p>2. — <i>ceuthocarpa</i> WBG.</p> <p>3. — <i>deversa</i> VAIN.</p> <p>4. — <i>maura</i> WBG.</p> <p>5. — <i>nigrescens</i> PERS.</p> <p>6. — <i>scotina</i> WEDD.</p> <p>7. — sp., e vicinitate <i>V. fraudu-</i>
<i>losae</i>.</p> <p style="text-align: center;"><i>Thelidium</i> MASS.</p> <p>8. <i>Thelidium denudatum</i> n. sp.</p> <p>9. — <i>pyrenophorum</i> (ACH.)
TH. FR.</p> <p style="text-align: center;"><i>Polyblastia</i> (MASS.) LÖNNR.</p> <p>10. <i>Polyblastia bryophila</i> LÖNNR.</p> <p>11. — <i>gelatinosa</i> (TH. FR.).</p> <p>12. — <i>Henscheliana</i> (KBR.)
LÖNNR.</p> <p>13. — <i>hyperborea</i> TH. FR.
f. <i>typica</i> LYNGE and f.
<i>macrospora</i> LYNGE.</p> <p>14. — <i>scotinospora</i>(NYL.)HELLB.
f. <i>monstrum</i> (KBR.).</p> <p>15. — <i>Sendtneri</i> KPLH.</p> <p>16. — <i>terrestris</i> TH. FR.</p> <p>17. — <i>theleodes</i> (SOMRFT.)
TH. FR.</p> | <p style="text-align: center;"><i>Microglæna</i> LÖNNR.</p> <p>18. <i>Microglæna muscorum</i> (FR.)
TH. FR.</p> <p style="text-align: center;"><i>Dermatocarpon</i> ESCHW.</p> <p>19. <i>Dermatocarpon cinereum</i>
(PERS.) TH. FR.</p> <p>20. — <i>rufescens</i> (ACH.) TH. FR.</p> <p style="text-align: center;"><i>Sphaerophorus</i> PERS.</p> <p>21. <i>Sphaerophorus globosus</i>
(HUDS.) PERS.</p> <p style="text-align: center;"><i>Jonaspis</i> TH. FR.</p> <p>22. <i>Jonaspis schismatopis</i> (NYL.)
HUE.</p> <p style="text-align: center;"><i>Gyalecta</i>(ACH.)A.ZAHLBR.</p> <p>23. <i>Gyalecta foveolaris</i> (ACH.)
SCHAER.</p> <p>24. — <i>geoica</i> (WBG.) ACH.</p> <p style="text-align: center;"><i>Sagiolechia</i> MASS.</p> <p>25. <i>Sagiolechia protuberans</i>
(ACH.) MASS.</p> <p style="text-align: center;"><i>Lecidea</i> (ACH.) TH. FR.</p> <p>26. <i>Lecidea arctica</i> SOMRFT.</p> <p>27. — <i>armeniaca</i> (DC.) E. FR.</p> <p>28. — <i>aspicilioidea</i> TH. FR.</p> <p>29. — <i>assimilata</i> NYL.</p> <p>30. — <i>atrofusca</i> (FW.) MUDD.</p> <p>31. — <i>atrocarpoides</i> VAIN.</p> |
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32. *Lecidea auriculata* TH. FR.
 β. *diducens* (NYL.) TH. FR.
33. — *Berengeriana* (MASS.)
 TH. FR.
34. — *confluens* FR.
35. — *consentiens* NYL.
36. — *cuprea* SOMRFT.
37. — *demissa* (RUTSTS.) ACH.
38. — *Dicksonii* ACH.
39. — *epiphaea* NYL.
40. — *flavo-caerulescens*
 (HORNEM.).
41. — *glomerulosa* DC. var.
 euphorea (FLK.) VAIN.
42. — *goniophila* FLK. var. *granulosa* (ARN.) VAIN. and
 var. *pungens* (KBR.) VAIN.
43. — *impavida* TH. FR.
44. — *lapicida* (ACH.) ARN.
45. — *latypea* ACH.
46. — *lepadina* SOMRFT.
47. — *leucophaea* (FLK.) TH. FR.
48. — cfr. *limosa* ACH.
49. — *lithophila* (ACH.) TH. FR.
 (f. *aberrans*).
50. — *lulensis* (HELLB.) STIZ.
51. — *minutissima* n. sp.
52. — *Miseriae* n. sp.
53. — *neglecta* NYL.
54. — *pantherina* (ACH.) TH. FR.
55. — *paupercula* TH. FR.
56. — *petrosa* ARN. α. *nuda*
 TH. FR.
57. — *ramulosa* TH. FR. var.
 evoluta TH. FR. and var.
 depressa TH. FR.
58. — *rhaetica* HEPP.
59. — *septentrionalis* TH. FR.
60. — *speirea* ACH.
61. — *steriza* (ACH.) VAIN.
 f. *contigua* (NYL.)
 f. *platycarpa* (ACH.) and
 f. *oxydata* KBR.
62. — *Ursina* n. sp.
63. *Lecidea vernalis* (L.) ACH.
 Bacidia (DNTRS.) ZAHLBR.
64. *Bacidia coprodes* KÖRB.
65. — *microcarpa* TH. FR.
66. — *muscorum* (SW.) ARN.
67. — *subfuscula* (NYL.) LYNGE.
 Toninia (MASS.) TH. FR.
68. *Toninia lobulata* (SOMRFT.).
 Lopadium KÖRB.
69. *Lopadium muscicola* (SOMRFT.)
 KBR. var. *coralloidea* NYL.
 Rhizocarpon (RAM.) TH. FR.
70. *Rhizocarpon badioatrum*
 (FLK.) TH. FR.
71. — *chioneum* NORM.
72. — *Copelandii* (KBR.) TH. FR.
73. — *expallescens* TH. FR.
74. — *geminatum* (FLOT.) KBR.
75. — *geographicum* (L.) DC.
76. — *grande* (FLK.) ARN.
77. — *Hochstetteri* (KBR.) VAIN.
78. — *obscuratum* (ACH.) MASS.
79. — *pseudospeireum* (TH. FR.).
 Baeomyces PERS.
80. *Baeomyces placophyllus* WBG.
 Cladonia (HILL) VAIN.
81. *Cladonia bellidiflora* (ACH.)
 SCHAER.
82. — *coccifera* (L.) WILLD. var.
 pleurota (FLK.) SCHAER.
 and var. *stemmatina* ACH.
83. — *Delessertii* (NYL.) VAIN.
84. — *elongata* (JACQ.) HOFFM.
85. — *Floerkeana* (FR.) SOMRFT.
86. — *gracilis* (L.) WILLD. var.
 chordalis (FLK.) SCHAER.
87. — *lepidota* NYL.
88. — *mitis* SANDST.

89. *Cladonia pyxidata* (L.) FR.
var. *neglecta* (FLK.) MASS.
and var. *Pocillum* (ACH.)
FLOT.
90. — *rangiferina* (L.) WEB.
91. — *uncialis* (L.) WEB.
- Stereocaulon* SCHREB.
92. *Stereocaulon alpinum* LAUR.
93. — *denudatum* FLK.
94. — *fastigiatum* ANZI.
95. — *glareosum* SAV.
96. — *paschale* (L.) FR.
- Gyrophora* ACH.
97. *Gyrophora arctica* ACH.
98. — *cylindrica* (L.) ACH. and
var. *Delisei* (DESPR.)
TH. FR.
99. — *erosa* (WEB.) ACH.
100. — *hyperborea* ACH.
101. — *proboscidea* ACH.
- Biatorrella* (DNOTRS.) TH. FR.
102. *Biatorrella coracina* (SOMRFT.)
- Acarospora* MASS.
103. *Acarospora scabrida* (HEDL.)
H. MAGN.
- Leciophysma* TH. FR.
104. *Leciophysma finmarkicum*
TH. FR.
- Collema* (HILL) A. ZAHLBR.
105. *Collema arcticum* LYNGE.
106. — *multifidum* (SCOP.) RABH.
- Arctomia* TH. FR.
107. *Arctomia delicatula* TH. FR.
- Leptogium* S. GRAY.
108. *Leptogium lichenoides* (L.)
A. ZAHLBR. var. *pulvinatum*
(HOFFM.) A. ZAHLBR.
- Parmeliella* MÜLL. ARG.
109. *Parmeliella arctophila*
(TH. FR.) MALME and var.
microspora nov. var.
110. — *lepidiota* (SOMRFT.) VAIN.
- Placynthium* S. GRAY.
111. *Placynthium asperellum*
(ACH.) TREV.
- Pannaria* DEL.
112. *Pannaria pezizoides* (WEB.)
TREV.
- Psoroma* (ACH.) NYL.
113. *Psoroma hypnorum* (DICKS.)
HOFFM.
- Solorina* ACH.
114. *Solorina bispora* NYL.
115. — *crocea* (L.) ACH.
116. — *spongiosa* (SM.) CARROLL.
- Peltigera* PERS.
117. *Peltigera aphthosa* (L.) WILLD.
118. — *canina* (L.) WILLD. and
var. *rufescens* (NECK.)
MUDD.
- Pertusaria* DC.
119. *Pertusaria oculata* (DICKS.)
TH. FR.
- Lecanora* ACH.
120. *Lecanora alpina* SOMRFT.
121. — *argopholis* ACH.
122. — *atra* ACH.
123. — *atrosulphurea* (WBG.)
ACH.
124. — *badia* (PERS.) ACH.
125. — *castanea* (HEPP) TH. FR.
126. — *cinerea* (L.) SOMRFT.
127. — *cinereorufescens* (ACH.)
TH. FR.

128. *Lecanora contractula* NYL.
 129. — *epibrya* (ACH.) NYL.
 130. — *flavida* HEPP.
 131. — *gelida* (L.) ACH.
 132. — *Hageni* (ACH.) KBR. var.
Behringii (NYL.) LYNGE.
 133. — *heteroplaca* A. ZAHLBR.
 f. *ursina* LYNGE n. f.
 134. — *laevata* (ACH.) NYL.
 135. — *leptacina* SOMRFT.
 136. — *mastrucata* (WBG.) ACH.
 137. — *Nordenskiöldii* VAIN.
 138. — *polytropa* (EHRH.) TH. FR.
 var. *vulgaris* FLOT. and
 var. *illusoria* ACH.
 139. — *quartzina* NYL.
 140. — *subfusca* (L.) ACH. Cfr.
 var. *argentata* ACH.
 141. — *torrida* VAIN.
 142. — *verrucosa* (ACH.) LAUR.
- Ochrolechia* MASS.
143. *Ochrolechia tartarea* (L.)
 MASS.
- Lecania* (MASS.) A. ZAHLBR.
144. *Lecania aipospila* (WBG.)
 TH. FR.
- Candelariella* MÜLL. ARG.
145. *Candelariella cerinella* (FLK.)
 A. ZAHLBR.
 146. — *vitellina* (EHRH.) MÜLL.
 ARG.
- Parmelia* (ACH.) DE NOTRS.
147. *Parmelia alpicola* TH. FR.
 148. — *omphalodes* (L.) ACH.
 149. — *pubescens* (L.) VAIN.
 150. — *saxatilis* (L.) ACH.
- Cetraria* ACH.
151. *Cetraria crispa* (ACH.) NYL.
 152. — *Delisei* (BORY) TH. FR.
153. *Cetraria hepatizon* (ACH.)
 VAIN.
 154. — *islandica* (L.) ACH.
 155. — *nivalis* (L.) ACH.
 156. — *tenuissima* (L.) var. *cam-*
pestris SCHAER.
- Alectoria* ACH.
157. *Alectoria jubata* (L.) ACH.
 f. *chalybeiformis* (L.).
 158. — *nigricans* (ACH.) NYL.
- Blastenia* (MASS.) TH. FR.
159. *Blastenia arctica* n. sp.
 160. — *rupestris* (SCOP.)
 A. ZAHLBR.
 161. — *tetraspora* (NYL.) TH. FR.
- Caloplaca* TH. FR.
162. *Caloplaca amniospila* (WBG.)
 OLIV.
 163. — *bracteata* (ACH.) JATTA.
 164. — *caesiorufa* (ACH.?)
 A. ZAHLBR.
 165. — *cinnamomea* (TH. FR.)
 OLIV.
 166. — *fraudans* (TH. FR.) OLIV.
 167. — *gilva* (HOFFM.) A. ZAHLBR.
 168. — *granulosa* (MÜLL. ARG.)
 STEINER.
 169. — *Jungermanniae* (VAHL)
 TH. FR. var. *subolivacea*
 TH. FR.
 170. — *murorum* (HOFFM.) TH. FR.
 var. *obliterata* (PERS.).
 171. — *nigricans* (TUCK.) OLIV.
 172. — *sorediata* (VAIN.) DU RIETZ.
 173. — *ursina* n. sp.
- Buellia* DNOTRS.
174. *Buellia atrata* (SM.) MUDD.
 175. — *coniops* (WBG.) TH. FR.

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| 176. <i>Buellia disciformis</i> (FR.)
DEICHMANN BRANTH et
ROSTRUP, and var. <i>musco-</i>
<i>rum</i> (SCHAER.) VAIN.
177. — <i>Malmei</i> n. sp.
178. — <i>punctiformis</i> (HOFFM.)
MASS. var. <i>punctata</i> (KBR.).

<i>Rinodina</i> (MASS.) STIZ.
179. <i>Rinodinaarchaea</i> (ACH.) VAIN. | 180. <i>Rinodina balanina</i> (WBG.)
VAIN.
181. — <i>mniaaraea</i> (ACH.) TH. FR.
182. — <i>orbata</i> (ACH.) VAIN.
183. — <i>roscida</i> SOMRFT.

<i>Physcia</i> (SCHREB.) VAIN.
184. <i>Physcia marina</i> (E. NYL.)
LYNGE.
185. — <i>muscigena</i> (ACH.) NYL. |
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185 different species and several formae is a large number of lichens from a small isolated island in the Arctic ocean. It proves that the lichen flora of Bear Island is not much inferior to that of our Arctic coast in Finmark.

And we cannot doubt of the fact that many lichens are still to be detected there. I venture the supposition that the number can be raised considerably above 200, perhaps to 225 or even to 250.

As we might have expected the flora is very similar to that of Arctic Norway, especially to the flora of Eastern Finmark (Varanger). But several more Arctic species are also present.

The determination of my enormous material of Novaya Zemlya lichens from the expedition of 1921 is yet only half done. Professor G. SAMUELSSON has also entrusted to me the determination of TH. M. FRIES's Spitsbergen collections from 1868. The richness of that collection can be estimated from these Bear Island lichens which he collected during a visit of a few days. And finally I intend to spend this summer (1926) in Spitsbergen.

When all these collections have been determined there will be a sufficient material for the discussion of the geographical distribution of the Arctic lichens in the European sector.

Algae and Fungi.

In the collection were also detected an Alga, with the *Verrucariae*, and some Fungi, chiefly paracitic on the lichens. Mr. KAARE MÜNSTER STRØM, Oslo, determined the Alga, and Dr. KARL KEISSLER, Wien, the parasitic Fungi, viz:

Colothrix scopolorum AG.

Crucibulum vulgare TUL.

Aposphaeria sp. ("ganz sterile Gehäuse").

Didymella pulposa (ZOPF) VOUAUX, on *Leptogium lichenoides* var. *pulvinatum*.

Durella Lecideola var. *coeruleoviridis* KEISSL. in Ann. Naturh. Mus. Wien Bd. 34 (1921) p. 70.

"Genau auf diese aus Russisch-Polen beschriebene Varietät passend, nur Paraphysen-Spitzen mehr schwarz als blaugrün. *D. melanochlora* RHEM, besonders deren subsp. *amplior* Sacc. ist ähnlich, aber durch konkave Fruchtschichte, J ÷, kleinen Sporen etc. verschieden; überhaupt eine sehr polymorphe Gegend." KEISSL. in litt.

Pleospora Engeliana WINT. syn. *Dacampia Hookeri* (NYL.), on a lichen that was deformed beyond recognition.

Tichothecium grossum KÖRB. = *Discothecium grossum* VOUAUX, on *Gyrophora cylindrica* var. *Delisei*.

Tichothecium pygmaeum, on *Lecidea pantherina*.

Torula Lichenum KEISSL. in Centralbl. Bakter. Parasitenkunde 2 Abt. Bd. 37 (1913) p. 388, 389 fig. 1 ("durch braune Färbung der Zellen von *T. alpina* FOURC. u. *T. opaca* CKE. verschieden").

Register.

- Acarospora* Mass. 4, 44.
 scabrida (Hedl.)
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Alectoria Ach. 60.
 bicolor Nyl. 4.
 divergens 60.
 — *jubata* f. *chalybeiformis*
 58, 60.
 — *nigricans* (Ach.) Nyl. 4, 60.
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Bacidia (De Notrs.)
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 — *accedens* 32.
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 — *muscorum* (Sw.) Arn. 33.
 — *subfuscula* (Nyl.)
 Lyng. 33.
 — — var. *venusta* (Hepp.) 33.
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 — *placophyllus* Wbg. 38.
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 — *coracina* (Somrft.) 44.
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Bilimbia *subfuscula*
 (Nyl.) Th. Fr. 33.
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 — *arctica* Lyng. 60.
 — *ferruginea* 62.
 — *leucoraea* 61, 64.
 — *rupestris* (Scop.)
 A. Zahlbr. 16, 35, 60, 61.

Blastenia *tetraspora* (Nyl.)
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 — *atrata* (Sm.) Mudd. 65.
 — *coniops* (Wbg.) Th. Fr. 65.
 Copelandi Kbr. 35.
 — *disciformis* (Fr.) Deichm.
 Branth et Rostrup 65.
 — var. *muscorum* (Schaer.)
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 — *Malmei* Lyng. 65.
 — *punctiformis* (Hoffm.)
 Mass. var. *punctata* (Kbr.)
 Vain. 66.

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 — *bracteata* (Ach.) Jatta 61.
 — *caesiorufa* (Ach.) A. Zahl.
 61, 62.
 — *cinnamomea* (Th. Fr.)
 Oliv. 62.
 — *elegans* 5, 64.
 — *fraudans* (Th. Fr.) Oliv. 63.
 — *gilva* (Hoffm.) A. Zahl. 63.
 — *granulosa* (Müll. Arg.)
 Steiner 5, 63.
 — *Jungermanniae* (Vahl)
 Th. Fr. var. *subolivacea*
 Th. Fr. 62, 63.
 — *murorum* (Hoffm.) Th. Fr.
 var. *obliterata* (Pers.)
 10, 56, 63.
 — *nigricans* (Tuck.?) Oliv.
 63.
 — *pyracea* 63.
 — *sorediata* (Vain.) Du Rietz
 5, 64.
 — *stillicidiorum* (Hornem.)
 64.
 — *ursina* Lyng. 64.

Calothrix *scopulorum* Ag.
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 — *cerinella* (Flk.) A. Zahlbr.
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 — *vitellina* (Ehrh.) Müll.
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Cetraria Ach. 58.
 — *aculeata* Fr. 4.
 — f. *hispida* 4.
 — *crispa* (Ach.) Nyl. 58, 59.
 — *cucullata* 59.
 — *Delisei* (Bory) Th. Fr. 58.
 — var. *dilatata* Vain. 59.
 — var. *fastigiata* (Del.)
 Vain. 59.
 — *hepatizon* (Ach.) Vain. 59.
 — *hiascens* (Fr.) Th. Fr.
 4, 58.
 — var. *Delisei* (Bory) 59.
 — *islandica* (L.) Ach. 4, 59.
 — var. *tenuifolia* Vain. 4.
 — *nivalis* (L.) Ach. 3, 4, 59.
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 — *alcicornis* 5.
 — *bellidiflora* (Ach.) Schaer.
 4, 38.
 — *cerasphora* Vain. 39.
 — *coccifera* (L.) Willd. 3.
 — var. *pleurota* (Flk.)
 Schaer. 38.
 — var. *stematina* Ach.
 38.
 — *degenerans* 38.
 — *Delessertii* (Nyl.) Vain. 38.
 — *elongata* (Jacq.) Hoffm.
 4, 39.
 — *Floerkeana* (Fr.) Somrft.
 39.

- Cladonia Floerkeana* var. *carcata* (Ach.) Nyl. 39.
 — var. *chloroides* (Flk.) Vain. 39.
 — *foliacea* Willd. 4, 5.
 — *furcata* Schrad. 4.
 — var. *spinosa* Leight. 4.
 — *gracilescens* Vain. 39.
 — *gracilis* Willd. 4.
 — var. *chordalis* (Flk.) Schaer. 39.
 — *lepidota* Nyl. 39.
 — var. *gracilescens* (Vain.) 40.
 — *f. hypophylla* Vain. 40.
 — *f. pterophora* Vain. 40.
 — *mitis* Sandst. 40.
 — *pyxidata* Hoffm. 4, 40.
 — var. *chlorophaea* 40.
 — *f. lophyra* 40.
 var. *neglecta* (Flk.) Mass. 40.
 — var. *Pocillum* (Ach.) Flot. 40.
 — *rangiferina* Web. 4, 40.
 — *s. sylvatica* c. *sphagni* 3, 40.
 — *rangiformis* Hoffm. 4.
 — *stricta* Nyl. 39.
 — *sylvatica* Hoffm. 4, 40.
 — *uncialis* (L.) Web. 41.
Collema (Hill) A. Zahlbr. 45.
 — *aggregatum* 46.
 — *arcticum* Lynge 45, 62.
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 — *ceranoides* (Borr.) Mudd. 45, 46.
 — *ceraniscum* Nyl. 45, 46.
 — *granosum* (Schreb.) Rabh. 46.
 — *multifidum* (Scop.) Rabh. 46, 47.
 — *verrucaeforme* (Ach.) Th. Fr. 45.
Crucibulum vulgare Tul. 74.

Dacampia Hookeri (Nyl.) 74.
Dermatocarpon Eschw. 14.
 — *cinereum* (Pers.) Th. Fr. 14.
 — *rufescens* (Ach.) Th. Fr. 15.
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Gyalecta (Ach.) A. Zahlbr. 16.
 — *foveolaris* (Ach.) Schaer. 16.
 — *gleoica* (Wbg.) Ach. 16.
Gyrophora Ach. 42.
 — *arctica* Ach. 42, 43.
 — *cylindrica* (L.) Ach. 43.
 — var. *Delisei* (Despr.) Th. Fr. 43.
 — *discolor* 44.
 — *erosa* (Web.) Ach. 4, 43.
 — var. *torrefacta* (Schrad.) Th. Fr. 43.
 — *hyperborea* Ach. 4, 43.
 — *proboscidea* Ach. 4, 43.
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Ionaspis Th. Fr. 15.
 — *rhodopis* 16.
 — *schismatopis* (Nyl.) Hue 15.

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 — *aipospila* (Wbg.) Th. Fr. 57.
Lecanora Ach. 51.
 — *alpina* Somrft. 51.
 — *argopholis* Ach. 51.
 — *atra* Ach. 51.
 — *atrosulphurea* (Wbg.) Ach. 51.
 — *badia* (Pers.) Ach. 52.
 — *Behringi* Nyl. 53, 54.
 — *caesiorufa* Nyl. 61.
 — *castanea* (Hepp) Th. Fr. 52.
 — *cinerea* (L.) Somrft. 52.
 — *cinereorufescens* (Ach.) Th. Fr. 52.
 — *contractula* Nyl. 52.
 — *diphyodes* Nyl. 65.
 — *epibrya* (Ach.) Nyl. 4, 52.
 — *flavida* Hepp. 53.
 — *galactina* subsp. *dispersa* Nyl. 4, 5.
 — *gelida* (L.) Ach. 53.
 — *gibbosa* (Ach.) Nyl. var. *squamata* (Fw.) Th. Fr. 53.

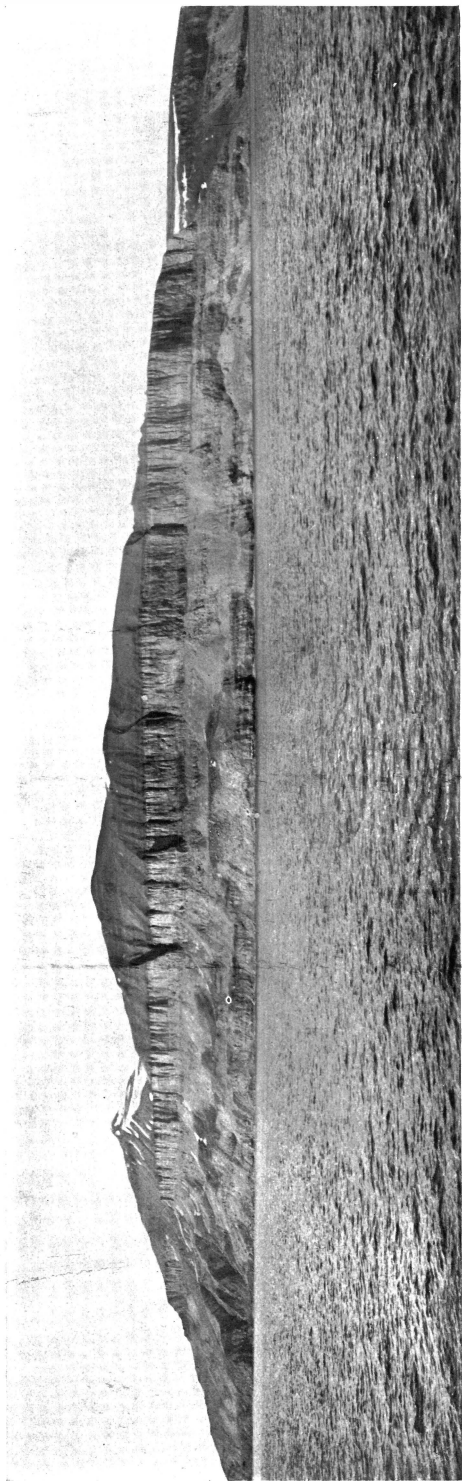
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 — *heteroplaca* A. Zahlbr. 54.
 — *f. ursina* Lynge 54.
 — *laevata* (Ach.) Nyl. 54.
 — *leptacina* Somrft. 55.
 — *mastrucata* (Wbg.) Ach. 55.
 — *Nordenskiöldii* 5, 55.
 — *polytropa* 4, 55.
 — var. *illusoria* Ach. 55, 56.
 — var. *vulgaris* Flot. 55.
 — *quartzina* Nyl. 56.
 — *schismatopis* Nyl. 15.
 — *Sommerfeltiana* Flk. β . *macra* Somrft. 56.
 — *subfusca* (L.) Ach. cfr. var. *angustata* Ach. 56.
 — *tartarea* 4.
 — *torrida* Vain. 5, 55, 56, 63.
 — *tumidula* Ach. 3.
 — *umbrina* 53.
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 — *verrucosa* (Ach.) Laur. 56.
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 — *alpestris* Th. Fr. 32.
 — *arctica* Somrft. 17.
 — *armeniaca* (DC.) E. Fr. 17.
 — *aspicilioidea* Th. Fr. 17.
 — β . *dovrina* Th. Fr. 17.
 — *assimilata* Nyl. 17, 29.
 — *atrofusca* (Fw.) Mudd. 17, 27, 30.
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 — *auriculata* Th. Fr. β . *diducens* (Nyl.) Th. Fr. 18.
 — *Berengeriana* Mass. Th. Fr. 18.
 — *caesiorufa* Ach. 61.
 — *conferenda* Nyl. 26.
 — *confluens* Fr. 4, 18.
 — *consentiens* Nyl. 19, 20.
 — *cuprea* Somrft. 21.
 — *demissa* (Rutstr.) Ach. 21.
 — *Dicksonii* Ach. 22.
 — *ementiens* Nyl. 27, 28, 29.
 — *epiphaea* Nyl. 22.
 — *flavocaerulescens* (Hornem.) 22.
 — *fuscoatra* 27.

- Lecidea glomerulosa* DC. 22.
 — *glomerulosa* DC. var. *euphorea* (Flk.) Vain. 22.
 — var. *Wulfenii* (Hepp) Vain. 22.
 — *goniophila* (Flk.) 4, 23.
 — var. *granulosa* (Arn.) Vain. 23.
 — var. *pungens* (Kbr.) Vain. 23.
 — *impavida* (Th. Fr.) 23.
 — *lapicida* (Ach.) Arn. 23.
 — *latypea* Ach. 23.
 — *lepadina* Somrft. 24.
 — *leucophaea* (Flk.) Th. Fr. 3.
 — *griseoatra* 24, 26.
 — *limosa* Ach. 25.
 — *lithophila* (Ach.) Th. Fr. 25.
 — f. *subnudus* Fr. 25.
 — *lobulata* Somrft. 34.
 — *lulensis* (Hellb.) Stiz. 24, 25.
 — *meiobola* Nyl. 32.
 — *minutissima* Lyng. 26.
 — *Miseriae* Lyng. 26.
 — *neglecta* Nyl. 27.
 — *obnubila* Th. Fr. 25.
 — *panaeola* Ach. 20.
 — *pantherina* (Ach.) Th. Fr. 4, 27.
 — *paupercula* Th. Fr. 27.
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 — *rufofusca* 30.
 — *sabuletorum* f. *syncomista* Flk. 34.
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 — f. *contigua* Nyl. 31.
 — f. *oxydata* Kbr. 31.
 — f. *platycarpa* Ach. 31.
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 — *muscicola* (Somrft.) Kbr. var. *coralloidea* Nyl. 34.
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 — *ectolechoides* Vain. 66.
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 — f. *theleporoides* 57.
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 — *deficiens* Nyl. 48.
 — *elaeina* 49.
 — *Hookeri* 49.
 — *pezizoides* (Web.) Trev. 49.
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 — *Hypnorum* 3.
 — *lepadina* Fr. 24.
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 — *pubescens* (L.) Vain. 58.
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 — var. *microspora* Lyng. 48.
 — *deficiens* (Nyl.) Malme 48.
- Parmeliella lepidiota* (Somrft.) Vain. 49.
 var. *tristis* Th. Fr. 49.
Peltigera Pers. 50.
 — *apthosa* (L.) Willd. 50.
 — *canina* (L.) Willd. 4, 50.
 — var. *rufescens* (Neck.) Mudd 50.
 — *polydactyla* 50.
 — *rufescens* Hoffm. 4.
 — *scabrosa* Th. Fr. 50.
- Pertusaria* DC. 51.
 — *oculata* (Dicks.) Th. Fr. 51.
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 — *muscigena* (Ach.) Nyl. 68.
 — *tenella* 68.
- Placodium cerinum* Ehrh. 4.
 — *elegans* DC. 4.
 — *ferrugineum* var. *caesiorufa* (Nyl.) Vain. 61.
 — *murorum* var. *obliterata* 63.
 — *rupestre* Branth et Rostr. 4.
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 — *nigrum* 49.
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 — *bryophila* Lönnr. 12.
 — *gelatinosa* Th. Fr. 12.
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 — var. *macrospora* Lyng. 13.
 — var. *typica* Lyng. 13.
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 — f. *monstrum* (Kbr.) 14.
 — *Sendtneri* Kplh. 12, 14.
 — *terrestris* Th. Fr. 14.
 — *theleodes* (Somrft.) Th. Fr. 12, 14.
- Psoroma* (Ach.) Nyl. 49.
 — *hypnorum* (Dicks.) Hoffm. 49.
- Pterygium* 49.

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| <p>Rhizocarpon (Ram.) Th. Fr. 34.
 badioatrum (Flk.) Th. Fr. 34.
 — calcareum (Weis) Th. Fr. 4, 37.
 — z. Weisii (Mass.) Th. Fr. f. pseudospeireum Th. Fr. 37.
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 — concretum (Ach.) Elenk. 36.
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 — geminatum (Flot.) Kbr. 36.
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 — pseudospeireum (Th. Fr.) 37.
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 — turfacea (Wbg.) Th. Fr. 67.</p> <p>Sagiolechia Mass. 16.
 — protuberans (Ach.) Mass. 16.</p> <p>Semibuellia 66.</p> <p>Solorina Ach. 50.
 — bispora Nyl. 50.
 — crocea (L.) Ach. 50.
 — saccata 50.
 — spongiosa (Sm.) Carroll 50.</p> <p>Sphaerophorus Pers. 15.
 — coralloides 3.
 — fragilis 45.
 — globosus (Huds.) Vain. 4, 15.</p> <p>Sporodictyon 12.</p> <p>Staurothele 14.</p> <p>Stereocaulon Schreb. 41.
 — alpinum Laur. 4, 41, 42.
 — denudatum Flk. 41.
 — evolutum Graewe 41.
 — fastigiatum Anzi 41, 42.
 — var. spathuliferum (Vain.) 42.
 — glareosum Sav. 42.
 — paschale (L.) Fr. 4, 42.
 — spathuliferum Vain. 41.</p> <p>Synalissa 45.</p> | <p>Synechoblastus aggregatus 46.</p> <p>Thamnotia vermicularis 60.</p> <p>Thelidium Mass. 11.
 — cataractarum Lönnr. 11.
 — denudatum Lynge. 11.
 — methoricum 12.
 — papulare 11, 12.
 — pyrenophorum (Ach.) Th. Fr. 4, 11.</p> <p>Tichothecium grossum Körb. 43, 74.
 — pygmaeum Körb. 27, 74.</p> <p>Toninia (Mass.) Th. Fr. 34.
 — lobulata (Somrft.) 34.
 — f. Theobaldi (Kbr.) 34.
 — syncomista 34.</p> <p>Torula alpina Fourc. 74.
 — Lichenum Keissl. 74.
 — opaca Chl. 74.</p> <p>Umbilicaria hyperborea 3.
 — proboscidea γ. arctica 3.</p> <p>Verrucaria Wigg. 9.
 — aethiobola Wbg. var. cataleptoides (Nyl.) Vain. 9.
 — ceuthocarpa Wbg. 9.
 — diversa Vain. 9.
 — var. meizospora Vain. 9.
 — sp. pr. fraudulosa Nyl. 10, 11.
 — maura Wbg. 10.
 — nigrescens Pers. 4, 10.
 — scotina Wedd. 10.</p> |
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De norske statsunderstøt. Spitsbergeneksped. Bind I, No. 9.

Plate I.



Misery Fjell from the sea.

A. Koller phot. 11/7 1924.



A. The plain of Bear Island. Looking NW from the western part of Misery Fjell, 286 m.
The lake in the foreground is seen in the map. A. Koller phot. 11/9 1923.



B. The cliffs of Sørhamna in the foreground and Misery Fjell (536 m.) in the background.
A. Koller phot. 30/8 1922.

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