

DET KONGELIGE DEPARTEMENT
FOR HANDEL, SJØFART, INDUSTRI, HÅNDVERK OG FISKERI

NORGES SVALBARD- OG ISHAVS-UNDERSØKELSER
LEDER: ADOLF HOEL

SKRIFTER OM SVALBARD OG ISHAVET

Nr. 81

BERNT LYNGE

LICHENS FROM NORTH EAST GREENLAND

COLLECTED ON THE NORWEGIAN SCIENTIFIC
EXPEDITIONS IN 1929 AND 1930

II. MICROLICHENS

WITH 9 PLATES AND 1 MAP



OSLO
JACOB DYBWADS BOKHANDEL
1940

RESULTS OF THE NORWEGIAN EXPEDITIONS TO SVALBARD 1906—1926 PUBLISHED IN OTHER SERIES

(See Nr. 1 of this series.)

The results of the Prince of Monaco's expeditions (Mission Isachsen) in 1906 and 1907 were published under the title of 'Exploration du Nord-Ouest du Spitsberg entreprise sous les auspices de S. A. S. le Prince de Monaco par la Mission Isachsen', in *Résultats des Campagnes scientifiques*, Albert Ier, Prince de Monaco, Fasc. XL—XLIV. Monaco.

ISACHSEN, GUNNAR, Première Partie. Récit de voyage. Fasc. XL. 1912. Fr. 120.00.

With map: Spitsberg (Côte Nord-Ouest). Scale 1:100000. (2 sheets.) Charts: De la Partie Nord du Foreland à la Baie Magdalena, and Mouillages de la Côte Ouest du Spitsberg.

ISACHSEN, GUNNAR et ADOLF HOEL, Deuxième Partie. Description du champ d'opération. Fasc. XLI. 1913. Fr. 80.00.

HOEL, ADOLF, Troisième Partie. Géologie. Fasc. XLII. 1914. Fr. 100.00.

SCHELIG, JAKOB, Quatrième Partie. Les formations primitives. Fasc. XLIII. 1912. Fr. 16.00.

RESVOLL HOLMSEN, HANNA, Cinquième Partie. Observations botaniques. Fasc. XLIV, 1913. Fr. 40.00.

A considerable part of the results of the ISACHSEN expeditions in 1909 and 1910 has been published in *Videnskapselskapets Skrifter. I. Mat.-Naturv. Klasse. Kristiania (Oslo)*.

ISACHSEN, GUNNAR, Rapport sur l'Expédition Isachsen au Spitsberg. 1912, No. 15. Kr. 5,40.

ALEXANDER, ANTON, Observations astronomiques. 1911, No. 19. Kr. 0,40.

GRAARUD, AAGE, Observations météorologiques. 1913, No. 1. Kr. 2,40.

HELLAND-HANSEN, BJØRN and FRIDTJOF NANSEN, The sea west of Spitsbergen. 1912, No. 12. Kr. 3,60.

ISACHSEN, GUNNAR, The hydrographic observations. 1912, No. 14. Kr. 4,20.

With chart: Waters and anchorages on the west and north coast. Publ. by the Norw. Geogr. Survey, No. 198.

HOEL, A. et O. HOLTEDAHL, Les nappes de lave, les volcans et les sources thermales dans les environs de la Baie Wood au Spitsberg. 1911, No. 8. Kr. 4,00.

GOLDSCHMIDT, V. M., Petrographische Untersuchung einiger Eruptivgesteine von Nord-westspitzbergen. 1911, No. 9. Kr. 0,80.

BACKLUND, H., Über einige Olivinknollen aus der Lava von Wood-Bay, Spitzbergen. 1911, No. 16. Kr. 0,60.

HOLTEDAHL, OLAF, Zur Kenntnis der Karbonablagerungen des westlichen Spitzbergens. I. Eine Fauna der Moskauer Stufe. 1911, No. 10. Kr. 3,00. II. Allgemeine stratigraphische und tektonische Beobachtungen. 1912, No. 23. Kr. 5,00.

HOEL, ADOLF, Observations sur la vitesse d'écoulement et sur l'ablation du Glacier Lilliehöök au Spitsberg 1907—1912. 1916, No. 4. Kr. 2,20.

VEGARD, L., L'influence du sol sur la glaciation au Spitsberg. 1912, No. 3. Kr. 0,40.

ISACHSEN, GUNNAR, Travaux topographiques. 1915, No. 7. Kr. 10,00.

With map: Spitsberg (Partie Nord-Ouest). Scale 1:200000 (2 sheets).

GUNNAR ISACHSEN has also published: Green Harbour, in *Norsk Geogr. Selsk. Aarb.*, Kristiania, 1912—13, Green Harbour, Spitsbergen, in *Scot. geogr. Mag.*, Edinburgh, 1915, and, Spitsbergen: Notes to accompany map, in *Geogr. Journ.*, London, 1915.

All the above publications have been collected into two volumes as *Expédition Isachsen au Spitsberg 1909—1910. Résultats scientifiques. I, II. Christiania 1916*.

As the result of the expeditions of ADOLF HOEL and ARVE STAXRUD 1911—1914 the following memoir has been published in *Videnskapselskapets Skrifter. I. Mat.-Naturv. Klasse*.

HOEL, ADOLF, Nouvelles observations sur le district volcanique du Spitsberg du Nord. 1914, No. 9. Kr. 2,50.

Expeditions of TH. VOGT 1925 and 1928:

STØRMER, LEIF, Downtonian Merostomata from Spitsbergen. — *Skr. Norske Vid.-Akad. I. Mat.-Nat. Kl.* 1934. No. 3. Kr. 3,00.

The following topographical maps and charts have been published separately:

Maps:

Bear Island. 1:25000. 1925. Kr. 10,00.

Bear Island. 1:10000. (In six sheets). 1925. Kr. 30,00.

East Greenland. Eirik Raudes Land from Sofiasund to Youngsund. 1:200000. 1932. Kr. 5,00.

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Preface.

In 1929 the present author joined a Norwegian scientific expedition to North East Greenland. The other botanist of the expedition was Mr. Jakob Vaage, who was in charge of the vascular plants. In the next year a new expedition went over. Its botanists were Mr. P. F. Scholander, who collected lichens and vascular plants, and Mr. Jakob Vaage, who again devoted himself to the vascular plants.

The first part of our report on the lichens was published in 1932: B. Lynge and P. F. Scholander: Lichens from North East Greenland collected on the Norwegian Scientific Expeditions in 1929 and 1930, *Skrifter om Svalbard og Ishavet*, Nr. 41, p. 1—116, pl. I—VII, 1 map. In this part our "Macrolichens" were treated, comprising in all 102 species.

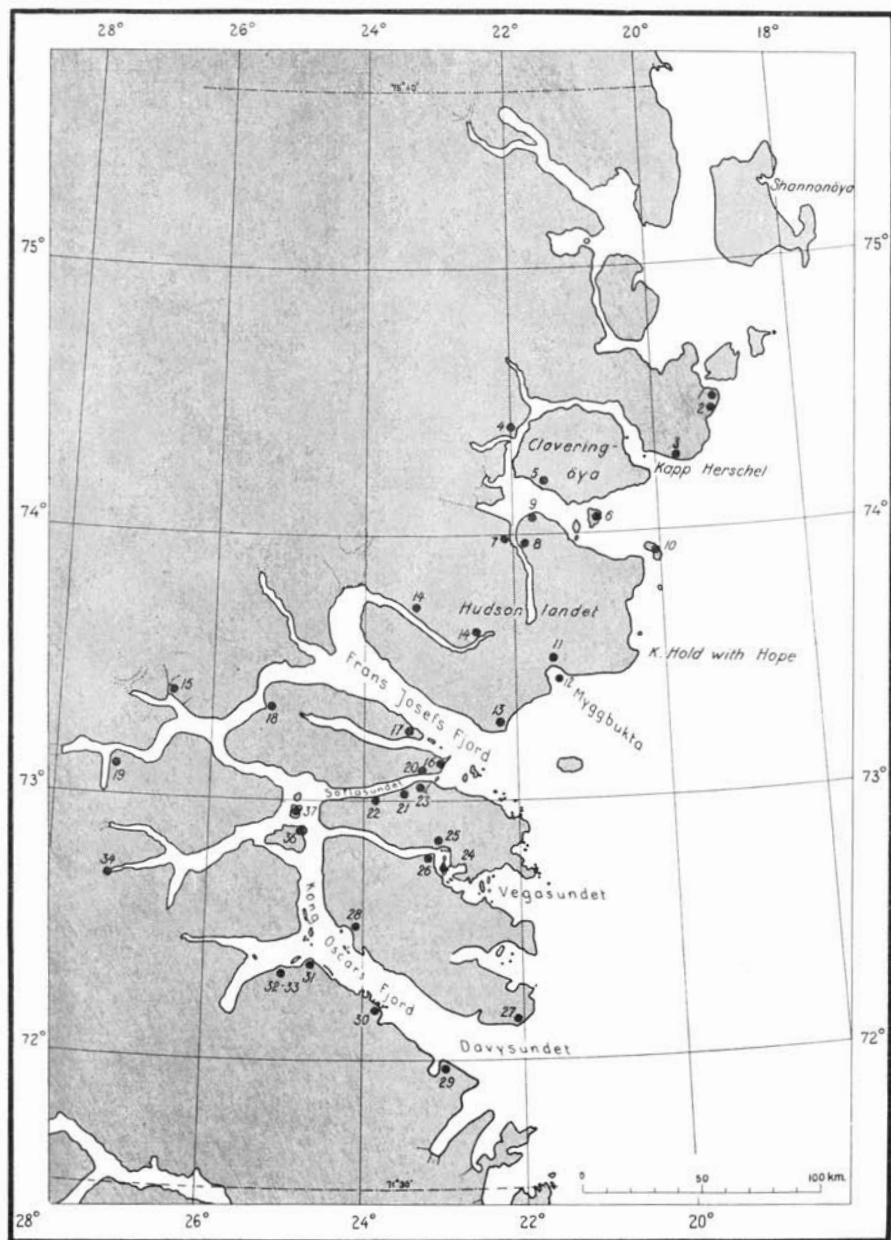
In this second part I present our "Microlichens". At the end of the paper is given a list of all the lichens, which we found, numbering in all about 350 different species and also the lichens, recorded from other parts of East Greenland, in all 406 species. Since 1932 I have again and again studied these species, and revised my opinion on several of them, which is not now the same as it was in 1932.

This number of species does not suggest a peculiarly rich flora. In 1921 I found 413 different species of lichens in Novaya Zemlya in one summer, and then I was alone in charge of the lichens as well as of the vascular plants, and with less experience, though with a better physic.

Our Greenland region is far to the north, between 72° and $74^{\circ} 30'$. Farther to the south we meet a great number of species, which we did not find in our region. In all the number of known Macrolichens from the East Greenland coast is 142. Possibly the number of Microlichens would be equally increased, or nearly so, if the South East coast of Greenland had been explored with the same intensity as our northern region. But it is labour lost to discuss such probabilities, let us rather go and find out what the South East Greenland coast really contains of Microlichens.

The itinerary for the two years was:

	1929	1930
I. Wollaston Forland and Claveringøya:		
1. Wollaston Forland: Kapp Wynn	-	20.7
2. — — : Landingsdalen	28.7	21.7
3. — — : Kapp Herschel	29.7	17—19.7, 21.7
4. Claveringfjorden: Revet	-	22—23.7
5. — — : Soppbukta	-	27—28.7
6. Finschøya	-	28.7
II. Coast of Hudsonlandet:		
7. Loch Fyne: Røyevatnet	-	25.7
8. — — : East side of the fjord	-	26.7
9. — — : Kapp Stosch	-	24.7
10. Jacksonøya	(night) 31.7—1.8	-
11. Foster Bay: Myggbukta	2.8, 16.8, 21.8	30.7— 2.8, 20.8
12. — — : Terneøya	-	1.8
13. — — : Kapp Bennet	20.8	-
III. Frans Josefs Fjorden:		
14. North side: Moskusoksefjorden, several places	18—19.8	4—6.8
15. — — : Reinbukta	14.8	-
16. South side: Kapp Humboldt	3— 6.8, 16.8	3.8, 19.8
17. — — : Dusénfjorden	16—17.8	-
18. — — : Blomsterbukta (also called Vargebukta)	14—15.8	-
19. — — : Kierulfffjorden	13.8	-
IV. Sofiasundet:		
20. North side: Celsiusberget	6.8	-
21. South side: Rudbeckfjellet	-	18.8
22. — — : Sanddalen	-	19.8
23. — — : Five km west of Robertsonøya..	-	19.8
V. Vegasundet:		
24. Scott Keltie-øyane: Gåsøya	9.8	-
25. Geogr. Society-øya: Husbukta, several places.	8—10.8	15—17.8
26. Traill-øya: Veganaset	7.8	-
VI. Davysundet, Kong Oscars Fjorden:		
27. North side: Kapp Simpson	12.8	-
28. — — : Holmvika	11.8	-
29. South side: Antartichamna	-	11.8
30. — — : Mainland near Archerøya	-	10.8
31. — — : Kapp Petersens	-	9.8
32. — — : 15 km west of Kapp Petersens..	-	12.8
33. — — : Segelsällskapetets Fjord: Mt. Carmela	-	10.8
34. — — : Röhssfjorden, two places	-	14.8
35. — — : Dicksonfjorden	-	13.8
36. Ellaøya: Kapp Elisabeth	-	8.8
37. Mariaøya: Nattvika	-	12.8



At present we only have a few representative monographs of arctic lichens, comprising also the Microlichens, they are insufficient for general comparisons. We are better informed of the lichens, which I have called Macrolichens. In my paper "Lichens from Spitsbergen and the North-East Land", Vid.-Akad. Skrift., Mat.-Naturv. Kl., 1938, No. 6, p. 107—111 I summarized what we knew of these lichens from West Greenland, East Greenland, Svalbard, and Novaya Zemlya. The number of species was resp. 161, 142, 145, and 138. In a recently finished (yet unpublished) paper on the Macrolichens of Iceland I enumerated 150 different species from that island.

It is unnecessary to say that these regions have been explored with a very unequal intensity. Further research will certainly add to the numbers. But I have the idea that it will add much more to the number of localities for each species than to the number of species.

It is an interesting fact that all these figures are of about the same size, between 138 and 161. That was discussed in my above mentioned Svalbard paper of 1938, p. 112—114.

We also find that a very great number of the Macrolichens are widely distributed, their number of circumpolar lichens is remarkably great. And yet it is well known that in the arctic there are very many sterile Macrolichens, even such species, as are better fertile when growing farther to the south. Their propagation must chiefly be by fragmentation, which is highly efficient under those conditions.

We know sufficient of the Microlichens to say that such is not the case with all of them. It was a study on arctic Rhizocarpons that first drew my attention to their regionally limited distribution (A Rev. of the Genus Rhizocarpon in Greenland, Skr. om Svalb. og Ishavet, No. 47, 1932). Out of 48 arctic *Rhizocarpons* I only knew of 6 circumpolar species, since then I have only been able to add 1 species (*Rhiz. expallescens*). Several other genera of Microlichens have the same regionally limited distribution, e. g. *Acarospora*, *Aspicilia*, and also some *Lecideae*. Nearly all the Microlichens are well fertile, and have spores as their single mode of reproduction.

It seems probable that such genera are in a state of rich evolution of new species in recent times, geologically spoken. But if spore propagation were so efficient as we are often inclined to suppose, we should not have expected so many Microlichens to have this limited distribution.

Having now worked up great lichen collections from Novaya Zemlya, East and West Greenland, I shall go in for the determination of our inexhaustible treasures from Svalbard, and the rest of my own collections from Iceland (1937 and 1939). This finished, we shall have an excellent material for the study of many general questions of lichen distribution.

Lichenologically, the most interesting arctic area is now the north coast of Greenland, where so much land is ice-free. Unfortunately it is

so difficult of access, but once in the future an aeroplane might be secured for scientific research, and then such problems could be attacked and solved.

A considerable number of new species have been described in this paper. I have worked under difficult conditions, without access to many types which were necessary to a satisfactory solution of my task. Some of the species are, perhaps, too narrowly limited, in other cases more material may bridge over the presumed difference between related species. This paper is but a beginning to our knowledge of the lichen flora in this part of Greenland. The more satisfactory continuation will be to trace up their distribution. If they are found only here they must have originated here. If they have immigrated, from whence have they come? Over the great (frozen?) sea, from the north, or from the south? We do not know. The same problem will interest us still more for the many species, reported also from other arctic areas, in that case we know more.

In 1932 my friend Dr. P. F. Scholander worked in South East Greenland (Dahl—Lyngé—Scholander: Lichens from Southeast Greenland, Skr. om Svalbard og Ishavet, No. 70). He collected about 200 different species of lichens, chiefly Macrolichens. We also have some other collections of minor importance from the South East (Bjørn Bjørlykke and J. Kr. Törnøe in 1931, and Tyge Wittrock Böcher in 1932). They found much the same lichens as we did farther to the north, but their collections are richer in some genera than our northerns are, e. g. in *Cladoniae*, a genus which is rather poorly represented in the north. Possibly some *Cladoniae* are immigrants from the south.

Atypically northern immigrant is *Neuropogon* (or *Usnea*) *sulphureus*, found on the east coast southwards to Cape Dalton, and on the west coast down to Christianshaab, in the Disko Fjord. Still more northern is *Dactylina ramulosa*, found from Danmarks Havn, north of our field, and northwards.

It was highly satisfactory to find *Lecidea ultima* Th. Fr. in my collection. It was previously only known from Grants Land, it must be a northern wanderer.

A few technical remarks may be allowed.

It is well known that calcium hypochlorite (CaCl_2O_2) loses its power of reaction after a short time, dependent on the preservation. It is therefore a capricious reagent, and records vary from work to work. It should always be kept in a dark bottle, well closed by a glass stopper. A few grains should be mixed up in a drop of water every time it is used. But it would be better to find another substance that contained the same efficient component in a more durable form. A chemical friend, Prof. Bj. Samdahl, has recommended *Losanthin* to me. I have used it much, and found it excellent.

The sectioning of small objects is a great difficulty. The old method of sectioning between two slices of *Sambucus* pith is good enough for large and soft objects, such as great apothecia, and the thallus of *Macrolichens*. But for small objects it is little satisfactory.

Dr. Scholander has so much improved this method that it could be utilized for the microtome, and the sections obtained were so fine that they could serve for microphotos. He placed the object, carefully orientated, between the two slices, enveloped them in a strip of paper, and tied them firmly together by a thin string. He then placed the whole in the microtome, orientated in such a way that the slit with the object was perpendicular to the longitudinal direction of the knife, or at a somewhat acuter angle to it. To spare the microtome knife he cut with a new sharp Gillette blade, fastened to the microtome knife by a simple screw arrangement. The edge of the Gillette blade should not project more than 1 mm beyond that of the knife. Before sectioning 96 % alcohol was poured over the *Sambucus* pith with the object, which was kept moistened with this throughout the sectioning. Alcoh. absol. would make the object too brittle. A binocular placed over the knife makes it easier to follow the sectioning, and to catch the sections with a curved needle, dipped in absolute alcohol. The sections were placed in absolute alcohol in order to drive out the air, and next transferred to alcohol of lower percentages, and at last to any medium desired, for inst. glycerine. Dr. Scholander sealed his slides by a rather thick Canada balsam.

Dr. Scholander described the method in his paper: "On the Family Umbilicariaceae". *Nyt Magazin f. Naturv.* Vol. LXXV, Oslo 1934, p. 29—30. The value of it can be tested by his microphotos in the same paper.

It is, however, doubtful whether his method is available for very small objects, such as small perithecia. *Sambucus* pith is too loose, and the minute sections are easily lost. My favourite method is the following.

The lichen is studied under a good binocular lens, magnifying 16 times, or more. The object to be cut is moistened by 96 % alcohol, to expell the air. A microtome wood block cubic, sides 12 mm, is fixed to a plate of mat glass and paraffine of a suitable melting point is poured over its upper side. The object is detached and placed over the paraffine where it is simply imbedded by a hot needle. All this is done under the binocular lens, which will enable us to follow the whole process, and ensure a correct orientation, a most important point.

The sectioning is done by hand, using a common razor. The cubic with the imbedded object is placed under the binocular lens and cut there. It is then possible to follow and direct the sectioning under an appropriate magnification. When the paraffine cover has been removed, and the object appears, it is moistened with water. It softens the object

and expands it, fixing it better to the paraffine. The object should not be moistened before imbedding. If it is surrounded with water the paraffine does not stick to it.

In order to remove the paraffine the sections can be placed in a small crucible, half filled with water. If carefully heated to cooking the paraffine will melt and go to the surface, and the object will sink to the bottom when the air has been expelled, a great advantage.

The section can be secured by a capillary pipette, but this brings too much water on the object glass. I prefer to use a pointed needle, or a scalpel, the point of which has been dipped in glycerine, in order to catch the section.

Of course the sections can be placed directly on the object-glass, and the paraffine dissolved by toluol, which must then be removed.

But the simplest method is to place the sections in a drop of water on the object glass, and then remove the paraffine by two thin and pointed needles, preferably dentists' sondes. For by this method the paraffine only surrounds the object, it does not penetrate into it. Of course the manipulation must be done under the binocular microscope ($\times 16$). The disadvantage is that the air is not expelled, which may result in difficulties. By this very simple method I have succeeded in cutting the perithecia of *Polyblastica gothica*, 0.2 mm in diam., and to obtain excellent, well orientated central sections.

The cubic with the imbedded object can also be placed in the microtome and cut there. Preference should be given to a slide microtome where the knife can be placed in a very oblique position. My microtome is of another construction; on the left side the knife is fixed to a vertical axis, and the knife moves like a radius. It often results in excellent sections, but the knife is hard on the object, which is easily detached from the paraffine if misfortune is out. In order to remove the paraffine from the sections, they are treated as above described.

I am indebted to Mr. Kristian Horn, cytologist, for valuable suggestions on this paraffine imbedding and hand sectioning.

In Upsala I saw a freezing microtome, which was handled with great results by Dr. Rolf Santesson. At home I immediately rebuilt a common Reichert microtome for ice, it is easily done. It is unnecessary to describe the procedure, which is well known to everybody who is acquainted with laboratory work. It is a rapid method, and its greatest advantage is the ice, which disappears of itself. Before sectioning the object should be placed in alcohol (to remove the air), and next in water. The difficulty is the orientation, for as soon as the moistened object touches the undercooled ice, it is fixed, and after that there is no orientation possible. The ice is also hard on the edge of the knife.

The object must therefore be orientated before it is fixed to the ice. This is done under the binocular. By the aid of a thin, pointed needle

the object is placed on the point of a scalpel, orientated as desired in relation to the blade of the scalpel. The object must protrude beyond the point of the scalpel, which must not touch the ice. The scalpel is withdrawn as soon as the object has been frozen to the ice.

It seems to me that the freezing microtome requires too much time if but one section is desired. It is more economic if several objects are to be cut at the same time.

In Vienna I saw another method which served well for small objects. They had a thick mucilago of gummi arabicum and glycerine, a drop of which was spread over a scrap of paper (not too thin). The object was orientated in the mucilago and left to dry up there, it was ready for sectioning after a day or so. The mucilago has the same elastic property as the paraffine, when appropriately moistened. This method has been largely used for sectioning perithecia, e. g. by Zschacke.

Dr. A. H. Magnusson in Göteborg has obtained excellent sections by a very simple method. He orientates his objects down into a thin slit in a good cork, and cuts by hand. The object should protrude a little above the cork. For people, who are not quite young it is necessary to have a pair of spectacle lenses before the eyes. To obtain good results some manual skill is necessary, a favour which has not been granted to all lichenologists. I cannot understand, how this method could serve for very small perithecia.

Several types of hand microtomes have been constructed, and some of them are excellent. They should not be much longer than the breadth of the hand, otherwise they are not easily handled.

The staining is also a difficult question. In a section, which has been well cleared (chlorale hydrate) and washed with water, chlorzinc-iodide stains the wall of the gonidia, and makes them visible, even if the gonidia are dead, and the chlorophyl destroyed. This is of importance for the study of many apothecia (lecanorine, or not).

If it is desired to study the direction of a hypha, or the structure of a tissue, cotton blue is excellent. It serves well for the cortical hyphae of the excipulum, which are often adspersed by the well known small grains, and therefore difficult to follow. Cotton blue stains the protoplasmatic contents of the hyphae, but unfortunately not their wall. It also stains the gonidia.

Another good stain is aniline blue. It stains the contents of the hyphae and the gonidia, but not the cell wall. Methylene blue is equally good. Elfving recommended polychromatic methylene blue as the best stain (Unters. über Flechtengonidien, 1913, p. 69).

I have been unable to find a good stain for the cell wall. I am thankful for suggestions.

Acknowledgements. To Mr. Adolf Hoel, director of Norges Svalbard- og Ishavs-undersøkelser, who organized our expeditions. He

has followed my work during all these years and supported it in very possible way.

To Dr. Anders K. Orvin, who was in command of the expedition in 1929, for helpful cooperation.

To my Norwegian lichenological friends, especially to Dr. P. F. Scholander, who worked up the Macrolichens of the expeditions together with me.

To my Swedish lichenological friends, especially to Dr. A. H. Magnusson, who determined our whole collection of the difficult genus *Acarospora*, and who repeatedly placed his great knowledge and experience at my disposal. Further to Mag. Rolf Santesson for valuable support on the genus *Staurothele*.

To Miss Renée Axelson for excellent photographic work for my plates.

Oslo, Sept. 14th, 1940.

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Verrucariaceae.

Verrucaria (Wigg.) Th. Fr.

1. (1) *Verrucaria aethiobola* Wbg.

Jacksonøya (sp. 16—20 μ). Myggbukta (sp. 20—27 \times 15—16 μ). Dusénfjorden (sp. 15—18 μ). — Kapp Humboldt (sp. 25—26 μ). — Celsiusfjellet (sp. 20 \times 8 μ). — Holmvika (sp. about 20 μ).

All the plants were sectioned, but in some of them the perithecia were so brittle that the sectioning did not succeed as was to be desired. In all my plants I found an entirely dark excipulum, a protruding, denudated vertex, and spores of the above mentioned size. The perithecia are rather small, a diam. of 0.35 mm is near the average size. The thallus is thin, either continuous or irregularly cracked. My plants are not far from var. *primaria* Vain.

Even if we limit *Verrucaria aethiobola* in this narrow sense it cannot be rare. It is found in places that are at times irrigated, preferably on hard rocks, but it is not directly calciphobous. It follows some other lichens, such as *Lecanora flavida*, *Staurothele fuscocuprea* and *St. per-radiata*.

2. (2) *Verrucaria margacea* Wbg.

Holmvika.

Thallus subcrassus, fuscus, irregulariter et leviter rimulosus. Perithecia majuscula, diam. 0.5—0.6 mm, elevata, vertice late denudata, sporae 25—30 \times 13—17 μ .

The large perithecia are often empty, but I detected spores in some of them. We have no type plant in our herb., my plant agrees well with a specimen from Kobbe Bay, Spitsbergen, leg. Malmgren, det. Th. Fries.

Nothing can be concluded on its distribution from this single find. It suggests a rather rare species, it should, however, be remembered that such plants are easily overlooked.

3. (3) *Verrucaria cataleptoides* Nyl.

Kapp Bennett. — Antartichamna.

Perithecia thallo obiecta, ostiolo solum denudato, sporae 20—22 μ .

As to colour a plant from Myggbukta agrees well with *Verrucaria aethiobola* var. *cinerascens* Vain. Havås Lich. Norv. No. 54. The thallus ascends so far up towards the ostiolum that it seems natural to refer at least my plant to *Verrucaria cataleptoides*, and not to *V. aethiobola*. I have always hesitated to regard these 3 species as specifically distinct. I have ventured to do it here, on account of my improved methods of sectioning.

4. (4) *Verrucaria arctica* Lynge.

Lich. Nov. Zemlya, 1928, p. 14, Lich. West Greenl., 1937, p. 12. Myggbukta. — Kapp Humboldt.

Found on rocks that contain some calcareous substance, and also directly on purely calcareous rocks. I have identified it in collections from Novaya Zemlya, East and West Greenland, the Spitsbergen *Verrucariae* have not yet been worked up. It is evidently widely distributed in the arctic.

It is distinguished by its short, broadly rounded spores, in the present plants I measured $10-12 \times 5-6 \mu$, in the Novaya Zemlya plants still broader ones, $8-12(-14) \times (6-8) 8-10 \mu$. The thallus varies much in thickness, as is usual in the *Verr. aethiobola* section, but I have not ventured a specific subdivision.

5. (5) *Verrucaria deversa* Vain.

Dusénfjorden, on a calcareous sandstone.

I obtained good sections of one perithecium, with the following results: Perithecia diam. 0.3—0.35 mm, basi tantum thallo immersa, excipulum integrum, fusco-fuligineum, amphithecio divergenti coronatum. Sporae (vulgo immaturae) $17-20 \mu$ longae, late ellipsoideae. — Thallus evanescens.

Vainio makes no mention of an amphithecium. After Zschacke, in Rabenhorst Kryptogamenflora, p. 95, it is an *Amphoridium*, "ohne Lagergehäuse" (amphithecium). If this is correct, my plant cannot be *Verr. deversa*, but possibly a n. sp. Zschacke does not say that he has studied Vainio's type plant, which is inaccessible to me now.

In Moskusoksefjorden I found another plant, which possibly belongs to the same species, but I was unable to get a good section of the very small perithecia, perhaps on account of a brittle excipulum, or, perhaps, mineral grains. The perithecia are 0.3 mm in diam., immersed with their lower half, the ostiolum is not pruinose, the spores $22-25 \times 12-13 \mu$ (the perithecia are often sterile).

Verrucaria grossa Nyl. has much larger perithecia (0.4—0.7 mm), *Verr. devergens* Nyl. too large spores ($30-36 \times 11-14(-18) \mu$). *Verr. integra* Nyl. has immersed perithecia and larger spores ($30-34 \times 12-20 \mu$).

Thelidium Mass.6. (1) *Thelidium aeneovinosum* (Anzi) Arn.

Kapp Humboldt, very scarce.

7. (2). *Thelidium velutinum* (Bernh.) Kbr.

Vain. Lich. Fenn. I, 1921, p. 130, ubi syn.

Blomsterbukta, in terra argillacea et supra muscos putrescentes, sparsum.

Thallus subtenuis, continuus, verruculoso-inaequalis vel hinc inde farinoso-dissolutus, albido-cinereus. — Perithecia semiimmersa, rotundata, parva, diam. 0.2—0.25 mm, amphithecia destitutum. Excipulum integrum, fuliginum, 25—40 μ crassum. Paraphyses non visae, asci angusti, maturi circ. 15 μ crassi, sporae longitudinaliter biseriatae, incoloratae, apiculatae vel apice rotundatae, 17—25 \times 5 μ . — Nucleus guttulis oleosis repletus, asci J rubescentes.

It is the first find of this very inconspicuous species in the arctic.

These are the only finds of *Thelidiums* in my collections, in Novaya Zemlya I found no less than 6 species.

Polyblastia (Mass.) Lönnr.8. (1) *Polyblastia terrestris* Th. Fr.

Landingsdalen, very scarce.

Sporae incoloratae, deinde leviter obscuratae, murales, octonae, magnae, usque ad 55—65 μ longae.

9. (2) *Polyblastia theleodes* (Somrft.) Th. Fr.

Kapp Bennett. — Moskusoksefjorden.

It was scarce, we should have expected it to be more common.

10. (3) *Polyblastia Sommerfeltii* Lynge.

Lich. Nov. Zemlya, 1928, p. 33, Lichens from West Greenland, 1937, p. 15.

Kapp Humboldt. — Veganeset.

It was no more common than the previous species. I have now identified it in collections from Novaya Zemlya, Spitsbergen where it is common, Iceland also common, and from East and West Greenland.

11. (4) *Polyblastia bryophila* (Nyl.) Lönnr.

Landingsdalen (sp. 29—45 \times 17—19 μ). — Kapp Bennett (sp. circ. 25 μ , excip. integr., fulig.). — Moskusoksefjorden (sp. 35—43 \times 17—22 μ). Kapp Humboldt (sp. 25—28 μ , excip. integr., fulig.).

Blomsterbukta (sp. 23—35 μ). — Sofiasundet, 5 km west of Robertsonøya (sp. 24—35 μ). — Husbukta (sp. 25—43 μ). Veganeset (sp. 25—30 μ). — Holmvika (sp. 24—27 \times 13, 28—35 \times 18—21 μ (excip. fulig.). Antarcticamna (sp. 25—27 μ , excip. fulig.). Mariaøya (sp. 25—33 μ , excip. fulig.).

A considerable number of plants, and of finds, suggests it to be quite common.

The spores are very often about 25 μ long, sometimes 25—30 μ , and but rarely longer, I have measured up to 45 μ . In the same perithecium the variation is not so great, one gets the impression that the spores ripen simultaneously. The distinction between this species and *Polyblastia Sendtneri* has always given me much trouble, after the spores alone it is difficult, if possible. The spores of *Pol. bryophila* are larger than in the other species, and the number of septa is greater. There are 5—7(—9) transversal septa in *Pol. bryophila*, and 3—5 in the other. In *Polyblastia Scandinavicae*, p. 18—19, Th. Fries stated the spore size to be 30—42 \times 14—26 μ , against 15—30 \times 9—14, Zschacke stated 25—46 \times 14—18, against 15—30(—33) \times 9—14 (*Verrucariaceae*, in Rabh. Krypt. Flora, 1933, p. 462 and 461). Th. Fries writes: “perithecium . . . nigrum” in *Pol. bryophila*, and “perithecium . . . nigrum vel nigricans” in *Pol. Sendtneri*, after Zschacke, l. c., resp. “Eigengehäuse schwärzlich, Lagergehäuse schwarz” and “Eigengehäuse farblos bis braunschwarz, bis zur Hälfte vom schwarzen Lagergehäuse überdeckt”.

In my collection I sectioned all the plants where an intermediate spore size was found, and I always found the excipulum brownish-black, even at the base. As is so often the case with arctic lichens the surface of the thallus is often destroyed, resulting in a farinose thallus.

12. (5) *Polyblastia nigrata* (Nyl.) Lönnr.

Landingsdalen. — Jacksonøya. — Holmvika.

Only a few plants were detected, but it is a very inconspicuous species. The dark thallus is poorly developed, the rather large perithecia (diam. up to 0.5 mm) are prominent, elevated, its excipulum dark. Spores eight in each ascus, muriform, uncoloured, large, 45—60 \times 21—26 μ .

13. (6) *Polyblastia gothica* Th. Fr.

Nya Skand. Lafarter, No. 27, Bot. Not. 1865, p. 112, Lich. Spitsb., 1867, p. 48, Polybl. Scand. 1877, p. 26. — Smith, A. L.: Brit. Lich. II, 1926, p. 334.

Kapp Herschel, supra muscos putrescentes et terram humosam.

Thallus gelatinosus (?), subnigrescens. Perithecia minuta, diam. 0.2 mm, semiimmersa, excipulum fuligineum, sporae plus minusve ob-

scuratae, subfusiformes, murales, septa transv. 6—8, septa long. 3, 20—25(—30) \times 9—11 μ .

Perhaps the most inconspicuous lichen in my collection. Such plants are hardly ever observed in nature, but they are detected at home when other lichens are studied under a good lens of high power (\times 16, or more).

Not previously found in Greenland, but Th. Fries recorded it from Spitsbergen. There were many gonidia in the humose substratum, the gelatinous thallus is due to a *Nostoc*. The true gonidia of this species could not be identified. I do not know whether there really are any, it may also be a Micromycet. I have no material for comparison, but the plant agrees to the point with Th. Fries's description.

Staurothele (Norm.) emend. Th. Fr.

14. (1) *Staurothele clopima* Th. Fr.

Kapp Stosch. — Celsiusberget. — Husbukta.
It is scarce and rare.

15. (2) *Staurothele fuscocuprea* (Nyl.) Zschacke.

Kapp Herschel, 650 m. — Jacksonøya. Myggbukta. Kapp Bennett. — Moskusoksefjorden, 375 m. Kapp Humboldt. Dusénfjorden. Blomsterbukta. — Celsiusfjellet. — Husbukta. — Holmvika. Kapp Petersens.

It is found on hard rocks, which are occasionally irrigated, and in such places it is almost ubiquitous. *Staurothele fuscocuprea* is undoubtedly the commonest of all *Verrucariaceae* in North East Greenland. As was to be expected a plant of this frequency must be variable, but on the whole its habitus is very characteristic, it was admirably described by Malme in his paper: "De svenska arterna av lavsläktet *Staurothele* Norm.", Svensk Bot. Tidskr., 1919, p. 194—203. Its gonidia hymenialia vary from 5—15 μ , usually 7—10, or 12 μ , its spores from 40—55 \times 17—25 μ , but I have measured spores so small as 30 μ .

Mag. Santesson as well as myself have been much interested in finding *Staurothele clopimoides* in my very great material. As is usual in arctic plants the thallus is often very thin, and in such plants the difference between the two species will diminish. After much deliberation we did not venture to refer any of my plants to that species.

16. (3) *Staurothele perradiata* Lynge.

Lich. West Greenland, 1937, p. 16, pl. I, fig. 4.

Myggbukta. — Moskusoksefjorden. Dusénfjorden. Blomsterbukta. — Celsiusberget. Sanddalen. — Holmvika. Antartichamna.

A quite common species, though much less common than the preceding species, with which it is generally associated.

It is distinguished by its radiating, discrete marginal lobes. In extreme cases its whole thallus is dissolved into more or less discrete, convex to verrucose, often very short lobules. Such plants deserve a name, f. *dissoluta* Lynge, n. f.: Thallus in lobulis parvis vel verrucis plus minusve discretis dissolutus (Dusénfjorden, Blomsterbukta).

If the thallus is very pauvre in *Staurothele fuscocuprea* similar plants are seen also of this species, dissolved into more or less discrete lobes. In such cases the distinction between the two species is difficult. But Mag. Santesson agrees with me in regarding *Staurothele perradiata* a distinct species.

17. (4) *Staurothele fissa* (Tayl.) Zw.

Jacksonøya, rare and scarce.

These were the only plants, which could with certainty be referred to this species. Plants with short gonidia hymenialia should always be reexamined, for in *Staurothele fuscocuprea* they are sometimes as short as $5\ \mu$, other perithecia in the same plant will then give longer gonidia.

Dermatocarpaceae.

Dermatocarpon (Eschw.) Th. Fr.

18. (1) *Dermatocarpon inconspicuum* Lynge n. sp.

Celsiusberget, in rupe arenaria non calcarea.

Thallus aut caespites minutos formans, 2—3 mm latos, aut subcrustaceus, thallus bullato-verrucosus vel papillatus, verrucae circiter 0.3—0.35 mm latae et 0.5 mm crassae, atrae, epruinosa. Thallus etiam subtus ater, gompho protracto substrato affixus.

Thallus secundum superficiem strato angusto, 17—20 μ alto, fusconigrescenti instructus, hyphis haud leptodermaticis, constrictis septatis, articulatis formato, intra hoc stratum obscuratum incoloratus, plectenchymatice cellulosus (ut in *Leptogia*), centrum versus hyphis leptodermaticis, ramosis, sat dense contextis, sed non plectenchymaticis.

Ostiolum supra thallum levissime elevatum, perithecia rotundata, diam. 200—250 μ , perithecium circum ostiolum infuscatum, praeterea incoloratum. Asci angusti, sporas octonas uni- vel biseriatas continentes. Sporae incoloratae, simplices, 10—13 \times 6—7 μ . — Pycnides non visae.

The genus *Dermatocarpon* was treated in the first part of our publication: Lynge—Scholander Lich. from N. E. Greenland, I, 1932, p. 17—20. But this most inconspicuous species had been overlooked, and placed with the crustaceous lichens, reserved for this second part of our report.

It is characterized by its minute black button-like verrucae, contiguous in their exterior part where they form an almost crustose surface. On their lower side they are fixed to the rock by a protracted, stalk-like gomphus. In a section the surface is brownish-black all over the "button", formed of constricted, not quite thin-walled hyphae, otherwise the thallus is colourless. Under this stratum the thallus is plectenchymatous from the upper side and downwards, but in the inner and lower part of the medulla this texture is dissolved into a more hyphose tissue. In the gomphus the hyphae are directed lengthways, as was to be expected.

The large perithecia fill a great part of the thallus. The dark wall around the ostiolum is developed slightly farther down than the dark cortex.

The accompanying plants were i. a. *Caloplaca elegans* and a *Staurothele*. The latter species perhaps suggests a substratum which is at times irrigated.

The plant has been discussed with Dr. Rolf Santesson, Upsala, who has studied our northern pyrenocarpous lichens, but neither of us could find anything, with which to compare it. It is very much smaller than the small *Dermatocarpons*, described by Vainio in his Lich. Fenn. I, and his species have been described as "lobatae" or "polyphyllae", *Derm. inconspicuum* has no lobes, and no leaves, but only "verrucae" or "bullae".

Since 1932 I have further studied the northern *Dermatocarpons* and found that our N. E. Greenland material of *Derm. miniatum* var. *complicatum* should be referred to *Derm. polyphyllum* (Wulf.) DT. & Sarnth., a species which has previously been largely overlooked in Scandinavian literature.

In the arctic it may be difficult, if possible, to distinguish between *Derm. rufescens* (Ach.) Th. Fr. and *Derm. hepaticum* (Ach.) Th. Fr., for the reduced squamules of the former species are generally more adpressed than in southern regions. It now seems uncertain to me whether the latter species is really found in the arctic.

Lecanactidaceae.

Catinaria Vain.

19. (1) *Catinaria athallina* (Hepp) Lynge.

Myggbukta, on a calcareous rock.

It was found but once, and it was very scarce. It should, however, be remembered that it is one of the most inconspicuous crustaceous lichens.

*Chryso-trichaceae.**Crocynia* Mass.20. (1) *Crocynia neglecta* (Nyl.) Hue.

Landingsdalen. — Jacksonøya. Myggbukta. Terneøya. Kapp Bennett. — Moskusoksefjorden. Kapp Humboldt. Dusénfjorden. Kierulffjorden. — Veganeset. — Kapp Simpson. Holmvika. Kapp Petersens. Dicksonfjorden.

Perhaps not plentiful, but evidently found all over the region.

21. (2) *Crocynia arctica* Lynge n. sp.

Loch Fyne. Moskusoksefjorden (typus). — Mariaøya.

I did not find it, we are indebted to the good eyes of Dr. Scholander for all these finds. In addition to them comes a plant from Tasiussaq in the Angmagssalik district, collected by Mr. Kruuse in 1902. It is not supposed to be common.

Thallus suborbicularis, parvulus, 2—4 cm latus, uniformis, crustaceus, in periphèria non lobatus vel squamulosus; si bene evolutus globulis parvis, diam. 175—275(—350) μ , farinaceis formatus, saepe tamen globulis confusis crustam rugosam subamorpham vel leprosam habet. Thallus mollissimus, albissimus, subtus sensim in rhizinas arachnoideas transiens.

Cortex omnino deficiens. Hyphae intricate ramosae, anastomosantes, granulis angulatis adeo adpersissimae ut saltem indistincte visae.

The French lichenologist, L'abbé Hue has written a monograph on the genus, *Monographia Crocyniarum*, published after his death by Dr. Bouly de Lesdain (Bull. Soc. Bot. France, 1924, p. 311—402).

The subdivision is largely based on the gonidia. Being unable to identify them myself, I submitted the question to Dr. H. Printz, who found *Trentepohlia* as well as *Cystococcus* out of the question. He suggested *Pleurococcus* or perhaps rather a *Chlorococcus*. He added: "Lichen gonidia are not always easily identified".

One of my best plants was sent to Dr. Bouly de Lesdain, who was kind enough to examine it and to answer: "il s'agit ici d'un *Crocynia* non décrit dans la monographie de Hue". Unfortunately he did not state its affinity. To judge from the monograph it may be related to our northern *Crocynia lanuginosa*, from which it differs in its entirely uniform crusta, without any indication of marginal squamules.

I am not inclined to call it soorediated, but that is almost a matter of tact, for such soft, glomerulose thalli easily break up into sooredioid structures. The globuli often fuse together, forming a white, almost amorphous crusta.

*Diploschistaceae.**Diploschistes* Norm.22. (1) *Diploschistes scruposus* (L.) Norm.

Myggbukta. — Moskusoksefjorden, 900 m. — Röhssfjorden. Ella-øya: Bjørnsjøen (leg. B. Wörn 1936).

Supposed to be rare, there are but a few plants, and they are not well fertile. In the arctic it is often sterile, but its faintly red reaction with CaCl_2O_2 will distinguish it from a *Baeomyces*.

It is found in South Greenland here and there. Along the west coast we have plants from Disko, Holsteinsborg, Godthaab, and Juliane-haab, on the east coast from Scoresby Sound, in addition to the present finds.

*Gyalectaceae.**Ionaspis* Th. Fr.23. (1) *Ionaspis epulotica* (Ach.) Th. Fr.

var. *arctica* (Lyngé) Magn.

Magnusson: Monogr. of *Ionaspis*, 1933, p. 16.

Myggbukta. — Dusénfjorden. Blomsterbukta.

Found on calcareous sandstones, evidently not common.

24. (2) *Ionaspis suaveolens* (Schaer.) Th. Fr.

Jacksonøya, on basalt, scarce and found nowhere else.

25. (3) *Ionaspis cyanocarpa* (Anzi) Th. Fr.

Blomsterbukta, on a sandstone, containing some calcareous substance.

The thallus is considerably better developed than in most other plants of this species in my material. On the same substratum I found an *Ionaspis epulotica*, with an equally thick thallus, this substratum is favourable to many lichens.

26. (4) *Ionaspis annularis* H. Magn.

Magn.: Monogr. of *Ionaspis*, 1933, p. 35.

Blomsterbukta, on a calcareous sandstone.

Apothecia very numerous, with a distinct margin. Hymenium about $100\ \mu$ high, smaragdine in its upper part, violet by HNO_3 . Paraphyses here and there ramose in their upper part, spores about $15\ \mu$ long, pycnoconidia $6\ \mu$.

Gyalecta (Ach.) Zahlbr.27. (1) *Gyalecta foveolaris* (Ach.) Schaer.

Landingsdalen. — Blomsterbukta. — Husbukta. Veganeset.

Rare and scarce, there are but a few plants in my collection.

The thallus is not so well developed as it generally is in Norwegian plants, in some plants it is almost lacking. But thick or thin, it is not the more leprose thallus of *G. geoica*. I have examined the spores of plants from each find, and measured them to be 16—21 μ long. The hymenium is very often dehiscent.

*Coenogoniaceae.**Coenogonium* Ehrbg.28. (1) *Coenogonium nigrum* (Huds.) Zahlbr.

Mainland near Archerøya, leg. Scholander. Found but once in the southern part of our region.

*Ephelaceae.**Ephebe* E. Fr.29. (1) *Ephebe lanata* (L.) Vain.

Holmvika, very scarce.

Supposed to be rare, for it was found but once, in the southern part of our region.

*Pyrenopsidaceae.**Pyrenopsis* Nyl.30. (1) *Pyrenopsis pulvinata* (Schaer.) Th. Fr.

Kapp Simpson.

I found one plant of this inconspicuous species, growing on soil, with *Lecidea demissa*. It is easily overlooked.

*Pannariaceae.**Placynthium* S. Gray.31. (1) *Placynthium asperellum* (Ach.) Trev.

Landingsdalen. Kapp Herschel. — Loch Fyne, 350 m s. m. Jacksonøya. Myggbukta. Kapp Bennett. — Moskusoksefjorden up to 1350 m s. m. Kapp Humboldt. Dusénfjorden. Blomsterbukta. — Celsiusberget. Sanddalen. Four km west of Robertsonøya. — Gåsøya. Husbukta. Veganeset. — Holmvika. Antartichamna. Kapp Petersens. Mariaøya.

Placynthium asperellum is one of the commonest of all lichens all over the region. It is the single really common *Pannariacé* there. It varies as usually.

32. (2) *Placynthium pannariellum* (Nyl.) H. Magn.

Dusénfjorden. — Gåsøya, on a brooklet, together with *Plac. asperellum*.

The thallus is of a pale greyish-brown colour, fruticulose-ramose with applanated, coarse lobes. The thallus is paler, and the squamules coarser and more incised than in *Plac. nigrum* (Malme Lich. Suec. No. 244), and the marginal lobes are somewhat applanated. There is a bluish-black hypothallus surrounding the thallus. The spores are 1—3-septated, 15—18 μ in length. The rock is not calcareous.

In Jacksonøya I collected a plant which resembles *Plac. nigrum* very much, unfortunately it was a young and sterile plant which it is hardly possible to determine with certainty.

Pannaria Del.33. (1) *Pannaria pezizoides* (Web.) Trev.

Landingsdalen. — Myggbukta. Kapp Bennett. — Kapp Humboldt. — Veganeset. — Antartichamna. Mainland near Archerøya.

In the more maritime part of our region this species is common and perfectly developed. Have we overlooked it in the more continental parts, or is it missing there?

Psoroma Nyl.34. (1) *Psoroma hypnorum* (Vahl) S. Gray.

Landingsdalen. Finschøya. — Myggbukta. Kapp Bennett. — Kapp Humboldt. — Veganeset. Husbukta. — Antartichamna. Kapp Petersens. Dicksonfjorden.

Widespread and common, but generally not plentiful. As is often the case in the arctic the plants are generally small, at times developed only as sterile granules. If fertile, the apothecia are not as large as in Norway. But fine plants are also found, even farthest north.

Parmeliella Müll. Arg.35. (1) *Parmeliella lepidiota* (Somrft.) Vain.

Landingsdalen. Kapp Herschel. — Jacksonøya. Myggbukta. Kapp Bennett. — Moskusoksefjorden, c.fr. Kapp Humboldt, c.fr. Blomsterbukta. Kierulffjorden. — Husbukta. Veganeset. — Röhssfjorden. Mariaøya.

The number of plants, and of localities, suggest a common and widespread species. Apothecia are very rare, and spores not always developed. They are thick-walled, smooth, 13—15(—18) μ long, the same size was found in West Greenland plants. The colour of the squamules is very variable, in some of them cervine, in others considerably darker, var. *tristis* Th. Fr. We cannot attribute much systematic importance to this difference.

*Lecideaceae.**Lecidea* (Ach.) Th. Fr.*Clavis specierum.*

I Species saxicolae.

1. Medulla J caerulescens.
2. Thallus KOH rubescens.
 3. Thallus (saepe inconspicue) sorediatus, P—. 40. *L. subsorediza* Lynge, p. 42.
 - 3*. Thallus sorediis omnino destitutus, P. intense flavescens.
 39. *L. pantherina* (Ach.) Th. Fr., p. 41.
- 2*. Thallus KOH non rubescens.
 3. Thallus fuscus. 41. *L. atrobrunnea* (Ram.) Schaer., p. 42.
 - 3*. Thallus cinereus vel albescens vel glaucescens.
 4. Apothecia immersa, thallum subaequantia. 36. *L. tessellata* Flk., p. 40.
 - 4*. Apothecia supra thallum plus minusve elevata.
 5. Hypothallus nigricans vel deficiens.
 6. Sp. anguste oblongae, $6-11 \times 2.5-3.5 \mu$, excipulum J caerulescens, medulla praeterea J—. 28. *L. auriculata* Th. Fr., p. 37.
 - 6*. Sp. (saepe late) ellipsoideae, etiam thallus J caerulescens.
 7. Hypothecium (fusco-)nigrum, thallus glaucescens, apothecia mox convexa, sp. late ellipsoideae, $7-9 \times 5-7 \mu$.
 35. *L. confluens* Fr., p. 39.
 - 7*. Hypothecium dilute fuscum, thallus cinerascens (vel in f. f. ochraceus), apothecia diu plana, deinde depresso convexa, sp. ellipsoideae, $8-13 \times 5-6 \mu$. 38. *L. lapicida* Ach., p. 41.
 - 5*. Hypothallus (albido-)glaucescens, subradiatus, thallus cretaceus, fissuris densis percursus, sp. $8-10 (-11) \times 6-7 (7.5) \mu$.
 37. *L. rimosissima* Lynge, p. 40.
- 1*. Medulla J non caerulescens.
 2. Medulla KOH rubescens (crystalla fasciculata praecipituntur).
 46. *L. Lulensis* (Hellb.) Stiz., p. 45.
 - 2*. Medulla KOH non rubescens.
 3. Thallus cephalodiis instructus, sp. majusculae, $17-27 \times 7-12 \mu$.
 30. *L. panaeola* Ach., p. 38.
 - 3*. Thallus cephalodiis destitutus, sed sorediis (saepe inconspicuis) instructus, vulgo sterilis.
 4. Thallus albidus, tenuis vel tenuissimus. 32. *L. albuginosa* Nyl., p. 39.
 - 4*. Thallus ochraceus, modice incrassatus.
 33. *L. melinodes* (Kbr.) Magn., p. 39.
 - 3**. Thallus cephalodiis sorediisque destitutus.
 4. Thallus ferrugineo-rufus, apothecia (saltem ab initio) thallo immersa.
 34. *L. Dicksonii* Ach., p. 39.
 - 4*. Thallus non ferrugineo-rufus.
 5. Paraphyses facillime discretiae (in aqua).
 6. Paraphyses (saltem p. p.) valde clavato-incrassatae, sursum obscuratae, asci cylindrici, sp. subglobosae, $5-8 \mu$ crassae, apothecia parva, diam. 0.35—0.6 mm, thallus evanescens.
 19. *L. ultima* Th. Fr., p. 32.
 - 6*. Paraphyses sursum non vel levissime incrassatae, apothecia majora.
 7. Asci cylindrici, apothecia innata. 18. *L. tenebrosa* Flot., p. 31.
 - 7*. Asci inflati, apothecia adnata.
 8. Thallus evanescens.
 14. *L. goniophila* var. *pungens* (Kbr.) Nyl., p. 29.
 - 8*. Thallus melius evolutus, vulgo granulatus.
 14. *L. goniophila* Flk., p. 29.

- 5*. Paraphyses concreatæ.
6. Hypothecium obscurum.
7. Apothecia minuta, diam. 0.3—0.35 mm, urceolata.
24. *L. Orvini* Lynge, p. 33.
- 7*. Apothecia majora, non (vel tantum ab initio) urceolata.
8. Hymenium angustum, 45—60 μ , in rupibus durioribus.
9. Apothecia majuscula, 1—2.5 mm, excipulum violaceo-nigrum (KOH), hymenium superne fuligineo-smaragdulum, sp. 6—11 \times 2.5—3.5 μ . 28. *L. auriculata* Th. Fr., p. 37.
- 9*. Apothecia ad 1 mm lata, excipulum fusco-nigrum, hymenium intense smaragdulum, sp. 11—13 \times 4—5 μ .
23. *L. vorticosa* (Flk.) Kbr., p. 33.
- 8*. Hymenium altius, 80 μ , subincoloratum, sp. majores, 15—17 \times 10—12 μ , areolæ cretaceæ, discretæ; in rupibus calcareis.
31. *L. Dusénii* Lynge, p. 38.
- 6*. Hypothecium incoloratum vel subincoloratum.
7. Thallus fuscus vel (fusco-)nigricans.
8. Hymenium superne fusco-fuligineum, sp. 10—15 \times 5—6 μ .
47. *L. aenea* Duf., p. 45.
- 8*. Hymenium superne aeruginoso-fuligineum, sp. 7—8 \times 5 μ .
48. *L. picea* Lynge, p. 45.
- 7*. Thallus cinereus vel albido-cinereus (vel evanescens).
8. Sp. majusculæ, 15—20 \times 10—12 μ , hymenium 90—125 μ .
9. Thallus crassus, areolatus, apothecia demum maxima, usque ad 2 mm, in rupe basaltica crescens.
26. *L. Humboldtii* Lynge, p. 35.
- 9*. Thallus tenuis-evanescens, areolis subdiscretis, apothecia minora vel minuta, 0.2—0.7 mm, (vulgo) in rupibus calcareis.
10. Apothecia minuta, 0.2—0.3 mm, thallus evanescens.
25. *L. Celsii* Lynge, p. 34.
- 10*. Apothecia 0.5—0.7 mm, thallus melius evolutus.
27. *L. Hornii* Lynge, p. 36.
- 8*. Sp. parvæ vel mediocres.
9. Sp. anguste oblongæ.
10. Apothecia 0.5—0.8 (—1.5) mm, plana, sp. 7—11 \times 2.5—4 μ , thallus subevanescens. 29. *L. plana* Lahm, p. 37.
- 10*. Apothecia minuta, 0.3—0.35 mm, deinde alte convexa, sp. 9—13 \times 3—4 μ , thallus minute granulatus.
22. *L. conferenda* Nyl., p. 33.
- 9*. Sp. ellipsoideæ, 8—12 (—14) \times 4—7 μ .
10. Paraphyses sursum bene incrassatæ, 3—4.5 μ , sursum fuscae, areolæ verruculosæ, subeffiguratæ, cinereæ.
45. *L. leucophaea* (Flk.) Nyl., p. 45.
- 10*. Paraphyses sursum haud vel leviter solum incrassatæ, in KOH 1.5—1.7 μ , areolæ planæ vel depresso convexæ, sulphureo-albidæ vel albidæ.
11. Hymenium superne olivaceum vel aeruginosum.
12. Hypothallus ater, excipulum fuscescens.
44. *L. atromarginata* Magn., p. 45.
- 12*. Hypothallus evanescens, rarius glaucescens, excipulum in parte exteriori aeruginosum.
42. *L. elata* Schaer., p. 43.
- 11*. Hymenium superne fusco-fuligineum.
43. *L. mollissima* Lynge, p. 44.

II. Supra terram, muscos vel plantas emortuas.

1. Thallus squamulosus vel squamuloso-crustaceus, P—. Subgen. *Psora* (Hall.) Mass.
2. Squamae albidae vel glaucescentes (in herb. interdum in aetate in fusco-rubrescentem vergentes, sed semper albido-marginatae).
 49. *L. rubiformis* Wbg., p. 46.
- 2*. Squamae rubescentes. 50. *L. decipiens* (Ehrh.) Ach., p. 47.
- 2**. Squamae fuscescentes.
 3. Squamae contiguas, arcte adnatae. 51. *L. demissa* (Rutstr.) Ach., p. 47.
 - 3*. Squamae imbricatae, marginibus plus minusve liberae v. adscendentes.
 4. Squamae parvae (1.5 mm), hymenium 50—55 μ , paraphyses facile liberae. 52. *L. Scholanderi* Lynge, p. 47.
 - 4*. Squamae majores (3—7 mm), hymenium 75 μ , paraphyses cohaerentes. [*L. lurida* (Sw.) Ach.]
- 1*. Thallus crustaceus, uniformis Subgen. *Eulecidea* (Th. Fr.) Lynge.
2. Paraphyses facillime discretas.
 3. Sporae ellipsoideae, 7—17 \times 7—8 μ , asci inflati. 16. *L. Wulfenii* (Hepp) Arn., p. 31.
 - 3*. Sporae globosae, diam. 8—10 μ , asci cylindrici. 17. *L. Magnussonii* Lynge, p. 31.
- 2*. Paraphyses cohaerentes.
 3. Hymenium granulis caeruleis instructum, vel striis caeruleis variegatum, apothecia diu plana.
 4. Thallus tenuis, albido-cinereus, hymenium granulis caeruleis instructum, hypothecium obscurum. 9. *L. atrofusca* (Flot.) Mudd, p. 28.
 - 4*. Thallus passim subcaesio-variegatus, hymenium striis irregularibus caeruleis instructum, hypothecium pallidum v. fuscescenti-rubricosum.
 5. Thallus crassus, e verruculis toruloso-ramulosis contextus. 11. *L. ramulosa* Th. Fr., p. 28.
 - 5*. Thallus tenuis, minute granulatus vel arachnoideus. 10. *L. ementiens* Nyl., p. 28.
- 3*. Hymenium granulis vel striis caeruleis destitutum.
 4. Hypothecium obscurum.
 5. Thallus tenuissimus, hymenium angustum, 45—50 μ , (excipulum, hypothecium atque hymenium violacea, asci ventricosi, sp. 9—11 \times 5—5.5 μ). 13. *L. tenuissima* Lynge, p. 28.
 - 5*. Thallus crassus v. crassiusculus, albidus vel cinereus, hymenium 50—70 μ .
 6. Epithecium fuscum, paraphyses apice capitatae (KOH), apothecia demum convexa, fusco-nigricantia. 8. *L. Berengeriana* (Mass.) Th. Fr., p. 27.
 - 6*. Epithecium aeruginoso-fuliginosum, paraphyses apice haud incrassatae, apothecia mox convexa, atra. 12. *L. assimilata* Nyl., p. 28.
- 4*. Hypothecium incoloratum vel pallidum.
 5. Sporae dupliciter limbatae, 16—24 \times 10—16 μ . 5. *L. Tornoënsis* Nyl., p. 27.
 - 5*. Episorium tenue.
 6. Apothecia pallida, testacea vel rufescentia, hymenium superne dilute flavescens vel pallidum.
 7. Thallus crassus, e verruculis subcontiguis contextus, P. rubescens. 2. *L. cuprea* Somrft., p. 26.
 - 7*. Thallus tenuis, minute granulatus, P—.
 1. *L. vernalis* (L.) Ach., p. 26.

- 6*. Apothecia atra vel atrofusca, hymenium superne aeruginosum vel smaragdulum.
7. Thallus crassus, granulatus vel verrucosus.
8. Thallus e granulis subglobosis formatus, P—, sp. 16—22 × 6—9 μ . 7. *L. pallida* Th. Fr., p. 27.
- 8*. Thallus granulatus vel verrucoso-diffractus, P. rubescens, sp. 15—24 × 3—4 μ . [*L. alpestris* Somrft.]
- 7*. Thallus tenuis-tenuissimus, depresso verruculosus, P—, sp. 8—17 × 4—5 μ . 6. *L. limosa* Ach., p. 27.
- III. In ligno vel in ossibus.
1. Paraphyses facillime liberae. 15. *L. glomerulosa* (D. C.) Steud., p. 31.
- 1*. Paraphyses cohaerentes.
2. Hypothecium obscurum, epithecium cyanescens. 21. *L. xanthococca* Somrft., p. 33.
- 2*. Hypothecium incoloratum.
3. Epithecium incoloratum, granulosum, apothecia lutea vel olivacea, thallus bene evolutus, flavescens. 3. *L. symmicta* Ach., p. 26.
- 3*. Epithecium superne coloratum, non granulosum, apothecia fusca vel nigricantia.
4. Hymenium superne cyanescens, apothecia atra, convexa, thallus tenuis. 20. *L. kolaënsis* Nyl., p. 33.
- 4*. Hymenium superne fuscescens, apothecia fusco-atra, plana, thallus subevanesens. 4. *L. erythrophaea* Flk., p. 27.

36. (1) *Lecidea vernalis* (L.) Ach.

Landingsdalen. — Kapp Humboldt. — Gåsøya. Veganeset. — Holm-
vika. Antartichamna.

Lecidea vernalis is found all over the region, but it is nowhere
common.

37. (2) *Lecidea cuprea* Somrft.

Landingsdalen. — Veganeset.
Supposed to be rare.

38. (3) *Lecidea*, cfr. *symmicta* Ach.

Myggbukta, very scarce.

Thallus subcrassus, mollis, granulosus, subleprosus, flavidus vel stramineus. — Apothecia diam. 0.7—1.0 mm, arcte vel arctissime ad-
pressa, convexa, emarginata, discus olivaceo-nigricans, leviter pruinosis.
Excipulum gonidiis destitutum. Hymenium circiter 75 μ altum, superne
granulosum, fuscescens. Paraphyses arcte cohaerentes, sed KOH si addito
subdiscretae, connexo-ramosae, tenuissimae, sursum non incrassatae.
Sporae oblongae, 16—17 × 4—5 μ . — Hymenium J e caeruleo vinosum,
KOH subdecoloratum et granulae epithecii sese dissolventes. Thallus
CaCl₂O₂ immutatus.

Lecidea symmicta is a lignicolous or a corticolous species. The present plant was found on a twig which was fallen to the ground. Its soft and rather thick thallus is, perhaps, due to the moisture from the ground.

39. (4) *Lecidea erythrophaea* Flk.

Vegasundet, 5 km west of Husbukta, on drift-wood, scarce.

Thallus evanescens, apothecia plana vel subplana, hypothecium incoloratum. Hymenium superne fuscum, paraphyses cohaerentes, sursum capitatae, sporae oblongae, $13 \times 4 \mu$.

It is an interesting find, the first one from East Greenland. To my knowledge there is but one previous find from West Greenland (Nanortalik, leg. Eberlin, vide Lynge Lich. West Greenl., 1937, p. 44).

40. (5) *Lecidea Tornoënsis* Nyl.

Landingsdalen.

Curiously enough there was but one plant of this species which is fairly common in several other arctic regions, such as West Greenland, and in Spitsbergen.

41. (6) *Lecidea limosa* Ach.

Myggbukta. Kapp Bennett. — Kapp Humboldt. — Gåsøya. Veganeset. — Holmvika. Kapp Petersens. Dicksonfjorden.

Evidently fairly common. — Its spores are sometimes poorly developed, and at times apparently uni-septated. If so, it should be distinguished from *Toninia squalecens* with some care.

I have been much interested in finding *Lecidea alpestris*, but I have not succeeded in doing so. It is distinguished by its thicker thallus and its narrower spores (rather variable characters!), and best by its reaction with P. There are fine plants of *Lecidea alpestris* from West Greenland in our herb., and from Kangerdlugssuak (leg. Scholander), and from Scoresby Sound (leg. Hartz) in East Greenland, the latter locality being the northernmost on that side of the great island. In the arctic *Lecidea limosa* is, perhaps, a more northern plant than *L. alpestris*.

42. (7) *Lecidea pallida* Th. Fr.

Vegasundet: Gåsøya (one of the Scott Keltie Islands), scarce, and only found here.

43. (8) *Lecidea Berengeriana* (Mass.) Th. Fr.

Myggbukta. — Kapp Humboldt. — Veganeset. Husbukta. — Holmvika.

Not found in our northernmost localities, but otherwise scattered over the whole region, and evidently not rare.

44. (9) *Lecidea atrofusca* (Flot.) Mudd.

Moskusoksefjorden. — Veganeset.

Evidently scarce and rare. — In the small island Gåsøya I detected its var. *Templetonii* (Tayl.) Zahlbr. The blue grains in its hymenium are very distinct. Its spores are septated, two apothecia were examined, and I hardly found unseptated spores.

45. (10) *Lecidea ementiens* Nyl.

Landingsdalen. — Jacksonøya. — Husbukta.

Less common, and perhaps more northern than *Lecidea ramulosa*.

46. (11) *Lecidea ramulosa* Th. Fr.

Loch Fyne. — Kapp Humboldt. — Holmvika. Kapp Petersens. Dicksonfjorden. Ellaøya. Mariaøya.

On moist mosses, in low depressions in the soil that are often irrigated by cold water, and the like. In such places it is common, but there are more localities from the southern part of our region than from the northern.

It is easily distinguished from some formae of *Ochrolechia frigida* by its caesious colour.

47. (12) *Lecidea assimilata* Nyl.

Landingsdalen. — Kapp Humboldt. — Kapp Bennett. — Veganeset. — Kapp Simpson. Mainland near Archerøya. Antartichamna. Scattered all over the region, and not rare.

Its thallus is thinner than it usually is in well developed Scandinavian plants, but yet too thick for *Lecidea limosa*, and its hypothecium is too dark. Its thallus is greyish, not purely white. Spores 12—16, rarely as long as 20 μ .

48. (13) *Lecidea tenuissima* Lynge n. sp.

Moskusoksefjorden, on naked clayey soil, with *Lecidea decipiens*.

Thallus subevanesens, minutissime granulosis, albido-cinereis.

Apothecia parva, diam. 0.3—0.5 mm, sessilia, deinde basi leviter constricta, omnino atra, etiam madefacta, subconvexa, immarginata. Hypothecium violaceo-fuliginosum, excipulum obscurius violaceo-fuliginosum, hymenium angustum, 45—50 μ altum, violaceum, superne obscurius coloratum. Paraphyses cohaerentes, crassitudine mediocri et sursum levissime solum incrassatae. Asci ventricosi, octospori, spores ellipsoideae, 9—11 \times 5—5.5 μ .

Hymenium J e caeruleo vinosum, apothecia KOH in omnibus partibus magis violascentia. Thallus J—, KOH —.

There are but a few, small apothecia, but their structure is very characteristic. If compared with the *Lecideae* of Vain. Lich. Fenn., IV, we might find it related to *Lecidea subflexuosa* Vain., l. c. p. 34 and 362, that species is, however, "thallus KOH rubescens". Curiously enough Vainio gave no spore size, only: "spora rectae aut parce leviter curvatae, apicibus vulgo rotundatis, lateribus vulgo cylindricis", suggesting oblong spores.

49. (14) *Lecidea goniophila* Flk., s. lat.

Syn. *Lecidea stigmatea* Ach. + *L. goniophila* Flk. (= *Lecidea pungens* (Kbr.) Nyl.).

Kapp Wynn. Kapp Herschel. Revet, 260 m s. m. — Loch Fyne. 350 m s. m. Jacksonøya. Myggbukta. Kapp Bennett. — Moskusoksefjorden up to 700 m. Reinbukta. Kapp Humboldt. Dusénfjorden. Blomsterbukta. Kierulfjorden. — Celsiusberget. — Gåsøya. Husbukta. Veganeset. — Holmvika.

Lecidea goniophila is as common and as widespread as a lichen can be in the region. It was found in nearly all the places where crustaceous lichens were collected (in 1930 Dr. Scholander chiefly collected Macrolichens), and always in the greatest abundance. Found on basaltic and quartzitic rocks, not on calcareous rocks.

I have long thought it possible to distinguish specifically between a *Lecidea goniophila* Flk. (or *L. stigmatea* Ach.), and a *Lecidea pungens* (Kbr.) Nyl., vide my Lichens from West Greenland, 1937, pp. 51—52. But I am obliged to state that a study of my very large East Greenland material made that conception untenable to me.

Biatora pungens Kbr. was proposed by Koerber in Parerga Lich., 1865, p. 161. Its characters were then precisely defined by Th. Fries in Lich. Scand., II, 1874, p. 543: "crusta tenuissima, granulosa vel obsoleta; apothecia parva, plana, marginata; partes internae var. β . similes" (var. β . *pilularis* (Dav.?) Th. Fr.: "hypothecium pallidum; paraphyses apice fusco- vel caeruleo-nigricantes vel (vulgo) in violaceum vergentes"). I have examined the apothecia of Koerber Lich. Germ. No. 13 (*Biatora pungens*), and found: hypothecium uncoloured or very pale brownish, the exterior part of the excipulum brownish-black, inwards with a tinge of violet, otherwise the excipulum is either uncoloured or faintly violet. There was no distinct cortex set off from the interior of the excipulum, but in the exterior, dark part of the excipulum the hyphae were thicker, and they radiate towards the surface in a more or less fan-like manner (hyphae flabellatae).

A *Lecidea elaeochroma* var. *pungens* which Magnusson collected at Sydoster in Bohuslän agreed well with Koerber's plant.

It would have been of great interest to study *Lecidea goniophila* in Floerke's own herb. which I have been unable to do. According to Vainio

Lich. Fenn. IV, p. 259 *L. goniophila* Flk. in herb. Acharius (Helsingfors) corresponds to the plant which has generally been named *L. pungens*. It is not improbable that Floerke himself included all the saxicolous plants of this section under the name *L. goniophila*, for Floerke was not a man of narrow specific distinction. Koerber quotes Hepp Flecht. Eur. No. 129 (*Biatora goniophila*) as identical with *Lecidella goniophila*, as understood by him. I have sectioned Hepp No. 129, and found: the exterior part of its excipulum was bluish-black (against brownish- or violet-black in the *pungens* of Koerber's collection), and its hyphae were there much more distinct than in the said *pungens*, perhaps on account of a paler and more transparent colour.

In the majority of my Greenland plants the structure was as follows: Apothecia numerosa vel numerosissima, usque congesta, parva vel majuscula, diam. usque ad 1.5 mm, sessilia, sed basi distincte constricta, omnino atra. Discus interdum persistente planus, margine elevato, subnitido, crenulato, circumdatus, interdum deinde plus minusve convexus, margine excluso. Excipulum in parte exteriori (75—100 μ) haud intense smaragdulum et secundum superficiem smaragdulo-fulgineum, et ibi hyphis superficiei perpendicularibus, ramosis, pachydermaticis, 7.5—8 μ crassis formatum, excipulum praeterea incoloratum, etiam cum hypothecio. Hymenium altum, 100—110 μ , superne pulchre smaragdulum vel usque ad smaragdulo-nigrescens. Paraphyses facile discretas, in HCl subvalidas et sursum leviter solum incrassatas. Sporae late ellipsoideae.

Hymenium J e caeruleo intense vinosum (partes smaragdulae si exceptae).

From this great majority of plants differed a few ones in a violet to violet-black colour of the upper part of the hymenium and the exterior part of the excipulum: Dusénfjorden, Kapp Humboldt, Gåsøya, and Holmvika. The structure of their apothecia was the same as in the other plants. They agree fairly well with Koerber's *Biatora pungens*.

Vainio suggested a specific distinction in the pycnoconidia (Lich. Fenn. IV, p. 260). But fertile pycnoconidia are so rare that this character is of little use for practical work.

In the greater part of my Greenland plants the thallus is very thin, or lacking. A minutely granular thallus is very frequent. A really thick and well developed thallus is rare. I saw it in plants from Jacksonøya, but they were collected on rocks that were rich in nutrient, on account of the droppings from the sea-birds.

The sections were cut after Horn's method which made it possible to obtain very good results. It is of peculiar value that the sections must be heated in water in order to remove the paraffine, for this also removes the air. In such sections I only saw entirely uncoloured hypothecia. The darker, brownish, hypothecia which are so often described, are evidently due to an inclusion of air, in some cases, perhaps, to age.

50. (15) *Lecidea glomerulosa* (D. C.) Steud.

Claveringøya: Daudmansøyra, on bones. — Myggbukta, on drift-wood. Kapp Bennett, on drift-wood. — Moskusoksefjorden. Kapp Humboldt, on bones. — Husbukta, several places, on drift-wood, bones, and twigs. — Kapp Simpson, on bones. Ellaøya, on bones. Mariaøya, on wood.

A common plant on drift-wood and especially on bones of every kind which are so often met with all over the region (killed reindeers, bones in the rubbish of the Esquimaux camps). It is also, though rarely, found on decaying twigs, e. g. of *Salices*. Plants from drift-wood are almost athalline, ossicolous plants, on the contrary, generally have a well developed thallus.

As is so often the case in the *Elaeochroma*-section the synonymy is inextricable without a careful study of the types, which is in this case impossible at the present day. The species name *glomerulosa* dates from Lam. et D. C. Flore Franç., ed. III, vol. II, 1805, p. 347 (as *Patellaria glomerulosa*), the species name *euphorea* from Nylander Enumération générale, 1857, p. 126. If "*Patellaria glomerulosa*" really is our species, preference must be given to this name which is the oldest.

51. (16) *Lecidea Wulfenii* (Hepp) Arn.

Landingsdalen. Finschøya. — Loch Fyne. Myggbukta. Kapp Bennett. — Moskusoksefjorden, up to 900 m. Reinbukta. Kapp Humboldt. Dusénfjorden. Blomsterbukta. Kierulffjorden. — Celsiusberget. — Gåsøya. Husbukta. Veganeset. — Holmvika. Antartichamna.

The number of plants, and of localities, is large enough to show that it is equally common in North East Greenland, as it generally is in other arctic regions. Most probably I could have found it every day ashore.

52. (17) *Lecidea Magnussonii* Lynge.

Lynge Lich. West Greenl., 1937, p. 53.

Kapp Simpson.

This inconspicuous, though characteristic, species is easily overlooked, but yet it is supposed to be rare. In 1937 I also found it in Iceland in one locality.

53. (18) *Lecidea tenebrosa* Fw.

Moskusoksefjorden. — Kapp Simpson.

Supposed to be rare, there were but few plants.

The specific name *tenebrosa* dates from Flot. in Zwack Lich. Exsic., No. 134, 1852. It seems unnecessary to substitute this well known name with the little known *atrocinerea* (Schaer.) Vain. Lich. Fenn. IV, p. 244,

for as a specific name the latter dates from the same year: Mass. Rich. Lich. Crost., 1852, p. 39.

If *Lecidea griseoatra* Fw. apud. Schaer. Enum. Crit., 1850, p. 101, were the same as *Lecidea tenebrosa*, preference must be given to that name, as the oldest (Zahlbr. Cat. Lich., III, p. 776). But to judge from Th. Fries Lich. Scand. II, p. 460, this is not the case. There has evidently been some confusion between the present species and *Lecidea leucophaea* (Flk.) Th. Fr. s. 1.

54. (19) *Lecidea ultima* Th. Fr.

Th. M. Fries Lichens coll. during the Engl. Polar Exp. of 1875—76, Linn. Soc. Jour. Bot. vol. XVII, 1897, p. 363.

Ymerøya: Dusénfjorden, on a sandstone where the quartz grains were cemented by a calcareous substance. — Reinbukta, on a calcareous rock.

Thallus (in specimine) evanescens.

Apothecia numerosa, sed dispersa, parva, diam. 0.35—0.6 mm, sessilia, sed basi distincte constricta et anguste affixa, omnino atra. Discus ab initio planus et margine inconspicuo integro circumdatus, deinde depresso convexus, emarginatus. Excipulum violaceo-rubescens et in hypothecium subconcolorem transiens. Hymenium angustum, 50—55 μ altum, intense smaragdulum, superne (ob paraphysum apices) subfuliginium. Paraphyses facile discretæ, (vulgo) valde clavato-incrassatæ, et tum constrictæ articulatæ, sursum 5—8 μ crassæ, apicem versus obscurascentes, articulis apicalibus facile dehiscentibus. Aliae paraphyses (immaturæ?) non incrassatæ. Asci angusti, subcylindrici, 7—8 μ crassi, octospori. Sporae saepe uniseriales, minutæ, ellipsoideæ, 6—7 \times 3.5—4 μ .

Hymenium J caeruleo-nigricans, medulla J —, KOH —, excipulum KOH magis violascens.

I have never seen the type plant, but the species is so characteristic that it is hardly possible to be mistaken. In the present plants there is no visible thallus, Th. Fr. described a "Crusta tenuissima, disperse verrucosa, albida".

Previously only recorded from Floeberg Beach, Grant Land, it is an addition to the flora of Greenland.

Th. Fries referred it to his Stirps *Lecideae sylvicolae*. But it differs from that section in its discrete and very characteristic paraphyses, I might rather suggest a proper section *Lecideae clavatae* Lynge for it. It is so far monotypic in its section which is evidently of western origin. It is of great interest to find this western species on the east coast of Greenland, suggesting the same route of migration as that of several animals, such as the musk-ox, the polar wolf, and the reindeer.

55. (20) *Lecidea Kolaënsis* Nyl.

Vain. Lich. Fenn. IV, 1934, p. 230, ubi syn.

Antarctichamna, on drift wood.

An interesting extension of its known arctic range. It has previously been recorded from Novaya Zemlya (Lynge Lich. Nov. Zeml., 1928, p. 101), and from Jan Mayen, 1939, p. 20), but not from Greenland.

56. (21) *Lecidea xanthococca* Somrft.

var. *immutata* Vain.

Vain. Lich. Fenn., IV, 1934, p. 235, ubi syn.

Antarctichamna, on drift wood.

One of the most interesting finds in the collections, for it has previously not been found in Greenland, and, to my knowledge, not in the arctic.

57. (22) *Lecidea conferenda* Nyl.

Scott Keltie-øya: Husbukta, on a basaltic rock (no CO₂ by HCl).

Thallus granulis minutis, 0.2—0.3 mm latis, dispersis, cinereis, formatus.

Apothecia minuta, diam. 0.3—0.35 mm, valde convexa, basi contracta. Hypothecium subincoloratum vel dilute flavo-fuscescens, excipulum in parte superiori hypothecio concolor, in parte exteriori aeruginosum, hyphae ibi radiantes. Hymenium subincoloratum vel dilute aeruginosum, superne obscurius coloratum, olivaceo-fuliginosum, circ. 70—75 μ altum. Sporae raro evolutae, oblongae, 10 \times 2 μ .

In Lich. Scand. II, p. 560, Th. Fries describes an "Excipulum caerulescens vel nigricanti-violascens". In the present plant the colour is much paler, but I found quite the same in a plant, collected by Vainio at Jyväskylä in Finland.

58. (23) *Lecidea vorticosa* (Flk.) Kbr.

Kapp Wynn. — Jacksonøya. — Blomsterbukta. — Holmvika.

Apparently not common.

59. (24) *Lecidea Orvinii* Lynge n. sp.

Moskusoksefjorden, on a calcareous sandstone (CO₂ by HCl).

Thallus inconspicuus, abrupte limitatus, areolatus, areolae parvae, 0.5 mm haud superantes, crassitudine mediocri, irregulares, angulatae vel subrotundatae, contiguae vel magis discretiae, molles, plus minusve convexae, pallide cinerae. Hypothallus non visus.

Apothecia numerosa vel numerosissima, sed haud conglomerata, minuta, diam. 0.3—0.35 mm, supra thallum bene elevata et basi con-

stricta, omnino atra, epruinosa, nitida, urceolata; discus concavus, margine tumidulo integro et persistenti cinctus. Excipulum violaceo-carbonaceum, sensim in hypothecium transiens, hypothecium in parte superiori tamen dilutius coloratum. Hymenium subangustum, 65—70 μ altum, in parte superiori aeruginoso-fuligineum, strato amorpho incolorato tectum. Paraphyses cohaerentes, validae, superne haud incrassatae, 2—2.5 μ crassae, articulate septatae. Sporae rarissimae, paucas solum vidimus, 7—8 \times 5 μ .

Hymenium J flavescens, KOH subimmutatum v. leviter dilutius coloratum, excipulum KOH magis violascens. Medulla J —, KOH —, Pd —.

A very characteristic species on account of its minute urceolated nitidous apothecia. The thallus is covered with an morphous substance, about 10 μ thick, resulting in the grey colour of the areolae. A section shows an almost aeruginose stratum of a very lax structure between this cover and the gonidia. The gonidia are rather large, up to 17—20 μ in diam., and profusely sporulating.

The articuli of the paraphyses should not be mistaken for oblong small spores. But very few spores were seen in one apothecium, the others contained no spores.

It resembles *Lecidea vorticosa*, and is most probably related to it. This species has larger spores, 11—13 \times 4—5 μ , an intensely smaragdine hymenium, and a nitidous margin. In *Lecidea vorticosa* there is a distinctly red colour of the stratum gonidiale and corticale with Pd (observed in Kbr. Lich. Sel. 168 and also in Greenland plants).

Named in honour of Dr. Gunnar Orvin, leader of the expedition in 1929 when the present lichens were collected.

60. (25) *Lecidea Celsii* Lynge n. sp.

Sofiasundet: Celsiusberget, on a calcareous rock (typus). — Myggbukta, on calcareous slates in a brooklet.

Thallus tenuissimus vel evanescens, areolae tenuissimae, molles, subangulatae, 0.2—0.3 mm latae, albido-cinerascentes vel dilute cinerascentes, hinc inde visae.

Apothecia numerosa vel numerosissima, dispersa vel rarius congesta, parva, diam. 0.4 mm haud superantia, sessilia sed basi constricta, omnino atra. Discus persistenter planus (vel subconcavus), epruinus, margine elevato, integro, persistenti, subnitido cinctus. Excipulum in parte exteriori (40—45 μ) carbonaceum, praeterea incoloratum, etiam cum hypothecio. Hymenium circ. 90—95 μ , superne fuligineum vel olivaceo-fuligineum, praeterea incoloratum. Paraphyses cohaerentes, KOH si addito facilius discretiae, distincte septatae, sursum non incrassatae. Asci (saepe steriles) late saccati, membrana apice valde incrassata. Sporae octonae, late ellipsoideae, majusculae, 15—20 \times 10 μ .

Medulla J et KOH —, hymenium J caeruleo-nigricans, KOH —.

Habitually its apothecia resemble those of *Lecidea vorticosa*, but every detail in the internal structure distinguishes it from that species. I do not know where to place it in the sections of Th. Fries Lich. Scand., perhaps with the *Microleciidae*, anyhow it much differs from all the species in that section by its large spores.

The structure of its apothecia agrees fairly well with my *Lecidea macrospora*, Lich. Nov. Zeml., 1928, p. 92—93, differing, however, in its purely white and better developed areolae, and in its considerably larger apothecia, 0.5—0.8 mm, with less distinct margin. In the plant from Celsiusberget the thallus is pale rosy, due, perhaps, to an impregnation with a mineral substance.

61 (26) *Lecidea Humboldtii* Lynge, n. sp.

Ymerøya: Kapp Humboldt, on the plateau 3—400 m above sea-level, on a basaltic rock.

Thallus late expansus, in specimine usque ad 8—10 cm, crassus, peripheriam versus abrupte limitatus, areolatus, areolae depresso convexae, rimis latis separatae, magnae, usque ad 1—2 mm latae, areolae profunde et irregulariter rimosae, centrum versus ob rimas magis evolutas et profundiores in areolis secundariis minoribus, verrucosis usque ad columnaribus dissectae. Thallus pure cinereus vel ambitum versus dilutius coloratus, sorediis isidiisque destitutus; hypothallus haud visus.

Apothecia numerosa vel numerosissima, dispersa vel hinc inde congesta, sessilia, sed basi constricta et deinde supra thallum bene elevata, omnino atra, epurina et opaca. Apothecia juniora diu plana et margine tumidulo subintegro instructa, postremo maxima, diam. usque ad 2 mm lata, crenulata usque dissecta, et interdum valde irregularia. Excipulum in parte exteriori plus minusve distincte plectenchymaticum, dilute violaceo-fuligineum, praeterea incoloratum et sensim in hypothecium omnino incoloratum transiens, gonidiis omnino destitutum. Hymenium altum, 100—125 μ , superne olivaceo- vel aeruginoso-fuligineum, epithecium minute granulosum (HCl). Paraphyses arcte cohaerentes, tenuissimae et apice haud incrassatae, septatae (KOH). Asci inflati, circiter 25 μ crassi (KOH), vulgo steriles. Sporae majusculae, late ellipsoideae, (5—)17—20 \times (8—)10—12 μ .

Pycnides frustra quaesitae.

Hymenium J intense rubescens, KOH —, superne HNO₃ aeruginosum, medulla J, KOH et CaCl₂O₂ non coloratur.

The rather thick thallus is profoundly intersected by deep cracks, the marginal areolae are large, but in the mature central thallus they are so profoundly cut by the cracks that the microareolae become verrucose, in places almost columnar. If studied under a strong binocular

lens this thallus resembles a plateau mountain, profoundly eroded by the action of streaming water. On account of the very thick margin young apothecia become a somewhat aspicilioid habitus, but no gonidia could be found in the margin of the apothecia, not even in young ones.

The uncoloured hypothecium, very large apothecia, and large spores is a rare combination. *Lecidea superlata* Vain. (Adj. Lich. Lapp. II, 1883, p. 79, Lich. Fenn., IV, 1934, p. 209, pl. II, fig. 1) combines some of these characters, but it must be distinct on account of its small areolae, and its small, almost innate apothecia.

The plant had overgrown a *Staurothele fuscocuprea*, suggesting a moist substratum.

62. (27) *Lecidea Hornii* Lynge n. sp.

Myggbukta. — Kapp Humboldt. Dusénfjorden. — Celsiusberget (Typus). — Husbukta. — Holmvika.

It is a rather common species, found on rocks, containing some calcareous substance, also on sandstones, which are here often somewhat calcareous. (Some of the sandstones gave no CO₂ with HCl).

Thallus tenuis, interdum subevanescent, interdum melius evolutus, areolatus. Areolae subdiscretae vel rarius contiguae, tum crustam irregulariter rimosam formantes, 0.3—0.7 mm latae, rotundatae vel vulgo irregulares, superne minutissime rimulosae et eam ob causam rugulosae (sub lente, × 32). Thallus albidus, hypothallus non visus.

Apothecia numerosa vel numerosissima, et tum approximata, rotundata, parva, diam. 0.5—0.7 mm, sessilia, sed basi plus minusve constricta et eam ob causam supra thallum leviter elevata. Discus ater, epruinus, subopacus, diu planus et margine integro, nitido, elevato circumdatus, interdum deinde depresso convexus, margine magis excluso. Excipulum saltem in parte exteriori anguste aeruginoso-carbonaceum (40—50 μ), tum dilute fuscescens, et in parte centrali late incoloratum. Hypothecium incoloratum. Hymenium altum, 100—120 μ, superne aeruginoso-fuligineum, strato amorpho incolorato tectum. Paraphyses arcte cohaerentes, tenues, sursum haud vel leviter solum incrassatae, hinc inde ramosae (KOH). Asci non transverse rugosi, haud numerosi. Sporae saepe immaturae, late ellipsoideae, 16—20(—22) × 8—11 (—14) μ.

Pycnides non visae.

Medulla J —, KOH —, hymenium J e caeruleo subnigrescens, KOH immutatum, nisi superne magis olivaceum.

The identification of this species gave me great difficulties, especially on account of its habitual resemblance to *Lecidea albosuffusa*. The thallus of the latter species is often evanescent, in our species it is, on an average, better developed. It was, however, an investigation of the structure of its excipulum and hypothecium which solved the problem.

It is generally stated that the hypothecium of *L. albosuffusa* is »carbonaceum«. This is not quite adequate, for a good section shows that there is a thin uncoloured stripe in its upper part (Havås Lich. Norv. No. 422). But the rest of the hypothecium, and the whole excipulum, are black all through. This is very different from the structure of the present species where only the exterior part of the excipulum is darkened, and the whole rest is entirely uncoloured, apart from a narrow transitional zone.

The long axis of the spores is more variable than the short axis, short spores are sometimes almost globose. — In *L. albosuffusa* the asci are distinctly rugose across, this is not the case with the present species.

We can hardly refer a *Lecidea* of this structure to the *Lecidea panaeola*-section, as limited by Th. Fries in Lich. Scand. II, p. 502. And its spores are too large for the *Lecidea lithophila*-section of Th. Fries, l. c. p. 495. The fact is often brought before us that the flora of Crustaceous lichens in Greenland is different from that of Scandinavia.

The sectioning of such small apothecia is difficult. Common hand sections, cut between slices of elder pith or cork, were not good enough. But the Norwegian cytologist, Mr. Kristian Horn, taught me how to make excellent hand sections in paraffine. The method has been explained p. 8—9. I have therefore named the species in honour of him.

63. (28) *Lecidea auriculata* Th. Fr.

Dusénfjorden. Kierulffjorden.

I was astonished to find this species so rare. Is it apparent, or really so? If no spores are found in *Lecidea lapicida* f. *ecrustacea*, the two species should be distinguished with some care. In *L. auriculata* the excipulum is J bluish, and more violet by KOH, but the same is the case with the other species. The distinction is the low hymenium, about 40 μ in height, the dark hypothecium, and especially the narrowly oblong spores of *L. auriculata*.

Räsänen Lich. Fenn. No. 518: *L. auriculata* var. *evoluta* Th. Fr. can hardly be referred to that variety, its thallus is certainly not "bene evolutus" (Vain. Lich. Fenn. IV, p. 146).

64. (29) *Lecidea plana* Lahm.

Kapp Humboldt. Reinbukta. Kierulffjorden (f. *ecrustacea*). — Geogr. Society-Øya: Husbukta. — Kapp Simpson. Holmvika.

The material is large enough to suggest a quite common species. As is so often the case with arctic lichens, the thallus is poorly developed. Several plants are typically f. *ecrustacea*, in others the thallus is better developed, but a f. *perfectior* (Nyl.) Vain. is hardly attained.

f. *subconvexa* Lynge n. f.

Kierulffjorden.

Thallus tenuis, rimuloso-areolatus, albido-cinereascens. — Apothecia numerosissima, sessilia, p. m. p. ab initio plus minusve convexa, margine excluso. Hypothecium dilute fuscum, hymenium angustum, 45—50 μ , caeruleum et superne caeruleo-fuliginum. Paraphyses validae (2—2.5 μ), superne capitato-incrassatae, conretae (aqua), in KOH + HCl facile discretatae et distincte septatae, hinc inde ramosae. Sporae parcissime visae, oblongae, 8—10 \times 2.5—3.5 μ .

On account of its convex apothecia its habitus differs so much from the type of the species that it might deserve a proper name. — If cleared by KOH and next with HCl the tips of the paraphyses got a beautiful, purely blue colour, much more intensely so than I found in plants of the typical *L. plana* (Norrl. & Nyl. Herb. Lich. Fenn. No. 338 a). In *L. plana* the paraphyses are stoutish, as stated by Th. Fries Lich. Scand. p. 498. I could not confirm Vainio's measures “. . . paraphyses . . . cras. 0.001 mm, apice 0.002—0.003 mm”.

65. (30) *Lecidea panaeola* Ach.

var. *elegans* Th. Fr.

Scott Keltie-øyane: Gåsøya.

There are several localities known from South and West Greenland, and it is widely distributed in other arctic regions. I was, therefore, astonished to find only two specimens during the whole summer's work.

Neither *L. consentiens*, nor *L. pelobotrya*, was found, the latter species is one of the commonest *Lecideae* in Iceland.

66. (31) *Lecidea Dusénii* Lynge n. sp.

Ymerøya: Dusénfjorden near Kapp Graah on calcareous rocks.

Species pulcherrima, effusa, illimitata, areolata. Areolae tenues vel crassitudine mediocri, subdiscretatae vel omnino discretatae, 0.35—0.7 mm latae, rotundatae vel magis irregulares, albissimae, cretaceae, subplanae vel depresso convexae, varie rimulosae. Hypothallus non visus.

Apothecia numerosa vel numerosissima, sed dispersa, supra thallum bene elevata et basi constricta, diam. 0.5—0.7 mm. Discus planus, ater, epruinus, margine integro crasso, atro, persistenti circumdatus, etiam excipulum extus aterrimum. Excipulum intus obscure fusco-violaceum vel carbonaceum, strato tenui amorpho incolorato tectum, peripheriam versus hyphis flabelliformiter radiantibus et constrictis septatis formatum. Hypothecium cum excipulo confluit, in parte superiori dilutius coloratum. Hymenium circiter 80 μ altum, incoloratum aut superne hinc inde obscure striatum, guttulis (oleosis?) plus minusve inspersum et superne crystallis minutis instructum. Paraphyses plus minusve ramoso-connexae, sub-

validae (2—2.5 μ), sursum leviter solum incassatae, constrictae septatae, in parte superiori submoniliformes, articulis facile dehiscentibus. Asci saepe steriles, asci evacuati interdum transverse striati. Sporae incolouratae, simplices, 15—17 \times 10—12 μ .

Asci J caerulescentes, hymenium praeterea flavo-fuscescens. Medulla J et KOH immutata.

Its intensely white, small, discrete areolae with very raised small apothecia give it a habitus which I have seen in no other *Lecidea*, known to me. The structure of its apothecia approaches it to *Lecidea albosuffusa*. But that species has a higher hymenium, bluish above. And though I sectioned several apothecia (Arnold Lich. Exsic. No. 1179, Havås Lich. Norv. No. 422, well identified Swedish plants, and plants from Jenisei, det. Magnusson) I never found the moniliform paraphyses of the present species. The spores of *L. Dusénii* are shorter than in *L. albosuffusa* where they are 18—27(—29) \times 9—12 μ , acc. to Th. Fries Lich. Scand. p. 512 and Vain. Lich. Fenn. IV, p. 181.

67. (32) *Lecidea albuginosa* Nyl.

Syn. *Lecidea soredizodes* (Nyl.) Vain.

Revet, 260 m s. m. — Scott Keltie-øyane: Gåsøya, very scarce.

The thallus is very thin, hardly coherent, purely white, medulla J —, KOH —. Vainio quotes the above name as a synonym of *Lecidea soredizodes*, and there is no reason to doubt of this statement (Lich. Fenn. IV, p. 169). After our present rules of nomenclature we must give preference to Nylander's name of 1877, the other species name dates from 1934. Acc. to Vain. l. c. *Lecidea soredizodes* Lindau is another species, but Vainio did not state what it is.

68. (33) *Lecidea melinodes* (Kbr.) Magn.

Magn. apud Lynge Lich. from Jan Mayen, 1939, p. 18, ubi syn.

Kapp Humboldt, scarce.

This species is so common in most other arctic regions that it was astonishing to find it so rare in North East Greenland.

69. (34) *Lecidea Dicksonii* Ach.

Kapp Humboldt. — Kapp Simpson.

Like the previous species it is one of the commonest lichens in most other arctic regions, but very rare and scarce in North East Greenland. Kapp Simpson was one of the most barren points which I ever saw, but even in such places is it possible to find interesting lichens.

70. (35) *Lecidea confluens* (Wigg.) Ach.

Kapp Humboldt. Kapp Bennett. — Rare and scarce.

71. (36) *Lecidea tessellata* Flk.

Landingsdalen. Kapp Herschel. Revet, 260 m s. m. — Loch Fyne. Kapp Stosch. Jacksonøya. Myggbukta. Kapp Bennett. — Moskusoksefjorden. Reinbukta. Kapp Humboldt. Dusénfjorden. Blomsterbukta. Kierulffjorden. — Celsiusberget. West of Robertsonøya. — Gåsøya. Husbukta. Veganeset. — Kapp Simpson. Holmvika. Kapp Petersens. Röhssfjorden. Dicksonfjorden. Ellaøya.

This is one of the commonest of all lichens in the region. I could certainly have found it every day ashore.

Its thallus is often better developed than we are wont to find it in arctic lichens. But it is very variable, as was to be expected in a species which is so common, there are also plants with only a narrow thallus around a few apothecia. However variable it generally preserves its characteristic habitus.

72. (37) *Lecidea rimosissima* Lynge n. sp.

Jacksonøya. — Myggbukta. — Moskusoksefjorden, 1350 m s. m. Kapp Humboldt (typus). Blomsterbukta. — Holmvika. Antarctichamna. Kapp Petersens. Dicksonfjorden.

Evidently common and widespread, found on hard rocks, often on sandstones.

Thallus magnitudine mediocri, 3—4 cm latus, tenuis — tenuissimus, effusus, non vel haud areolatus, sed fissuris irregularibus densissime percursus, planus vel subplanus, cretaceus, albidus vel levissime in glaucescentem vergens, sorediis isidiisque destitutus, epruinus, secundum ambitum hypothallo glaucescenti, subradianti circumdatus. — Hyphae medullares valde adpersae.

Apothecia numerosa, rotundata vel hinc inde mutua pressione subangulata, majuscula, diam. usque ad 2 mm, supra thallum plus minusve, usque valde elevata, basi constricta, deinde subcolumnaria. Discus planus vel depresso convexus, ater, epruinus, margo proprio tenui integro, disco subconcolori, et etiam annulo thallino circumdatus. Excipulum ater vel potius fuscens, hypothecium fuscum, in parte superiori (25 μ) subincoloratum. Hymenium subangustum, 50—55 μ altum, superne olivaceo- vel aeruginoso-fuligineum. Paraphyses arcte cohaerentes, sat validae, sursum distincte clavatae (4 μ). Sporae male evolutae, 8—10 (—11) \times 6—7(—7.5) μ , apice late rotundatae.

Pycnides non visae.

Medulla J intense caerulescens, P —, KOH non mutatur, etiam CaCl_2O_2 immutata, hymenium J e caeruleo-fuligineum sordide rubescens.

The cretaceous thallus resembles some formae of *Lecidea elata*, from which it is easily distinguished on account of its positive reaction with J. The colour of its hypothecium is intermediate between the sections *confluens* and *silacea*. Its affinity is, perhaps, with *Lecidea speirea*, from

which it differs by its raised apothecia, its cretaceous, irregularly and densely rimose, but not areolated thallus, lower hymenium, thicker paraphyses, and smaller spores. In *L. speirea* the spores are $12-15 \times 6-8 \mu$, and somewhat apiculated. In *L. rimosissima* the apothecia are crowded towards the central parts of the thallus. Towards the circumference the thallus is dissolved into microthalli, often discrete, and the hypothallus is distinctly visible between them.

In *L. speirea* (Malme Lich. Suec. No. 420) there is also an uncoloured upper part of the hypothecium. If the hymenium is reckoned from the lowest beginning of the asci, it is about $80-85 \mu$, my statement in Vain. Lich. Fenn. IV, p. 109: $120-130 \mu$, is too high, it evidently includes also the uncoloured upper part of the hypothecium. In Malme l. c. I found that the paraphyses were hardly incrassated at the tips, even if treated with KOH. My observation in Vainio l. c. could not be confirmed: "in apice capitato- vel clavato-incrassatae", it was, perhaps, due to a mucilaginous cover, often seen in paraphyses which are so coherent. — *Lecidea speirea* has a more distinctly areolated thallus.

Lecidea rimosissima should also be compared with *Lecidea tessellata*. That species has more immersed, often pruinose apothecia with considerably paler excipulum and hypothecium, only in old plants more fuscous, and especially it has its well known areolated thallus, expressed by its name. In the arctic its surface has occasionally suffered so much that the areolation is less distinct.

73. (38) *Lecidea lapicida* Ach.

Landingsdalen. Clavingfjorden: Revet, 1200 m above sea-level. — Jacksonøya. Myggbukta. Kapp Bennett. — Moskusoksefjorden. Reindalen. Kapp Humboldt. Dusénfjorden. Kierulffjorden. — Gåsøya. Husbukta. Veganeset. — Kapp Simpson. Holmvika. Kapp Petersens. Dicksonfjorden.

Lecidea lapicida is common all over the region, investigated by us. — It varies considerably. By far the greater part of my material belongs to the f. *ecrustacea*. But better developed thalli are also found, even typical f. *declinans*. Such plants may be difficult of distinction from *Lecidea tessellata*, which differs in its more immersed apothecia, and its more typically areolated thallus.

74. (39) *Lecidea pantherina* (Ach.) Th. Fr.

Jacksonøya. Myggbukta. — Moskusoksefjorden. Kapp Bennett. — Kapp Simpson. Holmvika.

Fairly common, though much less abundant than in many other arctic and subarctic regions. The thallus is usually well developed, suggesting its var. *Achariana* Vain.

75. (40). *Lecidea subsorediza* Lynge.

Dahl—Lynge—Scholander Lichens from Southeast Greenl., 1937, p. 22.

Davysundet: Kapp Simpson, only found once.

76. (41) *Lecidea atrobrunnea* (Ram.) Schaer.

Landingsdalen. — Kapp Stosch. Jacksonøya. Myggbukta. Terneøya. Kapp Bennett. — Moskusoksefjorden, 700 m above sea-level. Kapp Humboldt. Dusénfjorden. Blomsterbukta. Kierulffjorden. — Sofiasundet: Celsiusberget, Sanddalen, and 5 km west of Robertsonøya. — Gåsøya. Husbukta. Veganeset. — Kapp Simpson. Holmvika. Kapp Petersens. Ellaøya. Mariaøya.

A very common and widespread species, evidently found all over the region. It is a very nitrophilous species, hardly ever lacking in the resting-places of the birds where it forms characteristic associations together with other lichens of the same biology, such as *Lecanora melanophthalma*, *Parmelia infumata*, *Xanthoria candelaria*, *Physcia dubia*, and *Ph. caesia*.

Excipulum in parte exteriori (13—20 μ) obscure olivaceo- vel aeruginoso-fuligineum, hyphae ibi superficiei perpendiculares, crassae (6 μ), constrictae septatae. Hymenium circiter 60 μ altum, dilute smaragdulum, superne smaragdulo-fuligineum. Paraphyses transverse septatae, subvalidae (2.5—3.5 μ), sursum incrassatae, 4—5 μ crassae. Membrana ascorum in apice leviter solum incrassata, sporae anguste ellipsoideae, 7—11 \times 4—5 μ . Hymenium J e caeruleo rubescens, HCl pulchre caerulescens.

Cortex areolarum 45—60 μ altus, in parte exteriori (circ. 15 μ) fuscus, praeterea incoloratus, hyphae corticis constrictae septatae, articulis exterioribus subglobosis. Cortex strato incolorato, crassitudine valde varianti, 25—125 μ (vel ultra) tectus.

Lecidea atrobrunnea is an extremely variable species. Its areoles are very convex to plane, but always thick. They may form a continuous crusta of some extent, or rest more or less, to entirely, discrete on a thin hypothallus, which is often black and radiating along the circumference, or paler in older parts.

Fine plants are of the brown colour (Th. Fries: "rufocuprea vel rufofusca") which we know so well in Scandinavian plants, sometimes with a narrow, white marginal zone. A good section shows that even such areoles are covered with an amorphous uncoloured stratum, unstained by J, which gives them the shining surface. In the arctic the white edge often expands over the areolae, in extreme cases resulting in a quite white colour, the areolae are then apparently necrotized. But a section shows that this is due to an increase in thickness of the amorphous

stratum, which may attain $125\ \mu$, or more. Under this stratum the cortex and the rest of the thallus are intact.

Th. Fries states: "Hypothecium incoloratum v. dilute fuligineo-fuscescens v. fuscescens" (Lich. Scand. p. 482), and Vainio: "Hypothecium dilute aut partim intense fuscescens" (Lich. Fenn., IV, p. 97). I have sectioned a considerable number of apothecia, from the present collection and from Scandinavian plants. A really thin section always had an almost uncoloured hypothecium, slightly darkened, perhaps, in age. A darker hypothecium was often due to an inclusion of air which could be removed by heating.

The spores are always poorly developed, but in each section I found a few of them. Their size was $7.5\text{--}11 \times 4\text{--}4.5\ \mu$, rarely up to $5\ \mu$ broad. We cannot always expect spores to swim horizontally in the water, if they do not, we will measure shorter spores.

In Lich. Exped. Antarct. Belge, 1903, p. 33, Vainio described *Lecidea brunneoatra* n. sp.: "Forsan est variatio *L. atrobrunneae*, sporis minoribus ($5\text{--}6 \times 3\text{--}3.5\ \mu$) et hypothecio albido ab ea differens". Vainio had overlooked the name *Lecidea brunneoatra* Zenk. (= *Catillaria ? brunneoatra* (Zenk.) Zahlbr.), and Zahlbruckner renamed the species *Lecidea Gerlachii*, Zahlbr. Cat. Lich. III, p. 587.

I. Mackenzie Lamb recorded this species from Christian IV Glacier in Kangerdlugssuak Fjord, East Greenland, south of our district. Mr. Lamb measured larger spores than Vainio, even in the type plant: $7\text{--}8 \times 3.5\ \mu$ (Vain.: $5\text{--}6 \times 3\text{--}3.5\ \mu$).

Dr. Lamb has been kind enough to send me a specimen of his plants, but unfortunately it has not reached me. Not having seen *Lecidea Gerlachii* I cannot get a clear conception of it. But it seems to me that the data, given by Vainio, as well as by Lamb, are within the limits of variation of *Lecidea atrobrunnea*.

At first I thought that some of my plants with plane areoles could belong to *Lecidea paupercula*. But their thallus is much too thick, and a section clearly showed an almost uncoloured hypothecium. *Lecidea paupercula* is not rare farther south on the east coast of Greenland, but so far it has not been found in our district.

77. (42) *Lecidea elata* Schaer.

Myggbukta. — Kapp Humboldt (f. *purissima*). Blomsterbukta (var. *marginata*). Dusénfjorden (f. *planula* and f. *purissima*). — Celsiusberget (f. *planula* and f. *purissima*). Sofiasundet 4 km west of Robertsonøya. — Husbukta. Veganeset. — Holmvika. Mariaøya.

Typical plants are characteristic enough, but some plants are not easily distinguished from *Lecidea atromarginata*. The difference in the tips of the paraphyses (*Magnusson Lecidea armeniacea und elata*, 1931,

p. 95) is insignificant; the best character is perhaps the black, distinct hypothallus of the latter species, which inspired its name to Dr. Magnusson. There are sufficient of plants, and of localities, to show that *Lecidea elata* is common and widespread, even with allowance for a few doubtful plants. But I found no plants in the northernmost part of our region.

A plant from Myggbukta which possibly belongs to this species was infested with *Tichothecium pygmaeum* (det. Dr. K. Keissler).

78. (43) *Lecidea mollissima* Lynge, n. sp.

Ymerøya: Blomsterbukta, in rupe calcarea.

Thallus in specimine 5—6 cm latus, albidus, mollis, centrum versus verrucoso-rimulosus, ambitu magis squamulosus, squamulae contiguae vel subdiscretae, convexae, in margine radiato-ruptae, saepe effiguratae et hinc inde hypothallo angusto, obscuriori circumdatae.

Apothecia sparsa, dispersa, ab initio thallo immersa, deinde excrecentia et supra thallum elevata, ad 1 mm lata. Discus ater, etiam madefactus, epruinosis, planus vel deinde depresso convexus, margine proprio tenui, integro, subpersistenti circumdatus, saepe etiam thallo annulatus. Excipulum gonidiis omnino destitutum, incoloratum, etiam cum hypothecio. Hymenium 70—75 μ altum, superne fusco-fuligineum et strato amorpho, tenuissimo tectum, non granulosum. Paraphyses cohaerentes, in KOH subdecolorantur et facilius discretae, distincte septatae, saepe divergente ramosae, sursum non incrassatae aut leviter incrassatae et tum constrictae septatae. Sporae parce evolutae, simplices, 10—12 \times 5—6 μ .

Hymenium J vinosum, medulla J et KOH immutata.

Along the margin the thallus quite calls to mind a *Toninia*, on account of its (often discrete) squamules with long radiating cracks at their circumference. Towards the centre the squamules are concrescent, forming a thick, soft crusta with irregular fissures and verrucose areoles. The plant had suffered much from a parasitic fungus, which did not fructify (*Torula*-hyphae).

The apothecia are at first quite immersed, later they grow out, and at last they are raised considerably above the thallus. They have a thin, black, proper margin, but full-grown apothecia are often surrounded with a thalline annulus, evidently carried along by the apothecia during their excrecence. It gives the plant a lecanorine habitus, but a good section easily reveals their lecideine nature. The apothecia are about 150 μ thick.

In the annulus the hyphae radiate towards the surface in a fan-like manner. There are numerous angular grains fixed to the thalline hyphae, as is so often the case with lichens, growing on a calcareous substratum.

I would refer the species to the *Lecidea elata* section. It is, perhaps, nearest related to *Lecidea elata* itself, from which it differs i. a. in the colour of its epithecium, which is "fuligineum vel fuligineo-smaragdulum" in *L. elata*, according to Th. Fries and Magnusson. I have seen no *Lecidea elata* of this peculiar habitus, it should, however, be remembered that the habitus may be much influenced by the parasitic fungus.

79. (44) *Lecidea atromarginata* Magn.

Studien über Arten der *Lecidea armeniacea*- und *elata*-Gruppe, 1931, p. 95, 135.

Loch Fyne. Myggbukta. Kapp Bennett. — Moskusoksefjorden.

It was a little unexpected that this species should be so rare in the region. I got valuable advice from Dr. Magnusson on the determination of this and the previous species.

80. (45) *Lecidea*, cfr. *leucophaea* (Flk.) Nyl.

Kapp Humboldt.

Greyish, subdiscrete and slightly effigurate verrucae, considerably damaged by Cyanophyceous algae, growing between them. The internal structure of the apothecia agrees with *Lecidea leucophaea*, but habitually the plant differs considerably, and the determination is approximate and open to objections.

81. (46) *Lecidea Lulensis* (Hellb.) Stiz.

Kapp Bennett. — Veganeset.

It was quite scarce, and I found it but twice. It must be rare in the region.

82. (47) *Lecidea aenea* Duf.

Kapp Humboldt. Blomsterbukta.

In Blomsterbukta it was plentiful, but on the whole it is supposed to be rare in North East Greenland.

83. (48) *Lecidea picea* Lyng.

Lich. Nov. Zemlya, 1928, p. 108, pl. IX, fig. 4.

Myggbukta. — Holmvika. On basaltic rocks, very scarce.

Thallus piceus, areolato-diffractus, areolae irregulares, rugosae vel rimosae. Secundum marginem hypothallus aterrimus, radiatus progressus est.

Apothecia numerosa, supra thallum elevata et basi constricta, omnino atra, nitida, ab initio et diu plana et margine nitido subintegro cincta, deinde convexa. Excipulum in parte exteriori KOH pulchre aerugino-

sum (etiam cum parte superiori hymenii), praeterea incoloratum, etiam cum hypothecio et parte majori hymenii. Paraphyses arcte cohaerentes, in KOH facilius discretatae, apice haud incrassatae, constrictae septatae, ramosae. Sporae parvae, $7-8 \times 5 \mu$.

It is not stained by paraphenyldiamin, and agrees in that respect with *Lecidea aenea*. — I have reexamined my Novaya Zemlya type plant and found a hymenium of the same height as in the Greenland plants. The remarkably high figure: 130—150(—160) μ in my first description also includes the hypothecium which is but little distinct from the hymenium, as is so often the case where the hypothecium is uncoloured. The type plant was described as lacking a hypothallus, but I added: "The black areolae advance irregularly at the margin". I am inclined to regard this a thick hypothallus, not much distinct from the black areoles. The violet colour in the exterior parts of the excipulum is more pronounced in the type plant. — In the Greenland plants the excipulum was "open" below, and there were some gonidia in the lower part of it.

This species which is new to Greenland is widely distributed. I have identified it from the Taimir Peninsula (leg. Sverdrup), Novaya Zemlya: Matotchkin Shar (type plant, leg. Lynge), and from Spitsbergen: Murchison Bay (leg. Scholander), to which come the present finds. Large Spitsbergen collections are under determination, they may contain additional plants.

84. (49) *Lecidea rubiformis* Wbg.

Landingsdalen. Kapp Herschel, 650 m s. m. — Jacksonøya. Myggbukta. Kapp Bennett. — Moskusoksefjorden, 1350 m s. m. Reinbukta. Kapp Humboldt. Dusénfjorden. Blomsterbukta. Kierulffjorden. — Celsiusberget. — Gåsøya. Husbukta. Veganeset. — Holmvika. Antarcichamna. Röhssfjorden. Dicksonfjorden.

It is as common and plentiful as a lichen can be, all over the region investigated by us.

In Norway it is not so rare as it has been supposed to be, it is found here and there in our northernmost provinces and in our southern high mountains above the forest line as far south as Haugastøl, Finse, and Sogn. Th. Fries writes that it is found "in fissuris rupium". This is a very appropriate expression, I have only found it in such localities. But in East Greenland I have only seen it growing directly on the naked soil. Its mighty "caespites" are very conspicuous, with *Lecidea decipiens* and other soil lichens.

This difference is evidently due to the soil conditions in Greenland. The Scandinavian rock fissures are well drained, and that is also the case with the dry soil of the arid North East Greenland.

It has a wide distribution in the arctic: Konyam Bay (Vega exp.), Novaya Zemlya (Lynge), Spitsbergen (very rare, Th. Fr.), East and

West Greenland, and Ellesmere Land. Its distribution along the American and Siberian arctic coasts is unknown, but it is supposed to be much more common in the western, than in the eastern arctic.

In Europe it descends as far south as to the Alps (Anzi, Jatta). In America it has been recorded down to the mountains of Colorado and Southern California (Hasse Lich. Flora of Southern Calif., p. 47). I have not seen the latter plants.

85. (50) *Lecidea decipiens* (Ehrh.) Ach.

Kapp Herschel. Revet. — Loch Fyne. Myggbukta. — Moskusoksefjorden. Kapp Humboldt. Dusénfjorden. Blomsterbukta. — Celsiusberget. — Gåsøya. Husbukta. Veganeset. — Holmvika. Kapp Petersens. Dicksonfjorden. Ellaøya.

Very common all over the region, as far as there is calcareous ground. The plants are perfectly developed, but the cortex is often destroyed (by a parasitic fungus).

86. (51) *Lecidea demissa* (Rutstr.) Ach.

Jacksonøya. Kapp Bennett. — Kapp Simpson.

Only found along the coast, and always very scarce.

87. (52) *Lecidea (Psora) Scholanderi* Lyngé n. sp.

Reinbukta. Blomsterbukta. Kierulffjorden. — Husbukta (typus). — Dicksonfjorden.

Found on soil which is not calcareous. Hardly plentiful, but it cannot be rare.

Thallus squamulosus. Squamae parvae, 1.5 mm haud superantes, rotundatae vel subrotundatae, integrae vel sublobatae, adpressae, crassae, convexae, rufo-fuscescentes, epruinosa, subnitidae et (sub lente) minute scabrosae.

Apothecia numerosa vel numerosissima, thallum interdum tegentia, diam. 0.5—1 mm, adpressa. Discus supra thallum leviter elevatus, ater, etiam madefactus, epruinosis, diu planus et margine distincto, concolori, ecrenulato circumdatus, deinde leviter depresso convexus, margine tum minus distincto. Excipulum in parte exteriori fusco-rubescens, hyphis crassis, flabelliformiter radiantibus, praeterea subincoloratum. Hypothecium incoloratum vel dilute flavo-fuscescens, parte inferiori hymenii concolor. Hymenium angustum, 50—55 μ altum, superne fusco-nigricans. Paraphyses facile vel facillime liberae, superne plus minusve clavatae, 2—2.5 μ vel interdum etiam crassiores, subcapitatae, 2.5—3.5 μ . Sporae saepe male evolutae, octonae, 10—15(—18) \times 4—5(—7) μ , variantes, ellipsoideae vel dacryoideae vel anguste oblongae et tum subrectae.

Pycnides non visae.

Hymenium J rubescens, epithecium KOH subimmutatum et HNO₃ magis violascens, partes coloratae excipuli KOH violascentes.

Lecidea Scholanderi is clearly a *Psora*. Its brown squamules call to mind *Lecidea globifera* and *L. lurida*, but either of these species has much larger ascendant squamules, 3—7 mm large, covering the soil rather extensively, and either of them has coherent paraphyses. — *Lecidea globifera* differs much in its convex apothecia and its hymenium, stained violet to purple by KOH. *Lecidea lurida* is much nearer related, and our plants were at first referred to that species. But in addition to the above mentioned differences it has more scattered and much larger apothecia, up to 2 mm in diam., its disc is brown when moistened, its hymenium is higher, about 75 μ , and its epithecium is paler, yellowish-brown.

Lecidea globifera and *L. lurida* are calciphilous species. The substratum of the present species gave no CO₂ by HCl, and it is rich in small quartz grains.

Lecidea Scholanderi has been named in honour of my friend, the Norwegian lichenologist Dr. P. F. Scholander, member of the Norwegian East Greenland expedition in 1930.

Catillaria (Mass.) Th. Fr.

88. (1) *Catillaria*, cfr. *chalybeia* (Borr.) Mass.

Kapp Humboldt, on a hard rock, scarce.

A very inconspicuous plant with small, convex apothecia, dark brown excipulum, and brown hypothecium and epithecium, spores 12—15(—16) \times 4—5 μ . Evidently the same species, as I found in Th. Fries's collection from West Greenland (Lynge 1937, p. 82, which see). — A plant from Husbukta possibly belongs here, it differs in its much paler hypothecium.

89. (2) *Catillaria lenticularis* (Ach.) Lettau.

var. *rosea* Lynge n. var.

Myggbukta, in rupe calcarea.

Crusta omnino cum rupe confusa. — Apothecia minuta, immersa, atra vel rarius dilutius colorata. Excipulum rubescens, etiam cum hypothecio. Hymenium angustum, circiter 50 μ altum. Paraphyses facile discretæ, clavatae vel capitatae, sursum 4—5 μ , constrictæ septatae. Sporae male evolutae, paucas solum vidimus, 8.5—12 \times 4—5 μ .

Paraphyses HCl violascentes, KOH aeruginascentes.

Its affinity to *Catillaria lenticularis*, especially to its var. *erubescens*, is perfectly clear, but I have not ventured to identify it with that forma, on account of the aberrant colours of its epithecium and hypothecium.

Probably it is a distinct species, there were, however, but a few apothecia, and it was accordingly impossible to get an idea of its range of variation. In the above mentioned var. *erubescens* I found an uncoloured hypothecium.

90. (3) *Catillaria muscicola* Lyngé n. sp.

Kapp Simpson, muscicola.

Substratum thallo tenui, colore argillaceo, verniceo, submembranaceo vel hinc inde minute granulato-verrucoso obtectum.

Apothecia numerosa, usque congesta, majuscula, diam. 1—1.5 mm, supra substratum bene elevata, interdum substipitata, primo plana et crasse marginata, deinde magis convexa et immarginata, in aetate margine usque recurvato. Discus (sub lente) minute scabrosus, omnino ater, etiam cum margine. Excipulum sat obscure fusco-rubescens, hyphae in parte exteriori superficiei perpendiculares (subflabelliformiter radiantes), et valde incrassatae. Hypothecium indistinctum, excipulo subconcolor vel dilutius fusco-rubescens, HCl dilute violascens. Hymenium angustum, circiter $50\ \mu$ altum, dilute aeruginosum, superne strato incolorato (necrali?) tectum. Paraphyses cohaerentes, sed KOH vel HCl facilius discretæ, tenues, apice haud incrassatae, indivisæ, rarius parce furcatae videntur. Asci repleti saccati, membrana superne valde incrassata. Sporae incoloratae, bifusiformes, uniseptatae, medio haud contractae, $12-17 \times 5-6\ \mu$.

Hymenium J obscure rubescens vel subnigricans, etiam cum hypothecio. Epithecium (KOH) minute granulosum.

Gonidia laete viridia, diam. $12-15\ \mu$.

It cannot fail to be a *Biatorina*. There are very few *Catillariae*, growing on mosses and decaying herbs, such as the present species. *Catillaria jemtlandica* has much larger spores, $20-25 \times 8-11\ \mu$. I have not seen *Catillaria sphaeralis* Kbr., but to judge from Vainio's description it has a considerably higher hymenium, $60-90\ \mu$.

The present species is very characteristic on account of its thin thallus, large apothecia, and narrow hymenium. Its spores were distinctly septated. In some species of the *Lecidea alpestris* section there is sometimes an apparent septation of the spores, but in my opinion they do not resemble the present species.

Bacidia (Sw.) Mudd.

91. (1) *Bacidia muscorum* (Sw.) Mudd.

Landingsdalen, scarce.

92. (2) *Bacidia Anziana* Lyngé.

Lich. Nov. Zemlya, 1928, p. 125, pl. II, fig. 10—11.

Landingsdalen. Claveringfjorden: Revet, 600 m. — Loch Fyne. Myggbukta. Kapp Bennett. — Moskusoksefjorden, 900 m. Kapp Hum-

boldt. Kierulffjorden. — Celsiusberget. — Husbukta, c.fr. Veganeset, c.fr. — Antartichamna. Kapp Petersens. Dicksonfjorden. Ellaøya.

A common and widespread species, but perhaps not equally abundant everywhere.

The plants agree entirely with my Novaya Zemlya type. The only difference is that in a "Quetschpräparat" I found the paraphyses to be easily discrete.

We often find *Bacidia flavovirescens* recorded from the arctic, but it is little probable that it should be found there. It is distinguished, even habitually, by its soorediated surface, composed of minute granules, and by its margin, which is not abruptly limited. In the present species we find high, button-like or papillated thalli, well limited. The surface is rather firm in young plants, but in full-grown thalli often minutely cracked and thus weakened. In extreme cases it is quite denudated, leaving white, crateriform depressions in the middle, surrounded by a citrine margin, the remains of the original thallus. Profoundly cracked thalli may apparently look soorediated.

The spores are bifusiform, $14-18 \times 3-4.5 \mu$, and always three-septated, against acicular, multiseptated, and much longer in *B. flavovirescens* as well as in *B. alpina*: resp. $40-100 \times 2.5 \mu$, septa 7-15, and $35-54 \times 3 \mu$ (Vain. Lich. Fenn. II, p. 222 and 224). In *B. Anziana* apothecia are very rare, there were but 3 fertile plants in our large East Greenland collections. In the sterile plants I cannot distinguish between this species and *B. alpina*, but habitually the material looks uniform.

After this it is possible that the sterile plants from Akorninarmiut, leg. Scholander (Dahl, Lynge and Scholander 1937, p. 26) might be *B. Anziana*.

Toninia (Mass.) Th. Fr.

93. (1) *Toninia cumulata* (Somrft.) Th. Fr.

Davy Sound: Kapp Simpson.

Very sparingly, I detected but a few plants.

It was neither mentioned by Nylander, nor by Vainio, in their papers on the lichens collected by the Vega expedition on the Siberian coast. I did not find it in Novaya Zemlya in 1921. — Th. Fries wrote: "Ad terram nudam alpinam . . . insul. Spitsbergensium, Groenlandiae sat frequenter" (Lich. Arct., 1860, p. 187). But there is no Spitsbergen plant in our herbarium, and as far as I can see, none in our undetermined Spitsbergen collections. Th. Fries did not record it from Spitsbergen in his Lich. Spitsb., 1867. Its presence in Spitsbergen is hardly established. — But there are a few previous finds from Greenland.

On the whole a rare species in the arctic, and evidently restricted to the western regions.

94. (2) *Toninia tristis* Th. Fr.

Th. Fries Lich. Scand., II, 1874, p. 341. — *Thalloidima triste* (Th. Fr.) Vain. Lich. Fenn., II, 1922, p. 140. — *Toninia groenlandica* Lyngé Lich. West. Greenl. 1937, p. 88.

Kapp Bennett. — Moskusoksefjorden. Kapp Humboldt. Blomsterbukta. — Husbukta. — Holmvika.

There are so many finds from this region that it must be quite common there, and in places abundant. It is restricted to calcareous ground.

Th. Fries described it from Dovre in Norway. He attributed narrow spores to it: "spora cylindrico- v. fusiformi-oblongae, 12—18 × 2—4.5 μ ". This is hardly quite correct; Vainio's measures: 11—18 × 4.5—6 μ (l. c.) are more in agreement with my observations on a large material. Th. Fries's measures induced me to propose a n. sp., *Toninia groenlandica* Lyngé, l. c., differing in broader spores. Having now seen so much of *Toninia tristis*, I have found the two species to be identical, and I have to cancel my species.

After this *Toninia tristis* is found in West and East Greenland. I often detected it, and generally in abundance, in Iceland (1937 and 1939, unpublished). In the arctic it has not been found farther to the east. But there are a few finds from Dovre in Norway, its locus classicus, and from the calcareous region Kuusamo in Finland (Vain., l. c.). It is apparently one of the western species in the alpine flora of Fennoscandia.

95. (3) *Toninia candida* (Web.) Th. Fr.

Loch Fyne. Myggbukta. — Moskusoksefjorden. Reinbukta. Dusénfjorden. Blomsterbukta. — Ellaøya. Mariaøya.

Common and in places quite plentiful. The plants are well developed and fertile, but I found but few spores in the apothecia which I examined.

96. (4) *Toninia lobulata* (Somrft.) Lyngé.

Syn. *Toninia syncomista* (Flk.) Th. Fr. Lich. Scand. II, 1874, p. 335.

Landingsdalen. Kapp Herschel. — Jacksonøya. Kapp Bennett. — Moskusoksefjorden up to 1350 m s. m. (var. *Theobaldii*). Kapp Humboldt. Dusénfjorden. — Celsiusberget. — Gåsøya. Husbukta. Vega-neset. — Kapp Simpson. Holmvika. Kapp Petersens. Ellaøya.

Frequent, in places abundant. Perfectly developed and very common along the coast, but apparently less common in the fjords.

In the same apothecium we find one- as well as three-septated spores. Th. Fries is entirely right in regarding Koerber's *Catillaria Theobaldii* to be only an insignificant forma of the present species (Lich. Scand. p. 336).

97. (5) *Toninia fusispora* (Hepp) Th. Fr.

Landingsdalen. — Myggbukta. — Moskusoksefjorden. Kapp Humboldt. Reimbukta. — Holmvika. Röhssfjorden.

There are not a few localities, but it is always scarce.

Thallus albidus, squamulosus, squamae bene evolutae, haud tenues, circ. 0.5 mm latae. Excipulum obscure rubricosum, etiam cum hypothecio, KOH violascentia. Hymenium 40—50 μ altum, superne obscure smaragdulum, je caeruleo intense vinosum, paraphyses facile discretiae, spora bacillares, triseptatae, 26—28 \times 3—4 μ .

98. (6) *Toninia squalida* (Schleich.) Mass.

Syn. *Toninia squarrosa* (Ach.) Th. Fr. Lich. Scand. 1874, p. 331. Landingsdalen. — Kapp Bennett. — Reimbukta.

Scarce and rare. Its thallus is thicker, and it has a darker (brown) colour than the pale thallus of *Toninia fusispora*. In arctic material the habitual distinction between them may be difficult, for the thallus is often but poorly developed. Arctic Crustaceous lichens should not be determined habitually!

Lopadium Kbr.99. (1) *Lopadium coralloideum* (Nyl.) Lynge.

Lecidea pezizoidea var. *coralloidea* Nyl. Lich. Lapp. Orient., 1866, p. 156.

Landingsdalen. — Gåsøya. Veganeset. — Kapp Petersens.

It was expected to be more common, but we found but a few plants. We cannot conclude from this that it should be so very rare, for sterile plants are easily overlooked.

The type plant of Sommerfelt's *Lecidea muscicola* (Plant. Crypt. Norv. No. 43) has quite appressed granules, Sommerfelt himself compared it with *Lecidea uliginosa*. It seems to me that the coralloid habitus of the Greenland plants justifies a specific distinction. There are one or two spores in each ascus. Ripe spores are not always developed. I have measured 70—90 \times 24—47 μ in my Greenland plants. Vainio found longer spores, 100—115 μ (Lich. Fenn. II, p. 272).

Lopadium coralloideum is a northern and arctic plant of very considerable distribution: West and East Greenland, Iceland, Spitsbergen, Bear Island, Northern Scandinavia, Kola, Novaya Zemlya, and the Bering Strait district. Most probably it is a circumpolar species.

Rhizocarpon (Ram.) Th. Fr.

The material of this genus has already been worked up and published: "A Revision of the Genus *Rhizocarpon* (Ram.) Th. Fr. in Greenland", by B. Lyngé, Skr. om Svalb. og Ishavet, No. 47, Oslo 1932. It is not necessary to reprint this paper, and the following only contains a summary of the distribution, with a few additional notes and finds.

100. (1) *Rhizocarpon geographicum* (L.) DC.

Moskusoksefjorden, 1350 m. — Sofiasundet: Sanddalen, and west of Robertsonøya, and Rudbeckfjellet. — Antartichamna. Kapp Petersens. Segelsällskapet's Fjord: Mt. Carmela, 1600 m above sea-level. Dicksonfjorden. Mariaøya.

Very common and plentiful all over the region.

101. (2) *Rhizocarpon grande* (Flk.) Arn.

Rather rare, detected in a few localities only, to be added: Kapp Petersens.

102. (3) *Rhizocarpon disporum* (Naeg.) Müll. Arg.

Kapp Herschel. Revet, 260 m. — Loch Fyne, 350 m. — Kapp Stosch. — Sofiasundet: Sanddalen. — Kapp Petersens. Segelsällskapet's Fjord: Mt. Carmela, 1600 m. Röhssfjorden. Dicksonfjorden. Ellaøya. Mariaøya.

These additional data only confirm our impression that it is the commonest *Rhizocarpon* in the region. Its f. *Montagnei* is very common.

103. (4) *Rhizocarpon distinctum* Th. Fr.

A rare species, found only in the southern part of the region, nothing to be added.

104. (5) *Rhizocarpon obscuratum* (Ach.) Mass.

One locality, Husbukta, is to be added to the single previous locality. It is one of the rarest *Rhizocarpons* in the region.

105. (6) *Rhizocarpon crystalligenum* Lyngé.

Rhizocarpon in Greenland, 1932, p. 19.

Claveringfjorden: Revet, 1200 m above sea-level. — Moskusoksefjorden, 1350 m.

A rare species, scattered over the region.

106. (7) *Rhizocarpon occidentale* Lynge.

Moskusoksefjorden, 1350 m. Blomsterbukta. — Röhssfjorden. Dicksonfjorden.

Distributed all over our region, fairly common, but not plentiful. I was glad to find this species, as well as the previous one, in Iceland in 1937 and 1939. *Rhizocarpon occidentale* is also found on the north coast of Spitsbergen (leg. Scholander), and in Colorado: Rocky Mountain Park (leg. Walter Kiener).

Excipulum in parte exteriori anguste fusco-violaceum vel fusco-nigrescens, praeterea dilutius coloratum usque subincoloratum. Hypothecium partis coloratae excipuli concolor, etiam cum parte adjacenti hymenii. Hymenium subangustum, 85—90 μ altum, superne obscure violaceo-nigrescens, impellucidum, praeterea incoloratum vel dilute fuscescens. Paraphyses haud concretatae, validae, 2—2.5 μ crassae, sursum leviter clavatae, 3—4 μ , constrictae septatae.

Medulla J — (flavo-fuscescens), hymenium J vinosum, KOH superne fuscum, thallus KOH non rubescens.

The central parts of the excipulum are remarkably pale or uncoloured. The upper part of the hymenium is so dark that it is difficult to say whether it is brownish-violet or aeruginose, but it stains distinctly brown by KOH.

107. (8) *Rhizocarpon Copelandii* (Kbr.) Th. Fr.

Claveringfjorden: Revet, 1200 m above sea-level.

This species which was described from Shannon Island, was found nowhere else in North East Greenland by the Norwegian expeditions, it cannot be common there.

108. (9) *Rhizocarpon groenlandicum* Lynge.

We have nothing to add to the single find, from Kapp Humboldt.

109. (10) *Rhizocarpon jemtlandicum* Malme.

When I wrote my above mentioned paper on the *Rhizocarpons* from Greenland (1932) no locality was known north of Scoresby Sound. Since then it has turned up in our collections from 4 places farther north, viz.: Dicksonfjorden, Kapp Petersens, 15 km west of Husbukta, and at Kapp Humboldt.

Baeomyces Pers.110. (1) *Baeomyces roseus* Pers.

Myggbukta. — Kapp Humboldt. — Husbukta. Veganaset.

Scarce and rare, always sterile. It can be distinguished from sterile plants of *Diploschistes scruposus* by the red reaction by CaCl_2O_2 of the latter species. The globuli are often poorly developed, in the

arctic the surface of the thalli often consists of rather large, almost plane squamules. The indicated yellow staining by KOH is very indistinct and impure in arctic plants, perhaps the best distinctive character against the other two species of the genus.

111. (2) *Baeomyces rufus* (Huds.) Rebent.

Kapp Bennett. — Dusénfjorden. — Husbukta. Veganeset.

Scarce and rare, and always sterile. Arctic plants are often poorly developed, the cortex is eroded, and other damage is suffered. Such plants may be difficult of distinction from the other two species, especially from *Baeomyces roseus*.

Baeomyces roseus is more whitish of colour, and if developed, its large globuli are sunken at their upper part. Eroded plants do not stain perceptibly by Pd, but the intact cortex stains yellow-orange.

Baeomyces rufus is more greyish-green, often with a faint tinge of brown, more squamulose, often sorediated, its reaction by Pd is orange to cinnabar if the cortex is intact. Its cortex stains intensely yellow, and then red by KOH. At Veganeset I collected entirely sorediated plants, without this reaction.

112. (3) *Baeomyces placophyllus* Ach.

Landingsdalen. — Myggbukta. Kapp Bennett. — Dusénfjorden. — Mainland near Archerøya.

It is not supposed to be common. The plant from Archerøya was particularly fine, with the characteristic radiating marginal lobes. The others were of the common arctic type, an almost crustiform thallus, marginal lobes either not developed, or only seen in protected places. All the plants are sterile. The reaction with KOH is much less intense than in *Baeomyces rufus*, in several plants only an indistinct, yellow colour is observed.

Acarosporaceae.

Sporastatia Mass.

113. (1) *Sporastatia cinerea* (Schaer.) Kbr.

Kapp Simpson, very scarce.

114. (2) *Sporastatia testudinea* (Ach.) Mass.

Syn. *Biatorrella coracina* (Somrft.).

Landingsdalen. Clavingfjorden: Revet, 1200 m above sea-level, and Soppbukta. Kapp Herschel. Loch Fyne, 350 m. — Jacksonøya. Myggbukta. Kapp Bennett. — Moskusoksefjorden, up to 1350 m. Reinbukta. Kapp Humboldt. Dusénfjorden. Blomsterbukta. — Sofiasundet:

Celsiusberget and Sanddalen. — Vegasundet: Husbukta and Veganeset. — Kapp Simpson. Holmvika. Kapp Petersens. Dicksonfjorden. Ellaøya.

It is difficult to describe adequately the distribution and the abundance of this ubiquitous species in the region. There were more than a 100 plants in my collection from 1929. I could certainly have collected it every day.

It is quite obvious that a species of this distribution must have a corresponding variation. It develops its finest plants on plane slaty rocks. In such places we find the circular plants with radiating lobes along the circumference and angular regular areolae towards the centre. Occasionally the thallus dies around the centre, and centrifugal thalli are developed. A black hypothallus is distinctly seen along the circumference, and it is also more or less distinct between the areolae. The areolae are only in the best plants quite contiguous, in extreme cases they are quite scattered over the hypothallus.

In some very reduced plants the areolae form irregular patches, or even lines, on the stone, and no radiating marginal areolae are visible. Generally the areolae are plane, often with a central depression, a few (overfed?) plants have thick, almost verrucose areoles.

In most plants the colour of the areolae is very dark, black or brownish-black. A few plants are of a much paler colour, greyish or "flavido-cupreae", suggesting f. *pallens* Mont.

A large number of plants were examined microscopically. I always found the hypothecium uncoloured, the hymenium bluish-black at its upper part, at least if KOH was added, and the spores broadly elliptical, $3-4 \times 2-3 \mu$.

My arctic experiences have led me to attribute a great importance to the transforming effect on the thallus of arctic conditions of life. The internal structure of the apothecia is remarkably constant. If arctic collections come into the hands of botanists who have not had the privilege of studying the plants in nature they will quite naturally ignore such things, and describe varieties, or even species, based on such modifications, which are only reactions on extremely severe conditions of life.

115. (3) *Sporastatia tenuirimata* (Th. Fr.) Lynge comb. nov.

Sporastatia Morio **Sp. tenuirimata* Th. Fr. Lich. Spitsb., 1867, p. 42. *Biatorella testudinea* var. *tenuirimata* (Th. Fr.) Oliv. Zahlbr. Cat. Lich. V, p. 32.

Dusénfjorden. Blomsterbukta. — Kapp Simpson.

It is an addition to the lichen flora of Greenland. At Kapp Simpson I found it in abundance, otherwise it was scarce. I have hardly ever seen a more desolate place than Kapp Simpson, but in the arctic interesting lichens can be found anywhere.

It agrees well with *Sporastatia cinerea* with respect to colour, and at first I simply mistook it for that species. But a microscopical study of the apothecia revealed a bluish-black upper part of the hymenium, one of the best distinctive characters of *Sporastatia testudinea* and *S. tenuirimata* against *Sporastatia cinerea*. The hypothecium of the present species is either uncoloured or pale brownish, the excipulum dark, almost carbonized. The disc of the apothecia is very rugose, and often cracked, but not composed, as is the case in *Sporastatia cinerea*. The disc is often concave, with a thick, persistent margin.

The areolae are somewhat radiating towards the circumference, which is not the case in *Sporastatia cinerea*. If studied under a lens of high power the areolae are distinctly seen to be divided into very minute micro-areolae by reticulated deep black lines, the micro-areolae are, accordingly, verrucose.

The East Greenland plants agree entirely with Th. Fries's type plants from "Lomme Bay" in Spitsbergen which I have seen. Th. Fries's first impression was that it should be a proper species: "neque dubitarem pro distincta specie eam enuntiare, nisi in ambitu radianti passim adessent areolae laevigatae". The black lines are formed at the circumference of the thallus, in older areolae they sink deeper into the thallus, destroying the cortex.

On one stone I found a typical *Sporastatia tenuirimata*, the margin of which was invaded by an equally typical *Sp. testudinea*, no transitional stage was seen.

Sarcogyne Flot.

116. (1) *Sarcogyne pruinosa* (Sm.) Kbr.

Myggbukta. — Kapp Humboldt.

I only detected a few plants on calcareous rocks, together with plants, such as *Caloplaca elegans*, *Protoblastenia rupestris*, a. o. It is supposed to be rare.

There is no visible thallus. The apothecia are small, immersed into the rock. They are not pruinose. Their internal structure agrees well with Scandinavian plants. — Magnusson referred a plant from Kapp Humboldt to f. *atrosanguinea* Magn.

117. (2) *Sarcogyne simplex* (Dav.) Nyl.

Landingsdalen. — Kapp Herschel. — Myggbukta. — Reinbukta. Blomsterbukta. Kierulffjorden. — Sophiasundet, 4 km west of Robertsonøya. — Holmbukta.

A common and widespread species, found all over the region. It is easily overlooked on account of its small size, but very characteristic on account of its gyrose apothecia.

Acarospora Mass.

A considerable material was collected of this interesting genus. The author was happy enough to secure the cooperation of Dr. A. H. Magnusson, Göteborg, who identified the whole material. He published a paper on this, and some other arctic collections of *Acarospora*: "The Lichen-Genus *Acarospora* in Greenland and Spitsbergen", *Nyt Mag. f. Naturv.*, vol. LXXV, p. 1—21, 7 figs., Oslo 1935. Since then some localities have been added. In the present collection the following species were found:

118. (1) *Acarospora Schleicheri* (Ach.) Mass.
Myggbukta. — Moskusoksefjorden. — Röhssfjorden.
119. (2) *Acarospora lapponica* (Ach.) Th. Fr.
Landingsdalen. — Blomsterbukta (f. *minuta* H. Magn.). Kierulfjorden.
120. (3) *Acarospora fusca* B. de Lesd.
Husbukta.
121. (4) *Acarospora smaragdula* (Wbg.) Th. Fr.
Landingsdalen.
122. (5) *Acarospora scabrida* (Hedl.) H. Magn.
Kapp Simpson.
123. (6) *Acarospora Durietzii* H. Magn.
Jacksonøya. — Husbukta.
124. (7) *Acarospora veronensis* Mass.
Kapp Humboldt. — Husbukta.
125. (8) *Acarospora persimilis* H. Magn.
Kapp Herschel. — Kapp Bennett. — Dusénfjorden. — Celsiusberget.
126. (9) *Acarospora hospitans* H. Magn.
Blomsterbukta.
127. (10) *Acarospora nitrophila* H. Magn.
Myggbukta. Kapp Bennett. — Kapp Humboldt. Blomsterbukta. — Husbukta.
128. (11) *Acarospora glaucocarpa* (Wbg.) Kbr.
Myggbukta (var. *sarcogynoides*). — Kapp Humboldt. Blomsterbukta. — Husbukta.
Var. *endocarpoides* Vain. Kapp Humboldt. Blomsterbukta. — Veganeset. — Holmvika.

129. (12) *Acarospora Lyngei* H. Magn.
Husbukta.
130. (13) *Acarospora badiofusca* (Nyl.) Th. Fr.
Kapp Humboldt. — Celsiusberget.
131. (14) *Acarospora rosulata* (Th. Fr.) H. Magn.
Dusénfjorden. Blomsterbukta. Kierulffjorden (f. *pinus* Magn.). —
Röhssfjorden.
132. (15) *Acarospora montana* H. Magn.
Kierulffjorden.
133. (16) *Acarospora scrobiculata* H. Magn.
Husbukta.
134. (17) *Acarospora aspera* H. Magn.
Husbukta.
135. (18) *Acarospora peliocypha* (Wbg.) Arn.
Kapp Humboldt.
136. (18) *Acarospora interposita* H. Magn.
Kierulffjorden.
137. (20) *Acarospora insignis* (Th. Fr.) H. Magn.
Kierulffjorden. — Plants from Dusénfjorden and Holmvika possibly
belong here, but they are too young to allow of an unobjectionable
determination.
138. (21) *Acarospora atomariospora* H. Magn.
Kierulffjorden.
139. (22) *Acarospora nitida* H. Magn.
Reinbukta.
140. (23) *Acarospora molybdina* (Wbg.) Trev.
Terneøya in Mackenzie Bay.

After the completion of the manuscript another *Acarospora* (from Ellaøya) was detected in our collections. It was identified by Magnusson: *Acarospora macrospora* (Hepp) Bagl. It is new to East Greenland, but there is a previous record from Nanortalik in S. W. Greenland (Magn. Mon. *Acarospora*, 1929, p. 335).

*Pertusariaceae.**Pertusaria* DC.141. (1) *Pertusaria bryontha* (Ach.) Nyl.

Myggbukta. — Moskusoksefjorden. — Veganeset.

This species is generally not common in the arctic, but there were a considerable number of plants in my collection. I have only ventured to determine fertile plants, sterile plants resemble *Ochrolechia frigida* very much.

142. (2) *Pertusaria oculata* (Dicks.) Th. Fr.

Kapp Petersens. Mainland near Archerøya.

It was entirely missing in my collection from 1929, but Scholander found it in the southernmost part of the region in the next year. Otherwise we are wont to find it the commonest species of its genus in arctic collections.

143. (3) *Pertusaria dactylina* (Ach.) Nyl.

Finschøya, evidently very rare.

144. (4) *Pertusaria coriacea* Th. Fr.

Landingsdalen. Finschøya. — Holmvika. Dicksonfjorden.

145. (5) *Pertusaria globulifera* (Turn.) Mass.

Kapp Humboldt, scarce on rocks.

A rather thick, white or greyish-white crusta, with crateriform, very numerous soralia, 0.7—1.0 mm in diam. I could find no bitter taste, and the thallus does not stain by any of the reagents: J, KOH, CaCl₂O₂, KOH + CaCl₂O₂, or Pd. No marginal zonation visible.

The *Pertusariae* were but poorly represented in our collections, should we have overlooked them, or are they really so rare?

*Lecanoraceae.**Lecanora* Ach.¹*Clavis specierum.*

I. Thallus uniformis, latere tantum superiori corticatus, apothecia sessilia vel elevata, thallo nondum immersa. Subgen. *Eulecanora* Th. Fr., p. 65.

1. Lignicolae.

2. Epithecium intense granulose, discus obscure fuscus, persistenter marginatus, thallus KOH flavescens. 2. *L. coilocarpa* (Ach.) Nyl., p. 65.

¹ In the arctic the genus *Lecanora* is, perhaps, the most difficult of all lichen genera. This is not chiefly due to the great number of species. The genus

- 2*. Epithecium non granulosum, discus ater, margo deinde evanescens, thallus KOH —. 6. *L. surrecta* Lynge, p. 67.
- 1*. Muscicolae.
2. Thallus maximus, valde incrassatus, 0.7—0.8 mm altus, lobatus, pallide stramineus, discus pallide carneus v. helvolus, margine tenui, substramineo, evanescenti, sp. 10—12 × 5.5—6.5 μ . 16. *L. pachythallina* Lynge, p. 74.
- 2*. Thallus tenuis, sed distinctus, albidus, discus fusco-rufescens, margine integro, persistenti, albido, sp. 12—22 × 7—12 μ . 1. *L. epibrya* Ach., p. 65.
- 2**. Thallus evanescens, discus rufo-fuscus, primo urceolatus, deinde subplanus, margine subconcolori, deinde evanescenti, sp. 16—25 × 5—7 μ . 20. *L. castanea* (Hepp) Th. Fr., p. 76.
- 1**. Ossidicolae. 7. *L. Behringii* Nyl., p. 69.
- 1***. Saxicolae.
2. Thallus plus minusve evanescens.
3. Apothecia pruinosa, margine albido, crasso, crenulato, persistenti, paraphyses capitatae. 4. *L. crenulata* (Dicks.) Nyl., p. 66.
- 3*. Apothecia nuda.
4. Discus helvolus vel flavescens, paraphyses apice haud incrassatae.
5. Margo albidus, crassus, persistens. 5. *L. dispersa* (Pers.) Flk., p. 67.
- 5*. Margo inconspicuus, subflavescens, deinde evanescens.
15. *L. polytropa* f. *illusoria* (Ach.) Leight. p. 74.
- 4*. Discus (saepe obscure) olivaceus, paraphyses apice non incrassatae.
17. *L. intricata* (Schrad.) Ach., p. 75.
- 4**. Discus ater, paraphyses apice bene incrassatae.
5. Hymenium superne smaragdulum. 10. *L. parva* Lynge, p. 71.
- 5*. Hymenium superne fusco-fuligineum. 9. *L. congesta* Lynge, p. 69.
- 2*. Thallus distincte evolutus.
3. Thallus fuscus vel cinereo-fuscescens.
4. Thallus tenuis, inconspicuus, apothecia 0.3—0.35 mm, hymenium superne smaragdulum, sp. obtuse ellipsoideae, 14—15 × 7—7.5 μ .
19. *L. microfusca* Lynge, p. 76.
- 4*. Thallus crassus, conspicuus, apothecia 1—2 mm, hymenium superne fuscum, sp. oblongo-bifusiformes, 10—16 × 4—6 μ .
18. *L. badia* (Pers.) Ach., p. 76.
- 3*. Thallus flavescens, KOH intensius coloratus.
4. Thallus crassus, glebuloso-verrucosus.
5. Discus (saepe obscure) fuscus, hymenium superne fuscum, KOH dilutius coloratum.
13. *L. frustulosa* var. *argopholis* (Wbg.) Kbr., p. 73.
- 5*. Discus ater, hymenium olivaceo-fuligineum, KOH aeruginosum.
14. *L. occidentalis* Lynge, p. 73.

Lecidea is equally large, but here we have the masterly monographs by our Scandinavian Principes lichenologorum Th. M. Fries (Lich. Scand.) and Vainio (Lich. Fenn. IV), which largely facilitate our work. Magnusson's monograph of the *Aspicilliae* (1939) is a work of the same standard. But yet it seems to me that the distinctive characters of the *Lecanorae* are more in their habitus than they are in the *Lecideae*, and such characters cannot be satisfactorily expressed by clear termini, by measures, and by chemical reactions.

It was therefore thought necessary to illustrate the *Lecanorae* by good photos. The great expenses, and technical difficulties (the small size of the plants) prevented me from representing the *Eulecanorae* in the same manner as the *Aspicilliae*.

- 4*. Thallus tenuis (in arcticis saepe evanescens), subsquamulosus.
 5. Discus flavescens v. pallide testaceus.
 15. *L. polytropa* (Ehrh.) Rabh., p. 74.
- 5*. Discus (saepe obscure) olivaceus.
 17. *L. intricata* (Schrad.) Ach., p. 75.
- 3**. Thallus albidus vel albido-cinereus.
4. Thallus KOH flavescens, crassus.
 5. Discus, saltem madefactus, obscure fuscus, hymenium superne fuscum, sporae 12—16 μ longae (in rupe quartzitica).
 3. *L. campestris* (Schaer.) Hue, p. 65.
5. Discus pure ater, hymenium superne pulchre smaragdulum, sporae 7—8 μ longae (in rupe calcarea).
 12. *L. cladonioides* Lynge, p. 72.
- 4*. Thallus KOH —, discus ater.
 5. Hymenium superne fuscum, sp. 7.5 \times 5 μ (in rupe calcarea).
 11. *L. mollissima* Lynge, p. 71.
- 5*. Hymenium superne aeruginosum, sp. 10—12 \times 5—6 μ (in rupe diabasica).
 8. *L. subtorrida* A. Zahlbr., p. 69.
- II. Thallus uniformis, latere tantum superiori corticatus, apothecia thallo immersa, primo urceolata. Subgen. *Aspicilia* Stiz., p. 77.
1. In muscis terraque nuda. 21. *L. verrucosa* (Ach.) Laur., p. 78.
- 1*. Species saxicolae.
2. Thallus effusus, non zonatus vel radiatus (*Effusae* Magn.).
3. Hymenium superne aeruginosum vel smaragdulum.
4. Hymenium altissimum, 150—160 μ , apothecia punctiformia in areolis fertilibus immersa, sp. 20—25 \times 12—16 μ .
 24. *L. punctiformis* Lynge, p. 80.
- 4*. Hymenium 80 μ haud superans, sporae minores.
5. Thallus tenuissimus, vulgo subleprosus, ochraceo-cinereus, sp. (12) 16—18 \times 7—11 μ . 22. *L. flavida* Hepp, p. 78.
- 5*. Thallus crassior, 0.17—0.2 mm, distinctius areolatus, pallide rosaceus vel ochraceo-cinereus, sp. 15—20 \times 12—13 μ .
 23. *L. Celsii* Lynge, p. 79.
- 3*. Hymenium superne flavo-fuscescens vel olivaceum.
4. Thallus KOH distincte flavescens.
5. Thallus verrucoso-papillatus, obscure cinereo-nigrescens, apothecia verrucis profunde immersa. 25. *L. mastoidea* Lynge, p. 81.
- 5*. Thallus rimoso-areolatus, cinereus vel albido-cinereus, apothecia magis aperta, thallum subaequantia. 26. *L. arctica* Lynge, p. 81.
- 4*. Thallus KOH non (distincte) flavescens.¹
5. Apothecia ignota, verrucae albae supra hypothallum radiantem albido-flavescentem discretae vel subdiscretae, pycnoc. 17—21 μ .
 36. *L. eburnea* Lynge, p. 89.
- 5*. Apothecia plus minusve numerosa.
6. Sporae magnae, 25—30 \times 14—20 μ , hymenium altissimum, 125—150 (160) μ . 35. *L. pertusa* Lynge, p. 88.
- 6*. Sporae minores, 20 μ haud superantes.
7. Sporae parvae, 9—17 μ , hymenium angustum, 75—80 μ .

¹ The upper part of a dark cortex is generally to some degree discoloured by KOH, and may obtain a faintly yellowish colour (cfr. *L. composita* Lynge).

8. Thallus tenuissimus, membranaceus.
27. *L. annulata* Lynge, p. 82.
- 8*. Thallus alte verrucosus. 28. *L. conica* Lynge, p. 82.
- 7*. Sporae mediocres, 15—20 μ .
8. Hymenium angustum, 75 μ , thallus dilute rosaceus, areolatus.
29. *L. Nathorstii* Lynge, p. 83.
- 8*. Hymenium circiter 100 μ altum.
9. Thallus albidus.
10. Thallus discrete alteque verrucosus, apothecia composita. 30. *L. composita* Lynge, p. 84.
- 10*. Thallus undulato-rimosus, apothecia simplicia.
31. *L. Anseris* Lynge, p. 85.
- 9*. Thallus cinereus.
10. Medulla opaca, thallus valde verrucosus, KOH: crystallata prismatica non praecipituntur.
32. *L. pergibbosa* Magn., p. 86.
- 10*. Thallus translucidus (saltem KOH si addito), KOH: crystallata prismatica incolorata in medulla praecipituntur.
11. Thallus undulatus, optime fertilis, apothecia interdum composita et bene elevata; in rupe arenaria.
33. *L. major* Lynge, p. 86.
- 11*. Thallus alte verrucosus, sparse fertilis, apothecia subelevata; in rupe calcarea.
34. *L. semiglobosa* Lynge, p. 87.
- 2*. Thallus (saltem ambitu) distincte radiatus vel zonatus (*Orbiculares* Magn.).
3. Thallus sorediatus, sterilis.
4. Thallus dilute ochraceus. 37. *L. sorediza* Lynge, p. 89.
- 4*. Thallus obscure cinereus. 38. *L. Bennettii* Lynge, p. 90.
- 3*. Thallus sorediis destitutus.
4. Thallus KOH distincte flavescens.
5. Lobi contigui, cinerascens. 40. *L. perradiata* Nyl., p. 91.
- 5*. Lobi discreti, fusciscentes. 39. *L. rosulata* (Kbr.) Stiz., p. 91.
- 4*. Thallus KOH non (distincte) flavescens.
5. Thallus cinereus vel olivaceus, sp. parvulae, 12—16 μ ; in rupibus non calcareis.
6. Thallus olivaceus, hyphae corticis perpendiculares, pycnoc. 25—40 μ .
41. *L. sublapponica* Zahlbr., p. 91.
- 6*. Thallus cinereus, hyphae corticis constrictae septatae, articulis globosis, pycnoc. (ubi cognita) breviora, 16—18 μ .
7. Apothecia majuscula, ad 1.2 mm, thallus (vulgo) etiam centrum versus distincte lobatus, lobi ad 0.5 mm lati.
42. *L. circularis* Magn., p. 92.
- 7*. Apothecia minora, 0.3—0.4 mm, thallus solum marginem versus lobatus, lobi angusti, 0.2 mm lati, apiculati.
43. *L. contigua* Lynge, p. 93.
- 5*. Thallus albidus.
6. Thallus cretaceus, apothecia plus minusve pruinosa, cortex excipuli KOH flavescens, KOH: crystallata prismatica, incolorata in medulla praecipituntur; tantum in rupe calcarea.
44. *L. candida* var. *nikrapensis* (Darb.) Magn., p. 93.
- 6*. Thallus non cretaceus.
7. Lobi saltem ambitu discreti.

8. Cortex altus, 40—60 (70) μ , hymenium 100—125 μ .
9. Lobi ambitu indistincti, cum hypothallo confusi, thallus centrum versus undulatus et irregulariter rimosus, optime fertilis, apothecia margine solum supra thallum elevata.
45. *L. culicis* Lynge, p. 94.
- 9*. Lobi marginales distincti, thallus sparsius fertilis, apothecia (saltem in aetate) supra thallum elevata.
10. Thallus centrum versus discrete verrucosus, sp. 17—21 μ .
46. *L. expansa* Lynge, p. 96.
- 10*. Thallus centrum versus rimoso-areolatus, sp. 20—25 μ .
47. *L. Humboldtii* Lynge, p. 97.
- 8*. Cortex tenuior, 20—35 μ , hymenium 70—90 μ , pycnoc. (ubi cognita) 15—17 μ , lobi distinctissimi.
9. Lobi angusti, 0.25—0.35 mm lati, apiculati, cortex 20—25 μ , margo apotheciorum elevatus.
48. *L. disserpens* (Zahlbr.) Magn., p. 98.
- 9*. Lobi latiores, 0.4—0.5 mm, haud apiculati, cortex 30—35 μ , margo apotheciorum subelevatus.
49. *L. alboradiata* Magn., p. 98.
- 7*. Lobi omnino contigui (vel rarius subcontigui), cortex 20—35 μ .
8. Thallus parvus, ad 1 cm, pulcherrime tessellato-areolatus, lobi plani; in saxa non calcarea.
51. *L. Graahii* Lynge, p. 99.
- 8*. Thallus major, ad 2 cm, magis irregulariter areolatus, lobi subconvexi; vulgo in saxa calcarea.
50. *L. Lesleyana* Darb., p. 99.
- III. Thallus effiguratus, utrinque corticatus, apothecia sessilia, thallo nondum immersa.
Subgen. *Placodium* (Hill) Th. Fr., p. 100.
1. Thallus substrato arcte adnatus, cinereo-glaucescens, medulla P aurantiaco-rubescens.
55. *L. melanaspis a. stellata* Th. Fr., p. 104.
- 1*. Thallus pulvinatus, substrato non arcte adnatus, P —.
2. Discus ater vel obscure olivaceus, paraphyses (maturae, in aqua) obscure capitatae, sursum 5—7 μ , epithecium haud granulosum.
3. Thallus stramineus, paraphyses sursum aeruginosae.
52. *L. melanophthalma* Ram., p. 100.
- 3*. Thallus albidus, paraphyses sursum fusco-capitatae.
54. *L. contractula a. feracissima* Th. Fr., p. 103.
- 2*. Discus luteo-carneus, rarius in olivaceum vergens, paraphyses apice haud incrassatae, thallus flavescenti-stramineus.
53. *L. subpeltata* Lynge, p. 102.

Lecanora atra (Huds.) Ach., and *L. gelida* (L.) Ach., otherwise so common in the arctic, were not found in our collections.

Subgen. *Eulecanora* Th. Fr.

146. (1) *Lecanora epibrya* Ach.

Landingsdalen. Kapp Herschel. Finschøya. — Loch Fyne. Jacksonøya. Myggbukta. Terneøya. Kapp Bennett. — Moskusoksefjorden. Reindalen. Kapp Humboldt. Kapp Graah. Blomsterbukta. — Celsius-

berget. — Gåsøya. Husbukta. Veganeset. — Holmvika. Antarctic-hamna. Kapp Petersens. Dicksonfjorden. Ellaøya. Mariaøya.

Lecanora epibrya is one of the commonest and most widespread lichens in the whole region, found almost everywhere on its wonted substratum.

147. (2) *Lecanora coilocarpa* (Ach.) Nyl.

Five km west of Husbukta, very scarce on old decayed wood.

The excipulum is distinctly corticated, the cortex is 15—16 μ thick, and well set off from the medulla (clear with clorale hydrate and stain with chlorzinkiodide). There are innumerable minute grains in the epithecium. The margin of the apothecia is thin and entire, a thallus is hardly visible.

After this only *Lecanora chlarona* and *L. coilocarpa* are probable names. The former is found on the cortex of deciduous trees, its disc is reddish-brown, the latter on trees and wood, and its disc is black or dark brown. In the present plant the disc is not black, but yet so dark brown that I thought *L. coilocarpa* the best determination.

148. (3) *Lecanora campestris* (Schaer.) Hue.

var. *septentrionalis* Lynge n. var.

Myggbukta. — Antarctic-hamna, typus (on quartzitic rocks).

Thallus, ut videtur, late expansus, crustaceus, albissimus, nitidus (subeburneus), crassus, verrucosus, verrucae altae, usque ad 1.5 mm, rotundatae, vel hinc inde plus minusve crenatae, majusculae, diam. 0.4—0.7 mm, contiguae vel interdum magis discretiae.

Cortex 25—30 μ altus, impure flavescens vel flavo-cinerascens, strato incolorato tectus. Hyphae corticales minute adpersae, indistinctae.

Apothecia numerosissima, congesta, rotundata vel mutua pressione irregularia, mox supra thallum bene elevata et basi constricta, majuscula, diam. 1.5—2(—2.2) mm. Discus persistenter planus, pure ater, etiam madefactus, epruinosis, subnitidus, minutissime scabrosus (sub lente, $\times 16$), margine albissimo, persistenti, crasso, integro vel varie, usque valde crenato circumdatus. Hyphae excipulares tenues, leptodermaticae, sat dense contextae. Cortex in margine apotheciorum 25—30 μ , in parte inferiori 50—60 μ , hyphae corticales tenues, leptodermaticae, valde ramosae, in omnes partes currentes, minutissime adpersae et eam ob causam indistinctae. Cortex strato amorpho tenui vel p. m. crasso tectus. Hypothecium omnino incoloratum, etiam cum excipulo. Hymenium 75—80 μ altum, superne olivaceo- vel fusco-fuligineum, praeterea in-

coloratum, strato tenui incolorato tectum, epithecium non granulosum (vide infra). Paraphyses (sectio tenuissima) haud arcte cohaerentes, tenues, sursum aut non incrassatae, aut leviter clavatae, 2—2.5 μ crassae (etiam in KOH). Sporae variantes, saepe subangustae, e. g. 16 \times 6 μ , aut latiores, 12—16 \times 6—8 μ .

Pycnoconidia arcuata, elongata, 18—25 μ .

Thallus KOH distincte flavescens, hymenium J e caeruleo rubescens.

The same species was found at Dundas Harbour, Devon Island, by Dr. Polunin in 1936. The wide distribution of this characteristic type would make it natural to raise it to specific rank, and most probably this will be done. But the decision should, perhaps, be left to a monographer of the saxicolous plants of the *Lecanora subfusca* section.

It differs very considerably from the usual type of *Lecanora campestris*, as seen e. g. in Malme Lich. Suec. No. 619, by its purely white thallus, with larger verrucae, and by its very large, elevated apothecia, with their black, plane disc, irregular only on account of the mutual pressure of the growing apothecia. The white colour is due to the amorphous stratum that covers the thallus, it is at times seen also in southern plants.

In the plant from Myggbukta the paraphyses were more capitata (KOH), and the epithecium slightly granular (grains dissolved in KOH).

149. (4) *Lecanora crenulata* (Dicks.) Nyl.

Kapp Stosch, on a calcareous rock.

Thallus evanescens. — Apothecia numerosissima, mutua pressione difformia, majuscula, diam. usque ad 1.5—1.8 mm, elevata, basi bene constricta. Excipulum externe albissimum, rugosum, margo crassus, 70—150 μ , fissuris radiantibus plus minusve typice crenulatus, pruinosis, discus atro-fuscus, albido-pruinosis, planus, nisi margine involuto concavus. Cortex excipuli a medulla haud bene limitatus, centrum versus circiter 50 μ altus, marginem versus multo tenuior, hyphae corticis valde granulosae et eam ob causam indistinctae, ramosae. Hypothecium 40—50 μ altum, omnino incoloratum. Hymenium 65 μ altum, superne fuscum, strato tenui amorpho plus minusve rupto tectum. Paraphyses cohaerentes, distinctae, vulgo indivisae, rarissime ramosae, in aqua bene capitatae, sursum 4—5 μ crassae, etiam in KOH capitatae et sursum constrictae septatae. Sporae 8—11 \times 4—5 μ .

Hymenium J e caeruleo sordidum, gelatina flavo-fuscescens, asci vinoso-nigricantes, cortex KOH non coloratur.

The cortical hyphae are so intensely adspersed with minute grains, not dissolved in KOH, that they are hardly discernible. But if stained

by cotton-blue they are found to be ramose, and directed chiefly towards the surface, without forming a palissade tissue. They are rather thick-walled, the lumen is distinctly visible.

A plant from Myggbukta, and another from Blomsterbukta, possibly also belong here, but they were so poorly developed that I could not venture an unobjectionable determination.

150. (5) *Lecanora dispersa* (Pers.) Flk.

Lille Finschøya. — Myggbukta. Moskusoksefjorden. Kapp Humboldt. Dusénfjorden. Kierulffjorden. — Celsiusberget.

In this region it prefers the calcareous sandstones, but I also found it on rocks that gave no CO₂ with HCl. It is not supposed to be rare, but it is easily overlooked, on account of its modest size.

Cortex excipuli a medulla bene limitatus, in margine tenuis, stipitem versus crassior, usque ad 50 μ altus, hyphae valde granulosae et indistinctae, pachydermaticae, conglutinatae, superficiem versus perpendicularares (vallatae). Hymenium 70—75 μ altum, superne dilute flavofuscenscens vel incoloratum, plus minusve granulosum, etiam hymenium p. p. granulosum. Paraphyses tenuissimae, apice haud incrassatae, sporae parcissime visae, ellipsoideae, 10—12 μ .

The structure of the apothecia agreed well with Malme Lich. Suec. No. 544.

151. (6) *Lecanora surrecta* Lyngé, n. sp.

Kapp Petersens, on drift wood of *Populus* (det. Dr. Elias Mork).
Thallus visibilis omnino deest.

Apothecia parva, diam. 0.3—0.6 mm, numerosa, sed dispersa, ab initio ligno immersa, deinde magis elevata et basi constricta, sed non stipitata. Discus epruinosis, ater, madefactus tamen leviter in fuscescentem vergens, primo planus et margine tenui vel subtenui, integro vel subcrenulato, saepe pruinoso, cinctus, deinde convexus, immarginatus. Excipulum arachnoideum (sectio tenuis), gonidiis repletum. Excipulum in parte inferiori cortice crasso, 35—40 μ alto, incolorato, hyphis perpendicularibus instructum, in ipso margine subcorticatum. Hypothecium in parte interiori hyphis superficiei p. m. parallelibus formatum, in parte exteriori, superiori, hyphae in omnes partes directae. Hymenium angustum, 45—50 μ altum, strato amorpho tenui tectum, epithecium omnino egranulosum, fuscum, hymenium praeterea incoloratum. Paraphyses in aqua cohaerentes, validae, circiter 2 μ crassae, fusco-capitatae, sursum 4—5 μ crassae. Paraphyses in HCl immutatae, etiam in KOH parce mutatae, nisi facilius discretiae, hinc inde ramosae videntur. Asci fertiles

non numerosi, anguste pyriformes, sporae octonae, ellipsoideae vel oblongae, $11-12.5 \times 4-5 \mu$. — Pycnides non visae.

Hymenium J rubescens, excipulum J flavescens, sed non caerulescens. Medulla KOH non tingitur.

The negative reaction of the medulla by KOH will distinguish the species from the *Lecanora subfusca* section. There are then 2 papers, that should be consulted for the identification of our species, the first of which is Vainio Lich. Pitlek., 1909. In our species there is a distinct chondroid cortex on the under side of the excipulum, but several sections clearly show that it is missing along the margin. This will exclude *Lecanora Behringii* Nyl.

The saxicolous *Lecanora Nordenskiöldii* Vain. has a "thallus crustaceus", larger apothecia (0.4—1.2 mm), and a higher hymenium (80μ). The lignicolous *Lecanora Palanderi* Vain. has still larger apothecia (0.6—1.6 mm), its disc is "lividorufescens, tenuiter pruinosis", its paraphyses "tenues aut sat tenues ($1-1.5 \mu$)", it also has a "thallus crustaceus". Its cortex agrees with our plants. On the whole it is difficult to exclude it with full certainty, but the agreement does not seem convincing. I have at present no access to the type plant. The saxicolous *Lecanora glaucoatra* Vain. has a verrucose thallus and must be another species.

The other paper is Hedlund's "Kritische Bemerkungen" from 1892. The epithecium of our species is not in the least granular, which must exclude his species, p. 36—49.

Hedlund's *Lecanora symmictiza* (Nyl.) Hedl. has a brown disc, and Herb. Lich. Fenn. No. 163 differs sufficiently from our plants. They more resemble *Lecanora hypoptoides* Nyl., as seen in Herb. Lich. Fenn. No. 126. But in the last mentioned plant the apothecia are smaller than in ours, rarely surpassing 0.4 mm, they are also more appressed, and very inconspicuous. It also differs in its cortex: "superne non attenuatus", and in the reaction of its excipulum: "pars centrali excipuli J caerulescens".

Our plants might be compared with *Lecanora obscurella* (Somrft.) Hedl. which differs in its small apothecia, rarely exceeding 0.4 mm in diam., its brown disc (moistened), its very thin and easily discrete paraphyses, and in the same reaction of the excipulum by J as in *Lec. hypoptoides*. The type plant is "*Lecidea pellucida* γ . *obscurella*" in Somrft. *Plantae cryptogamae Norvegiae*, No. 132, it is truly a *Lecanora*, as is seen by its excipulum, in agreement with Hedlund's statement.

I have named it *surrecta*, "raised from the sea". It is doubtful whether an exobiont can be transported by drift wood over such great distances. But it might be possible for an endobiont, such as the present species. The substratum, *Populus*, and the direction of the arctic streams, suggest a very long drift, perhaps from the forest zone of a Siberian river.

152. (7) *Lecanora Behringii* Nyl.

Landingsdalen. Kapp Herschel. — Myggbukta. Kapp Bennett. — Moskusoksefjorden. Reinbukta. Kapp Humboldt. Kierulfjorden. — Sofiasundet, south side west of Robertsonøya. — Kapp Simpson. Holm-vika.

On the bones of animals, possibly also in a few places on soil. — The Reindeer (*Rangifer tarandus*) is supposed to have immigrated to this region along the northern route, north of Greenland, followed by its faithful attendant, the Polar wolf. The Reindeer was severely hunted by the wolf, as well as by the Eskimos, and it is now exterminated. In 1899 Nathorst, the great killer, shot some, in 1900 a few were also seen, but to my knowledge they were the last. Now Reindeer bones are found all over the country, and especially at the old Eskimo sites, in an abundance, which is a witness to their great number in those days.

On such bones we find an interesting vegetation of crustaceous lichens, among which *Lecanora Behringii* is one of the most characteristic, together with *Caloplaca stillicidiorum*, *C. subolivacea*, *Candelariella epixantha*, a. o. At the Eskimo sites we find piles of bones, also of other animals, with these lichens. At Kierulfjorden there must have been a very great site, to judge from the residue of bones.

Vainio has explained to us the anatomical difference between *Lecanora Behringii* and *L. Hagenii* and other related species (Lich. Pitlek., 1909, p. 47). *Lecanora Behringii* can be distinguished, even habitually from *L. Hagenii*, by its considerably larger (0.3—2 mm), and more elevated apothecia: "peltata et basi bene constricta" (Vain. l. c.). *Lecanora Hagenii* is hardly found in the arctic.

153. (8) *Lecanora subtorrida* A. Zahlbr.

Die Gattung *Lecanora*, 1928, p. 23, in Rep. Scient. Res. Norw. Exped. to Novaya Zemlya, No. 44.

Jacksonøya, on basalt.

Whether this species is specifically distinct from *Lecanora torrida* Vain. Lich. Pitlek., 1909, p. 45, is difficult to say, probably it is not. In the present plant I measured a low hymenium, 50—55 μ high, in its upper part olive-coloured, uppermost aeruginose, and unchanged by HNO_3 . The disc is black, rather than brown, and very little changed if moistened. The type plant of *Lecanora torrida* is at present not accessible to me.

154. (9) *Lecanora congesta* Lynge, n. sp. ad int.

An syn. *Lecanora Nordenskiöldii* Vain. Lich. Pitlek., 1909, p. 46?

Jacksonøya. Myggbukta. — Kapp Humboldt. Kierulfjorden (typus).
In rupibus durioribus.

Thallus inter apothecia congesta haud visibilis, vel si adest tenuis, rimosus, corrosus. — Apothecia numerosissima, aggregata, elevata, pel-tata, basi bene constricta, diam. usque ad 1.0 mm. Discus planus, eprui-nosus, ater, margine crasso, albido, saepe pruinoso, persistenti, integro vel deinde varie rupto, saepe ob mutuam pressionem flexuoso, circum-datus. Excipulum gonidiis repletum, hyphae laxae contextae. Cortex excipuli a medulla bene limitatus, in margine tenuis, subobscuratus, sed distincte visibilis, centrum versus crassior, usque ad $65\ \mu$ altus, in parte exteriori dilute cinerascens, praeterea incoloratus. Hyphae corticales crassae, $7-8\ \mu$, valde pachydermaticae, conglutinatae, ramosae, saltem in parte exteriori superficiei plus minusve perpendiculares. Hypothecium omnino incoloratum. Hymenium $60-65\ \mu$ altum, superne olivaceo-fuscum vel fusco-fuligineum, epithecium plus minusve granulosum. Paraphyses simplices vel in parte superiori interdum furcatae, haud cohaerentes, maturae sursum (in aqua) pyriformiter incrassatae et ibi $5-6\ \mu$ crassae, sed in KOH haud incrassatae. Sporae male evolutae, octonae, simplices, ellipsoideae, $10-13 \times 4-5\ \mu$. — Pycnides non visae.

Hymenium J e caeruleo sordide vinosum, KOH superne dilutius coloratum, HNO_3 subimmutatum. Margo apotheciorum KOH immutatus.

If KOH is added to a section the tips of the full-grown paraphyses are no more incrassated. This is the case in several *Lecanorae*, and suggests a (mucilaginous?) hood, simulating an incrassated cell-wall. The plant from Jacksonøya is not so well developed as the type. Its apothecia are numerous, but not so pulvinated, and their margin is thinner and darker.

Lecanora congesta is so nearly related to *L. Nordenskiöldii* Vain. l. c. that the specific distinction is open to grave doubt. The distinctive character is the black colour of the disc, which is brown in the said species. My Greenland material is considerable, and the black colour is evidently constant. In Lich. Pitlek. 1909, p. 46, Vainio describes the cortex of *L. Nordenskiöldii*: »strato corticali (excipuli) circ. $30-40\ \mu$ crasso, ex hyphis irregulariter contextis, ramoso-connexis” &c. In *L. congesta* the cortex is thicker, up to $65\ \mu$, which is, perhaps, unimportant. But in the exterior part its hyphae are distinctly perpendicular to the surface. In that respect it differs from *L. Nordenskiöldii*, and agrees with *L. Behringii* and *L. Hagenii*. Vainio is of opinion that this is an important character.

Lecanora Nordenskiöldii was described from Jinretlen and Ildidja in Eastern Siberia. It has been found in Novaya Zemlya by me in 1921, and in Bear Island by Th. Fries in 1868. If the present plants (or some of them) should belong to that species, it is most probably a circumpolar species, at least its section is widely distributed.

155. (10) *Lecanora parva* Lynge n. sp.

Landingsdalen, in rupe basaltica.

Planta inconspicua, athallina vel subathallina, granulis minutis cinereoalbidis apotheciis affixis. — Apothecia parva, 0.5—0.7 mm lata, rarius majora, dispersa vel contigua, supra substratum elevata et basi bene constricta. Discus epruinosis, pure ater, etiam madefactus, e plano convexus, sub lente ($\times 16$) scabrosulus, margine persistenti, sed deinde tenui, integro, cinereo vel cinereo-nigrescenti circumdatus. Cortex a medulla non distincte limitatus, in margine tenuissimus, praeterea altior, hyphae corticis ramoso-connexae (KOH), articulis extremis tamen conniventibus, caeruleo-fuligineis. Medulla gonidiis repleta, hypothecium omnino incoloratum. Hymenium 65—70 μ altum, superne pulchre aeruginoso-smaragdulum, praeterea incoloratum, epithecium haud granulatum. Paraphyses sursum clavatae vel capitatae, 3—4 μ crassae, sporae ellipsoideae, 10—12 \times 5—6.5 μ .

Hymenium J caeruleo-fuligineum, thallus KOH non flavescens.

My *Lecanora congesta* has larger, quite pulvinate apothecia, and its hymenium is olive-black or dark brownish, not smaragdine in its upper part, and its cortex is much better developed, and well limited from the medulla of the apothecia. Yet they must be nearly related.

156. (11) *Lecanora mollissima* Lynge n. sp.

Blomsterbukta, in rupe calcarea.

Thallus irregulariter orbicularis, parvus, 1 cm haud superans, thalli complures tamen interdum confluunt. Thallus mollissimus, tenuis, margine evanescens, deinde sine structura et centrum versus (si bene evoluta) fissuris irregulariter areolatus, areolae elongatae, 1.0 \times 0.35 mm attingentes. Thallus colore cinereo-argillaceo, sub lente ($\times 64$) superne membranaceus, aut subplanus aut ob corrosionem plus minusve undulatus.

Apothecia centrum versus numerosa usque congesta, supra thallum bene elevata vel etiam substipitata, rotundata, parva, diam. 0.35—0.5 mm. Discus ater, etiam madefactus, in juventute ob marginem tumidulum subconcaevus, deinde margine evanescenti planus vel subconvexus, margo integer vel deinde crenulatus. Excipulum gonidiis repletum, hyphae excipulares in margine apothecii peripheriam versus radiantes, constrictae septatae, articulis extremis obscure fusciscentibus. Hymenium angustum, 50—55 μ altum, superne obscure fuscum, paraphyses cohaerentes, ramosae, sursum capitatae et ibi 3—4 μ crassae. Sporae parce evolutae, paucas solum vidimus, 7.5 \times 5 μ . — Pycnides frustra quaesitae.

Medulla J non caerulescens, hymenium J obscure vinosum, medulla KOH immutata, etiam cum hymenio.

The clayey thallus is not unlike a *Lecanora flavida*, but the species is typically an *Eulecanora*. The very soft thallus may look leprose, and it occasionally is, on account of erosion, but if an intact part of the thallus is studied under a binocular lens of high power ($\times 64$) the surface is membranaceous, rather than leprose. The cracks are radial and transversal, but not regularly so, they limit the oblong areolae which are often elongated radially.

I do not know of any Scandinavian *Lecanora*, with which I could compare this very characteristic species. Is it of western origin?

157. (12) *Lecanora cladonioides* Lynge, n. sp.

Sanddalen (typus). — Dicksonfjorden. In rupe quartzitica.

Thallus crustaceus, non lobatus, in typo 6 cm latus, ubique albissimus, subnitidus, mollis, crassus, usque ad 2—3 mm altus, valde irregularis, papillato-verrucosus vel grosse plicatus vel hinc inde adscendente subsquamosus, saepe cariosus, sed non sorediatus, epruinus.

Thallus strato necrali tectus, 35—40 μ alto, ipse cortex subincolatus, crassitudine varianti (vide infra), hyphae corticales minutissime adpersae et eam ob causam valde indistinctae. Hyphae medullares tenues, 2—2.5 μ crassae, sat laxae contextae, haud adpersae.

Apothecia numerosissima, approximata usque contigua, sed haud pulvinate congesta, majuscula, diam. ad 1.5 mm, ab initio sessilia, sed basi constricta, deinde valde elevata et in aetate interdum excrescentibus thallinis columnaribus, podetiiformibus vel squamuliformibus in apice adfixa. Discus omnino ater, epruinus, in juventute subplanus et margine concolori crasso integro circumdatus, deinde alte convexus usque ad semiglobosus, recurvatus, margine omnino excluso. Excipulum in parte inferiori non limitatum, gonidia in margine apothecii sat numerosa, in centro excipuli vulgo sparsa vel deficientia. Apothecia in margine corticata, cortex circiter 50 μ altus, hyphae leptodermatae, tenues, indistinctae, in omnes partes currentes, in parte exteriori marginis superioris tamen magis flabelliformiter radiantes. Excipulum omnino incoloratum, etiam cum hypothecio et parte majori hymenii, hymenium 50—55 μ altum, superne pulchre smaragdulum, epithecium non granulosum. Paraphyses tenues, septatae, indivisae vel rarius hinc inde ramosae vel sursum furcatae, apicem versus leviter incrassatae. Asci numerosi, anguste pyriformes, sporis saepe carentes, sporae octonae, ellipsoideae vel oblongae, minutae, 7—8 μ longae. — Pycnides frustra quaesitae.

Thallus KOH distincte flavescens et Pd flavo-aurantiacus, sed non cinnabarinus. Medulla J —, et CaCl_2O_2 —. Hymenium J e caeruleo sordide vinosum, etiam cum hypothecio.

Habitually the plant is entirely lecideine (I first took it for a plant near *Lecidea plana*), even under a lens of high power there is hardly a

trace of a lecanorine margin. I was, therefore, much astonished to find well developed gonidia in the margin of the apothecia. Several of them were sectioned, and they all showed the same.

The thick soft thallus is unlike anything, which I have seen in a Scandinavian, or in an arctic, *Lecanora*. Under a good lens some of the stalked apothecia quite called to mind a *Cladonia*. The stratum necrale, covering the thallus, gives it the white, shining colour, it did not stain with cotton blue. But a fine staining was obtained in the lumen of the hyphae between the thalline gonidia and just above them. The true cortex is, accordingly, poorly developed.

158. (13) *Lecanora frustulosa* (Dicks.) Kbr.

var. *argopholis* (Wbg.) Kbr.

Moskusoksefjorden, 4—900 m. Blomsterbukta. — Sofiasundet: Rudbeckfjellet, 1600 m, leg. Devold. — Röhssfjorden.

Neither common nor plentiful, only in Blomsterbukta I found it in some abundance.

Hymenium about 75—80 μ , always brownish above, also in KOH, paraphyses often stoutish, but hardly incrassated at their tips (KOH). Spores 10.5—13 μ long. Margin thick, entire, persistent. In my material I never found so large spores as those, measured by Th. Fries (Lich. Scand. p. 256: 11—18 \times 6—9 μ , in Lich. France p. 1026 Harmand stated 10—18 \times 5—9 μ). In order to prevent a confusion with var. *Ludwigii* (Spreng.) Th. Fr. it is necessary to study the margin of the apothecia.

Arctic plants are not always so well developed as they are in southern regions, this is often the case with lichens.

159. (14) *Lecanora occidentalis* Lynge.

Lecanora frustulosa var. *occidentalis* Lynge Lich. West Greenl., 1937, p. 126, pl. VI, fig. 2.

Myggbukta. — Kapp Humboldt. Dusénfjorden near Kapp Graah. Found on basaltic rocks.

The type plant was described from Disko in West Greenland, leg. Th. Fries in 1871. Then Scholander found it in Mariadalen, Akorninarmiut, South East Greenland. That is what we know of its distribution.

Thallus quam in *Lecanora frustulosa* magis albidus et verrucae thallinae minores. — Thallus apotheciis plus minusve creberrime tectus. Discus ater, etiam madefactus, margo persistens, albidus, integer vel interdum crenulatus. Hymenium subangustum, 60—65 μ , superne olivaceo-fuliginium, KOH aeruginosum, paraphyses (KOH) sursum plus minusve incrassatae usque ad bene capitatae et tum 5—6 μ crassae. Sporae par-

vulae, 8—10(—12) \times 6 μ . — Thallus KOH flavescens, hymenium J e caeruleo sordide et obscure vinosum.

On the whole a thinner and smaller plant than *Lecanora frustulosa*, from which it is especially distinguished by the colour of its disc and, in sections, of its hymenium, a slightly lower hymenium, and, on an average, slightly shorter spores.

160. (15) *Lecanora polytropa* (Ehrh.) Rabh.

Landingsdalen. Kapp Herschel. Clavingøya: Revet. — Jacksonøya. Myggbukta. Terneøya. Kapp Bennett. — Moskusoksefjorden. Kapp Humboldt. Dusénfjorden. Kierulffjorden. — Sofiasundet: Sanddalen, and Rudbeckfjellet, 1600 m, leg. Devold. — Gåsøya. Husbukta. Veganeset. — Kapp Simpson. Holmvika. Antarctichamna. Mainland near Archerøya. Röhssfjorden. Dicksonfjorden.

It is quite as ubiquitous in this region, as it is all over the arctic, and its well known variation is the same. *F. illusoria* is quite common.

161. (16) *Lecanora pachythallina* Lynge n. sp.

Landingsdalen (typus). — Myggbukta. Kapp Bennett. — Kapp Humboldt. — 15 km west of Husbukta. — Dicksonfjorden.

It grows on mosses. Not supposed to be common, but it was found in the collections from either year.

Thallus lobatus, lobi non radiantes, marginales usque ad 0.75—0.8 mm crassi et usque ad 2 mm lati, effigurati, varie crenulati vel incisi, lobuli marginales subglobosi vel papillato-rotundati. Thallus subcoriaceus, superne pallide stramineus, leviter nitidus, subtus incoloratus.

Hyphae epigonidiales pachydermaticae, superficiei plus minusve paralleles, vel in omnes partes currentes, dense contextae, granulis minutis valde adpersae. Gonidia glomerata, stratum subcontinuum circiter 40—50 μ infra superficiem formantia, interdum fere usque ad superficiem progressa sunt, glomeruli praeterea sparsa per totam fere medullam dispersi. Hyphae medullares pachydermaticae, 7.5—10 μ crassae, coriaceae, lucidae, hinc inde granulis varie adpersae. Etiam pagina inferior hyphis valde pachydermaticis et in omnes partes directis, dense contextis, formata.

Apothecia rara, juvenilia plana et bene marginata, deinde depresso convexa, subemarginata, majuscula, diam. 1—1.5 mm. Discus epruinosis, pallide carneus, margo juvenilis thallo concolor. Excipulum in parte exteriori (cortex) hyphis valde pachydermaticis, usque ad 8—10 μ crassis, in omnes partes directis vel subflabelliformibus, plus minusve adpersis, instructum. Medulla hyphis minus pachydermaticis, sed dense contextis, haud vel leviter adpersis, formatum. Gonidia in margine numerosa, infra hyphas marginales sparsius adsunt, in ipsa medulla et infra hypothecium saepe desunt. Hypothecium incoloratum, circiter 50 μ

altum, sed ab hymenio et a medulla non distincte limitatum. Hymenium 60—65(—70) μ altum, in parte superiori dilute flavo-fuscenscens, aureus, granulis minutis inspersum, praeterea incoloratum. Paraphyses arcte conglutinatae, praesertim sursum, in KOH facilius discretae, apice non incrassatae, subvalidae, 2 μ crassae, sed ob granulas valde indistinctae. Asci angusti, circiter 12 μ crassi, saepe steriles. Sporae ellipsoideae, haud oblongae, 10—12(—13) \times 5.5—6.5 μ . — Pycnides frustra quaesitae.

Thallus KOH dilute flavescens, CaCl_2O_2 —, Pd. flavescens vel flavo-aurantiacus. Medulla J —, asci subpersistenter caerulescentes, paraphyses aureae, gelatina haud tingitur.

The size of *Lecanora pachythallina* is that of a *Placodium*, rather than of a *Eulecanora*. But the lobes are not radiating, not even along the circumference, and there is no *Placodium*-cortex, neither in the excipulum, nor in the thallus. If the upper part of the thallus is destroyed, as it often is in this, as in other arctic lichens, the white colour of the medulla is seen.

In the medulla the small grains assemble around the hyphae in glomeruli of an irregular form, about 120—150 μ in size. Here the hyphae are entirely covered and hardly visible. The grains are angular, about 2—2.5 μ in size. Between the glomeruli the hyphae are perfectly clear, and hardly adspersed.

The colour of the whole plant suggests an affinity with *Lecanora polytropa*, but it is very much larger than that species. Even in the largest areoles of *L. polytropa* var. *leucococca* the size but rarely attains 1 mm, and they are very thin. Even lignicolous *L. polytropa* faithfully preserves its habitus, and it is difficult to understand why it should develop such gigas-plants, if found on mosses. There is no muscicolous *L. polytropa* in our herbarium.

I sectioned one apothecium of *L. polytropa*. The hymenium was adspersed only in the epitecium. The hyphae of the excipulum were much thinner, 2.5—3 μ thick. The excipulum was quite filled with gonidia. The spores were oblong and narrow, 10—13 \times 3.5—4 μ .

Lecanora pachythallina has nothing of the columnar structure of the lobes in *L. maxima* Lynge (Lich. West Greenl., 1937, p. 126, pl. IX, fig. 2), and its disc is pale flesh-coloured and its margin thin, evanescent, in *L. maxima* the disc is leaden-coloured to dark and very pruinose, and the persistent margin is very thick.

162. (17) *Lecanora intricata* (Schrad.) Ach.

Jacksonøya. Myggbukta. Kapp Bennett. — Moskusoksefjorden. Kapp Humboldt. — Holmvika.

The number of localities is not inconsiderable, but it is always rather scarce.

163. (18) *Lecanora badia* (Hoffm.) Ach.

F. typica: Myggbukta. — Moskusoksefjorden. Kapp Humboldt. — Sofiasundet: Sanddalen, and 4 km west of Robertsonøya. — Veganeset. — Antartichamna. Kapp Petersens. Dicksonfjorden.

F. cinerascens Fw.: Landingsdalen. — Moskusoksefjorden. Kapp Humboldt. Dusénfjorden.

There are several localities, but I always found it scarce. Its f. *cinerascens* is more common in the arctic than in southern regions. A peculiar forma is

F. rosacea Lynge n. f.: Thallus incrassatus, bullato-verrucosus, in alia planta tenuior, sed praeterea conformis, colore pallide rosaceo. Apothecia ut in typo, sporae bifusiformes. Pycnoconidia 8—10 μ .

It is not rare that lichens are stained with this rosy colour when growing on red sandstones. The rock gave some CO₂ by HCl.

164. (19) *Lecanora microfusca* Lynge n. sp.

Moskusoksefjorden, in rupe calcarea arenaria.

Thallus valde inconspicuus, oculo nudo haud visibilis, areolatus, areolae circ. 0.3 mm latae, tenuissimae, discretae vel hinc inde contiguae, irregulares, saepe angulosae, planae, plus minusve cariosae, fuscae, margine diluitori leviter elevato cinctae.

Apothecia numerosa, sed non congesta, rotundata, parva, diam. 0.3—0.35 mm, supra thallum (vel substratum) elevata, basi constricta. Discus ater, etiam madefactus, scabrosus, deinde depresso convexus, margine fusco, integro, persistenti circumdatus. Cortex excipuli in margine tenuis, 15 μ altus, in parte exteriori fuscus et minute granulatus, praeterea incoloratus, egranulatus, hyphis leptodermaticis, constrictae articulatis formatus. Hymenium 65 μ altum, superne pulcherrime smaragdulum, strato tenui amorpho tectum. Paraphyses conglutinatae, tenuissimae, sursum non incrassatae. Sporae ellipsoideae (interdum late), 14—15 \times 7—7.5(—9) μ , apicibus obtuse rotundatae.

It is one of the most inconspicuous lichens in my collection, its habitus had to be studied under a binocular lens of high power (\times 16 and 64).

I do not know of any other lichen, with which to compare it. *Lecanora badia* is entirely different by its thick thallus, brown hymenium, fusiform spores &c, and *L. atriseda* differs in much the same characters, excepting its obtuse spores.

165. (20) *Lecanora castanea* (Hepp) Th. Fr.

Kapp Humboldt. — Veganeset. — Kapp Petersens.

Scattered over the region, but rare and scarce, I only detected a few plants. Spores 15—21 \times 6.5—8 μ , suggesting f. *vulgaris* Th. Fr. Lich. Scand. p. 272.

Subgen. Aspicilia.

The subgenus *Aspicilia* is well known to be one of our severest "Cruces lichenologorum", and few are those who have succeeded in the identification of its species in a large collection.

The Swedish lichenologist, Dr. A. H. Magnusson, is the first to have published a perspicuous monograph of the greater part of its northern species: "Studies in Species of Lecanora. Mainly the *Aspicilia gibbosa* Group", Kungl. Svenska Vet. Akad. Handl., ser. III, vol. XVII, No. 5, p. 1—182, text-fig. 1—44, Stockholm 1939.

Dr. Magnusson's monograph is based on a careful study of the morphology, anatomy, and the chemical characters of the species. This method is sufficient for specific distinction, but it is doubtful whether it can build up a system, based on the real affinity of the species. It seems to me that such results can only be obtained by a minute research on the development of the apothecia from the first beginning to the ripe stage. We are much in need of such investigations.

It was Dr. Magnusson's Monograph, and his personal help, which encouraged me to attempt the identification of my large material from North East Greenland. Future research alone can prove whether I have succeeded in my difficult task, or not. I shall be fully prepared to find the specific limits between some species bridged over by the material of future expeditions.

I have often felt grave doubts concerning the specific limitation of several *Aspiciliae*, also of my own. The final review of my material and my paper did certainly not diminish my doubts, and I cancelled some species which I had at first intended to propose. But even if additional species should loose their lives at the axe of coming research work, it is, perhaps, the best proceeding to limit the species rather narrowly in the first sketch. It is a greater disadvantage than it is to present the species as large systematic units which may be of no systematic importance.

In the present region the species of the *Cinerea* and the *Alpina* sections are evidently quite lacking. So much the more abundant are the species of the section *Orbiculares* Magn. This is a common arctic feature.

It requires a considerable experience to say whether a species has a translucent, or an opaque medulla. In my Clavis this character has, therefore, not been used so extensively as did Dr. Magnusson in his Monograph. — Arctic lichens often have a remarkably soft thallus, a really thin section is not always coherent, and the examination and the description may be difficult.

The hypothecium is always uncoloured, and the distinction between it and the hymenium is not always easily observed. I have tried to

measure the height of the hymenium from the lowest end of the asci. This may include a part of the hypothecium, at least I have sometimes measured a higher hymenium than Dr. Magnusson found in the same plant.

In some species, e. g. in *L. candida* and in *L. sublapponica*, I have found that a concentrated solution of potash (50 % KOH) precipitated large, uncoloured crystals, the nature of which is unknown to me. The study of their nature, and their systematic importance, is recommended.

Several *Aspiciliae* have a very wide distribution, but a very great number of them are very local species. Every great northern collection of *Aspiciliae* has brought to light a certain number of apparently endemic species. I may refer to my own material from Novaya Zemlya (1921), identified by Zahlbruckner: "Die Gattung Lecanora", Rep. of the Scient. Res. of the Norw. Exp. to Novaya Zemlya, No. 44, Oslo 1928.

The same is the case with my Icelandic collections from 1937 and 1939. The *Aspiciliae* have not yet been identified, but they contain a great number of "n. sp.". My Spitsbergen collection from 1926 (not yet determined), is, perhaps, not so rich in novelties, but anyhow it is very rich in *Aspiciliae*.

All this shows us that *Aspicilia* is a subgenus in quite an explosive development, presumably in recent times, at least in northern and arctic regions. The same is the case with some other genera, such as *Rhizocarpon*, and the subgen. *Melanaspicilia* of *Buellia* (my Icelandic collections are peculiarly rich in *Melanaspiciliae*).

The inverse is evidently the case with some other genera, the prototype of which is *Dactylina* (vide my paper "On Dufourea and Dactylina, three Arctic Lichens«, Skr. om Svalbard og Ishavet, No. 59, Oslo 1933).

Our science gains in importance if it can contribute to the elucidation of such general questions.

It is next to impossible to find characteristic names in this subgenus where such a great number of species has been described. I have, therefore, often chosen the name of the locus classicus.

166. (21) *Lecanora verrucosa* (Ach.) Laur.

Landingsdalen. Kapp Herschel. Finschøya. — Myggbukta. Kapp Bennett. — Moskusoksefjorden. Kapp Humboldt. Dusénfjorden. Blomsterbukta. Kierulffjorden. — Celsiusberget. — Husbukta. Veganeset. — Ellaøya. Holmvika.

One of the commonest and most widespread lichens of the region.

167. (22) *Lecanora flavida* Hepp.

Myggbukta. — Kapp Humboldt. Blomsterbukta. — Sofiasundet: Sanddalen. — Holmvika.

In East Greenland I only detected rather few plants of this species which is so common and plentiful in some other arctic regions, e. g. in Novaya Zemlya.

Hymenium intensely blue, spores $12-18.5 \times 10-11 \mu$, gonidia small, diam. $7-10 \mu$.

168. (23) *Lecanora Celsii* Lynge n. sp.

Ymerøya: Celsiusberget. — Blomsterbukta.

Found on rocks, containing some calcareous substance.

Thallus parvus, ad 1 cm latus, interdum tamen thallis confluentibus plagas latiores formans, tenuis-tenuissimus, $170-200 \mu$ altus, ambitu tenuissimus et hypothallo haud cinctus, centrum versus irregulariter rimosus, haud areolatus vel, si thallus melius evolutus, subareolatus. Thallus pallide rosaceus vel ochraceo-cinerascens. Areolae fertiles rimis profundis a thallo sterili separatae.

Apothecia parva, diam. $0.2-0.35$ mm, plus minusve numerosa, centrum versus interdum contigua, ab initio profunde immersa, dein thallum subaequantia et in aetate margo elevato eum leviter superantia. Margo thallinus subinteger, thallo concolor, margo excipularis haud visus, discus ater, epruinosis. Excipulum tenue (vide infra), hymenium $70-80 \mu$ altum, parte interiori dilute, sed distincte smaragdulum, parte superiori intensius coloratum, plus minusve granulosum. Paraphyses tenuissimae, sursum levissime solum incrassatae, septatae, sed non moniliformes (KOH). Asci vulgo steriles, sporae $(12.5)15-20(24) \times (7)12-13 \mu$.

Pycnides frustra quaesitae.

Medulla plus minusve distincte paraplectenchymatica, pellucida, cortex superior saepe destructus, si evolutus, plectenchymaticus, tantum $10-15 \mu$ altus. Thallus gonidiis repletus.

Medulla HCl + KOH —, hymenium J subpersistente caerulescens, asci persistente, gelatina hymenialis deinde magis flavescens.

var. *rosacea* Lynge n. var.

Thallus pallide rosaceus (Celsiusberget).

var. *cinerascens* Lynge n. var.

Thallus ochraceo-cinerascens (Blomsterbukta and Myggbukta).

The two varieties possibly represent different species. In the grey plants the spores are often smaller, $12.5-15 \mu$, in one of them however $16-20 \mu$, but they are often unripe, and they are, perhaps, more variable than in other *Aspicillae*. The grey plants are much better fertile than the others. — I have repeatedly observed a more or less rosaceous colour in plants growing on calcareous sandstones.

I have seen no arctic *Aspicilia* which I could identify with the present plants. *Lecanora lacustris* has a more ochraceous thallus, the habitus of its small apothecia agrees fairly well, but its disc is "rubellus vel rufescens", Th. Fr. Lich. Scand. p. 288, in section "fuscescens v. lutescens". — *Lecanora flavida* is evidently much nearer related, it has much the same colours in its hymenium, but its apothecia are smaller, and its thallus is thinner.

A microtome section showed a distinctly plectenchymatous tissue under the gonidia. Between them the texture relaxed, and the hyphae were more distinctly seen. The cortex was very often eroded or quite lost, exposing the gonidia, but in one section I saw a distinctly plectenchymatous, very thin cortex.

The hymenium is very low, and the excipulum very thin, hardly to be distinguished from the hypothecium. The whole part of the apothecium under the hymenium hardly exceeded 25—30 μ in my sections. A margo excipularis was hardly to be distinguished between the hymenium and the thalline cortex.

Habitually the species resembles an *Jonaspis*, but the gonidia are green, 8—10 μ large. — It is hardly possible to obtain a serviceable photograph of this inconspicuous species, which to the eye is so confluent with its substratum.

On a sterile thallus, presumably of this species, I found a parasitic fungus, which was not determined. It was a pyrenocarp, with small, two-celled spores, 8—9 μ long.

169. (24) *Lecanora punctiformis* Lyngé n. sp.

Pl. I, fig. 1, 2.

Dusénfjorden, on sandstone (no CO₂ by HCl).

Thallus 5—6 cm latus, effusus, crustaceus, mollis, continuus, non rimosus, et non areolatus, secundum ambitum subevanescent, etiam centrum versus tenuis. Thallus ferrugineo-rubescens (Séguy Code Universel, 1936, ad No. 249). Supra hanc thallum sterilem areolae fertiles et omnino concolores, rotundatae, diam. 0.7—1.2 mm, elevatae, superne depresso convexae, vulgo omnino discretae, rarius subcontiguae, adsunt.

Apothecia singula, bina vel terna in areolis omnino immersa. Discus ater, epruinus, punctiformis, thallo supervallatus, diam. 0.15 mm haud superans. Hymenium altissimum, 150—160 μ , guttulis oleosis repletum, superne aeruginosum, epithecium ruptum, granulis irregulariter inspersum. Paraphyses tenuissimae, ramosae, in KOH validiores et (ob semper?) constrictae septatae, sed haud moniliformes. Sporae late ellipsoideae, 20—25 \times 12—16(17) μ .

Cortex areolarum fertilium circiter 50 μ altus, distincte plectenchymaticus, superne flavescens. Hyphae medullares superficiem versus flabelliformiter radiantes.

Thallus HCl + KOH non mutatur, hymenium superne HCl pulcherrime smaragdulum. Medulla subopaca, sed HCl si addito, translucida. Medulla J non caerulescens, hymenium J caeruleo-nigrescens, etiam cum excipulo atque hypothecio.

This is, perhaps, the most peculiar *Aspicilia* in my collection. Swimming on an undifferentiated thallus (hypothallus?) are the fertile, button-like, more or less isolated areolae, with their immersed hymenia. It is difficult to describe the colour, a pale rusty-red, with a tinge of yellow.

In one of my sections I detected pycnides, the conidia were but 2—3 μ long. Pycnoconidia of that size are extremely rare in this subgenus, cfr. Magnusson's Monograph: *Aspicilia bohémica* with 4—5 μ . Pycnoconidia of 2—3 μ are so aberrant in the *Aspiciliae* that one has to consider the possibility of a parasitic fungus.

170. (25) *Lecanora mastoidea* Lyng.

Lyng. Lich. West Greenl., 1937, p. 130.

Kapp Petersens, scarce.

Unfortunately there were no apothecia, but the habitus, and the chemical reaction, are sufficiently characteristic. Pycnides were abundant, pycnoconidia 15—23 μ . They agreed "to the μ " with one of my West Greenland plants where I have now succeeded in finding them.

171. (26) *Lecanora arctica* Lyng.

Lyng. Lich. West Greenl., 1937, p. 132, pl. VIII, fig. 2. Magn. *Aspicilia*, 1939, p. 26 and 118.

Moskusoksefjorden. — Scott Keltieøyane: Gåsøya. — Geogr. Societøya: Husbukta. Trailløya: Holmvika. Kapp Petersens. Antarctic-hamna. Found on basaltic rocks.

In addition to these localities I can mention Brandal in South-Eastern Greenland (leg. Scholander 1932). Magnusson recorded it from Northern Sweden and from N.W. Nevada (*Aspic.*, l. c.). It must be a species of wide, possibly western arctic distribution. It cannot be rare, but it is not supposed to be plentiful, at least there were but few plants in our collections.

I have very little to add to the data, given by Magnusson and by myself. In the present plants the spores measured 12—17.5, rarely up to 20 μ , the hymenium is about 100 μ high, only in one plant I measured 70—75 μ . It is well fertile, and the numerous apothecia is one of its best characters. In a plant from Moskusoksefjorden (leg. Schol.) the thallus was literally covered with apothecia, to the exclusion of the crusta itself.

If the cortex is necrotized, as it often is in arctic plants, the yellow colour by KOH is little distinct.

In Geogr. Societøya, 4 km west of Robertsonøya, Scholander collected an *Aspicilia* which is nearly related to the present species:

var. *altior* Lynge n. var.

Sofiasundet: 4 km west of Robertsonøya.

Differt a typo hymenio altiori: (100—)125 μ . — Paraphyses (aqua) sursum haud incrassatae, KOH: constrictae septatae, articulis elongatis, sporae 15—18 μ , pycnoconidia 18—25 μ . Hyphae corticis perpendiculares.

Medulla HCl + KOH distincte flavescens, hymenium J vinosum, excipulum J fugaciter caerulescens.

Dr. Magnusson is of opinion that this plant might be a proper species, i. a. on account of its very high hymenium. It seems related to *Lecanora arctica*, and I have preferred to leave it there, until more material is to hand.

172. (27) *Lecanora annulata* Lynge.

Lynge Lich. West Greenl. 1937, p. 136, pl. V, fig. 3. — Magnusson *Aspicilia*, 1939, p. 30.

Kapp Herschel. — Jacksonøya.

Found in small rivulets, coming from melting snow, where it grows together with *Staurothele fuscocuprea*. It was described from Disko Island in West Greenland, and has so far not been found outside of Greenland.

The thallus is slightly better developed than in the type plant, in the central part around the apothecia it may be somewhat areolate. I found a cortex of 25—30 μ , yellowish-brown in its upper part, its hyphae are perpendicular, constrictedly septate, with rounded articuli, 4—6 μ thick, rather distinct in HCl + KOH. The medulla is opaque with adspersed hyphae, but translucent in HCl. Paraphyses constrictedly septate, hymenium 75—80 μ , spores very small, but variable in size, in one plant I measured 9—11 \times 7.5—8 μ , in the other 13—16 \times 7.5 μ . Hypothecium and excipulum J blue, passing into wine-red.

Two plants from Landingsdalen, Wollaston Forland, possibly belong here. The thallus is slightly darker than in the type plant. But the elevated margin of the apothecia is the same. The spores are generally 15—16 μ , but I also measured a few larger ones, up to 20 μ (perhaps *Lecanora elevata* Lynge?).

173. (28) *Lecanora conica* Lynge n. sp.

Pl. III, fig. 2.

Ymerøya: Kapp Humboldt, on a non-calcareous rock.

Thallus, ut videtur, parvulus, in specim. 1—1.5 cm latus, effusus, irregulariter limitatus, crassitudine mediocri vel subcrassus, subdiscrete areolatus. Areolae rotundatae, diam. 0.25—0.35 mm, rarius irregulariter

elongatae, alte verrucosae, superne laevigatae (i. e. non rimulosae), obscure cinereae, etiam madefactae. Hypothallus haud visus.

Thallus optime fertilis. Verrucae fertiles 0.3—0.4(0.5) mm latae, conicae, elevatae. Discus concavus, parvus, diam. 0.2 mm haud superans, ater, epruinus, margine elevato, integro, acuto, circumdatus. Apothecia (in sect.) cupuliformia, circ. 150 μ alta, hymenium 80—100 μ , a hypothecium male limitatum, superne olivaceo-fuligineum, corpusculis angulatis et guttulis oleosis inspersum. Paraphyses cohaerentes, in aqua parce distinctae, in HCl magis discretae, tenuissimae, etiam KOH si addito sursum leviter solum incrassatae et subconstrictae septatae, sed non moniliformes. Sporae parvae: 11—12(—14) \times 7—8 μ .

Pycnides fertiles frustra quaesitae.

Verrucae etiam in latere corticatae. Cortex crassitudine irregularis, 25—40 μ altus, superne plus minusve obscuratus vel flavescens, hyphae corticis minute adpersae et indistinctae, in HCl + KOH constrictae septatae et articulatae. Medulla haud impellucida, HCl + KOH omnino pellucida.

Cortex in parte exteriori obscurata KOH (subfugaciter) flavescens, sed non nubilat, thallus praeterea HCl + KOH immutatus. Hymenium J vinosum, etiam cum hypothecio.

There is but one plant, perhaps fragmentary, but it is so distinct that it could not be left aside. Related to *Lecanora annulata* Lyngé, from which it is sufficiently distinct by its much thicker, verrucose thallus, in *Lecanora annulata* the thallus is an utterly thin, hardly continuous grey film.

174. (29) *Lecanora Nathorstii* Lyngé n. sp.

Pl. II, fig. 1.

Dusénfjorden (typus). Celsiusberget. On a quartzitic rock where the quartz grains are conglutinated by a calcareous substance.

Thallus parvulus, effusus, sed plus minusve distincte orbicularis, diam. circ. 2 cm, subcrassus, abrupte limitatus, non cretaceus, et non radiatus vel zonatus. Thallus areolatus, areolae subangulatae vel subrotundatae, 0.55—0.7 mm latae, alte verrucosae, hinc inde subcolumnares, superne fissuris irregulariter divisae et eam ob causam rugosae. Thallus pallide rosaceus (ob substratum?).

Apothecia numerosissima, interdum concreta, diam. 0.5—0.7 mm, supra thallum subcolumnariter elevata, simplicia vel hinc inde composita. Discus ater, epruinus, leviter concavus vel subplanus, margine integro tumidulo cinereo cinctus. Excipulum indistinctum, hymenium angustum, circ. 75 μ altum, guttulis oleosis repletum, epithecium olivaceum vel obscure flavo-fuscens, crystallis instructum. Paraphyses ramosae, apice (KOH) 2—2.5 μ crassae, distincte moniliformes. Sporae 14—20(—22) \times 8—13 μ .

Pycnides non visae.

Thallus mollissimus, omnino impellucidus, etiam in KOH, hyphae granulis variis densissime obtectae. Cortex superior (saepe destructus) 25—30 μ altus, strato fusco necrali irregulari tectus. Hyphae corticis valde indistinctae.

Medulla HCl + KOH non tinctoria, cortex excipuli HCl + KOH haud tinctus (nisi gonidia magis fulvescentia). Medulla KOH si addito : crystallae incoloratae prismatica praecipituntur (ob semper?).

The type plant was associated with a *Staurothele*, suggesting a substratum which is at least at times irrigated. But it is no aquatic species, the other plant grew together with a *Rhizocarpon dispersum*. It is, perhaps, a quick grower which invades its neighbours.

The grey colour in the margin of the apothecia does not agree with the pale rosy colour of the sterile areolae, but the latter colour is sometimes seen in plants, growing on calcareous sandstones, it may be due to the substratum. The thallus is very soft and incoherent, it was impossible to obtain a clear section of the cortex, except in the apothecia.

The dark, very elevated, dense apothecia are very characteristic of the species. They look perfectly developed, but curiously enough the hymenium was not always so, I have measured hymenia that were as low as 55 μ . The spores were unequally developed. — Pycnides were hardly to be expected in this very soft thallus.

The specific identity between the plants from the two localities is not unobjectionable. In the type plant the apothecia are more elevated, the disc more open and plane, and the epithecium contained crystals of CaOx, not seen in the plants from Celsiusberget. In the latter plants I found slightly larger spores, 20—22(—25), against 14—20 μ , but in the type plant the hymenia were often poorly developed, as were also the spores.

Named in honour of Professor A. G. Nathorst, distinguished Swedish naturalist, leader of the Swedish expedition to North East Greenland in 1899, which explored and mapped the present region.

175. (30) *Lecanora composita* Lynge n. sp.

Pl. II, fig. 2.

Ymerøya: Kapp Humboldt, on a non-calcareous rock (no CO₂ by HCl).

Thallus effusus, plagas latas tegens, crustaceus, mollis, ambitu non lobatus, verrucis albidis, epruinosis, discretis vel subcontiguis, rotundatis, diam. 0.7—1.2(—1.5) mm, alte convexis, rimulis irregularibus, reticulatis plus minusve rugosis, formatus. Inter verrucas thallus primarius, plus minusve dense rimosus, ochraceus, visus est.

Thallus optime fertilis. Verrucae fertiles elevatae, usque columnares, apothecia in verrucis singula, rarius bina, ab initio margine proprio, ob-

scurato, parce elevato, integro cincta, deinde (margine proprio subevanescenti) ipso thallo albido circumdata. Apothecia majuscula, discus diam. usque ad 1.5 mm, typice composita, discus ater, subpruinosis, interdum umbonatus. Hymenium circ. 100 μ altum, superne olivaceo-fuliginosum, granulis plus minusve adpersum, etiam guttulae oleosae adsunt. Paraphyses in aqua indistinctae, in HCl distinctiores, in KOH indistincte subconstrictae septatae, sed non moniliformes, tenues, ramosae. Sporae male evolutae, ellipsoideae, 17—22 μ longae.

Pycnides frustra quaesitae.

Medulla in aqua impellucida, in HCl magis pellucida, hyphae granulis valde adpersae, laxae contextae. Cortex altus, circiter 50 μ , hyphae minutissime granulato-adpersae et valde indistinctae, leptodermatae, articulis rotundatis formatae. Thallus strato alto incolorato granulato tectus.

Excipulum J fugaciter caerulescens, hymenium superne HCl smaragdulum, KOH impure flavescens. KOH si addito crystallae incoloratae prismatica in medulla praecipitantur. Pars exterior corticis HCl+KOH indistincte flavescens, thallus praeterea non tinctus.

A characteristic species of uncertain affinity. Some characters call to mind *Lecanora candida* var. *nikrapensis* f. *evanescens* Magn. But its very high scattered verrucae, composed apothecia, and typically effuse thallus should make it specifically distinct. — The specific name suggests its composed apothecia.

176. (31) *Lecanora Anseris* Lynge n. sp.

Pl. III, fig. 1.

Scott Keltieøyane: Gåsøya, on a basaltic rock (no CO₂ by HCl).

Thallus in specim. (fragmentum solum) 4 cm, effusus, non orbicularis, continuus, irregulariter rimosus et haud areolatus, mollis, crassitudine mediocri, ambitum versus tenuior usque evanescens et haud rimosus, hinc inde in hypothallum angustum, indistinctum, dilute cinerascentem transiens. Thallus undulatus, pars sterilis magis depressa, dilute cinereo-ochracea, partes fertiles rimis limitatae, magis elevatae, convexae, sed haud verrucosae, ab initio albae vel albido-cinerascentes ($\times 30$).

Apothecia numerosissima, in tumidulis albidis singula vel compluria, diam. ad 0.5 mm, simplicia, in aetate interdum confluentia. Discus crateriformis, rarius subplanus, leviter pruinosis, margine elevato, acuto, dilutiori cinctus. Latera apotheciorum in parte superiori obscure cinerascens. Hymenium 80—100 μ altum, superne flavo-fuscescens. Paraphyses tenues, in KOH facilius discretae, sursum leviter solum incrassatae et constrictae septatae, sed haud vel indistincte moniliformes, hinc inde ramosae, etiam ramoso-connexae. Sporae male evolutae, 16—20 μ .

Pycnides non visae.

Sectio thallina in aqua impellucida, hyphae valde granulato-adsersae, in HCl + KOH magis pellucidae, hyphae corticis granulis minutis adsersae et haud distinguendae (etiam in HCl). Cortex altus, in partibus albidis thalli 50—80 μ .

Thallus KOH non flavescens, hymenium J rubescens, etiam cum hypothecio. KOH si addito crystallata prismatica incolorata in medulla praecipituntur.

To the naked eye the thallus is whitish-grey. It is so soft that it is difficult to obtain a good section. The cortical hyphae are so adsersed by minute grains that they resisted all efforts of clearing. Anyhow the cortex cannot be plectenchymatous. Its hyphae were apparently constrictedly septate.

Habitually it rather resembles *Lecanora laevatoidea*, which differs in a less rimose, more concolorous, yellowish thallus, almost immersed apothecia, and in a much more pellucid thallus with distinct cortical cells. — Habitually there is also resemblance to *Lecanora ursina* (Lyngé) Magn., differing in a thicker margin of the apothecia, a very high hymenium, 120—135 μ , and larger spores, 22—25(—28) \times 12—14 μ .

Named Anseris after its "locus classicus" (Gås in Norw. = *Anser*).

177. (32) *Lecanora pergibbosa* H. Magn.

Magnusson "Aspicilia", 1939, p. 25 and 95.

Jacksonøya. — Kapp Bennett. Moskusoksefjorden.

Found on basaltic rocks (no CO₂ by HCl), and not common in North East Greenland. It has previously been recorded from Northern Sweden, the mountains of Western Norway, and from West Greenland.

It is a dry-rock plant, found together with *Physcia sciastra*, a. o. lichens.

178. (33) *Lecanora major* Lyngé n. sp.

Pl. III, fig. 3.

Ymerøya: Dusénfjorden, near Kapp Graah, on a red sandstone, containing no calcareous substance.

Thallus late expansus, usque ad 8 cm latus, subcrassus, effusus, crustaceus, non zonatus, undulato-tumidulus, i. e. areolae convexae, rotundatae, interdum subvermiformes, valde irregulares et convallis, non rimis, separatae. Thallus abrupte limitatus et hypothallo angusto, saepe indistincto, obscurato, hinc inde circumdatus. Thallus (sub lente) cinereus vel dilutissime in rosaceum vergens, superne laevigatus, epruinosis, non rimosus et non farinaceus.

Apothecia numerosissima, diam. 0.7—1.0 mm, supra thallum bene elevata. Apothecia simplicia vel haud raro composita. Discus ater,

epruinosis, subcrateriformis et margine integro, acuto, elevato, ab initio subobscuro, deinde dilutius colorato, circumdatus. Hymenium 100—110 μ altum, superne obscure olivaceum, guttulis oleosis repletum. Paraphyses (KOH) distincte moniliformes, sursum 2—2.5 μ crassae. Sporae late ellipsoideae, 16—20 \times 10—13 μ , saepe immaturae vel male evolutae.

Pycnides fertiles raras. Pycnoconidia 25—30(—33) μ , subrecta vel plus minusve arcuata.

Thallus mollis. Medulla in aqua haud impellucida (sectio tenuis), in HCl magis pellucida, cortex altus, circiter 50 μ , superne cinerascens, hyphae corticis minute adpersae, in aqua indistinctae, in HCl constrictae septatae et articulis rotundatis formatae. Thallus strato necrali incolorato, plus minusve rupto, tectus.

Thallus HCl + KOH subimmutatus (nisi pars superior cinerascens corticis in flavescens leviter vergens), sed cortex excipuli KOH indistincte flavescens. KOH si addito crystallae incoloratae prismatica in medulla praecipituntur (ob semper?).

Lecanora major is nearly related to *L. Nathorstii*, and it is doubtful whether they are specifically distinct. *Lecanora major* is a much greater plant than the other, and apparently distinct by its undulating surface, crateriform, sharply margined apothecia, higher hymenium and broader spores. But the material is not large, and the differences may be bridged over by a better material.

It is uncertain whether the precipitation of the prismatic uncoloured crystals is really characteristic of this species, it was not obtained in all the plants where the test was made.

179 (34) *Lecanora semiglobosa* Lynge n. sp.

Pl. IV, fig. 3.

Thallus late expansus, in specimine (fragmentum solum) 7 cm latus, effusus, crustaceus, non lobatus, areolae molles, verrucosae, subglobosae, rotundatae, diam. 0.7—1.0(—1.5) mm, subdiscretae vel hinc inde contiguae et tum rimis profundis separatae. Verrucae superne minutissime scabrosae, non farinosae, pure cinereae, opacae. Hypothallus dilute flavo-rufescens, granulatus, vel subareolatus inter verrucas subdiscretas plus minusve distincte visus est.

Apothecia non numerosa, in verrucis singula vel rarius bina, saepe excentrice evoluta, rotundata, diam. ad 1.0 vel 1.1 mm, supra thallum subelevata. Discus ater, epruinosis, concavus, margine obscurato, elevato, integro, crasso circumvallatus. Excipulum male definitum. Hymenium 90—100(—110) μ altum, guttulis oleosis vel granulis plus minusve inspersum, superne olivaceo-fuligineum. Paraphyses in aqua indistinctae, conretae, in KOH facilius discretae, flexuosae, tenues, apice leviter solum incrassatae, constrictae septatae, sed non moniliformes. Sporae (male evolutae) 15—17 μ longae.

Pycnides non visae.

Medulla impellucida, etiam in HCl, in KOH magis pellucida (aere repleta), hyphae granulis valde adpersae. Cortex 30—35 μ altus, superne obscuratus, hyphae sat indistinctae (aq.), 4—5 μ crassae, constrictae septatae, articulis rotundatis vel angulatis formatae.

Medulla HCl + KOH immutata, cortex tamen distincte flavescens, etiam cum cortice excipuli, in medulla KOH crystallata incolorata, prismatica praecipituntur. Hymenium J vinosum, etiam cum excipulo.

A characteristic species, on account of the semiglobose, grey areoles. Unfortunately the thalline margin is lacking, but there is nothing suggesting a radiate thallus. In a section HCl + KOH stain the cortex fairly distinctly yellow, but the colour does not nubilate outside the thallus.

It is a very isolated species, I have hardly anything to say concerning its affinity.

On the verrucae there are numerous small spots, pale or black. A section gave me the impression that they are abortive apothecia. If so, the scarcity of developed apothecia is, perhaps, not characteristic of the species.

180. (35) *Lecanora pertusa* Lynge n. sp.

Pl. IV, fig. 2.

Geographical Societyøya: Husbukta, in a rivulet on a non-calcareous rock, together with *Staurothele fuscocuprea*.

Thallus effusus, (in specimine singulo) circ. 3 cm latus, crustaceus, tenuis, ochraceus. Supra hanc thallum verrucae fertiles evolutae sunt.

Apothecia numerosa-numerosissima, areolae fertiles thallum fere omnino tegentes. Apothecia in areolis fertilibus compluria et concrecentia, et eam ob causam composita videntur. Areolae fertiles rotundatae, diam. 0.7—1.0 mm verrucosae, supra thallum bene elevatae, olivaceo-ochraceae. Discus ater, epruinus, concavus, diam. 0.15—0.3 mm, margine elevato, crasso, integro, subolivaceo et areolis fertilibus magis ochraceis circumvallatus. Hymenium altissimum, 125—150(—160) μ altum, guttulis oleosis repletum, superne olivaceo-fuligineum, HCl pulcherrime smaragdulum, strato amorpho, plus minusve granulato tectum. Paraphyses in aqua haud distinguendae, in HCl + KOH tenues-tenuissimae, sursum haud incrassatae et indistincte septatae (caveas, ne cum cortice adjacenti confundas!). Sporae, si bene evolutae, magnae, 25—30 \times 14—20 μ .

Pycnides frustra quaesitae.

Thallus HCl + KOH haud flavescens, cortex verrucarum fertilium tamen plus minusve distincte flavescens. Epithecium KOH flavescens. Hymenium, hypothecium atque excipulum alc. + J e distincte caeruleo deinde vinosa.

The thallus is covered by the fertile verrucae to the degree that it is only visible between them, and along the margin, as a little differentiated, granular or irregularly rimose crusta.

If hunted after in Magnusson's Clavis we approach *Lecanora gyrodes* and *L. mazarina*. The former species is clearly distinct by its brown thallus. There is no specimen of *Lecanora mazarina* in our herb., but to judge from Magnusson's description it differs in its large (2—3 mm), irregular, brownish-grey areolae. Either of these two species has perpendicular cortical hyphae. *Lecanora pertusa* makes the impression of being a very characteristic species.

181. (36) *Lecanora eburnea* Lyngé, n. sp.

Pl. IV, fig. 1.

Ymerøya: Blomsterbukta, on a basaltic rock (no CO₂ by HCl).

Hypothallus conspicuus, albido-flavescens, pulcherrime radiatus, radii angusti, 0.15—0.2 mm lati, convexi, ramosi. Supra hanc hypothallum verrucae thallinae molles, discretæ vel subdiscretæ adsunt, diam. ad 1.0 mm, basi constrictæ, subglobosæ, albidæ (v. levissime in flavescetem vergentes), superne laevigatæ, nitidæ, eburneæ.

Apothecia desunt. — Pycnoconidia (usque valde) arcuata, 17—21 μ .

Verrucae usque ad 0.7—0.8 mm altæ. Hyphæ medullares circiter 4 μ crassæ, granulis valde adpersæ, medulla eam ob causam (in aqua) omnino impellucida, in HCl + KOH magis pellucida. Cortex 25—35 μ altus, superne obscuratus, strato amorpho incolorato laevigato vel rupto, 12—15 μ alto, tectus. Hyphæ corticis in omnes partes currentes. Thallus KOH haud flavescens.

The apothecia being unknown, it is doubtful whether this species is an *Aspicilia*, or not. Its cortex differs much from other *Aspiciliae*. Anyhow, it is so characteristic that it could not be left unmentioned.

182. (37) *Lecanora solediza* Lyngé n. sp.

Pl. V, fig. 3.

Kjerulf fjorden, on a hard rock (no CO₂ by HCl), associated with *Rhizocarpon geographicum* and *Gyrophora decussata* (dry rock).

Thallus orbicularis, mediocris, diam. ad 2 cm, thallis compluribus tamen plagæ latiores tectæ sunt. Thallus saltem secundum marginem anguste et haud distincte radiatus, præterea effusus, areolatus. Lobi marginales tenuissimæ, subplanæ, contiguæ, non apiculatæ, indistincte terminatæ, areolæ (centrales) parvæ, diam. 0.25—0.35 mm, superne planiusculæ, abrupte limitatæ, plus minusve discretæ, superne sorediose fatiscentes. Thallus dilute ochraceus.

Apothecia desunt.

Hyphæ granulis valde adpersæ, medulla in aqua impellucida, in HCl tamen pellucida. Cortex radii melius evolutus quam in areolis,

hyphae 5—6 μ crassae, leptodermaticae, constrictae septatae, articulatae, in parte exteriori obscure flavo-cinerascentes.

Gonidia HCl + KOH intense aurea, cortex minus distincte flavescens (in parte obscurata).

In this species, as well as in *Lecanora Bennettii*, one easily gets the impression that the thallus stains intensely yellow by HCl + KOH. This is due to the intensely yellow staining of the gonidia, and the poor development of the cortex. But in a section which is good enough to allow of a distinction between these two strata the cortex is but slightly stained, only the upper darkened part stains faintly yellow.

The small areolae rest on an underlying, concolorous thallus (hypothallus?), and are more or less discrete. Their upper side breaks up into depressed soralia of a dark colour, and from the beginning of a stellate appearance, calling to mind parasitic *Torula*-hyphae. But a section proves that they consist of real, globose soredia.

This species differs sufficiently from *Lecanora Bennettii* in its ochraceous colour, and from *Lecanora mashiginensis* in its very distinct soralia and its effuse thallus, radiating only along a very narrow marginal zone, up to 1.5 mm broad.

183. (38) *Lecanora Bennettii* Lynge n. sp.

Pl. V, fig. 2.

Hudson Land: Kapp Bennett, on a basaltic rock, containing no calcareous substance (no CO₂ by HCl). — Dicksonfjorden.

Thallus mollis, orbicularis, parvus, in specim. diam. 1.5 cm, centrum versus effusus et crustaceus, areolatus, ambitum versus anguste radiatus. Areolae 0.35—0.55 mm latae, rimis profundis atque sublatis separatae et eam ob causam subcolumnares, rotundatae vel subangulatae, superne distincte et dense sorediose fatiscentes. Radii marginales ramosae, vulgo plus minusve discretae, convexae, angustae, 0.15—0.3 mm latae, apiculatae, saepe longitudinaliter striatae et hinc inde nodulosae. Thallus obscure cinereus vel (ob corticem destructum) magis cinereo-albescens.

Apothecia atque pycnides desunt.

Lobi marginales tenues, crassitudine haud 0.15 mm superantes, cortex tenuis, crassitudine varianti, ad 25 μ altus, in parte exteriori obscure cinerascens. Hyphae valde leptodermaticae, 5 μ crassae, constrictae septatae, articulis rotundatis formatae, articulae exteriores in aqua distinctae. Medulla subpellucida, in HCl omnino pellucida.

Gonidia HCl + KOH intense aurea, cortex tamen haud vel indistincte flavescens.

Magnusson only mentions one sorediated *Aspicilia* in his monograph of 1939, viz. *Lecanora mashiginensis* Zahlbr., from Novaya Zemlya. This is a considerably larger species of an ochraceous-grey colour, with undulating, radiating lobes, even far towards the centre, very indistinctly sorediated, its cortical reaction is HCl + KOH distinctly yellow. *Leca-*

nora mashiginensis had no apothecia, but I succeeded in detecting fertile pycnides, hitherto unknown, the pycnoconidia were 20—25 μ .

184. (39) *Lecanora rosulata* (Kbr.) Stiz.

Syn. *Lecanora proserpens* Nyl. — Vide Magnusson *Aspicilia*, 1939, p. 29 et 169.

Jacksonøya. — Kapp Petersens.

This species was described by Koerber from Franz Joseffjorden, it was detected there by the 2nd German Polar Exp. 1869—70. Curiously enough we only found these two specimens. It is not supposed to be common.

An arctic species, previously known from the Bering Sound region (Vega exped.), Novaya Zemlya, several places (Lyngø), Jan Mayen (Lid), West Greenland (Th. M. Fr.), in addition to which comes a plant, collected by me in S.E. Iceland in 1939. These data suggest a circum-polar species, common, perhaps, in Novaya Zemlya and farther east.

Recorded by me from Taimir Peninsula (leg. Sverdrup during the Maud exp.), but having studied the species more in detail now I have to verify this determination and refer the plant to *Lecanora perradiata*, which is a much more common species.

185. (40) *Lecanora perradiata* Nyl.

Kapp Herschel. — Loch Fyne. Jacksonøya. Myggbukta. Kapp Bennett. — Kapp Humboldt. Dusénfjorden. Blomsterbukta. — Sofiasundet near Robertsonøya. — Holmvika. Ellaøya.

Supposed to be fairly common, and in places abundant. The plants are generally rather small, but confluent thalli may cover larger areas. It is found on dry, basaltic rocks.

The colour varies from pale to dark grey, but it is never white. The thallus is typically orbicular and limited by a very distinct black hypothallus. The lobes are profoundly cut by transverse cracks, if they are quite short, the plant may appear zonate, rather than lobate. But with some experience it is easily identified, on account of its characteristic habitus, and its intensely yellow reaction by KOH.

Böcher's specimen from D'Aunay Bay, East Greenland (Lyngø 1933, p. 8) is supposed to be correctly identified.

186. (41) *Lecanora sublapponica* Zahlbr.

Pl. V, fig. 1.

Zahlbruckner Gattung *Lecanora* (Novaya Zemlya), 1928, p. 17, pl. IV, fig. 3. Magnusson *Aspicilia*, 1939, p. 28 and 150.

Myggbukta. — Kapp Humboldt. — Geographical Societyøya: Husbukta.

It was found but 3 times, but in considerable abundance, on basaltic rocks (no CO₂ by HCl) along the banks of rivulets. It is a widely distri-

buted, perhaps circumpolar species, previously recorded from the arctic coast of Siberia, Novaya Zemlya, Sweden, and S.E. Greenland (Magn. 1939, p. 151). To these localities can be added East Iceland where I found it in 1939.

Easily identified on account of its radiating lobes (at least towards the circumference), divided by transverse contractions into more or less verrucose parts. The colour is a very characteristic olive (often dark), but its otherwise very thick ($50\ \mu$) cortex may be damaged, as is so often the case in the arctic with lichens, growing in places which are occasionally irrigated. The olive colour is then only visible in protected places.

Its pycnoconidia are very long, I have measured up to $40\ \mu$, the pycnides are profoundly immersed, and little visible on the surface. Its spores are small, generally 12—15, or $17\ \mu$, rarely attaining $20\ \mu$. — Its cortical hyphae are distinctly perpendicular to the surface, like palisades, a rather unusual occurrence in arctic *Aspicilliae*.

It is one of the *Aspicilliae* in which KOH precipitates large, prismatic, uncoloured crystals. Its cortex stains yellow by KOH, but it is doubtful whether there is any yellow staining in the medulla.

It seems doubtful whether it is specifically distinct from *Lecanora plicigera* Zahlbr.

187. (42) *Lecanora circularis* Magn.

H. Magnusson Mon. of *Aspicilia*, 1939, p. 28 and 152, fig. 37.

var. *tenuis* Lynge n. var.

Kapp Herschel, near Sandodden, on a basaltic rock (no CO_2 by HCl).

Differt a typo thallo tenuiori, obscurius cinerascenti, lobis minus distincte radiantibus, apotheciis magis elevatis, atque obscurius marginatis.

Hymenium $100\text{--}110\ \mu$, superne olivaceo-virescens, HCl flavescens, sporae parvae, $11\text{--}13\ \mu$, pycnoconidia $16\text{--}17.5\ \mu$, leviter arcuatae.

In the type plant of the species (from Novaya Zemlya) the lobes are branched in a fan-like manner, typically discrete, visible to the centre of the thallus, slightly darker than the underlying thallus (hypothallus?), and therefore distinctly seen.

In the present plant the lobes are quite contiguous, distinct only along the circumference, otherwise lost into an areolated thallus. The apothecia are more numerous than in the type plant, and on an average slightly smaller. The Greenland plants measure about 2.5 cm in diam., the type plant is larger, 4 cm.

It is quite possible that the two types represent proper, though nearly related species, but as long as the material is so small we know nothing of their range of variability.

188. (43) *Lecanora contigua* Lynge n. sp.

Pl. VI, fig. 1.

Ymerøya: Dusénfjorden, near Kapp Graah, on non-calcareous slates.

Thallus parvulus, bene orbicularis, diam. ad 2 cm, tenuis vel tenuissimus, centrum versus depresso et minute verrucoso-areolatus, areolis subrotundatis, diam. 0.3—0.35 mm, praeterea pulchre radiato-areolatus, areolae depresso convexae et rimis transversis plus minusve distincte zonatae. Thallus laevigatus, epruinosis, non cretaceus, lobi arcte contigui, rimis radiantibus solum separati, convexi, apiculati, ramosi, angusti, 0.2 mm, cinerascens, centrum versus leviter in dilute fusciscentem vergentes. Secundum peripheriam thallus sensim in hypothallum conspicuum obscure cinerascens transit.

Apothecia numerosa, parva, diam. 0.3—0.4 mm, in areolis singula, rarius bina, simplicia, subconica et supra thallum bene elevata. Discus ater, epruinosis, diam. 0.15—0.2 mm, margine cinereo, deinde dilutiori, integro, elevato circumdatus. Hymenium 100—110 μ altum, granulis et guttulis oleosis inspersum (haud dense), superne obscure fusciscentis. Paraphyses tenues, apice haud incrassatae (HCl), in KOH sursum moniliformes, ad 2.5 μ crassae, ramosae. Sporae parvulae, 12—16(—18) μ , saepe male evolutae.

Medulla granulis adspersa, sed haud impellucida, gonidia glomerata, hyphae corticis constrictae septatae. Cortex verrucarum fertile HCl + KOH distincte flavescens, thallus praeterea KOH —. Excipulum J vinosum.

It was difficult to state the thickness of the cortex, on account of the glomerated gonidia, but it is not thick (25—30 μ thick?).

Evidently nearly related to *Lecanora disserpens* which differs in a white, considerably thicker thallus with much more discrete lobes, and its almost lacking hypothallus. In either species the lobes are paler along their upper mid-line.

189. (44) *Lecanora candida* (Anzi) Nyl.var. *nikrapensis* (Darb.) Magn.

Pl. VII, fig. 3.

H. Magnusson Mon. of *Aspicilia*, 1939, p. 29 and 158, fig. 40, ubi syn.

Myggbukta (untypical). Kapp Bennett. — Moskusoksefjorden, up to 1350 m. Kapp Humboldt. Dusénfjorden. Blomsterbukta. — Celsiusberget. — Scott Keltieøya: Gåsøya.

It is restricted to calcareous rocks, and it is best developed on soft calcareous sandstones, e. g. at Kapp Humboldt, in Dusénfjorden, and other such places. We did not find it in the northern localities where

the basaltic rocks are so prevailing. It is very plentiful, no other *Aspicilia* was so well represented in my collection.

It prefers the banks of brooklets and other places which are at times irrigated by cold water. It is there associated with such plants as *Staurothele fuscocuprea*, and the like.

It is now known from the arctic regions between Ellesmere Land in the west and Novaya Zemlya in the east. Whether it is circumpolar is at present unknown, and perhaps doubtful.

Its leading characters have been described by Magnusson, l. c., and there is not much to be added. — Its cretaceous surface is very characteristic, as is also the slightly prominent, thick, generally farinose margin of the apothecia. The thalli are very variable in size, fully developed, individual plants vary from 2—3 cm and up to 10 cm. Confluent thalli may cover large areas. Fine plants are rather thick towards the circumference with regular cracks in radial and peripheric directions, resulting in a thallus of radiating, zonate, connivent, often little distinct lobes. In more "meagre" plants the lobes are less connivent along the circumference. The thallus is surrounded by a more or less distinct greyish-black hypothallus, at least in the best plants.

Towards the centre the thallus is often less coherent, it does not always cover the substratum. Extreme cases represent f. *evanescens* Magn., where the thallus is only developed around the apothecia.

A concentrated solution of KOH precipitates long uncoloured prismatic crystals, especially in the apothecia, but also in the medulla. They were found also in plants of *Lecanora candida* from Central Europe, e. g. in Kerner Flora Exsic. Austr.-Hung. No. 2754 (*Aspicilia polychroma* Anzi var. *candida* Anzi).

Well ripe spores are 16—20 μ long. — Fertile pycnides are very rare, I detected but one with conidia 17—20 μ .

The normal colour is white, "cretaceous", but plants growing on the red sandstones are sometimes more ochraceous or pale reddish, apparently due to the absorption of some substance from the underground.

190. (45) *Lecanora culicis* Lynge n. sp.

Pl. VI, fig. 2.

Landingsdalen. — Kapp Stösch. Myggbukta (typus). — Kapp Bennett. — Geographical Societyøya: Husbukta.

Found on basaltic rocks along brooklets.

Thallus 4—6 cm latus, tenuis-tenuissimus, mollis, ambitum versus distincte radiato-lobatus. Lobi marginales basin versus plus minusve contigui, sed ramosi et apicem versus plus minusve discreti, 0.35—0.4 mm lati, hinc inde transverse rupti et eam ob causam subzonati, tenuissimi, subplani, albidii vel dilute albido-cinerascentes, opaci, non cretacei, cum

hypothallo dilute ochraceo omnino confluentes. Centrum versus thallus areolatus, areolae lobis concolores, rotundatae, diam. 0.7—1.0 mm, depresso convexae, plus minusve discretae vel hinc inde contiguae et tum rimoso-angulatae. Inter areolas centrales hypothallus tenuis, rimoso-areolatus, dilute ochraceus distincte visus. Thallus zona hypothallina, 1—1.5 mm lata, tenuissima, effusa, evanescenti, circumdatus.

Apothecia centrum versus numerosa, vulgo discreta, interdum contigua, in areolis singula, rarius bina, simplicia, rotundata, diam. ad 0.7 mm. Discus ater, concavus vel planus, epruinosis, margine crasso, obscurato circumdatus, apothecia eam ob causam subelevata videntur, saepe rimis ab areolis separata. Cortex excipuli crassus, 40—50 μ . Hymenium guttulis oleosis repletum, altum, 100—125 μ , superne olivaceo-fuliginum, strato amorpho, rupto, incolorato tectum. Paraphyses sursum leviter incrassatae, 2—3 μ , constrictae septatae (HCl), sed non moniliformes. Sporae 15—18(—20) \times 9—12 μ .

Pycnoconidia 22—27 μ .

Cortex altus, 40—50(—60) μ , hyphae valde adpersae et indistinctae, constrictae septatae et articulatae videntur.

Medulla, cortex et cortex excipuli KOH non tinguntur, medulla HCl + KOH translucida. KOH si addito crystallae prismatica incolorata in crebre praecipituntur. Hymenium J vinosum, sursum KOH flavescens.

The marginal lobes are so thin, and so concrescent with the hypothallus that they are very little distinct to the naked eye. But under a good binocular lens they are distinct enough, and even the central areolae are sometimes arranged in rows. Habitually this orbicular thallus much resembles *Lecanora cingulata* Zahlbr. It seems to me that the species belongs to the "*Radiatae*", rather than to the "*Zonatae*" in the section "*Orbiculares*" of Magnusson.

The limit between these two groups is, however, not always distinct, and in reality Magnusson is inclined to refer our species to *Lecanora supertegens*. It differs from that species in a much thinner, paler thallus, it also has a paler hypothallus, rimoso-areolate when fairly thick, otherwise structureless. — *Lecanora culicis* is, perhaps, related to *Lecanora virginea*, but its substratum is not calcareous, and it has a very distinct hypothallus.

The material was rich, for an *Aspicilia*, and evidently quite monotypic, an important fact which made it less difficult to distinguish it specifically from *Lecanora supertegens*, in spite of Dr. Magnusson's divergent opinion.

Its specific name has been derived from its locus classicus (Norw. "Mygg" = *Culex*).

191. (46) *Lecanora expansa* Lynge n. sp.

Pl. VII, fig. 1, 2.

Geographical Societyøya: Husbukta, on a basaltic rock (no CO₂ by HCl).

Thallus latitudine mediocri, in specimine (fragmentum) circ. 4—5 cm. Hypothallus tenuis, ochraceus, rimis in omnes partes percursus et eam ob causam minute subareolatus. Supra hypothallum verrucae thallinae evolutae sunt, alte verrucosae, basi saepe constrictae, molles, rotundatae, diam. ad 0.5—0.7 mm, laevigatae vel levissime rimulosae vel etiam subcariosae ($\times 64$), albae, superne macula vel maculis rotundatis ornatae. Verrucae centrum versus dispersae vel subdispersae, peripheriam versus magis confluentes, indistincte radiatae, crustam areolato-verrucosam formantes. Hypothallus marginalis cinereo-flavescens hinc inde indistincte evolutus, vulgo effusus et evanescens.

Apothecia sparsa, supra thallum bene elevata, *Lecanorae* instar expansa, simplicia, rotundata, majuscula, diam. ad 1.1 mm. Discus ater, leviter pruinosis, ab initio concavus et margine crasso albido thallino circumdatus, deinde subplanus et margine proprio tenui, obscure cinereo integro circumdatus. Apothecia circ. 225 μ alta, excipulum indistincte limitatum. Hymenium altum, 100—125 μ , superne dilute olivaceum et interdum crystallis oxalicis instructum. Paraphyses etiam in aqua subdistinctae, saltem in parte interiori, in HCl + J constrictae septatae, sed haud moniliformes, in HCl + KOH tumescentes et moniliformes, hinc inde furcatae. Sporae bene evolutae, ellipsoideae, 17—21 μ longae.

Pycnides frustra quaesitae.

Hyphae granulatis valde adpersae, thallus tamen haud impellucidus. Gonidia glomerata et thallus superne undulatus, altitudine corticis eam ob causam varianti, sed crasso, 50—75 μ . Hyphae corticis corpusculis minutis valde adpersae et (in aqua) indistinctae, in HCl, etiam in KOH distinctae, constrictae septatae, articulatae, leptodermatae, 5—6 μ crassae. Etiam medulla in HCl et in KOH pellucida.

Thallus HCl + KOH non tinctus (nisi gonidia subaurea), cortex excipuli tamen flavescens. Hymenium J sordide vinosum, hypothecium e caeruleo vinosum.

Magnusson divided the *Aspicilliae* in two sections, the *Effusae* and the *Orbiculares*. It is hardly possible to find a better morphological subdivision. But yet some species are more or less intermediate, and the present one is one of them. There are no radiating lobes, but towards the circumference the thalline verrucae are arranged in a more or less radiating manner.

If placed with the *Orbiculares*, the white verrucae and the yellow reaction of the surface of the excipulum approach it to *Lecanora candida*. But it is clearly distinct from that species, it is not cretaceous, its thallus

is verrucose, and its apothecia are large, raised and expanded (whence its name). *Lecanora candida* is restricted to calcareous rocks.

When I first examined the plant (there is but one specimen), KOH precipitated some of the uncoloured, prismatic crystals, seen in several *Aspicilliae*, but on the final revision I obtained no such precipitation.

192. (47) *Lecanora Humboldtii* Lynge n. sp.

Pl. VIII, fig. 1—2.

Kapp Humboldt, on a quartzitic rock.

Thallus orbicularis, in specim. 5 cm latus, mollis, crassitudine mediocri. Thallus centrum versus rimis profundis late areolatus (non lobatus!), areolae angulatae, 1—1.5 mm latae, rugosae, deinde convexae, minutissime verrucosae, ob rimas minutas irregulares. Ambitum versus thallus anguste, sed pulchre radiatus, lobi conniventes, convexae, angustae, 0.2—0.35 mm lati, apiculati et hypothallo atro distincto radianti circumdati. Thallus albidus, ambitum versus subnitidus.

Apothecia sparsa, sed hinc inde congesta, diam. 0.7—1.0 mm, ab initio immersa, deinde supra thallum distincte elevata, simplicia vel subcomposita (concretescentia). Margo albidus vel albido-cinereus, integer vel leviter sinuatus, discus aterrimus, etiam madefactus, e concavo planus. Cortex excipuli circ. 30 μ altus, indistincte evolutus, gonidia fere usque ad superficiem progredientia, hyphae subplectenchymaticae, cellulis rotundatis formatae. Hymenium altum, circ. 125 μ , superne fuscofuliginosum, guttulis oleosis repletum, strato amorpho rupto plus minusve tectum. Paraphyses cohaerentes, in aqua superne incrassatae (3—4 μ), in HCl indistincte septatae. Sporae male evolutae, 20—25 \times 10—15 μ .

Pycnides frustra quaesitae.

Thallus (in centro) 0.6—0.65 mm altus. Cortex indistinctus, 50—60 μ altus, hyphae valde leptodermaticae, 3—4 μ crassae, in articulis rotundatis vel subplectenchymaticis constrictae. Medulla pellucida, hyphae leptodermaticae, 3—4 μ crassae.

Medulla HCl + KOH non flavescens, et cortex excipuli non vel indistincte flavescens. Hymenium J obscure vinosum. KOH si addito crystallae prismatica incolorata haud abundante praecipituntur.

This species is related to *Lecanora disserpens*, but it is a much larger and thicker plant with connivent marginal lobes and a continuous, areolated, soft thallus towards the centre. The cortex is very thick, its hyphae are hardly distinct in a common good hand section, but a microtome section revealed its structure. A good section shows a slightly interspersed, though transparent medulla (alc. + HCl).

The cortex is often damaged, as is so often the case with half aquatic *Aspicilliae*. The minute "verrucae" on the central lobes were found to be destitute of gonidia, they are at first pale, then darker. In sections this part of the cortex somewhat resembles that of some *Parmeliae*, e. g.

Parmelia rudecta. The verrucae may be atrophied pycnides. They are possibly not characteristic of the species, but perhaps an individual variation. Fertile pycnides were not found.

The hypothallus much resembles destroyed apices of the marginal lobes.

The type plant was found on a siliceous rock along a brooklet, fed with cold water.

At Kapp Bennett I found a plant (basaltic rock) which is possibly within the range of variation of *Lecanora Humboldtii*. It differs in the great size, up to 2 mm diam. of its very elevated apothecia, and in its paler hypothallus. In this plant I succeeded in finding fertile pycnides, with pycnoconidia slightly arcuate, very narrow, 20—25 μ long. In the type plant the apothecia were, perhaps, not fully developed.

193. (48) *Lecanora disserpens* (Zahlbr.) H. Magn.

Pl. VI, fig. 3.

Magnusson *Aspicilia*, 1939, p. 29 and 164, text-fig. 42, ubi syn. — *Lecanora perradiata* var. *disserpens* Zahlbruckner *Lecanora* (Novaya Zemlya), 1928, p. 10.

Wollaston Foreland: Landingsdalen. Kapp Herschel. Claveringøya: Soppbukta. Finschøya. — Jacksonøya. Myggbukta. Kapp Bennett. — Moskusoksefjorden. Kapp Humboldt. Dusénfjorden. — Sofiasundet: Sanddalen. — Trailløya: Veganaset.

Next to *Lecanora candida* var. *nikrapensis* the commonest *Aspicilia* in North East Greenland. It is found on basaltic rocks, but it is not quite lacking on slightly calcareous sandstones, and the like. It is, therefore, chiefly found along the coast where basaltic rocks prevail.

It prefers the banks of small brooks, pebbles, and the like in small depressions of the ground which are at times irrigated by cold water.

It is a widespread species, known from West- and East Greenland, all over Spitsbergen, and from Novaya Zemlya (vide Magn., l. c.), and it is common in all these regions. Our present knowledge does not suggest a circumpolar species. It is strictly arctic, and has so far not been found in Scandinavia.

It has been united with *Lecanora perradiata*, from which it is easily distinguished by its habitus, and by its negative reaction with KOH. It is much nearer related to *Lecanora virginea*, and especially to *Lecanora alboradiata*, and lichenologists who prefer wider species might be inclined to unite it with the latter species. For differences, see Magnusson, l. c.

194. (49) *Lecanora alboradiata* H. Magn.

Pl. VIII, fig. 3.

Magnusson *Aspicilia*, 1939, p. 29 and 163, fig. 41.

Wollaston Foreland: Landingsdalen. — Jacksonøya. Myggbukta. — Mariaøya.

Found on basaltic rocks, often associated with *Staurothele fusco-cuprea*, suggesting rather moist (at times irrigated) localities.

A fine little plant with stellate, almost tessellate (zonate), more or less contiguous, nearly plane lobes, 0.4—0.5 mm broad, and rather "blunt" ends, not so protractedly apiculate as in *Lecanora disserpens*. The lobes do not advance much beyond the circular margin. The hypothallus is pale and therefore little conspicuous.

The plants agree well with Th. Fries's plants from Asuk in Disko Island, West Greenland, referred by me to *Lecanora perradiata* (Lichens from West Greenland, 1937, p. 143), but by Magnusson to the present species. After this *Lecanora alboradiata* is found in Siberia, Novaya Zemlya, Sweden, Bear Island, Spitsbergen, East and West Greenland, and in Ellesmere Land (Magn. l. c.). It is most probably an arctic circumpolar species, rarely found in subarctic regions.

195. (50) *Lecanora*, cfr. *Lesleyana* Darb.

Pl. IX, fig. 1.

Myggbukta.

The determination is not unobjectionable. The plant resembles *Lecanora alboradiata*, but Magnusson is of opinion that it approaches *Lecanora Lesleyana* more, in spite of the negative reaction of its excipular cortex with KOH.

We should have expected more plants of this species in this large collection, for it is evidently widely distributed. Magnusson records it from Arctic Canada, West Greenland, Novaya Zemlya, and Siberia.

196. (51) *Lecanora Graahii* Lyngé n. sp.

Pl. IX, fig. 2

Ymerøya: Dusénfjorden, near Kapp Graah, on a red sandstone (no CO₂ by HCl), with *Rhizocarpon disporum* (dry substratum).

Thallus parvus, ad 1 cm latus, et tenuis, 0.5 mm, interdum plures confluentes, pulcherrime orbicularis, secundum ambitum radiato-lobatus, praeterea areolatus. Lobi omnino contigui, rimis transversis regulariter tessellato-zonati, 0.35—0.4 mm lati, ad 2 mm longi, apice truncati, superne plani, laevigati vel hinc inde minute rimulosi. Areolae rimis profundis et latis separatae et eam ob causam subdiscretae, planae, subrotundatae, diam. 0.2—0.35 mm. Thallus albidus, dilutissime in rubescentem vergens, epruinosis, secundum peripheriam hypothallo distincto, obscurato, 0.3 mm lato, radiatim rimoso, sed omnino continuo circumdatus.

Apothecia centralia, columnari-elevata, contigua vel concretescentia, diam. 0.45—0.55 mm. Discus ater, epruinosis, concavus, margo albido, crasso, integro, elevato circumvallatus. Excipulum indistinctum. Hymenium circ. 90 μ altum, superne obscure fuscum, corpusculis angulatis inspersum. Paraphyses in aqua indistinctae, in KOH distinctae, gela-

tinam increbre percurrentes, tenues, sursum leviter solum incrassatae, constrictae septatae, submoniliformes. Sporae (vulgo immaturae) $15-18 \times 8 \mu$.

Pycnides non visae.

Cortex circiter 25μ altus, in parte superiori obscuratus, strato alto (25μ) amorpho, incolorato, granulato, tectus, cortex granulis intense inspersus (HCl) et hyphae indistinctae, in KOH valde leptodermatae, constrictae septatae, haud perpendiculares. Medulla subpellucida, saltem in KOH.

Thallus KOH —, etiam cortex excipuli. Hymenium J vinosum, etiam cum excipulo atque hypothecio.

A beautiful small plant, distinct on account of its orbicular, zonate and tessellate thallus with quite contiguous, broad and truncated marginal lobes. Related to *Lecanora alboradiata*, which is, however, distinct by its discrete marginal lobes.

The yellow reaction of the excipular cortex by KOH is, perhaps, not so important as suggested by Magnusson. A better material might efface the specific distinction between *Lecanora lesleyana* and *L. Graahii*.

Subgen. *Placodium* (Hill) Th. Fr.

197. (52) *Lecanora melanophthalma* Ram.

Lam. et DC. Flore Franç., II, 1815, p. 376. Lynge Lich. West Greenl., 1937, p. 145. — *Lecanora rubina* var. *melanophthalma* (Ram.) A. Zahlbr. Cat. Lich. IV, 1927, p. 659, ubi syn.

Landingsdalen. Kapp Herschel, 650 m. Revet, 1200 m. — Loch Fyne. Jacksonøya. Kapp Stosch. Myggbukta. Terneøya. Kapp Bennett. — Moskusoksefjorden, up to 1350 m. Reinbukta. Kapp Humboldt. Dusénfjorden. Blomsterbukta. Kierulffjorden. — Sofiasundet: Sanddalen, and 5 km west of Robertsonøya. — Gåsøya. Husbukta. Veganeset. — Holmvika. Antartichamna. Kapp Petersens. — Röhssfjorden. Dicksonfjorden. Ellaøya. Mariaøya.

This species is found all over the region, and it is so common as it possibly can be. But it has its special demands: In the arctic it is a coprophilous species, restricted to the upper part of the bird-stones and to other prominent rocks where birds like to rest. In such places it is very abundant, together with *Xanthoria candelaria*, *Parmelia infumata*, *Lecidea atrobrunnea*, *Physcia dubia* and *Ph. caesia*, and *Rinodina Hueana*. The last mentioned species is found more on the vertical parts of the bird-rocks.

Lecanora melanophthalma is widely distributed in the arctic, but distinctly western, its easternmost locality being Franz Josef Land (Lynge, l. c. p. 148—155).

In my opinion it is specifically distinct from the related *Lecanora rubina*. This is i. a. shown by their different distribution, for the latter

species is much more southern. I know but a few arctic localities for the latter species, in West Greenland between Godthaab and Nûgssuaq. So far north it is still more western than the former species (Lyngé, l. c. p. 146—148).

My eminent friend, Dr. Ed. Frey, who has devoted so much study to the genus *Lecanora*, is not so convinced of their specific distinction.

It is generally stated that *L. rubina* stains yellow by KOH, whereas *L. melanophthalma* is KOH —, see f. inst. Harmand Lich. de France, p. 921—922, in p. 931 Harmand states that this negative reaction “est très constant”. Dr. Frey found an almost equally intense reaction in either species. I have also found a yellow reaction in either species, but much more intensely in *L. rubina*.

I have sectioned several apothecia and found:

Lecanora melanophthalma: Cortex a medulla non bene limitatus, crassus, usque ad 80—90 μ altus, hyphae minute granulosae et eam ob causam indistinctae, in omnes partes currentes, pachydermaticae. Hymenium circiter 65 μ altum, superne obscure fuscum et plus minusve granulatum, paraphysum apices tamen aeruginosae. Paraphyses distincte septatae (tinctae!), apice capitatae (in aqua), sed KOH si addito sursum leviter solum incrassatae. Sporae variantes, 9—12 \times 5—7 μ . — Pycnides haud raras, sed inconspicuas, ob ostiolum pallidum, pycnoconidia arcuata, longitudine valde variantia, 15—30 μ .

Hymenium J e caeruleo rubescens, cortex KOH dilute flavescens.

Lecanora rubina: Cortex a medulla melius distinctus, in centro apotheciorum circiter 75 μ altus, in margine multo tenuior, hyphae pachydermaticae, ad 10 μ crassae, conglutinatae, ramosae, in omnes partes currentes, sed in parte exteriori ad vallos accedentes, hyphae granulis minutis, fuscis, dense adpersae. Hymenium circiter 50 μ altum, superne intense fusco-granulatum, granulae in KOH dissolutae, sed non in HNO₃ (10%), inferne saepe flavescens. Paraphyses apice non incrassatae, omnino incoloratae. Sporae quam in spec. praec. leviter minores (angustiores): 8—10 \times 4—5 μ . — Pycnides raras, pycnoconidia parce visae, 15—20 μ (Migula Krypt. Germ. No. 249).

Hymenium J e caeruleo fuligineum, cortex KOH intense flavescens.

It is well known that in *L. melanophthalma* the colour of the disc varies from nearly black to a pale flesh-colour, even in the same plant: “Specimina dimidia parte ad α . (*rubina*), altera ad β . (*melanophthalma*) pertinentia licet invenire” (Th. Fr. Lich. Scand. p. 225). In our herb. we have a plant from Franz Josef Land: Kapp Forbes (leg. Olaf Hansen), showing this variation to an extraordinary degree. Pale and dark apothecia in the same plant were sectioned, and I found:

The dark apothecia were of the normal type, very incrassated paraphyses with dark, aeruginose heads, and a sparingly inspersion epithecium; the pale apothecia had an intensely inspersion epithecium and very

little incrassated paraphyses. There is apparently an inverse correlation between these two characters, which together determine the colour of the disc. But even in such plants *Lecanora melanophthalma* is quite distinct habitually: its coarser thallus, its pale underside, and the number of pale apothecia is never great.

The reaction of the paraphyses in *L. melanophthalma* upon KOH is interesting, it suggests a cover over their tips, dissolved by KOH, not a widened cell-wall.

The pycnoconidia are always arcuated, but their length is very variable. In *L. melanophthalma* I found 15—22 μ in a Greenland plant from Kierulffjorden, and 25—30 μ in the above mentioned plant from Franz Josef Land. In *L. rubina* they are very rare, and I have nothing to tell about their variability.

198. (53) *Lecanora subpeltata* Lynge n. sp.

Syn. *Lecanora peltata* Zahlbr. in *Lecanora* from Novaya Zemlya, 1928, p. 31. Lynge Lich. West Greenl., 1937, p. 145. — Non *L. peltata* DC. in Nyl. Syn. Lich. II, p 62.

Eskimones (leg. Gelting).

Thallus pulvinatus, ad 3 cm latus, peltato-affixus, foliaceus, rigidus, polyphyllus, foliis tamen saepe fragilibus, in centro substipitatis, marginem versus adpressis vel recurvatis, convexis, brevibus, crenatis vel varie incis. Thallus superne flavescenti-stramineus vel ochroleucus, epruinus, laevigatus, nitidus, subtus pallide coloratus.

Apothecia numerosissima, thallum interdum omnino tegentia, sessilia, sed basi constricta, rotundata vel vulgo mutua pressione angulata vel etiam difformia, majuscula, diam. 1.5—3 mm. Discus luteo-carneus, hinc inde in olivaceum vergens, sed non rubescens, margo crassus, thallo concolor, persistens, crenatus. Cortex vulgo a medulla bene limitatus, crassus, in centro usque ad 100—125 μ altus, in margine tenuior, 20—25 μ , hyphae corticales in omnes partes currentes, non vallatae, crassae, pachydermaticae, 8—10 μ crassae, granulis fuscis adpersae et eam ob causam indistinctae. Hymenium 70—75 μ altum, epithecio fusco et intense granulato, ut in *L. rubina*, hymenium praeterea incoloratum. Paraphyses indistinctae, cohaerentes, interdum ramosae, apice haud incrassatae vel praesertim in apotheciis obscurioribus bene aeruginoso-capitatae, 5 μ crassae. Sporae 8—12 \times 5—6(—7) μ .

Pycnoconidia 18—25 μ .

Hymenium J e caeruleo vinosum, KOH si addito decoloratum, granulae epitheciales dissolventes, et paraphyses capitatae, superne constrictae septatae, etiam in apotheciis pallidioribus. Cortex KOH flavescens.

Zahlbruckner referred my plants from the bird-cliffs at Arkhangel Bay, Novaya Zemlya, to *Lecanora peltata* (Ram.) Steud., the type plants

had been collected in the Pyrenees and in the Alps. These plants were "noirâtres en dessous", their apothecia "épars sur le disque et le bord des feuilles". Nylander described the thallus as "typice rugosus vel subrimose insculptus" (Syn. Lich. II, p. 62), it should be "frequentissime in alpihus Delphinatus".

The arctic plants do not agree with these data, and still less with those in Harm. Lich. de France, p. 933. It was also a little improbable, though not impossible, that a species from these southern mountains should appear so far to the north. But it was impossible for me to get to sight a good specimen of *L. peltata*, and when the plant was found also in Th. Fries's collection from Disko Island, West Greenland, I simply had to state its identity with my plants from Novaya Zemlya, determined by Zahlbruckner. The present plant from Eskimones was submitted to Dr. Ed. Frey, Bern. After a careful examination and a comparison with *L. peltata* he found that they could not be identical.

It is quite evident that the arctic plants are nearer related to *L. melanophthalma* than to *L. rubina*. In reality I cannot exclude the possibility that they could be the former species with a predominant development of the pale type of apothecia. If so, they should be named *L. melanophthalma* var. *subpeltata* Lynge.

199. (54) *Lecanora contractula* Nyl.

α. *feracissima* Th. Fr.

Mackenzie Bay: Terneøya.

Thallus pulvinatus, 1—1.5 cm latus, peltato-affixus, albidus, etiam subtus.

Apothecia numerosissima, thallum tegentia, rotundata vel mutua pressione angulata vel difformia, sessilia, sed basi bene constricta, magna, diam. usque ad 2—3(—4) mm. Discus ater, madefactus in fusciscentem vergens, epruinosis, subnitidus, laevigatus, margine involuto, persistenti, crasso, integro, albido circumdatus. Cortex apothecialis undulato-rugosus, a medulla bene limitatus, incoloratus, crassitudine subaequalis, 40—50 μ , hyphae corticales saltem in parte exteriori subparalleles, supericie perpendicularares, pachydermaticae (vallatae), medullam versus minus distincte vallatae, magis divergente ramosae. Hymenium angustum, circiter 50 μ altum, superne fuscum, strato incolorato tenui tectum et vulgo egranulatum. Paraphyses in aqua cohaerentes, vulgo fusco-capitatae, sursum 4—5 μ crassae, in KOH facilius discretas, interdum ramosae visae, apice minus incrassatae et subconstrictae septatae. Sporae 10—13 \times 5—6 μ , variables, anguste ellipsoideae, 13 \times 5 μ , vel normaliter, usque ad late ellipsoideae. — Pycnides ignotae.

Asci J subpersistente caerulescentes, praecipue sursum, gelatina J parce coloratur. Cortex KOH distincte flavescens.

In the apothecia sectioned the cortex was well set off from the medulla, and almost equally thick all over, it was of a fairly typical palissade structure, at least in the exterior part. A staining by cotton blue may reveal a stratum necrale in some places along the surface. In one section the gonidia were profusely sporulating.

Lecanora congesta Lynge has much smaller apothecia, and even if they are usually congested they do not form such large and thick pulvinulos as in the present species.

200. (55) *Lecanora melanaspis* (Ach.) Th. Fr.

α. stellata Th. Fr.

Myggbukta. Kapp Bennett. — Kapp Humboldt. — Dicksonfjorden. It is not supposed to be common, but at Kapp Humboldt I found it in great abundance.

Apothecia numerosissima, margine si excepta thallum subtegentia, rotundata vel mutua pressione angulata, majuscula, diam. 2—2.5(—3) mm, sessilia, sed basi bene constricta. Discus planus, siccus ater, epruinus, madefactus fuscescens, subnitidus, margine persistenti, crasso, integro, thallo concolori cinctus. Cortex in margine circiter 25 μ , centrum versus 40—45(—50) μ altus, hyphae subplectenchymaticae, leptodermaticae, dense contextae, versus peripheriam plus minusve directae, constrictae septatae. Cortex strato amorpho, subcrasso tectus et eam ob causam nitidus. Hymenium 70—75 μ altum, superne dilute fuscum et strato tenui, amorpho, incolorato, egranulato tectum, praeterea incoloratum et guttulis oleosis instructum. Paraphyses (KOH) sursum distincte moniliformes, sed apicem versus leviter solum incrassatae, 2.5—3 μ crassae, etiam in aqua sursum leviter solum incrassatae. Sporae late ellipsoideae vel subglobosae, 9—12 \times 7—8 μ .

Pycnoconidia recta, cylindrica (vel lageniformia?), 5—6 μ longa.

Hymenium J e flavo intense rubescens, KOH superne dilute flavescens. Cortex KOH e flavo aurantiacus vel sanguineus, Pd. immutatus.

Ochrolechia Mass.

201. (1) *Ochrolechia frigida* (Sw.) Lynge.

Landingsdalen. — Loch Fyne. Myggbukta. Terneøya. Kapp Bennett. — Moskusoksefjorden. Kapp Humboldt. — Gåsøya. Husbukta. Veganeset. — Holmvika. Antartichamna. Kapp Petersens. Dicksonfjorden.

Certainly quite as common here as elsewhere in the arctic. There were, however, no plants from the more continental parts of the region, but it is not probable that it should be missing there.

Fertile plants are not rare. I do not know how to distinguish it from sterile plants of *Ochrolechia upsaliensis*, all sterile plants have

therefore been referred to *Ochrolechia frigida*. The greater part of the plants are fairly typical, with the well known small noduli. Some of them are so large that the plants approach f. *gonatodes*. Its f. *thelephoroides* was not found. The cortex is occasionally destroyed, resulting in aberrant plants. In extreme cases an almost amorphous substance is formed which covers the substratum.

202. (2) *Ochrolechia upsaliensis* (L.) Mass.

Kapp Herschel. Claveringfjorden: Revet. — Myggbukta. Moskusoksefjorden. — Husbukta. Veganeset.

I got the impression in 1929 that it was rather rare, but in 1930 Scholander brought a considerable number of additional plants. It is evidently fairly common.

203. (3) *Ochrolechia inaequatula* (Nyl.) Zahlbr.

Landingsdalen. — Mainland near Archerøya.

Most probably we have overlooked it, for Danish botanists have brought home a good number of plants from North East Greenland.

Haematomma Mass.

204. (1) *Haematomma ventosum* (L.) Mass.

var. *lapponica* (Räs.) Lyng.

A rare species in this region. I did not find it in 1929, but Scholander detected fine plants 15 km west of Husbukta, Geographical Societyøya.

It is widely distributed, though rare, along the east coast of Greenland, the northernmost find being Eskimoneset in Claveringøya (Poul Poulsen). Hartz found it in Danmarkøya in Scoresbysund, and farther south we have Scholander's finds from Kangerdlugssuak: Amdrupneset and Skardet, Akorninarmiut: Mariadalen, and Tingmiarmiut: Bratneset. All of these plants are P —, with the exception of Hartz's plants which are P +, suggesting the type of the species.

Candelariella Müll. Arg.

205. (1) *Candelariella vitellina* (Ehrh.) Müll. Arg.

Landingsdalen. — Moskusoksefjorden. Kapp Humboldt. Dusénfjorden. Kierulfffjorden. — Celsiusberget. Rudbeckfjellet, 1600 m above sea-level. — Gäsøya. Husbukta. — Holmvika. Antartichamna, on stone and wood.

Widespread and common, in places plentiful, especially on hard rocks. Rarely found on old decayed bones, and still rarer on decaying mosses.

The spores are generally undivided, septated spores are very rare.

206. (2) *Candelariella epixantha* (Ach.) Sandst.

Flecht. des n.w.deutschen Tieflandes, Abh. naturw. Vereins Bremen, vol. XXI, 1912, p. 189. — *Lecidea epixantha* Ach. Förteckning på de i Sverige växande arter af Lafvarnes familj, Kgl. Vet. Akad. Nya Handl., 1808, p. 271. — *Lecanora cerinella* (Flk.) Vain. Lich. Pitlek., 1909, p. 39. — *Candelariella aurella* (Hoffm.) Zahlbr. Cat. Lich., vol. V, p. 790.

Landingsdalen. Lille Finschøya. — Jacksonøya. Myggbukta. — Moskusoksefjorden. Reinbukta. Kapp Humboldt. Blomsterbukta. Kierulfjorden. — Husbukta. — Holmvika. Ellaøya, on bones.

Widespread, common and in places plentiful. It prefers calcareous ground, and it is especially plentiful on old bones. Reindeer bones are found all over the country, and in great heaps around some old Eskimaux domiciles, such as in Kierulffjorden. It is often found on other lichens, especially on *Placynthium asperellum*. It is more nitrophilous than the previous species, it is therefore often found on the tops of bird-stones, and the like, even if they consist of hard rocks.

In many apothecia I only found evacuated asci, evidently its spores are promptly discharged after maturation. Its asci are considerably narrower than in *Candelariella vitellina*.

Few lichens have a more intricate synonymy than this species, cfr. Zahlbr. Cat. Lich. l.c. Zahlbruckner reintroduced the specific name *aurella*, based on *Verrucaria aurella* Hoffm. Deutschl. Flora, 1796, p. 197 (it was publ. in 1795, not in 1796!). I have not ventured to accept this name, for Th. M. Fries expressly writes: “(syn.) *Gyalolechia aurella* Körb. Pg. p. 51 (non Hoffm.)” (Lich. Scand. p. 190). Whether Fries ever saw Hoffmann’s plant is unknown to me. — The specific name *epixantha* Ach. 1808 is older than *cerinella* Flk. 1826.

Nylander (Lich. Aegypt. Ehrenb. p. 4), as well as Vainio (Lich. Pitlek. p. 39) have identified this species with the *epixantha* of Acharius. Either of them having had an easy access to Acharii herb., I found no reason to doubt of this identity.

Th. Fries’s name *subsimilis* from 1867 must in any case disappear.

207. (3) *Candelariella placodizans* (Nyl.) H. Magn.

Lynge Lich. of the Dan. 5th Thule Exped. 1921—24, Copenh. 1935, p. 23.

Landingsdalen. Clavingfjorden: Revet, 1200 m above sea-level. Finschøya. — Foster Bay: Myggbukta and Terneøya. — Moskusoksefjorden. Kapp Humboldt. Dusénfjorden. Blomsterbukta. — Husbukta. Veganeset. — Holmvika. Antartichamna. Röhssfjorden. Dicksonfjorden. Mariaøya.

Common and widespread. Found on the soil, or on other lichens, such as *Placynthium asperellum*, which is an excellent substratum for other lichens.

208. (4) *Candelariella xanthostigma* (Pers.) Lettau.

Kapp Herschel. — Kapp Humboldt. Moskusoksefjorden. — Husbukta. Veganeset.

Candelariella xanthostigma is rare and always very scarce. It was an unexpected find, and evidently an addition to the lichen flora of Greenland. This inconspicuous plant was hardly observed during the field work, but it was found at home when some other soil lichens were examined under a strong lens.

*Usneaceae.**Cornicularia* Ach.209. (1) *Cornicularia mirabilis* Lynge n. sp.

Moskusoksefjorden: Hoelsbu, on rocks, leg. Sigurd Aandstad, 9. 8. 1932.

Thallus orbicularis, dense depresso-caespitosus, diam. usque ad 30 mm, altit. ad 5 mm. Surchuli radiantes, arcte contigui, applanati, 250—300(—400) μ lati, 80—90 μ crassi, fragiles, hinc inde nodulosi, connivente furcati vel varie palmato-incisi, latere superiori atri, opaci, latere inferiori dilutius colorati, fusco-nigrescentes.

Structura anatomica isolateralis. Thallus in centro subfistulosus vel arachnoideus, secundum peripheriam corticatus (25—30 μ), atrofuscescens, hyphis valde indistinctis, subplectenchymaticis, leptodermaticis, constrictis septatis, articulis rotundatis, diam. 6.5—7.5 μ . — Gonidia viridia, diam. 6.5—7.5 μ .

Medulla J —, KOH —.

Apothecia et pycnides desunt.

This species must be rare, for it entirely escaped the attention of all the lichenologists who previously worked in North East Greenland. It was found by Mr. Aandstad who was collecting mosses, and sent to Mrs. Karen Hygen, who is at work on his mosses. The plant quite resembles an *Andraea*, but Mrs. Hygen readily saw that it was a lichen. Habitually it looks like a *Collema*, and I was much astonished to find green gonidia.

No fructification being found it is difficult to refer it to its genus, we might quite as well call it a "lichen imperfectus". The plant was brought to Upsala and discussed with my lichenological friends. We all agreed that "such a plant does not exist", as the saying is in Upsala, but that it might be a *Cornicularia*.

Cornicularia normöricea is a much larger plant, with a more divergent branching of its rigid shining fronds. The thallus of *Cornicularia mirabilis* is so compact that one does not see the individual fronds at first glance. *Cornicularia normöricea* differs considerably with respect to its

anatomical structure. A cross section shows an oblong (4×1) medulla with arachnoid, rather thick-walled hyphae, the gonidia (not too numerous) are found between this medulla and a mighty, corneous stratum with very pachydermatous cells, and over its surface a brownish-black stratum, about 25μ thick. Anatomically *Cornicularia mirabilis* resembles a *Dactylina*, rather than a *Cornicularia normörca*.

Caloplacaceae.

Protoblastenia (Zahlbr.) Stein.

210. (1) *Protoblastenia rupestris* (Scop.) Stein.

var. *typica* Th. Fr.

Dusénfjorden, on a conglomerate. — Holmvika, on a calcareous rock.

Its substratum, entirely uncoloured hypothecium, and the structure of its thallus must exclude *Protoblastenia Siebenhaariana*. Spores simple, $15-16 \times 9 \mu$.

var. *incrustans* (DC.)

Jacksonøya. Myggbukta.

A few plants were found on calcareous rocks. The apothecia are well immersed.

211. (2) *Protoblastenia terricola* (Anzi) Lynge.

Myggbukta. — Moskusoksefjorden. Dusénfjorden. Blomsterbukta. — Celsiusberget. — Veganeset. — Kapp Petersens.

It has the same distribution here as in Novaya Zemlya: quite common, but nowhere plentiful.

The KOH test should be made on young apothecia, if not studied under the microscope. Old apothecia are often so dark that the purplish colour is less distinct.

Blastenia Mass.

212. (1) *Blastenia tetraspora* (Nyl.) Rehm.

Landingsdalen. — Myggbukta. — Moskusoksefjorden. Kapp Humboldt. — Husbukta. Veganeset. — Antartichamna.

Widely distributed throughout the region, as was to be expected. There are no finds from the inland districts, but it is not known whether this is due to insufficient exploration. There are not many plants. The species is supposed to be common, but scarce.

The spores are $25-30 \mu$ long, the paraphyses very thin and hardly incrassated at their tips, they are transversely septated, and imperceptibly constricted at the septa (studied in HCl, and slightly heated, in order to remove an eventual mucilaginous cover).

213. (2) *Blastenia leucoraea* (Ach.) Th. Fr.

Myggbukta. — Moskusoksefjorden. — Veganeset.

Rare and scarce. These finds have confirmed my opinion (Lich. Nov. Zeml. 1928, p. 217) that it should be a species of western distribution in the arctic. So far I have never found it in a Spitsbergen collection. I did not find it in Novaya Zemlya, and it was not mentioned in Nylander's and in Vainio's papers on the Vega lichens from Eastern Asia. It has been found in Jan Mayen, and also in West Greenland, and in Gjøa Harbour, King William Land. In the arctic it is always rare and scarce, much less common than *Blastenia tetraspora*.

Its paraphyses are hardly incrassated at the apices.

Fulgensia Mass.214. (1) *Fulgensia bracteata* (Hoffm.) Räs.

Landingsdalen. Claveringfjorden: Revet, 600 m above sea-level. — Loch Fyne. Jacksonøya. Myggbukta. — Moskusoksefjorden. Reinbukta. Kapp Humboldt. Dusénfjorden. Blomsterbukta. — Gåsøya. — Kapp Petersens. Ellaøya. Mariaøya.

It is supposed to prefer calcareous soil, and plants of so special demands cannot be expected to be ubiquitous. But with that reserve it must be called widespread and common, in places very plentiful. I have never seen so many fertile plants as here, in Reinbukta and Blomsterbukta I could have collected any number of fertile plants. North East Greenland is known for its low precipitation and (for the latitude) high summer temperature, evidently an advantage for this species, to judge from its distribution in other parts of Europe.

Apothecia in Groenl. orient. septentr. frequentia, numerosa vel numerosissima, rotundata vel mutua pressione subangulosa, diam. 0.7—1.0 mm. Discus croceo-rubescens, epruinosis, e plano subconvexus, margine integro, epruinoso, quam discum leviter pallidiori, demum excluso, circumdatus. Excipulum gonidiis repletum. Hypothecium hyphis dense contextis, guttulis repletis, sat pachydermaticis formatum, in hymenium sensim transiens. Hymenium 70—80 μ altum, superne flavo-fuscescens et dense minute granulosum, valde impellucidum, praeterea incoloratum, sed guttulis (oleosis?) numerosis et etiam crystallis magis dispersis instructum. Paraphyses (ob hymenium granulosum) indistinctae, sursum leviter solum incrassatae vel (in aetate?) clavatae, 2.5—3.5 μ crassae, et tum distincte, haud constrictae, septatae. Asci subanguste clavati, 12—15 μ crassi, membrana superne protracta et incrassata. Sporae 12—15 \times 6—7(—8) μ , oblongae vel late ellipsoideae, apice late rotundatae, anguste septatae, loculis approximatis, membrana sporarum tenuis, aequaliter incrassata, vel (in aetate?) magis incrassata, loculis angulosis.

Pycnides a me non visae.

Asci in apice et in parte exteriori membranae J persistente caerule-scentes, hymenium praeterea J subincoloratum (obs.: sectio tenuis!), KOH roseo-violascens, farinam roseo-violascentem effundens. Guttulae hymeniales in C₂H₅OH dissolutae.

The thallus is generally pale sulphur yellow, but there are also some plants of a more citrine colour, and I have one plant where citrine parts of the granules are surrounded by a thallus of the usual pale colour.

Th. Fries referred this species as a subspecies to his *Lecanora (Placodium) fulgens* (Lich. Scand. p. 222—3). This cannot be correct, for the *fulgens* has simple spores, in Malme Lich. Suec. No. 657 I found 9—10 × 4.5—5 μ. Other authors, e. g. Jatta, referred them to different genera, on account of the spore difference.

Zahlbruckner justly remarked that his sect. *Fulgensia* (Mass.) Zahlbr. is an analogon of *Protoblastenia* (Nat. Pflanzenfam. ed. II, 1926, p. 250). He acknowledged the latter as a proper genus, the consequence would be to acknowledge also *Fulgensia* as such. Elenkin, for instance, has done so (Lich. Flor. Ross. Med. 1906, p. 243). To me this interesting spore difference suggests a line of evolution: *Protoblastenia-Blastenia*, and *Fulgensia-Caloplaca*.

Zahlbruckner referred the genus *Candelariella* to the *Lecanoraceae*, but he called attention to its affinity with *Caloplaca*. This affinity is really so great that it suggests a place for *Candelariella* in the family *Caloplacaceae*.

Caloplaca Th. Fr.

Clavis specierum.

1. Thallus crustaceus, uniformis.
2. Thallus (sterilis), minute granulosus, sorediose efflorescens.
 11. *C. epiphyta* Lynge, p. 119.
2. Thallus numquam sorediatus.
3. Discus siccus nigricans (sp. saxicolae).
 4. Epithecium KOH non rosaceum (sed violascens vel subincoloratum).
 10. *C. melanocarpa* (Th. Fr.), p. 118.
 - 4*. Epithecium KOH rosaceum.
 9. *C. groenlandica* Lynge, p. 117.
- 3*. Discus laete coloratus (aurantiacus vel cerinus vel ferrugineus).
 4. Species saxicolae.
 5. Apothecia parva, 0.4—0.6 mm, sporae 10—12 × 6—8 μ.
 2. *C. pyracea* (Ach.) Th. Fr., p. 112.
 - 5*. Apothecia majora, ad 1 mm, sporae angustae, 10—12 × 4.5—6.5 μ.
 7. *C. fraudans* (Th. Fr.) Oliv., p. 115.
 - 4*. Species non saxicolae.
 5. Supra thallum aliorum lichenum vigentes, sporae crassae.
 6. Apothecia parva, 0.35—0.5 mm, discus ochraceo-ferrugineus, margo obscurus usque nigricans, sporae 10—11 × 6.5—7.5 μ.
 5. *C. epithallina* Lynge, p. 113.

- 6*. Apothecia majora, usque ad 1 mm lata, discus luteo-ferrugineus, margo dilutior, ceraceo-nitidus, sporae $13-16 \times 8-10 \mu$.
8. *C. invadens* Lynge, p. 116.
- 5*. Species autonomae, p. m. p. muscicolae.
6. Margo disci pulverulentus, thallus cinereo-albicans.
1. *C. stillicidiorum* (Vahl) Lynge, p. 111.
- 6*. Margo disci epruinus.
7. Apothecia majora, 0.3–0.5 mm, ochraceo-aurantiaca, hymenium altum, 90–100 μ , paraphyses sursum modice incrassatae (2–2.5 μ).
3. *C. Jungermanniae* (Vahl) Th. Fr., p. 112.
- 7*. Apothecia minuta, 0.7–1.0 (–1.5) mm, hymenium circ. 65 μ altum.
8. Apothecia ochraceo-aurantiaca, paraphyses sursum (si bene evolutae) clavato-incrassatae, 5–6 μ .
4. *C. subolivacea* (Th. Fr.) Lynge, p. 113.
- 8*. Apothecia rufo-cinnamomea, paraphyses sursum haud incrassatae (nisi granuloso-adsersae). 6. *C. cinnamomea* (Th. Fr.) Oliv, p. 114
- 1*. Thallus ambitu effigurato-laciniatus.
2. Thallus esorediatus. 12. *C. elegans* (Link) Th. Fr., p. 119.
2*. Thallus soreidiis crateriformibus instructus. 13. *C. sorediata* (Vain.) DR., p. 120.

215. (1) *Caloplaca stillicidiorum* (Vahl) Lynge.

Landingsdalen. Kapp Herschel. Claveringfjorden: Daudmansøyra. — Jacksonøya. Myggbukta. Kapp Bennett. — Moskusoksefjorden. Reinbukta. Kapp Humboldt. Dusénfjorden. Blomsterbukta. Kierulfjorden. — Husbukta. Veganeset. — Holmvika. Antarctichamna. Dicksonfjorden.

A circumpolar species which I have found equally common in all the arctic regions where I have worked. There were rather few plants from the southern parts of these regions, but that is supposed to be due to insufficient collecting, in 1929 we did not work so much there.

Caloplaca stillicidiorum abounds on old mosses. Drift-wood is rare in North East Greenland, as compared with the coasts of Spitsbergen and Novaya Zemlya. But where we found drift-wood with lichens, this species was also present. We are wont to find reindeer bones and horns here and there in Spitsbergen and in Novaya Zemlya, but in North East Greenland they abound on the plains, suggesting the incredible number of reindeer that once lived here. Now the animal has been entirely exterminated, most probably chiefly by the polar wolf, but also by the Eskimos. In Kierulfjorden we found large refuse heaps of bones at the desolate Eskimo camp. If old enough, such bones have a very characteristic lichen vegetation, and *Caloplaca stillicidiorum* is hardly ever missing.

As usually ossicolous plants have a better developed thallus, concentrated pulvinate apothecia with a thick, often much incurved and persistent margin. The colour of the disc, and the pruina of the apothecia vary in the usual, well known manner.

216. (2) *Caloplaca pyracea* (Ach.) Th. Fr.

Landingsdalen, saxicola.

Thallus parce evolutus, glomeruli citrini hinc inde inter apothecia adsunt.

Apothecia numerosa-numerosissima, approximata vel vulgo contigua, supra substratum elevata et basi constricta, parva, diam. 0.4—0.6 mm. Discus planus vel subplanus, aurantiacus vel flavo-aurantiacus, margine integro, subpersistenti, dilutiori circumdatus. Excipulum gonidiis glomeratis repletum, anguste corticatum, cortex (in margine) (6—)10—13 μ haud superans, in parte exteriori fuscum, praeterea incoloratum, hyphae corticis superficiei perpendiculares, leptodermaticae, constrictae septatae, articulis rotundatis vel subangulatis. Hymenium angustum, 55—60 μ , superne intense granulatum. Paraphyses cohaerentes, apicem versus hinc inde furcatae, sursum incrassatae, 4—5(—7) μ , et constrictae septatae. Sporae (in specim.) male evolutae, 10—12(—13) \times 6—7 μ , apice late rotundatae, medio haud constrictae, septum subangustum.

Hymenium J intense caerulescens, etiam cum hypothecio. Granulae thallinae KOH roseae, apothecia KOH obscure violascentia.

In Swedish (corticolous) plants I found a hymenium of the same height, stouter and less concrete paraphyses, and broader spores, 12—15 \times 7—8(—9) μ , septum 4.5—5 μ , and in abundance in every hymenium. The spores were polari-dyblastae, with a very thick septum. Together with them I found some other spores, evidently of an abnormal development: constrictedly, simply septated with two rounded thin-walled halves, and often narrower than the normal spores. Such spores were common in the Greenland plant where ripe spores were scarce and poorly developed. They cannot be of any taxonomical importance. — Also in the Swedish plants the cortex of the excipulum was very narrow in the margin of the apothecia.

217. (3) *Caloplaca Jungermanniae* (Vahl) Th. Fr.

Landingsdalen. — Myggbukta. Terneøya. Kapp Bennett. — Moskusoksefjorden. Kapp Humboldt. Kierulffjorden. — Celsiusberget. — Gåsøya. Husbukta. Veganeset. — Holmvika.

The apothecia are not always so large as in Norwegian plants, their usual size being about 0.7—1.0 mm. But larger apothecia are also found, and they are not rare, up to 1.5 mm. The apothecia are persistently plane, with a thick, paler margin.

The high hymenium, 90—100 μ , was already mentioned in my paper on the Novaya Zemlya lichens (1928, p. 225). The present material can only confirm this statement. One or more plants from each locality were examined. It was found, however, that this height was only attained in full-grown apothecia. I also detected another difference

against *Caloplaca subolivacea*. In *C. Jungermanniae* the paraphyses are not quite thin, but they are not so clavated at their tips as in *C. subolivacea*. They are generally about 2—2.5 μ thick there, in the latter species 5—6 μ .

In North East Greenland *Caloplaca Jungermanniae* is more common than in most other arctic regions, as far as my experience goes. The reason is, perhaps, the dry and for the latitude hot summers.

218. (4) *Caloplaca subolivacea* (Th. Fr.) Lyng.

Landingsdalen. Kapp Herschel. — Loch Fyne. Jacksonøya. Myggbukta. Terneøya. Kapp Bennett. — Moskusoksefjorden. Reinbukta. Kapp Humboldt. Dusénfjorden. Blomsterbukta. Kierulffjorden. — Celsiusberget. — Gåsøya. Husbukta. Veganeset. — Holmvika. Antartichamna. Kapp Petersens, on drift-wood. Röhssfjorden. Dicksonfjorden. Ellaøya. Mariaøya.

Caloplaca subolivacea is one of the commonest of all lichens all over the region explored by us. It is found on decaying organic matter of every kind, perhaps slightly nitrophilous, such as on dead herbs, e. g. *Saxifraga oppositifolia*, on grass tufts, even on *Cassiope tetragona* which is otherwise a bad substratum for epiphytic lichens, further on old excrements (hares, grouse), on decaying large lichens (*Peltigereae*, *Parmeliae*, *Physciae*), on very old bones, and, though rarely, on decaying wood.

It is generally followed by a characteristic society of other lichens, amongst which it is one of the commonest, such as *Caloplaca stillicidiorum*, *Rinodina roscida*, *Lecidea Wulfenii*, a *Lecanora* sp., and some others.

Its apothecia are small, 0.3—0.5, rarely up to 0.7 mm large, plane, with a thick, entire and usually persistent margin. Convex apothecia, with evanescent margin, such as Malme Lich. Suec. No. 784, are rare in the arctic.

The height of its hymenium is about 65 μ . Its mature paraphyses which reach up into the granular epithecium, are clavated, up to 5—6 μ thick at their tips, and constrictedly septated, often with capitated apical articuli. This is not due to a cover of the minute yellow grains, it is seen also below the epithecium in full grown paraphyses, though less distinctly.

Plants that look intermediate between this species and *Caloplaca Jungermanniae* are rare, and a study of their paraphyses and the height of their hymenium will identify them.

219. (5) *Caloplaca epithallina* Lyng. n. sp.

Jacksonøya. Kapp Bennett. — Moskusoksefjorden (typus). Kapp Humboldt. Blomsterbukta.

Planta supra thallum aliorum lichenum parasitica, e. g. supra *Parmeliam disjunctam*, *Rinodinam Hueanam*, *Lecanoram melanophthalmam*, etc. Thallus proprius vulgo non evolutus, si adest, albidus videtur.

Apothecia dense conglomerata, parva, diam. 0.35—0.5 mm, sessilia, sed basi constricta. Discus planus, epruinus, ochraceo-ferrugineus vel ferrugineo-fuscus, margine obscuriori, usque nigricans, integro, persistenti, circumdatus. Excipulum gonidiis repletum, in parte interiori (infra gonidia) plus minusve distincte plectenchymaticum, in parte exteriori hyphae superficiei perpendiculares, constrictae septatae et secundum marginem in zona angusta granulis minutis fusco-ferrugineis colorantur. Hypothecium incoloratum, circiter $40\ \mu$ altum. Hymenium $70\text{--}75\ \mu$ altum. Paraphyses haud cohaerentes, ramosae vel furcatae, transverse septatae, subvalidae ($2\text{--}2.5\ \mu$ crassae in KOH), sursum haud vel leviter incrassatae, sed granulis fusco-ferrugineis minutis dense vestitae et eam ob causam spurie incrassatae videntur. Asci $45\text{--}50\ \mu$ longi et (repleti) $13\text{--}15\ \mu$ crassi, interdum sparse evolutae et steriles. Membrana sursum valde incrassata, praeterea subtenuis, lumen ascorum sursum in membranam protractum. Sporae polari-dyblastae, parvulae, $10\text{--}11\text{--}13) \times 6.5\text{--}7.5\ \mu$, septum $2\text{--}2.5\ \mu$, sporae apice late rotundatae, medio non constrictae.

Membrana ascorum J sursum e caeruleo vinoso-fuligineum, hymenium praeterea J vinosum.

If compared with the formae of *Caloplaca ferruginea* in Th. Fries Lich. Scand. p. 182—184 it undoubtedly belongs to his γ . *obscura* Th. Fr. = *Caloplaca fuscoatra* (Nyl.) Zahlbr. But it is so distinct on account of its parasitic habits of life that it should be regarded a proper species. Its congested apothecia form small colonies on the thallus of larger lichens. Its spores are broadly elliptical, its paraphyses are easily discrete in a "Quetsch-Präparat", and much branched (furcated). A really thin section shows that they are but imperceptibly incrassated at their apices, but there is often a cover of the small ferrugineous grains which eventually makes them look incrassated.

It cannot be quite rare, for it was found in 1930 by Scholander as well as in 1929 by myself in 5 different places. But it was always scarce. The Greenland material is quite monotypical. I have seen the same species in the Upsala herbarium.

220. (6) *Caloplaca cinnamomea* (Th. Fr.) Oliv.

Landingsdalen. — Kapp Humboldt. Blomsterbukta. Kierulffjorden. — Gåsøya. Husbukta. Veganeset. — Dicksonfjorden. Kapp Petersens.

All these plants are muscicolous, with the exception of one plant from Husbukta, which was found on a dead twig, lying on the ground,

and another from Kapp Petersens, found on drift-wood. In the region it is widely distributed, and fairly common, but not plentiful. It is found together with the more common *Caloplaca subolivacea*, *C. stillicidiorum*, *Rinodina turfacea*, a. o.

The hymenium is about 65μ high. The paraphyses are hardly incrassated upwards, but there is a mucilaginous cover at their upper end, densely interspersed with the well known small grains. One therefore easily gets the (false) impression that they are considerably incrassated there. — I was not a little astonished to find broad spores, $7.5-8 \mu$, or even up to $9-10 \mu$ broad, the broadest spores were almost subglobose. After this the whole material was examined, with the result that the broad spores were absolutely constant: $14-17 \times 7.5-8(-10) \mu$.

I then examined Th. Fries's material in Upsala and found the spores more variable. In two of the plants they were broad, as in my material, in one plant rather mixed (in one apothecium $14-15.5 \times 6-7.5$, in another $12-17 \times 6.5-7.5 \mu$). In a Spitsbergen plant from Treurenberg Bay I found oblong spores about 6μ thick. The spores often remain unripe, they are then oblong and rather narrow, $5-6 \mu$ thick, but even apparently ripe spores may be oblong, e. g. $17 \times 6.5 \mu$.

"*Caloplaca ferruginea* γ . *cinnamomea* Th. Fr." was described in his Lich. Arct., 1860, p. 123, without spore measures. In Lich. Spitsb., 1867, p. 26, and in Lich. Scand., 1871, p. 183 Th. Fries attributed narrow, oblong spores to it. This observation can hardly be correct, in muscicolous plants at least the broad spores are much more common.

Caloplaca cinnamomea is easily distinguished from *C. amniospila* and *C. fraudans* by the colour of its small apothecia: "rufo-cinnamomea, tandemque olivaceo-fuscescentia" (Th. Fr. Lich. Scand., l. c.), against the "subaurantiaca vel fulvorufa" of the latter species. The size of the apothecia is usually $0.3-0.5$ mm, they rarely attain 0.7 mm. They are often crowded, plane, with a rather thick margin, full-grown apothecia are slightly convex, the margin is then less distinct, habitually so far resembling *Caloplaca subolivacea*.

221. (7) *Caloplaca fraudans* (Th. Fr.) Oliv.

Loch Fyne, 350 m. Myggbukta. — Moskusoksefjorden. Kapp Humboldt. Dusénfjorden. — Sofiasundet: Celsiusberget and Sanddalen. Near Robertsonøya. — Holmvika.

Evidently not rare. I have examined the spores of all my plants and found them narrow, about 5μ thick, agreeing with all the plants in herb. Th. Fries. It grows on hard rocks, often together with the parasitic *Caloplaca invadens*. It is occasionally found together with the here ubiquitous *Placynthium asperellum*, but one gets the impression that it is oftener overgrown by the latter than it is parasitic on it.

Usually quite athalline. If there is a thallus it is pale yellow, but it is often difficult to say whether these minute granules are not initiating apothecia.

Habitually *Caloplaca fraudans* resembles *C. pyracea* not a little. I have seen no type plant of *C. vitellinula*, and the herb. material is heterogeneous. *Lecanora vitellinula* Nyl. (saxicola) in Herb. Lich. Fenn. No. 271 has narrow spores and small apothecia: Apothecia 0.5 mm, sporae $10.8-13 \times 7-8 \mu$, very polaridyblastous with a broad septum. In Ad-denda Nova Hue mentions narrow spores, $11 \times 4.5-6.5 \mu$, and the apothecia are described as vitelline, in *C. fraudans* they are aurantiaca. In Lapp. Orient. Nylander wrote on *Lecanora vitellinula* that it was found "ad Alnos in regione Kolaënsi", but I have also seen saxicolous plants from Karelia Onegensis (det. Vainio, leg. Nylander s. n. *Lecanora pyracea* saxicola). This plant has small apothecia, as in *Caloplaca pyracea*, hardly exceeding 0.5 mm. In the present Greenland plants the apothecia are larger, up to 1.0 mm. Their margin is not always so thick as in Th. Fries's plants of *C. fraudans*; and not so nitidous.

I have examined the material in Upsala of *Caloplaca fraudans*, and found: Altenfjord, leg. Wahlenberg 6. 5. 1802, s. n. *Lichen erythrellus*, spores $12-13 \times 5-5.5 \mu$.

Typus, Hammerfest: Rossmollen, leg. Th. Fries 14. 7. 1864, spores narrow, about 5μ .

Magerø in cacumine montium circa Gjesvær, 23. 7. 1864, leg. Th. Fries, spores narrow, about 5μ .

Maasø, 18. 7. 1864, leg. Th. Fries, spores narrow, about 5μ .

In Upsala there is also a considerable material of Spitsbergen plants, in all from 5 localities. In all of them I found narrow spores, $(12-14) \times 4.5-6 \mu$. All of these plants were found on drift-wood. They much resemble *Caloplaca aurantiaca*, on account of their large apothecia with an orange-coloured disc.

It is more difficult to get an impression of the habitus of *Caloplaca amniospila*. Its disc is more reddish, and there is a distinct, darker thalline margin. The paraphyses are rather discrete, the spores broad in all the 3 plants: $15-17 \times 7-10 \mu$. The 3 plants are all lignicolous, collected by Wahlenberg and by Th. Fries in Finmark, the northernmost Norwegian province.

222. (8) *Caloplaca invadens* Lynge.

Lich. Nov. Zemlya, 1928, p. 228.

Landingsdalen. — Kapp Bennett. Moskusoksefjorden, 375 m. Kapp Humboldt. Dusénfjorden. — Veganeset. — Dicksonfjorden.

Most probably this species is fairly common and widely distributed. As was the case with my Novaya Zemlya plants it is found on the thallus

of other lichens, preferably *Placynthium asperellum*, which is an excellent substratum for epithalline lichens.

Habitually it much resembles *Caloplaca fraudans*. It has the same thick, rather nitidous margin, often large apothecia, about 1.0 mm in diam., if ripe. Th. Fries justly remarks of his *C. fraudans*: "ad *C. aurantiacam* habitu et colore adeo accedit ut pro hujus forma facile habenda est nisi sporis ceterisque partibus cum priori omnino congruit" (Lich. Spitsb. 1867, p. 27, priori is *Cal. cinnamomea*). I have also found narrow spores in the whole material of *Caloplaca fraudans* in herb. Upsala, and this difference seems sufficient to distinguish it from *Caloplaca invadens* with its very broad spores: 7.5—9(—10) μ broad, in my Novaya Zemlya material I measured 13—16 \times 8—10 μ .

In my Novaya Zemlya plants I measured a rather high hymenium, 90—95 μ . This is, perhaps, too much, for in the Greenland material I found 65—70 μ . If the hypothecium is entirely uncoloured, as it is here, it is not always distinguished with certainty from the hymenium, which latter is then often measured too high.

In some plants I only found narrow paraphyses, not incrassated, and constrictedly septated at their upper end, but I have also seen paraphyses which were more clavated. The observation is not always easy, on account of the grains in the epithecium, they cover the tips of the paraphyses, and they are difficult to remove. The best clearing is, perhaps, $C_2H_5OH + HCl$.

223. (9) *Caloplaca (Pyrenodesmia) groenlandica* Lynge n. sp.

Ymerøya: Celsiusberget, on calcareous rocks.

Thallus (in specimine singulo) circiter 2 cm latus, crassitudine mediocri, uniformis, irregulariter rimosus, peltato-areolatus vel subplicatus, ambitu depresso verrucosus, fuscescens et leviter in rubescentem vergens. Hypothallus non visus.

Thallus bene fertilis, apothecia tamen non numerosa, subdispersa, parva, diam. vulgo 0.5 mm, rarius 0.7 mm, ab initio thallo immersa, deinde magis elevata, sed adnata. Discus pure ater, etiam madefactus, epruinosis, planus vel depresso convexus, margine proprio integro, crasso, epruinoso, persistenti, circumdatus, et in juventute etiam annulo thallino. Hymenium circiter 75 μ , superne olivaceo-nigricans. Paraphyses haud concretæ, in KOH facile discretæ, tenues vel tenuissimæ, 1—1.5 μ , sursum haud incrassatæ, hinc inde ramosæ, etiam ramoso-connexas vidi-mus. Sporæ (sparsæ) 18—19 \times 10 μ , loculi isthmo angusto separati.

Hymenium J intense caeruleo-nigricans, etiam cum hypothecio, epithecium KOH rosaceum.

Its black disc refers it to the subgenus *Pyrenodesmia* which is better represented in southern regions than it is so far to the north. *Caloplaca chalybaea* has a thicker, laevigate, more regularly rimoso-areolated

thallus of a plumbeous colour, and quite immersed apothecia, thicker paraphyses (2—2.5 μ), which are , however, but slightly incrassated at their tips (plant from Visby in Gotland, Sweden, leg. Malme). In *Caloplaca variabilis* the paraphyses are still stouter and, if well developed, constrictedly septated in their upper part, the apothecia are larger, about 1 mm, more elevated, with a thick, pale margin. In either of these species the spores are smaller, 11—15, resp. 11—13 μ long. *Caloplaca ursina* Lynge Lich. Bear Isl., 1926, p. 64, has a grey thallus, larger apothecia, clavated and constrictedly septated paraphyses, and hardly any reaction in the epithecium by KOH. *Caloplaca melanocarpa* is out of the question, on account of the negative reaction of its epithecium by KOH.

In *Caloplaca groenlandica* the colour of the thallus is a little more reddish than in Séguy Code universel des couleurs, No. 703. It might be due to iron, but the test with rhodanammonium was negative.

224. (10) *Caloplaca melanocarpa* (Th. Fr.) Steiner.

Landingsdalen, saxicola. — Kapp Humboldt and Blomsterbukta, muscicola. Kapp Bennett, lignicola.

Rather rare, and always very scarce.

Thallus evanescens vel tenuissimus, albidus, minute granulato-membranaceus. Apothecia numerosa, parva, diam. 0.5—0.7 mm, olivaceo-nigricantia, diu plana et marginata. Excipulum apotheciorum juvenilium gonidiis subnumerosis instructum, gonidia tamen sensim emorientia. Hypothecium incoloratum, hymenium altitudine varianti, 65—90 μ . Paraphyses omnino vel saltem in parte inferiori facile discretæ, sursum valde clavatæ, ad 5—7 μ crassæ, constrictæ septatæ, non adspersæ, olivaceo-fuligineæ vel roseo-violascenti-fuligineæ, interdum furcatæ. Sporæ late ellipsoideæ, 12—15 \times 7.5—8(—9) μ .

Hymenium KOH magis violascens (si roseo-fuligineum), aut subincoloratum (si olivaceo-fuligineum).

I am indebted to the Botanical Museum in Upsala for the loan of two plants from Spitsbergen, det. Th. Fries (Treurenberg Bay and Lovén's berg). They agree perfectly with one another, the best developed plant from Treurenberg Bay is regarded as the type plant.

I have found that my own muscicolous and lignicolous plants agree well with this type plant. Leading characters are the almost lacking, whitish thallus, small plane apothecia, easily discrete, very clavated, thick, not adspersed paraphyses, dark olive-black or somewhat rosy-violet in their upper part.

This species is distinctly a *Caloplaca*, and not a *Blastenia*. In young apothecia green gonidia are conspicuous enough in the excipulum, but they often die, and in old apothecia they are but little visible, if visible at all. They are also often covered by inclusions of air, even in good

sections. But if the section is cleared by clorale hydrate, washed, and stained by chlorzinkiodide, the gonidia, or more correctly their cell-walls, are conspicuous enough.

Caloplaca melanocarpa is distinct from the species of the *Caloplaca ferruginea* section on account of its very clavated paraphyses.

225. (11) *Caloplaca epiphyta* Lynge n. sp.

Jacksonøya, on decaying vegetables.

Thallus effusus, ambitu non lobatus vel radiatus, substrato arcte adpressus, subintense aurantiacus (non vitellinus vel citrinus!), minute verrucoso-granulatus vel fere papillatus, verrucae circiter 0.1—0.2 mm latae, facile in soredia fatiscentes. Apothecia desunt. — Thallus KOH intense violaceo-roseus.

A most perplexing plant. It spreads extensively over the substratum, one plant is 6—7 cm large. Its soredia call to mind *Caloplaca cirrhochroa*, its colour also resembles that species, which is, however, typically a *Gasparrinia*. In the present plant there is no trace of radiating lobes at the circumference. I have also compared it with *Caloplaca citrina*, which differs considerably in the colour of its thallus. My species is possibly a *Fulgensia*, that cannot be decided, for it was entirely sterile. *Fulgensia bracteata* has quite another colour, citrine. *Caloplaca epiphyta* differs from all the said species in its minutely granular thallus, the granules are much smaller than in any of the other 3 species.

226. (12) *Caloplaca elegans* (Link) Th. Fr.

Landingsdalen. Kapp Herschel, up to 560 m above sea-level. Claveringfjorden: Revet up to 1200 m above sea-level. Lille Finschøya. — Kapp Stosch. Loch Fyne, 350 m. Jacksonøya. Myggbukta. Terneøya. Kapp Bennett. — Moskusoksefjorden, up to 1350 m above sea-level. Reinbukta. Kapp Humboldt. Dusénfjorden. Blomsterbukta. Kierulfjorden. — Celsiusberget. Sanddalen. Sofiasundet west of Robertsonøya. — Gåsøya. Husbukta. Veganeset. — Holmvika. Antartichamna. Kapp Petersens. Ellaøya, on bones.

Caloplaca elegans is widely distributed, found in practically every corner of this region. But it is restricted to the bird-stones, and found there together with other coprophilous lichens, such as *Rinodina Hueana*, *Parmelia infumata*, *Physciae*, and *Xanthoria candelaria*.

It is well known that there are no great bird-cliffs north of the Liverpool coast, stocked with sea birds, alks, sea gulls, and the like. The commonest birds in our regions are ravens, snow owls, and the like, and the coprophilous lichens are, therefore, quite as common at the head of the fjords, and in great altitudes, as they are along the coast itself.

Caloplaca elegans shows the usual variation: colour more or less intense, thallus developed as fine placodioid rosettes, or dissolved into more or less discrete lobes (the latter type sometimes seen on dolomites), lobes broad and contiguous, or narrow, discrete and distinct, f. *tenuis*. The f. *tenuis* is rather rare in our region. I can only see individual modifications, perhaps induced by varying external factors, such as insolation, food, even or uneven substratum, and the like, in these things. The modifications are hardly worthy of a name.

227. (13) *Caloplaca sorediata* (Vain.) DR.

Landingsdalen. — Myggbukta. — Moskusoksefjorden. Kapp Humboldt. Blomsterbukta. — Sofiasundet: Sanddalen. — Kapp Petersens. Röhssfjorden. Ellaøya.

Caloplaca sorediata is not common, we found but a few plants.

The extremely nitrophilous *Caloplaca granulosa* (Müll. Arg.) was not found in North East Greenland. It prefers the bird-cliffs along the coast.

Buelliaceae.

Buellia (De Notrs.) Th. Fr.

Clavis specierum.

1. Sporae tetrablastae vel nonnihil murales.
 2. In rupe calcarea. 10. *B. margaritacea* (Somrft.) Lynge, p. 123.
 - 2*. Supra muscos destructos. 4. *B. geophila* (Somrft.) Lynge, p. 121.
- 1*. Sporae dyblastae.
 2. Apothecia sessilia, vel si immersa, non aspicilioidea.
 3. Supra muscos emortuos. 3. *B. disciformis* var. *muscorum* (Hepp) Vain., p. 121.
 - 3*. Species saxicolae.
 4. Hypothecium incoloratum, thallus albido-cinereascens.
 5. Medulla J caerulescens, thallus tenuissimus vel evanescens.
 6. *B. vilis* Th. Fr., p. 122.
 - 5*. Medulla J non caerulescens, thallus crassus, areolato-verrucosus.
 5. *B. notabilis* Lynge, p. 121.
 - 4*. Hypothecium obscurum.
 5. Thallus nigricans vel cinereo-nigricans, medulla J —, sporae saepe simplices.
 9. *B. atrata* (Sm.) Anzi, p. 123.
 - 5*. Thallus fuscus, medulla J —, pycnides frequentes (in aliis spec. rariores) pycnoconidia elongata, arcuata. 8. *B. coniops* (Wbg.) Th. Fr., p. 123.
 - 5**. Thallus albidus vel albido-cinereascens (vel evanescens), sporae parvae, 9—16 μ longae.
 6. Medulla J caerulescens, apothecia ad 1 mm lata.
 7. *B. leptocline* (Flot.) Kbr., p. 122.
 - 6*. Medulla J —, apothecia 0.3—0.4 mm lata.
 7. Saxicola.
 2. *B. stigmatea* Kbr., p. 121.
 - 7*. Lignicola.
 1. *B. punctiformis* (Hoffm.) Mass., p. 121.
 - 2*. Apothecia aspicilioidea, immersa, hypothecium incoloratum.
 3. Thallus J+, KOH —.
 12. *B. Malmei* Lynge, p. 123.
 - 3* Thallus J —, KOH—.
 12. *B. microplaca* (Vain.) Erichs., p. 123.

228. (1) *Buellia punctiformis* (Hoffm.) Mass.

Kapp Bennett, etiam supra muscos. Kierulffjorden, etiam supra excrementa leporina. — Husbukta.

It is not supposed to be common.

229. (2) *Buellia stigmatea* Kbr.

Kapp Humboldt. Blomsterbukta. — Holmvika, on a slaty sandstone, half overgrown by a white, sterile thallus.

Supposed to be rare, it should, however, be remembered that it is a very inconspicuous plant. Its specific distinction from the preceding is, perhaps, not well established.

230. (3) *Buellia disciformis* (Fr.) Mudd.

var. *muscorum* (Hepp) Vain.

Landingsdalen. — Myggbukta. Kapp Bennett. — Moskusoksefjorden. Kapp Humboldt. Blomsterbukta. Kierulffjorden. — Celsiusberbet. — Gåsøya. Husbukta. Veganeset. — Kapp Petersens. Ellaøya.

A plant from Blomsterbukta could be referred to its var. *papillata* (Somrft.).

The number of localities, as well as the number of plants (35) show that it is widely distributed and common in the region.

231 (4) *Buellia geophila* (Somrft.) Lyng.

Syn. *B. disciformis* var. *triphragmia* (Nyl.).

Landingsdalen. — Kapp Bennett. — Kapp Humboldt, several plants. Dusénfjorden. Blomsterbukta. — Celsiusberget, many plants. — Dicksonfjorden.

The microscopical examination gave me about 15 plants of the present species, against 35 of the previous one. This is a much higher percentage than we are wont to find in arctic collections, it suggests *B. geophila* to be fairly common and widely distributed in the region.

232. (5) *Buellia notabilis* Lyng. n. sp.

Kapp Humboldt, in rupe calcarea.

Thallus 1—2 cm latus, irregulariter limitatus, non orbicularis, crassus, 0.5—1.0 mm, rimis profundis verrucoso-areolatus, areolae 0.7—1.0 (—1.2) mm latae, ab initio rotundatae, deinde angulatae, saepe bullatae, rimis secundariis percursae et eam ob causam rugosae, albidae vel cinereo-albidae (vide infra). Hypothallus angustus, ater, in rimis et secundum marginem thalli evolutus est.

Apothecia numerosa vel numerosissima, saepe contigua et mutua pressione angulata, majuscula, diam. 0.7—1.0 mm, thallo immersa, sed nondum aspicilioidea. Discus pure ater, epruinus, rimosus et scabro-

sus, planus, thallum subaequans vel deinde depresso convexus et supra thallum leviter elevatus. Margo disco concolor, tenuis, inconspicuus, plus minusve crenulatus, deinde saepe evanescens. Excipulum in parte exteriori fuscum vel fusco-violaceum, praeterea incoloratum, gonidiis omnino destitutum. Hypothecium omnino incoloratum. Hymenium 85—90 μ altum, strato amorpho incolorato tectum, superne parte colorata excipuli concolor, praeterea incoloratum. Paraphyses subcohaerentes, sursum leviter fusco-clavatae, 2.5—3 μ crassae. Sporae octonae, 14—16(—18) \times 7—8 μ , medio leviter constrictae, episporium crassum, inaequaliter incrassatum, lumen subangulare.

Hyphae corticis superficiei perpendiculares, sursum fusco-clavatae, thallus tamen strato amorpho crasso, 25 μ , incolorato tectus et eam ob causam albidus. Gonidia viridia, strato valde irregulari inclusa, nunc fere ad superficiem progredientia, nunc profunde in thallo immersa.

Medulla J non caerulescens, KOH —, hymenium J caeruleo-nigrescens.

The immersed apothecia much resemble those of *Lecidea tessellata*, there is no suggestion of an aspicilioid habitus, and the *Melanaspicilliae* must be excluded, in spite of the quite uncoloured hypothecium. The white colour of the thallus is due to the amorphous cover, for the cortical hyphae have brown tips along the surface of the thallus.

Several apothecia were sectioned. In all of them I saw long stripes of spores far down into the excipulum, below the hymenium. I have seen that in other lichens, but nothing suggested a parasitic fungus.

Buellia notabilis differs from the species of the *Parasema* section (Th. Fries Lich. Scand. p. 589) in its uncoloured hypothecium, from *B. stigmatæa* also in its large apothecia and thick thallus, and from *B. vilis* in the negative reaction of its thallus by J.

233. (6) *Buellia vilis* Th. Fr.

Kapp Bennett. — Holmvika.
Apparently rare.

234. (7) *Buellia leptocline* (Flot.) Kbr.

Jacksonøya. Myggbukta. — Holmvika.

Thallus tenuis, areolatus, areolae minutae, angulatae, 0.2—0.4 mm latae. Apothecia parva, diam. 0.3—0.5(—0.7) mm, atra, epruinosa, crasse et subpersistente marginata, vel deinde subconvexa et immarginata. Excipulum fusco-nigrum, hypothecium dilutius fuscum, hymenium circiter 55 μ altum, paraphyses fusco-capitatae, sursum (in KOH) 5 μ crassae. Sporae uterque apice obtusae et medio haud constrictae, late ellipsoideae, 13—15 \times 7.5—8 μ , membrana aequaliter incrassata.

Medulla J caerulescens, KOH —, paraphysum apices KOH dilute violascentes.

235. (8) *Buellia coniops* (Wbg.) Th. Fr.

Mackenzie Bay: Terneøya, scarce.

Only a fragmentary plant, half overgrown by other lichens. The apothecia are well developed, and agree perfectly, but unfortunately no pycnides could be detected. The thallus consists of small, brown papillae. Terneøya (Tarn Island) is a bird island. It is characteristic of the poor sea-bird life in this region that only one fragment, hardly to be identified with certainty, was found of this lichen, which is otherwise ubiquitous in all arctic bird-islands.

236. (9) *Buellia atrata* (Sm.) Anzi.

Kapp Humboldt.

It was found there in some abundance, but nowhere else.

237. (10) *Buellia margaritacea* (Somrft.) Lyng.

Blomsterbukta, on a calcareous rock, not quite scarce.

238. (11) *Buellia microplaca* (Vain.) Erichs.

Jacksonøya, scarce.

Paraphyses haud cohaerentes, superne clavatae vel capitatae, spora 12.5—16 × 9—10 μ , apice late rotundatae, medio leviter constrictae.

It agrees perfectly with the other plants in our herb. Previously recorded from Pitlekai near the Bering Strait, Novaya Zemlya, Spitsbergen (bird-cliff, leg. Lyng., unpublished), West Greenland: Disko, and from Baffin Island: Arctic Bay (leg. Polunin, unpublished). There is every reason to suppose that it should be circumpolar.

239. (12) *Buellia Malmei* Lyng.

Buellia Malmei Lyng. Lich. Bear Island, 1926, p. 65, Lich. Nov. Zemlya, 1928, p. 246, pl. IV, fig. 23—24, XIII, fig. 1.

Moskusoksefjorden.

It agrees to the point with my first diagnosis, with the exception of its small spores: 7.5—10 × 5—6 μ , against 11—15 × 6.5—8 μ in the Bear Island plant, and 9—13 × 5—6 μ in the Novaya Zemlya plant. There is no habitual difference. It is widely distributed in the Arctic, but perhaps not circumpolar: from Novaya Zemlya in the east (Lyng., l. c.), Bear Island (Lyng., l. c.), and from Disko Isl., West Greenland (leg. Th. Fries, unpublished).

Rinodina S. Gray.

Clavis specierum.

1. Thallus lobatus, ambitu laciniato-effiguratus (Sect. *Dimelaena*).

2. Terricola, thallus cervinus vel vulgo albo-pruinosis.

9. *R. nimbose* (Fr.) Th. Fr., p. 127.

2*. Saxicolae, thallus ochroleucus vel stramineus.

3. Thallus ochroleucus vel albidus.
 4. Lobi marginales crassi, convexi, 1—1.5 (—2) mm lati.
 7. *R. Hueana* Vain., p. 126.
 4*. Lobi (marginales) tenues, plani, angusti, 0.1—0.15 mm lati.
 8. *R. stellata* Lynge, p. 126.
 3*. Thallus fuscus. 9. *R. balanina* (Wbg.) Vain., p. 128.
 1*. Thallus uniformiter crustaceus (Sect. *Euriodina*).
 2. Terricolae.
 3. Apothecia minuta, 0.3—0.5 (—0.6) mm lata, disco margineque albo- vel caesio-
 pruinosis. 2. *R. roscida* (Somrft.) Lynge, p. 124.
 3*. Apothecia majora, 1—1.5 mm, epruinosa.
 4. Discus planus, hymenium vulgo circ. 100 μ altum.
 1. *R. turfacea* (Wbg.) Kbr., p. 124.
 4*. Discus convexus, hymenium circ. 120 μ altum.
 3. *R. mniaraea* (Ach.) Th. Fr., p. 125.
 2*. Saxicolae.
 3. In saxo calcareo, spora medio obscurius coloratae.
 6. *R. Bischoffii* (Hepp) Mass., p. 125.
 3*. In rupibus durioribus, spora medio non obscurius coloratae.
 4. Spora 17—20 \times 10—11 μ . 5. *R. milvina* (Wbg.) Th. Fr., p. 125.
 4*. Spora 12—15 \times 5—7 μ . 4. *R. cacuminum* (Th. Fr.) Malme, p. 125.

240. (1) *Rinodina turfacea* (Wbg.) Kbr.

Landingsdalen. — Myggbukta. Kierulffjorden. — Gåsøya. Vega-
 neset. — Antarctichamna, etiam lignicola. Kapp Petersens. Segelsäll-
 skapets fjord: Mt. Carmela, 1600 m above sea-level. Röhssfjorden.
 Dicksonfjorden.

A circumpolar species, supposed to be common or even plentiful
 nearly everywhere in the arctic. We have more plants from the southern,
 than from the northern part of our region, but that may be accidental.
 We found *Rinodina roscida* more common here than *R. turfacea*.

Its f. *acrustacea* Vain. was found on drift-wood at Kapp Bennett,
 Gåsøya, and Husbukta.

241. (2) *Rinodina roscida* (Somrft.) Lynge.

Lich. Nov. Zemlya, 1928, p. 253, ubi syn.

Landingsdalen. Kapp Herschel. — Myggbukta. Kapp Bennett. —
 Moskusoksefjorden. Reinbukta. Kapp Humboldt. Dusénfjorden. Blom-
 sterbukta. Kierulffjorden. — Gåsøya. Husbukta. — Dicksonfjorden.
 Ellaøya.

Very common, in places plentiful. It is quite as common in this
 part of East Greenland as in most other parts of the arctic. It is found
 on decaying plants of every kind.

I should suppose it to be circumpolar. But we have so far no
 plants from the Bering Strait region, it was not mentioned in Nylander's
 Enum. Lich. Fret. Behr., and not in Vainio's Lich. Pitlek. (lichens of
 the Vega expedition).

242. (3) *Rinodina mniaraea* (Ach.) Th. Fr.

Landingsdalen. — Myggbukta. — Kapp Humboldt. — Husbukta. Veganeset. — Kapp Petersens.

It is widely distributed, but not common, and always scarce.

243. (4) *Rinodina cacuminum* (Th. Fr.) Malme.

Landingsdalen. — Kapp Bennett, basaltic rocks. — Mariaøya, quartzitic rocks.

Paraphyses facile discretæ, fusco-capitatae. Sporae 12—15 μ , non constrictæ, episporium tenue, aequaliter incrassatum. Hymenium angustum, circiter 65 μ altum, J e caeruleo vinosum.

The thallus forms the characteristic small pulvinuli, but the colour is so pale that it is more grey than brown. No hypothallus is visible. The plants do not fully agree with Scandinavian plants, anyhow, the spores suggest this species, and not f. inst. *Rinodina confragosa*.

244. (5) *Rinodina*, pr. *milvinam* (Wbg.) Th. Fr.

Holmvika, on a quartzitic rock.

The plant is hardly to be determined with absolute certainty, for its thallus is entirely overgrown by a *Caloplaca elegans*. Between the lobes of the latter the apothecia are seen, elevated, rather large, up to 1 mm in diam., with a brownish-black, slightly convex disc, and a paler brown, almost entire margin. The hymenium is high, about 125 μ , the paraphyses have distinctly capitated, dark brown tips, about 5 μ . The spores are very broad and broadly rounded, not or imperceptibly constricted at the septum, 17—20 \times 10—11 μ , episporium equally thick, and thin all over. — No thallus is visible, it has been destroyed by the *Caloplaca*.

The spores agree fairly well with those of *R. milvina*, they are, perhaps, more thick-walled and less constricted at the septum than in Scandinavian plants, that were studied for comparison. The dark heads of the paraphyses are considerably thicker than was observed in Scandinavian plants.

There is but one plant, and I can hardly do anything more with it.

245. (6) *Rinodina Bischoffii* (Hepp) Mass.

Myggbukta, on a calcareous rock, with *Caloplaca elegans*, *Protoblastenia rupestris*, and a *Lecanora*.

Paraphyses facile discretæ, sursum tamen magis cohaerentes et ibi fusco-clavatae vel potius fusco-capitatae, 5 μ crassae. Sporae late ellipsoideae, medio non constrictæ, sed plus minusve distincte obscuratae, 17—20 \times 10—11 μ . Episporium tenue, aequaliter incrassatum.

In the first apothecium sectioned the equatorial dark zone of the spores was, perhaps, less distinct than in Scandinavian plants, in another apothecium it was very distinct, but it is necessary to have well developed spores, which are quite ripe.

246. (7) *Rinodina Hueana* Vain.

Lich. Cauc., 1899, p. 301, Elenkin Lich. Flor. Ross. (Schaeadae), No. 92, Lyngé Lich. West Greenl., 1937, p. 190. — *Rinodina Mougeotioides* Nyl. Flora, 1872, p. 364. — *Rinodina oreina* Th. Fr. Lich. Scand., 1871, p. 192, p. p.

Revet, 260 m. — Loch Fyne, 350 m. Kapp Stosch. — Moskusoksefjorden. Reinbukta. Kapp Humboldt. Kierulfjorden. — Sofiasundet: Celsiusberget and Sanddalen. — Holmvika. Kapp Petersens. Dicksonfjorden. Ellaøya. Mariaøya.

Rinodina Hueana is characteristic of the bird-stones, and it is common in such places, perhaps with the exception of the northernmost localities.

The marginal lobes are not so typically stellate as is often seen in Norwegian material. The colour varies from the typical ochroleucous to a yellowish-white, but it is never purely white. The spores are unusually broad, 6—8 μ , and so constricted at the septum that they are almost catenated.

Our present knowledge suggests *Rinodina Hueana* to be a western species in the arctic, distributed between Ellesmere Land — Baffin Bay and Ungava Peninsula in the west to Spitsbergen in the east. In Spitsbergen it is rare. — *Rinodina oreina* (Ach.) Vain. must be a much more southern species.

247. (8) *Rinodina stellata* Lyngé n. sp.

Pl. IX, fig. 3.

Blomsterbukta, in abundance on hard (non calcareous) rocks. — Kapp Petersens.

Thallus orbicularis, diam. usque ad 3 cm (vulgo minor), sed thallis confluentibus plagas latas interdum tegit. Lobi marginales 1—1.5 mm longi, optime radiantes, subdiscreti, hinc inde connivente furcati, angusti, 0.1—0.15 mm lati, lobi non marginales discreti, minuti, 0.3—0.5 (1.0) mm lati, valde irregulares, crenatae, digitatae vel stellate incisae. Lobi plani, tenues (0.25—0.35 mm), albissimi, saepe strato amorpho, emortuo tecti, subnitidi, subtus albid.

Apothecia et pycnides desunt.

Thallus J —, KOH —, CaCl₂O₂ —, Pd. —.

No fructification being present, it is difficult to say with certainty whether it really is a *Rinodina*, or perhaps an *Aspicilia* with radiating lobes. But its habitus is so obviously that of a *Dimelaena* that the plants were at first referred to *Rinodina Hueana*. It seems distinct from that species in its purely white colour, its extremely regularly stellate lobes,

occupying but 1—1.5 mm of the marginal zone, and apart from this zone its most irregular and quite discrete minute areoles, if we can call them areoles, and also in its negative reaction with *J. Rinodina Hueana* stains intensely blue by J, as does also *R. oreina*.

Under a strong lens the extreme apices of the lobes are darker, grey or even dark grey.

At the locality Blomsterbukta it was found in considerable abundance on a flat, slaty rock which was very rich in lichens. *Rinodina Hueana* was plentiful on the same slates, but no intermediate plants were found. The latter species always has a yellowish, ochroleucous colour, and a much thicker thallus.

248. (9) *Rinodina nimbosa* (Fr.) Th. Fr.

Syn. *Rinodina Panschiana* Kbr.

var. *nuda* Lyngé: Thallus epruinosis.

var. *pruinosa* (Havås) Lyngé: Thallus plus minusve caesio-pruinosis, etiam cum disco (*Dimelaena nimbosa* f. *pruinosa* Havås Lich. Norv. Exsic. No. 359).

var. *athallina* Lyngé: Differt a typo thallo fere deficienti et disco magis convexo.

Landingsdalen. — Loch Fyne. Jacksonøya. Myggbukta. Kapp Bennett. — Moskusoksefjorden. Reinbukta. Kapp Humboldt. Dusénfjorden. Blomsterbukta. Kierulffjorden. — Celsiusberget. — Husbukta. Veganeset. — Röhssfjorden.

Rinodina nimbosa is a circumpolar species, but its frequency is very unequal. The Vega expedition found it in Konyam Bay (Nyl. Enum. Freti Behr., 1888, p. 211). It is far from common in Novaya Zemlya (Lyngé Lich. Nov. Zeml., 1928, p. 249). There are some localities from Spitsbergen, especially along the northern coast (Th. Fries Lich. Spitsb., 1867, p. 20, and my unpublished manuscript). There are several (unpublished) localities in my collection from North and East Iceland (1937 and 1939). Koerber recorded it from Sabine Isl. in North East Greenland (s. n. *Rinodina Panschiana*, Flechten d. Zweit. deutsch. Polarexp. p. 78). The Danish botanist Lundager collected it in Danmarks Havn (Galløe Lich. N.-E. Greenl., 1910, as *Rinodina mniaraea* var. *cinnamomea*), and P. Gelting and Thv. Sørensen collected it in Clavingersundet, at Revet and Eskimoneset (unpublished). It has been recorded from West Greenland at Ikertôq by Deichmann Branth (Grønlands Lichen-Flora, 1888, p. 477), and from Disko, where it was collected by Th. Fries (Lyngé Lich. West Greenl., 1937, p. 189). Bangsted collected it in Vansittart Isl. (Lyngé Lich. 5th Thule Exped., 1935, p. 39). — Darbishire's record of *Dimelaena nimbosa* from Ellesmere Land is false, as usual (Darb. Lich. 2nd Norw. Polar Exped., 1909, p. 41).

To judge from literary records and from my own arctic experience it is generally rare in the arctic. Great was therefore my surprise to

find it one of the commonest and most plentiful lichens all over the regions investigated by us in North East Greenland.

The pruinose variety is remarkable. It is, perhaps, a west-arctic type. All my Novaya Zemlya plants are epruinose, and Th. Fries writes (l. c.) that the Spitsbergen plants have a "discus nudus". In nature var. *pruinosa* is very conspicuous and distinct enough from the naked variety.

In var. *athallina* there is hardly any thallus visible, and the apothecia are so convex that at first sight I thought it a forma of *Rinodina mniaraea*. But its small spores exclude that possibility, they measure 16—20 μ in length. The margin of their apothecia has the colour of *Rinodina nimbosa*.

249. (10) *Rinodina balanina* (Wbg.) Vain.

Ellaøya, scarce, a rather fragmentary, sterile plant, found on a large bone.

It has a very wide arctic distribution: Bering Strait region, on the Asiatic side (Vain. Lich. Pitlek., 1909, p. 69), Novaya Zemlya (Lyngé Lich. N. Z., 1928, p. 250), Spitsbergen, several localities (Th. Fries, Lyngé, unpublished), and Iceland in south east and in south west (Lyngé, unpublished). It is new to Greenland, and it was an interesting extension of its known range.

Fungus.

The fungus *Pleospora Hookeri* (Schaer.) Keissl. is fairly common in this area, as it often is in the arctic. It was collected in the following places: Kapp Herschel. — Loch Fyne. Myggbukta. — Kapp Humboldt. — Ellaøya.

Summary.

In the following enumeration I have tried to collect all the lichens, which are at present known from East Greenland. It comprises all the lichens, collected by our expeditions, as well as those, which have been brought home by others. A considerable part of the latter has been determined by me. This has facilitated a revision of the material, nearly the whole of which is found in the Botanical Museum of Oslo, either as originals, or as duplicates, presented to us. Every author must reserve for himself the right to reconsider his previous determinations, and I have done so in several cases. This is in part due to a greater material, which shows us the range of variation of our species, in part due to more experience on the influence of the severe climate upon the plants, or simply to the beneficent influence, which time cannot fail to exercise on our opinions from bygone years.

The genera have been arranged in systematical order, the species alphabetically.

*Moriolaceae.**Moriola* Norm.

1. *pseudomyces* Norm.

*Verrucariaceae.**Verrucaria* (Wigg.) Th. Fr.

2. *aethiobola* Wbg.
3. *arctica* Lyng.
4. *cataleptoides* Nyl.
5. *deversa* Vain.
6. *margacea* Wbg.
7. *maura* Wbg.

Thelidium Mass.

8. *aeneovinosum* (Anzi) Arn.
9. *velutinum* (Bernh.) Kbr.

Polyblastia (Mass.) Lönnr.

10. *bryophila* (Nyl.) Lönnr.
11. *gothica* Th. Fr.
12. *nigrata* (Nyl.) Lönnr.
13. *Sommerfeltii* Lyng.
14. *terrestris* Th. Fr.
15. *theleodes* (Somrft.) Th. Fr.

Staurothele (Norm.) emend. Th. Fr.

16. *clopima* Th. Fr.
17. *fissa* (Tayl.) Zw.
18. *fuscocuprea* (Nyl.) Zschacke.
19. *perradiata* Lyng.

*Dermatocarpaceae.**Dermatocarpon* (Eschw.) Th. Fr.

20. *cinereum* (Pers.) Th. Fr.
21. *daedaleum* (Krempelh.) Th. Fr.
22. *inconspicuum* Lyng.
23. *Lyngei* Servit (as *D. sphaerosporum* Lyng).
24. *polyphyllum* (Wulf.) DT. et Sarnth. (often as *D. miniatum* var. *complicatum*).
25. *rivulorum* (Arn.) DT. et Sarnth.
26. *rufescens* (Ach.) Th. Fr. (in the arctic not always to be disting. from *D. hepaticum*).

Endocarpon Hedw.

27. *pulvinatum* Th. Fr.

*Caliciaceae.**Mycocalicium* Vain.

28. *subtile* (Ach.) Vain.

Coniocybe Ach.

29. *furfuracea* (L.) Ach.

*Sphaerophoraceae.**Sphaerophorus* Pers.

30. *fragilis* (L.) Pers.
31. *globosus* (Huds.) Vain.

*Lecanactidaceae.**Catinaria* Vain.

32. *athallina* (Hepp) Lyng.

*Chrysothricaceae.**Crocynia* Mass.

33. *arctica* Lyng.
34. *neglecta* (Nyl.) Hue.

*Diploschistaceae.**Diploschistes* Norm.

35. *scruposus* (L.) Norm.

*Gyalectaceae.**Ionaspis* Th. Fr.

36. *annularis* H. Magn.
37. *cyanocarpa* (Anzi) Th. Fr.
38. *epulotica* (Ach.) Th. Fr. var. *arctica* (Lyng.) Magn.
39. *suaveolens* (Schaer.) Th. Fr.

Gyalecta (Ach.) Zahlbr.

40. *foveolaris* (Ach.) Schaer.

*Coenogoniaceae.**Coenogonium* Ehrbg.

41. *nigrum* (Huds.) Zahlbr.

*Ephebaceae.**Ephebe* Fr.

42. *lanata* (L.) Vain.

Polychidium (Mass.) Zahlbr.

43. *musciicola* (Sw.) S. Gray.

*Pyrenopsidaceae.**Pyrenopsis* Nyl.

44. pulvinata (Schaer.) Th. Fr.

*Collemaceae.**Leciophysma* Th. Fr.

45. finmarkicum Th. Fr.

Collema (Wigg.) A. Zahlbr.

46. arcticum Lynge.
-
47. polycarpum (Schaer.) Krempelh.
-
48. pulposum Ach.

Arctomia Th. Fr.

49. delicatula Th. Fr.

Leptogium (S. Gray) Zahlbr.

50. „lacerum f. majus“ Kbr. (an syn.
-
- L. pulvinatum?).
-
51. pulvinatum (Hoffm.) Cromb.

*Pannariaceae.**Massalongia* Kbr.

52. carnosa (Dicks.) Kbr.

Placynthium S. Gray.

53. asperellum (Ach.) Trev.
-
54. pannariellum (Nyl.) H. Magn.

Parmeliella Müll. Arg.

55. lepidiota (Somrft.) Vain.

Pannaria Del.

56. elaeina (Wbg.) Nyl.
-
57. Hookeri (Borr.) Nyl.
-
58. pezizoides (Web.) Trev.

Psoroma Nyl.

59. hypnorum (Vahl) S. Gray.

*Peltigeraceae.**Solorina* Ach.

60. bispora Nyl.
-
61. crocea (L.) Ach.
-
62. octospora Arn.
-
63. saccata (L.) Ach.
-
64. spongiosa (Sm.) Anzi

Nephroma Ach.

65. arcticum (L.) Torss.
-
66. laevigatum (Huds.) Ach.
-
67. parile Ach.

Peltigera Willd.

68. aphthosa (L.) Willd., s. ang.
-
69. canina (L.) Willd.
-
70. erumpens (Tayl.) Vain. (incl. of
-
- P. leptoderma).
-
71. lepidophora (Nyl.) Bitter.
-
72. leucophlebia (Nyl.) Gyeln.
-
73. malacea (Ach.) Duby.
-
74. polydactyla (Neck.) Hoffm.
-
75. polydactyloides Nyl.
-
76. rufescens (Weiss) Humb. (incl.
-
- of P. Suomensis).
-
77. scabrosa Th. Fr.
-
78. venosa (L.) Baumg.

*Lecideaceae.**Lecidea* (Ach.) Th. Fr.

79. aenea Duf.
-
80. albuginosa (Nyl.) Vain.
-
81. alpestris Somrft.
-
82. arctica Somrft.
-
83. arctogena Th. Fr.
-
84. assimilata Nyl.
-
85. atrobrunnea (Ram.) Schaer.
-
86. atrofusca (Flot.) Mudd.
-
87. atromarginata Magn.
-
88. auriculata Th. Fr.
-
89. Berengeriana (Mass.) Th. Fr.
-
90. Celsii Lynge.
-
91. cinereoatra Ach.
-
92. conferenda Nyl.
-
93. confluens (Wigg.) Ach.
-
94. cuprea Somrft.
-
95. decipiens (Ehrh.) Ach.
-
96. demissa (Rutstr.) Ach.
-
97. Dicksonii Ach.
-
98. Dusénii Lynge.
-
99. elata Schaer.
-
100. elevata Lynge.
-
101. ementiens Nyl.
-
102. epiphaea Nyl.
-
103. erythrophaea Flk.
-
104. glomerulosa (DC.) Steud.
-
105. goniophila Flk.
-
106. granulosa (Ehrh.) Ach.

107. *hilaescens* Nyl. (not seen).
 108. *Hornii* Lynge.
 109. *Humboldtii* Lynge.
 110. *Kolaënsis* Nyl.
 111. *lapicida* Ach.
 112. *leucophaea* (Flk.) Nyl.
 113. *limosa* Ach.
 114. *Lulensis* (Hellb.) Stiz.
 115. *Magnussonii* Lynge.
 116. *melinodes* (Kbr.) Magn.
 117. *mollissima* Lynge.
 118. *Orvini* Lynge.
 119. *pallida* Th. Fr.
 120. *panaeola* Ach. var. *elegans* Th. Fr.
 121. *pantherina* (Ach.) Th. Fr.
 122. *paupercula* Th. Fr.
 123. *pelobotrya* (Wbg.) Leight.
 124. *picea* Lynge.
 125. *plana* Lahm.
 126. *ramulosa* Th. Fr.
 127. *rimosissima* Lynge.
 128. *rubiformis* Wbg.
 129. *rufofusca* (Anzi) Nyl.
 130. *Scholanderi* Lynge.
 131. *subcongrua* Nyl.
 132. *subsorediza* Lynge.
 133. *symmicta* Ach.
 134. *tenebrosa* Fw.
 135. *tenuissima* Lynge.
 136. *tesselata* Flk.
 137. *Tornoënsis* Nyl.
 138. *ultima* Th. Fr.
 139. *vernalis* (L.) Ach.
 140. *vorticosa* (Flk.) Kbr.
 141. *Wulfenii* (Hepp) Arn.
 142. *xanthococca* Somrft.

Catillaria (Mass.) Th. Fr.

143. *chalybeia* (Borr.) Mass.
 144. *lenticularis* (Ach.) Lettau var. *rosea* Lynge.
 145. *musciola* Lynge.

Bacidia (Sw.) Mudd.

146. *Anziana* Lynge (incl. of *B. alpina* (Schär.) Vain.).
 147. *muscorum* (Sw.) Mudd.

Toninia (Mass.) Th. Fr.

148. *candida* (Web.) Th. Fr.
 149. *cumulata* (Somrft.) Th. Fr.
 150. *fusispora* (Hepp) Th. Fr.

151. *lobulata* (Somrft.) Lynge.
 152. *squalida* (Schleich.) Mass.
 153. *tristis* Th. Fr.

Lopadium Kbr.

154. *coralloideum* (Nyl.) Lynge.

Rhizocarpon (Ram.) Th. Fr.

155. *badioatrum* (Flk.) Th. Fr.
 156. *chionophilum* Th. Fr.
 157. *Copelandii* (Kbr.) Th. Fr.
 158. *crystalligenum* Lynge.
 159. *disporum* (Naeg.) Müll. Arg.
 160. *distinctum* Th. Fr.
 161. *geographicum* (L.) DC.
 162. *grande* (Flk.) Arn.
 163. *groenlandicum* Lynge.
 164. *jemtlandicum* Malme.
 165. *obscuratum* (Ach.) Mass.
 166. *occidentale* Lynge.
 167. *Rittokense* (Hellb.) Th. Fr.

Cladoniaceae.

Baeomyces Pers.

168. *placophyllus* Ach.
 169. *roseus* Pers.
 170. *rufus* (Huds.) Rebert.

Cladonia (Hill.) Vain.

171. *acuminata* (Ach.) Arn.
 172. *alpicola* (Ach.) Schaer.
 173. *amaurocraea* (Flk.) Schaer.
 174. *bellidiflora* (Ach.) Schaer.
 175. *cariosa* (Ach.) Spreng.
 176. *carneola* Fr.
 177. *cenotea* (Ach.) Schaer.
 178. *cervicornis* (Ach.) Flot.
 179. *chlorophaea* Flk.
 180. *coccifera* (L.) Willd.
 181. *cornuta* (L.) Schaer.
 182. *crispata* (Ach.) Flot.
 183. *cyanipes* (Somrft.) Vain.
 184. *deformis* Hoffm.
 185. *degenerans* (Flk.) Spreng.
 186. *Delessertii* (Nyl.) Vain.
 187. *elongata* (Jacq.) Hoffm.
 188. *fimbriata* (L.) Fr. (f. *major* or f. *minor*).
 189. *gracilis* (L.) Willd. var. *chordalis* (Flk.) Schaer.
 190. *lepidota* Nyl.

191. macrophyllodes Nyl.
 192. mitis Sandst.
 193. pyxidata (L.) Fr. f. f.
 194. rangiferina (L.) Web.
 195. squamosa (Scop.) Hoffm., f. f.
 196. subcervicornis (Vain.) DR.
 197. turgida (Ehrh.) Hoffm.
 198. uncialis (L.) Web.

Stereocaulon Schreb.

199. alpinum Laur.
 200. arcticum Lynge.
 201. botryosum Ach. (syn. fastigiatum Anzi).
 202. paschale (L.) Fr.
 203. rivulorum H. Magn.

Umbilicariaceae.

Umbilicaria (Hoffm.) emend. Schol.

204. Lyngei Schol.
 205. rigida (DR.) Frey.

Omphalodiscus Schol.

206. decussatus (Vill.) Schol.
 207. polaris Schol.
 208. virginis (Schaer.) Schol.

Gyrophora Ach.

209. arctica Ach.
 210. cylindrica (L.) Ach.
 211. deusta (L.) Ach.
 212. hyperborea (Hoffm.) Ach.
 213. proboscidea (L.) Ach.
 214. torrefacta (Lightf.) Cromb. (syn. G. erosa (Web.) Ach.).
 215. vellea (L.) Ach.

Acarosporaceae.

Sporastatia Mass.

216. cinerea (Schaer.) Kbr.
 217. tenuirimata (Th. Fr.) Lynge.
 218. testudinea (Ach.) Mass.

Sarcogyne Flot.

219. pruinosa (Sm.) Kbr.
 220. simplex (Dav.) Nyl.

Acarospora Mass.

221. aspera H. Magn.
 222. atomariospora H. Magn.
 223. badiofusca (Nyl.) Th. Fr.

224. chlorophana Mass.
 225. Durietzii H. Magn.
 226. fusca B. de Lesd.
 227. glaucocarpa (Wbg.) Kbr.
 228. hospitans H. Magn.
 229. insignis (Th. Fr.) H. Magn.
 230. interposita H. Magn.
 231. lapponica (Ach.) Th. Fr.
 232. Lyngei H. Magn.
 233. macrospora (Hepp) Bagl.
 234. molybdina (Wbg.) Trev.
 235. montana H. Magn.
 236. nitida H. Magn.
 237. nitrophila H. Magn.
 238. oxytona (Ach.) Mass.
 239. peliocypha (Wbg.) Arn.
 240. persimilis H. Magn.
 241. rosulata (Th. Fr.) H. Magn.
 242. scabrida (Hedl.) H. Magn.
 243. Schleicheri (Ach.) Mass.
 244. scrobiculata H. Magn.
 245. smaragdula (Wbg.) Th. Fr.
 246. veronensis Mass.

Pertusariaceae.

Pertusaria DC.

247. bryontha (Ach.) Nyl.
 248. coriacea Th. Fr.
 249. dactylina (Ach.) Nyl.
 250. globulifera (Turn.) Mass.
 251. oculata (Dicks.) Th. Fr.

Lecanoraceae.

Lecanora Ach.

252. alboradiata Magn.
 253. alpina Somrft.
 254. annulata Lynge.
 255. Anseris Lynge.
 256. arctica Lynge.
 257. atosulphurea (Wbg.) Ach.
 258. badia (Hoffm.) Ach.
 259. Behringii Nyl.
 260. Bennettii Lynge.
 261. campestris (Schaer.) Hue.
 262. candida (Anzi) Nyl. var. nikrapensis (Darb.) Magn.
 263. castanea (Hepp) Th. Fr.
 264. Celsii Lynge.
 265. cinereorufescens (Ach.) Th. Fr.
 266. circularis Magn.
 267. cladonioides Lynge.
 268. coilocarpa (Ach.) Nyl.

269. *composita* Lyng.
 270. *congesta* Lyng.
 271. *conica* Lyng.
 272. *contigua* Lyng.
 273. *contractula* Nyl. *x. feracissima* Th. Fr.
 274. *crenulata* (Dicks.) Nyl.
 275. *culicis* Lyng.
 276. *dispersa* (Pers.) Flk.
 277. *disserpens* (Zahlbr.) Magn.
 278. *eburnea* Lyng.
 279. *epibrya* Ach.
 280. *expansa* Lyng.
 281. *flavida* Hepp.
 282. *frustulosa* (Dicks.) Kbr. var. *argopholis* (Wbg.) Kbr.
 283. *gelida* (L.) Ach.
 284. *Graahii* Lyng.
 285. *Humboldtii* Lyng.
 286. *indissimilis* Magn.
 287. *intricata* (Schrad.) Ach.
 288. *Lesleyana* Darb.
 289. *major* Lyng.
 290. *mastoidea* Lyng.
 291. *maxima* Lyng.
 292. *melanaspis* (Ach.) Th. Fr. *x. stellata* Th. Fr.
 293. *melanophthalma* Ram.
 294. *microfusca* Lyng.
 295. *mollissima* Lyng.
 296. *Nathorstii* Lyng.
 297. *occidentalis* Lyng.
 298. *pachythallina* Lyng.
 299. *parva* Lyng.
 300. *pergibbosa* Magn.
 301. *perradiata* Nyl.
 302. *pertusa* Lyng.
 303. *polytropa* (Ehrh.) Rabh.
 304. *punctiformis* Lyng.
 305. *rosulata* (Kbr.) Stiz.
 306. *semiglobosa* Lyng.
 307. *sorediza* Lyng.
 308. *straminea* (Wbg.) Ach.
 309. *sublapponica* Zahlbr.
 310. *subpeltata* Lyng.
 311. *subtorrida* Zahlbr.
 312. *surrecta* Lyng.
 313. *verrucosa* (Ach.) Laur.

Ochrolechia Mass.

314. *frigida* (Sw.) Lyng.
 315. *inaequatula* (Nyl.) Zahlbr.
 316. *upsaliensis* (L.) Mass.

Icmadophila Trevis.

317. *ericetorum* (L.) Zahlbr.

Haematomma Mass.

318. *ventosum* (L.) Mass. var. *lapponica* (Räs.) Lyng.

Candelariella Müll. Arg.

319. *epixantha* (Ach.) Sandst.
 320. *placodizans* (Nyl.) Magn.
 321. *vitellina* (Ehrh.) Müll. Arg.
 322. *xanthostigma* (Pers.) Lettau.

*Parmeliaceae.**Parmelia* Ach.

323. *alpicola* Th. Fr.
 324. *centrifuga* (L.) Ach. var. *groenlandica* Lyng.
 325. *disjuncta* Erichs. (syn. *P. granulosa* Lyng).
 326. *infumata* Nyl.
 327. *intestiniformis* (Vill.) Ach.
 328. *isidiotyla* Nyl. var. *glomellifera* Nyl.
 329. *omphalodes* (L.) Ach.
 330. *prolixa* (Ach.) Röhl.
 331. *saxatilis* (L.) Ach.
 332. *sorediata* (Ach.) Th. Fr.
 333. *stygia* (L.) Ach. var. *septentrionalis* Lyng.
 334. *subobscura* Vain.
 335. *sulcata* Tayl.

Cetraria Ach.

336. *crispa* (Ach.) Nyl.
 337. *cucullata* (Bell.) Ach.
 338. *Delisei* (Bory) Th. Fr.
 339. *Fahlunensis* (L.) Vain.
 340. *hepatizon* (Ach.) Vain.
 341. *islandica* (L.) Ach.
 342. *nivalis* (L.) Ach.
 343. *saepincola* (Ehrh.) Ach.

*Usneaceae.**Dactylina* (Nyl.) Tuck.

344. *ramulosa* (Hook.) Tuck.

Cornicularia Ach.

345. *aculeata* (Schreb.) Ach.
 346. *mirabilis* Lyng.
 347. *racemosa* Lyng.

Evernia Ach.

348. mesomorpha Nyl.

Alectoria Ach.

349. chalybeiformis (L.) Röhl.
 350. cincinnata (Fr.) Lyng.
 351. minuscula Nyl.
 352. nigricans (Ach.) Nyl.
 353. ochroleuca (Ehrh.) Nyl.
 354. pubescens (L.) Howe.

Neuropogon Nees et Flot.

355. sulphureus (König) Elenk.

*Caloplacaceae.**Protoblastenia* (Zahlbr.) Stein.

356. rupestris (Scop.) Stein. var.
 incrustans (DC.) et var.
 typica Th. Fr.
 357. terricola (Anzi) Lyng.

Blastenia Mass.

358. leucoraea (Ach.) Th. Fr.
 359. tetraspora (Nyl.) Rehm.

Caloplaca Th. Fr.

360. cinnamomea (Th. Fr.) Oliv.
 361. elegans (Link) Th. Fr.
 362. epiphyta Lyng.
 363. epithallina Lyng.
 364. fraudans (Th. Fr.) Oliv.
 365. groenlandica Lyng.
 366. invadens Lyng.
 367. Jungermanniae (Vahl) Th. Fr.
 368. melanocarpa (Th. Fr.) Steiner.
 369. pyracea (Ach.) Th. Fr.
 370. sorediata (Vain.) DR.
 371. stillicidiorum (Vahl) Lyng.
 372. subolivacea (Th. Fr.) Lyng.

Fulgensia Mass.

373. bracteata (Hoffm.) Räs.

*Teloschistaceae.**Xanthoria* (Fr.) Th. Fr.

374. candelaria (Ach.) Arn.

*Buelliaceae.**Buellia* (De Notrs.) Th. Fr.

375. atrata (Sm.) Anzi.
 376. coniops (Wbg.) Th. Fr.
 377. disciformis (Fr.) Mudd. var.
 muscorum (Hepp) Vain.
 378. geophila (Smrft.) Lyng.
 379. groenlandica Vain.
 380. leptocline (Flot.) Kbr.
 381. Malmei Lyng.
 382. margaritacea (Smrft.) Lyng.
 383. microplaca (Vain.) Erichs.
 384. notabilis Lyng.
 385. punctiformis (Hoffm.) Mass.
 386. stigmatea Kbr.
 387. vilis Th. Fr.

Rinodina S. Gray.

388. balanina (Wbg.) Vain.
 389. Bischoffii (Hepp) Mass.
 390. cacuminum (Th. Fr.) Malme.
 391. Hueana Vain.
 392. milvina (Wbg.) Th. Fr.
 393. mniaraea (Ach.) Th. Fr.
 394. nimbose (Fr.) Th. Fr.
 395. roscida (Smrft.) Lyng.
 396. stellata Lyng.
 397. turfacea (Wbg.) Kbr.

*Physciaceae.**Physcia* (Ach.) Vain.

398. caesia (Hoffm.) Nyl.
 399. constipata (Nyl.) Norrl. et Nyl.
 400. dubia (Hoffm.) Lyng.
 401. intermedia Vain.
 402. lithotodes Nyl.
 403. muscigena (Ach.) Nyl.
 404. sciastra (Ach.) DR.
 405. tenella Bitter.

*Lichenes Imperfecti.**Thamnolia* Ach.

406. vermicularis (Sw.) Ach.

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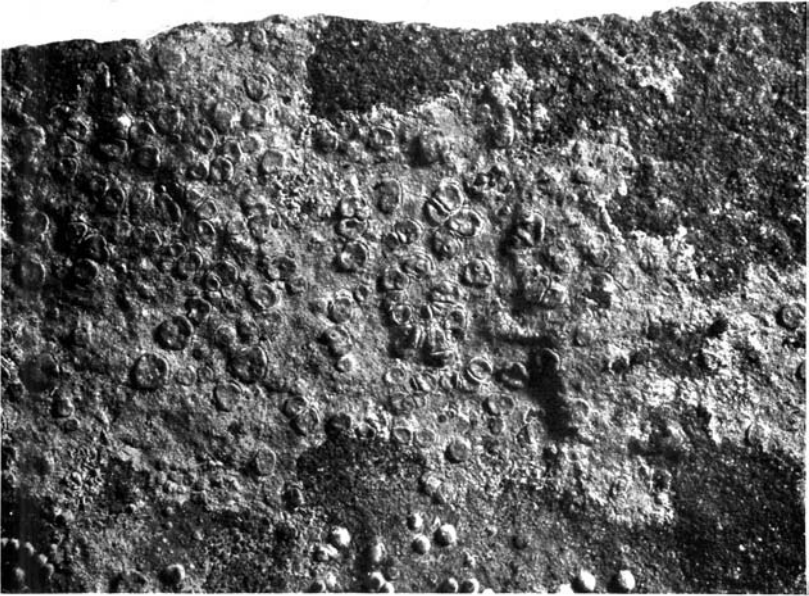
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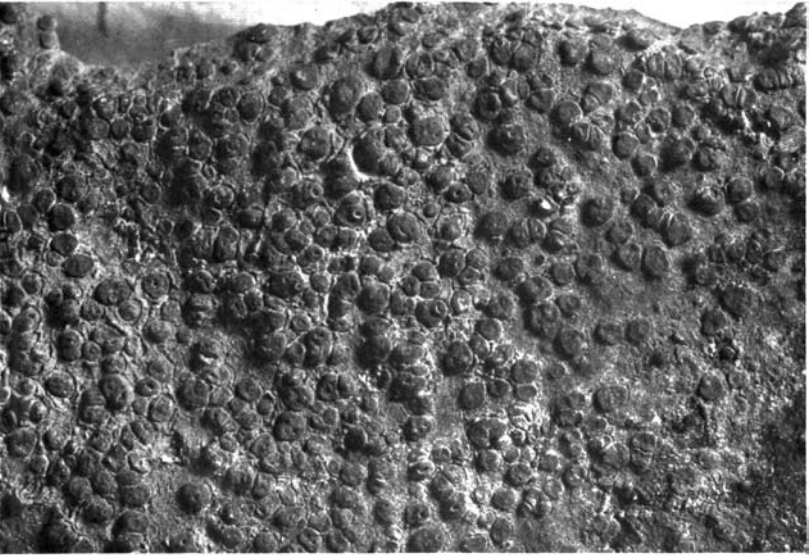
PLATES

ON THE PLATES THE SIZE OF THE PLANTS
IS SHOWN BY A MEASURING SCALE UNDER EACH FIGURE.
ON THIS SCALE THE INTERVAL BETWEEN THE
VERTICAL LINES REPRESENTS 1 MM
IN ALL CASES

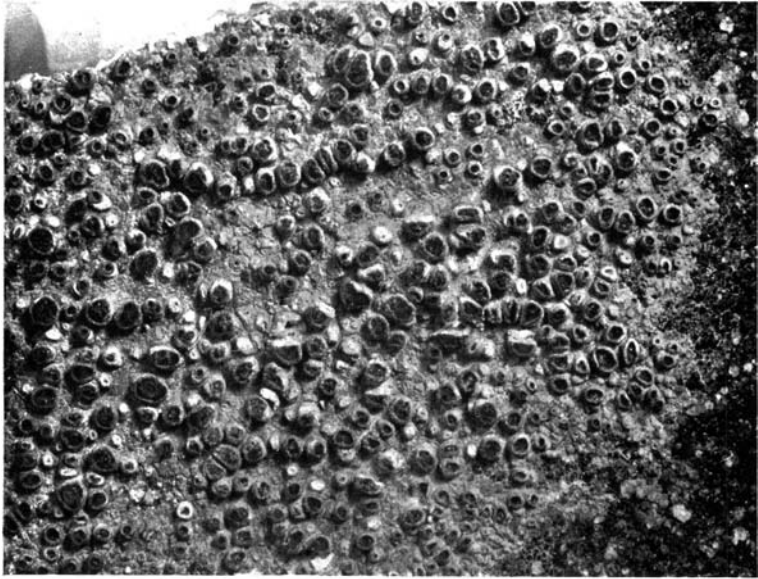
- Plate I. Fig. 1—2. *Lecanora punctiformis* Lyng. Dusénfjorden 17. 8. 1929 (leg. B. L.).
- Plate II. Fig. 1. *Lecanora Nathorstii* Lyng. Dusénfjorden 17. 8. 1929 (leg. B. L.).
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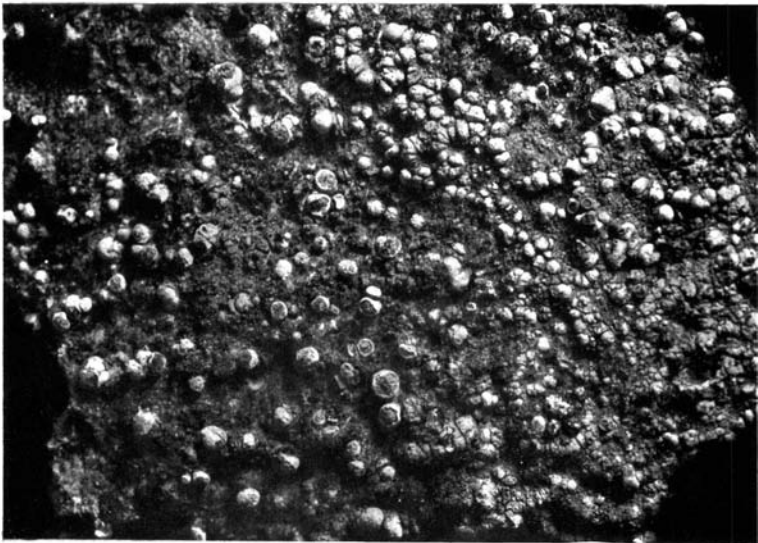
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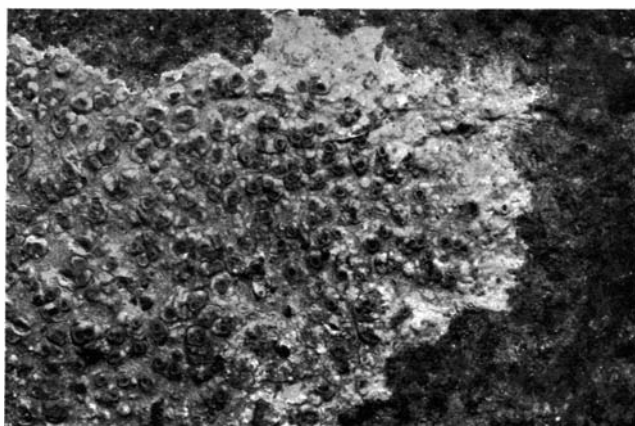
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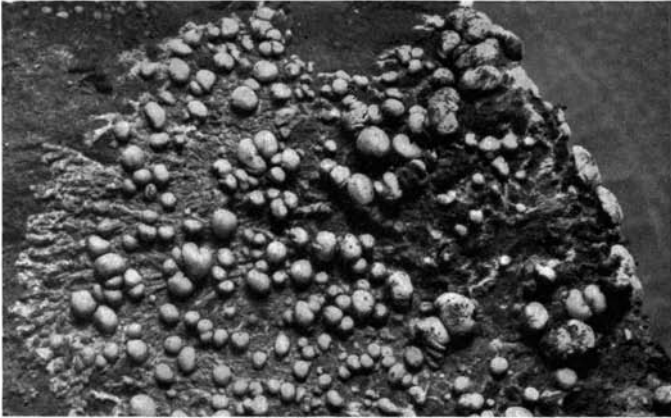
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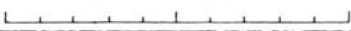


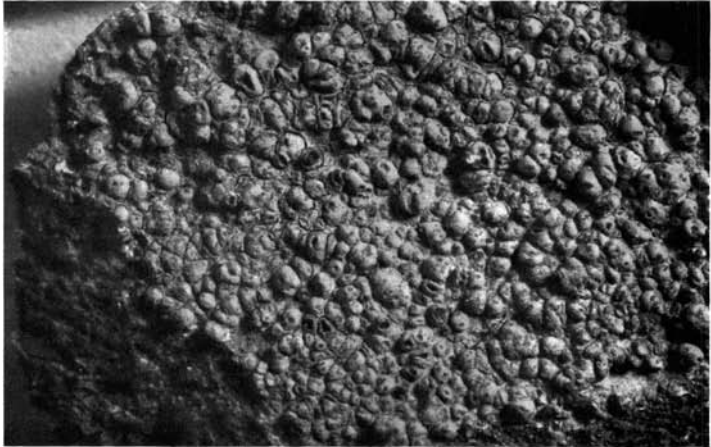
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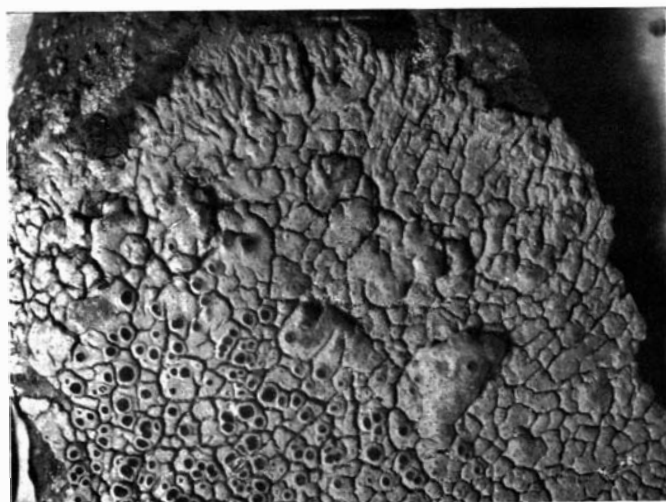
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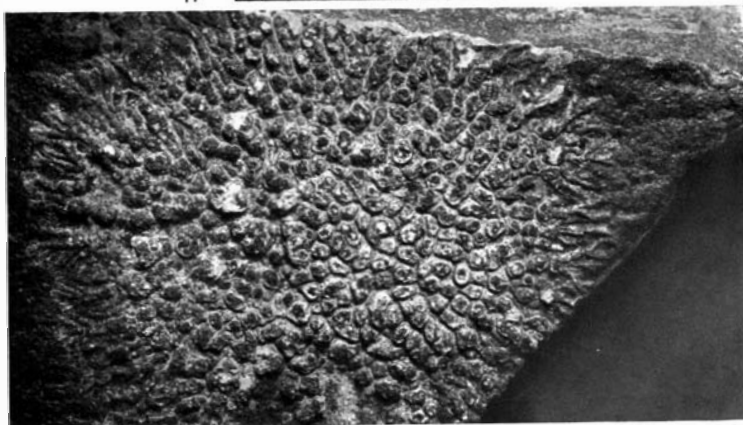
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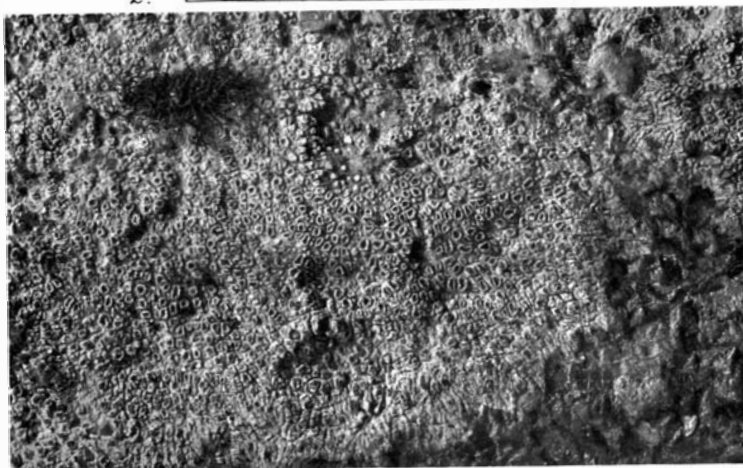
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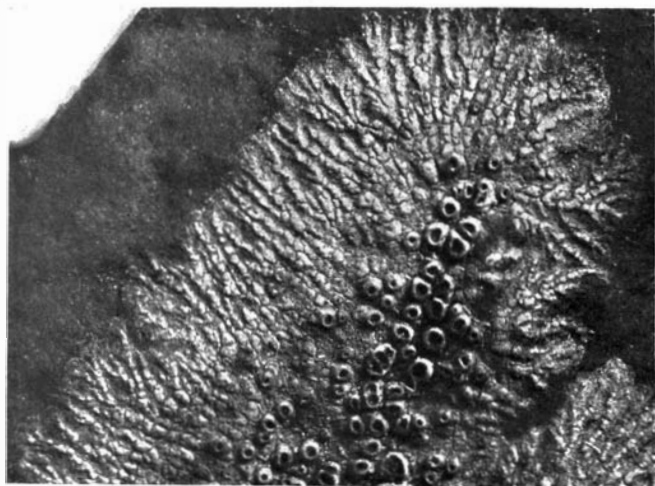
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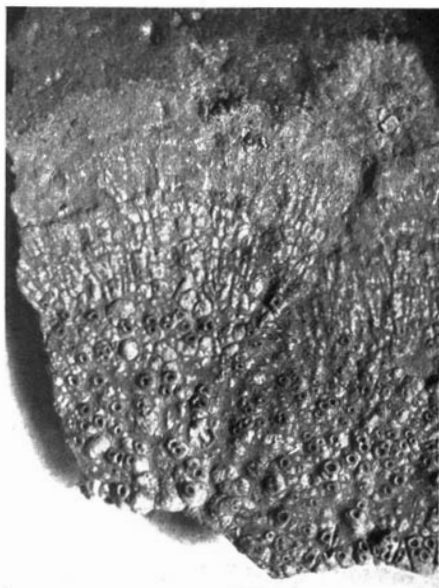
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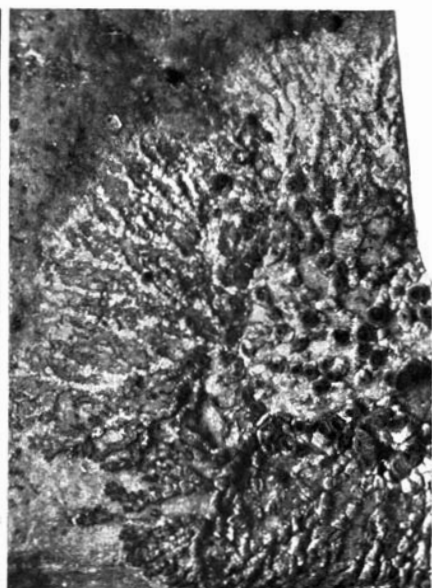
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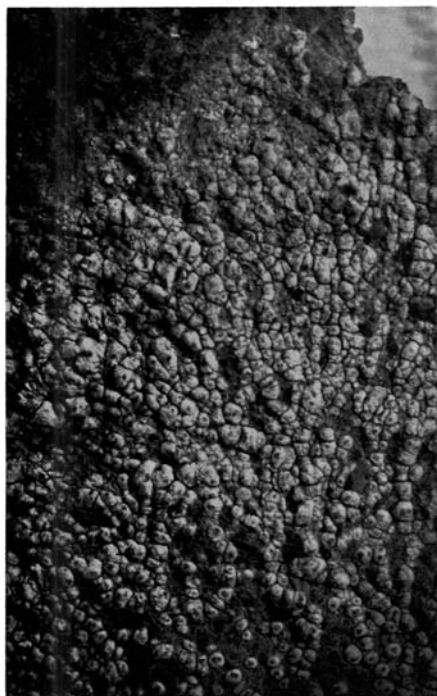
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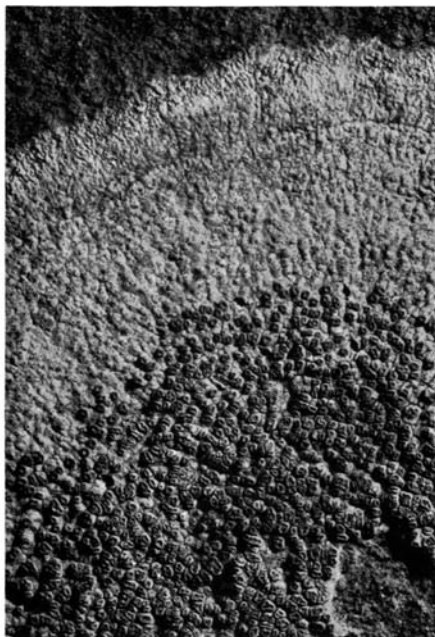
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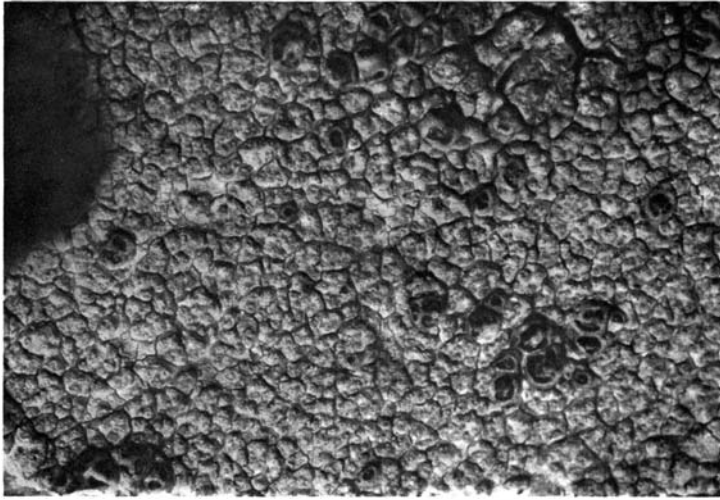
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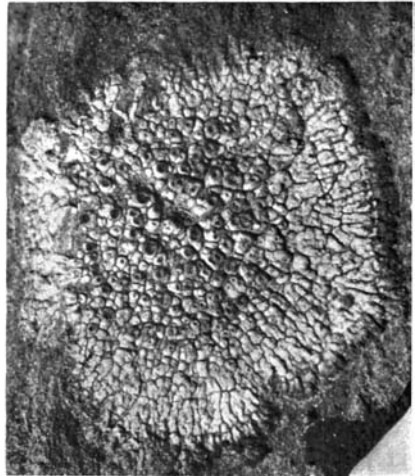
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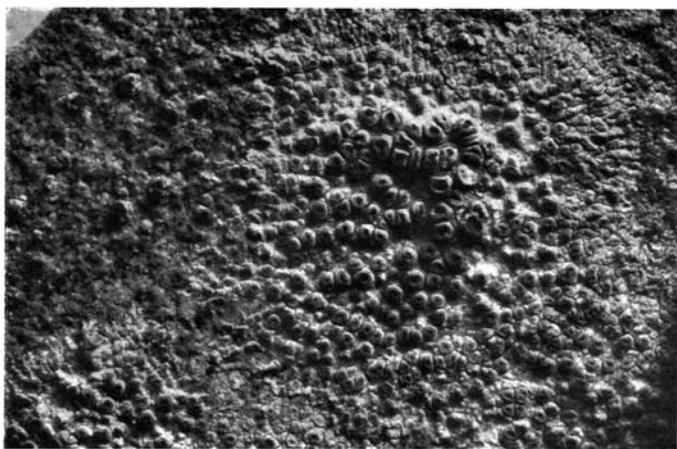
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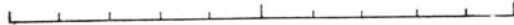


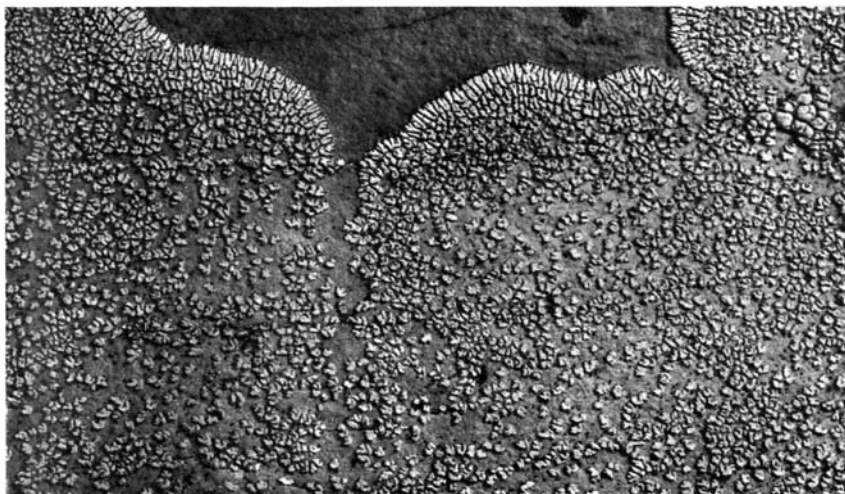
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