

DET KONGELIGE INDUSTRI-, HÅNDVERK-
OG SKIPSFARTSDEPARTEMENT

NORSK POLARINSTITUTT

(Formerly Norges Svalbard- og Ishavs-undersøkelser)

SKRIFTER

Nr. 93

NOTES ON ARCTIC FUNGI

BY

ASBJØRN HAGEN

I. FUNGI FROM JAN MAYEN

II. FUNGI COLLECTED BY DR. P. F. SCHOLANDER
ON THE SWEDISH-NORWEGIAN
ARCTIC EXPEDITION 1931



OSLO

I KOMMISJON HOS JACOB DYBWAD

1950

NORSK POLARINSTITUTT

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" 2. RAVN, J. P. J., *On the Mollusca of the Tertiary of Spitsbergen*. 1922. Kr. 1,60.
" 3. WERENSKIOLD, W. and I. OFTEDAL, *A burning Coal Seam at Mt. Pyramide, Spitsbergen*. 1922. Kr. 1,20.
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Nr. 12. STENSIÖ, E. A:SON, *The Downtonian and Devonian Vertebrates of Spitsbergen*. Part I. *Cephalaspidae*. A. Text, and B. Plates. 1927. Kr. 60,00.
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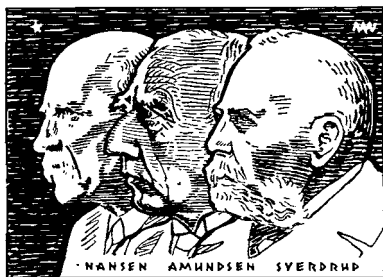
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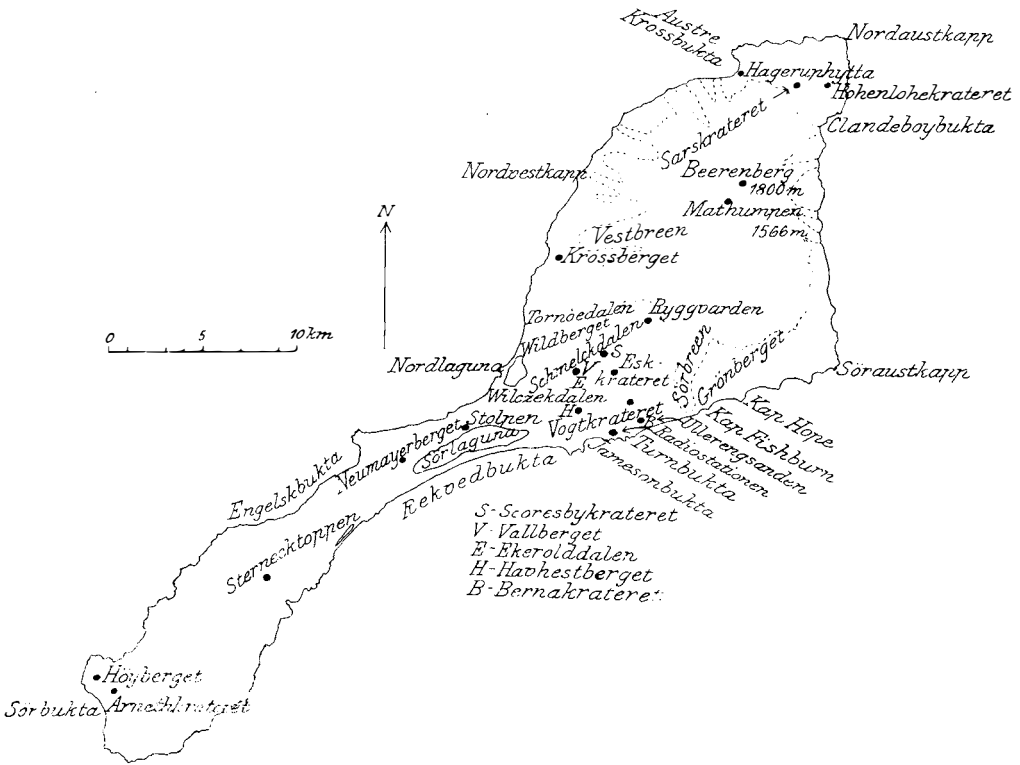
I. Fungi from Jan Mayen.

The first published list of fungi from Jan Mayen comprises five species of Agarics collected by the Austrian expedition in 1882—83. These species are, according to H. W. REICHARDT's nomenclature (1886 pp. 4—5): *Cortinarius cinnamomeus* (L.) Fr., *Agaricus (Galera) Hypni* Batsch, *Agaricus (Hebeloma) fastibilis* Pers., *Agaricus (Omphalia) umbelliferus* L., and *Agaricus (Collybia) atratus* Fr.

After studying specimens collected by the French "La Manche" Expedition that visited Jan Mayen July 27 and 28, 1892, P. HARIOT (1893 p. 117, 1893 b p. 239) recorded one fungus species, viz. *Galera Hypnorum* (Batsch) Fr.

In 1896 (July 22) the Danish cruiser "Ingolf" anchored for a few hours in Rekvedbukta on the south coast of the island, and its botanist, C. Ostenfeld, made some botanical collections. His fungi — 9 species — were identified by E. ROSTRUP (1897 p. 28) as follows: *Galera Hypni* (Batsch), *Cantharellus lobatus* (Pers.) Fr., *Puccinia Saxifragae* Schlecht. "dans les fleurs et les feuilles du *Saxifraga nivalis* L." (according to OSTENFELD-HANSEN (1897 p. 32), *Saxifraga nivalis* had only been collected on Mont Mohn by Ostenfeld), *Caeoma Saxifragarum* (DC.) "dans les feuilles du *Saxifraga caespitosa* L.", *Trochila Juncicola* Rostr. on *Luzula arcuata* (Wahlenb.) Sw. (cp. Lind 1910 p. 12), *Mollisia graminis* (Desm.) Karst. on *Festuca ovina* L., *Leptosphaeria culmorum* Awd. on *Poa alpina* L. and *Festuca ovina* L., *Pleospora herbarum* (Pers.) Rbh. on *Oxyria digyna* (L.) Hill, *Saxifraga caespitosa* L. and *Cerastium arcticum* Lge.¹, *Dothidella Laminariae* Rostr. "dans des stipes de *Laminaria Agardhii*". Rostrup adds that "il n'y avait pas encore été annoncé ni des parasites ni des saprophytes sur les plantes de l'île".

¹ i. e. *C. alpinum* L., as Ostenfeld later on (KRUISE 1902, pp. 297—299) changed his opinion regarding the occurrence in Jan Mayen of *Cerastium Edmondstonii* (Wats.) Murb. & Ostenf. (= *C. arcticum* Lge.); he says (l.c. pp. 298—299, in translation): "After revision of Ostenfeld-Hansen's material and the new material, it may be considered definite that it all belongs to *C. alpinum*, — — — Thus *C. Edmondstonii*, for the time being, ought to be excluded from the flora of Jan Mayen."



Sketch map of Jan Mayen showing conditions in 1930.

In 1919 (August 4 to 9) the Danish botanist Johannes Gandrup made botanical investigations in Jan Mayen. His fungi were submitted to POUL LARSEN, who (1924 pp. 23—24) recorded 10 species, viz. *Mitrula gracilis* Karsten, *Leptotus lobatus* (Persoon), *Leptoglossum muscigenum* (Bull.), *Psilocybe ammophila* (Dur. et Lév.) Fries, *Psalliota campestris* (L.), *Russuliopsis laccata* (Fries) Schroeter, *Omphalia umbellifera* (L.), *Galera hypnorum* (Schrank), *Galera stagnina* Fries and *Galera mycenopsis* Quélet.

FR. J. MATHIESEN (1924 p. 28) found in Gandrup's lichen collection the lichen parasite *Endococcus gemmifer* Tayl., "parasitic on a white crustaceous undeterminable thallus; Blytts Bjerg on lava. Ascus with spores; spores dark-coloured, uniseptate, 8 μ long, 4 μ broad." For this species the name *Discothecium gemmiferum* Vouaux should preferably be used (KEISSLER 1930 p. 385).

Two other lichen parasites were recorded by B. LYNGE (1939) who writes (p. 11) of *Peltigera venosa* (L.) Hoffm.: "It is often severely attacked by a parasitic fungus. Dr. Keissler was kind enough to determine it: *Scutula epiblastematica* Rehm". Another species of *Scutula*, viz. *S. stereocaulorum* Körb. on *Stereocaulon rivulorum* Magn., was also found by Lyngé in Jan Mayen: "South of Nordlaguna I found plants, infested with "*Catillaria Stereocaulorum*" " (l. c. p. 30).

Lynge also recorded (l. c. p. 50) *Illosporium roseum* Mart., leg. R. Scott Russell 1938, from Jan Mayen (according to information from Dr. I. Mackenzie Lamb).

Of *Lecidea melinodes* (Kbr.) Magn. Lynge writes (l. c. p. 19): "On the thallus there are numerous black, slightly prominent points, looking like large pycnides. A microscopical examination revealed a parasitic fungus, a Pyrenomycete with dark two-celled spores, about $7.5 \times 5 \mu$ large."

Of *Peltigera erumpens* (Tayl.) Vain. f. *leptoderma* (Nyl.) Schol. Lynge remarks (l. c. p. 13): "The type of *P. erumpens* was not found in our Jan Mayen collections. The plants were not infested by *Illosporium carneum*, otherwise so common on *P. erumpens*."

In 1934 J. LIND recorded many species of Micromycetes not previously known from Jan Mayen. He writes (1934 p. 11): „I have seen several very good collections from the little isolated island Jan Mayen, 71°, which was visited by C. H. Ostenfeld in 1896, by C. Kruuse and Nic. Hartz in 1900 and by Johs. Gandrup in 1919." Of particular interest is Lind's record of *Puccinia cochleariae* Lindr. (= *Puccinia eutremae* Lindr.) on *Cochlearia officinalis* L. from Jan Mayen (l. c. p. 103).¹ In his paper from 1934 he also published the following species from Jan Mayen: *Leptosphaeria microscopica* Karst. on *Festuca ovina* L. and *Poa alpina* L. (p. 22), *Leptosphaeria algida* Rostr. on *Phippisia algida* (Sol.) R. Br. (syn. *Catabrosa algida* (Sol.) Fr.) (p. 22), *Leptosphaeria graminum* Sacc. on *Poa arctica* R. Br. (p. 24), *Leptosphaeria culmifraga* (Fr.) Ces. on *Phippisia algida* (Sol.) R. Br., *Festuca ovina* L. and *Poa arctica* R. Br. (p. 24, 25), *Metasphaeria arabidis* Johans. on *Arabis alpina* L. (p. 28), *Pleospora magnusiana* Berl. on *Phippisia algida* (Sol.) R. Br. (p. 38), *Pleospora scrophulariae* (Desm.) v. Hoehn. on *Poa alpina* L. (p. 40), *Pyrenophora chrysospora* (Niessl) Sacc. on *Cerastium alpinum* L. (p. 46), *Pyrenophora cerastii* (Ouds.) Lind on *Cerastium alpinum* L. (p. 47), *Pyrenophora androsaces* (Fuck.) Sacc. on *Oxyria digyna* (L.) Hill (p. 49), *Mycosphaerella tassiana* (de Not.) Johans. on *Festuca ovina* L. and *Festuca rubra* L. (p. 60), *Mycosphaerella confinis* (Karst.) Lind on *Cochlearia officinalis* L. (p. 66), *Mycosphaerella silenes acaulis* Maire on *Silene acaulis* (L.) Jacq. (p. 67), *Mycosphaerella ranunculi* (Karst.) Lind on *Ranunculus pygmaeus* Wahlenb. (p. 67), *Mycosphaerella saxifragae* Passer. on *Saxifraga caespitosa* L. (p. 69), *Lophodermium arundinaceum* (Fr.) Chev. on *Festuca ovina* L. and *Poa alpina* L. (p. 82), *Hysteropezizella ignobilis* (Karst.) Lind on *Festuca ovina* L., *Festuca rubra* L. and *Poa alpina* L. (p. 91), *Pseudorhytisma bistortae*

¹ Thanks to Dr. O. Hagerup, I had an opportunity of studying this specimen (leg. J. Gandrup Aug. 1919) in the Arctic Herbarium of the Botanical Museum, University of Copenhagen, during a visit to Copenhagen in the autumn of 1948; the teleutospores measured $28-44 \times 12.5-18 \mu$, mesospores $24-26.5 \times 13-14 \mu$.

(Fr.) Juel on *Polygonum viviparum* L. (p. 96), *Allophyllaria pusiola* (Karst.) Nannf. on *Festuca ovina* L. and *Festuca rubra* L. (p. 97), *Ustilago inflorescentiae* Maire on *Polygonum viviparum* L. (p. 112), *Heteropatella umbilicata* (Fr.) Jaap on *Polygonum viviparum* L., *Ranunculus pygmaeus* Wahlenb. and *Saxifraga foliolosa* R. Br. (syn. *S. comosa* (Retz.) Fellm.) (p. 132.).

Discussing the wanderings of the species, how fragments of plants and the endophytes living on them may easily be carried across the ice from one land to another, and how the species may easily be scattered with the snow over the frozen ground and waters, Lind remarks (l. c. p. 141): "In this connection I may call attention to the island of Jan Mayen, of volcanic origin, extremely isolated, more than 500 km¹ from Greenland and Iceland. Mammals (e. g. foxes) and plants must necessarily have been transferred by floating icebergs or across the frozen sea by means of the wind, and yet a considerable number of fungi are found here. In the preceding list I have mentioned 19 species of micromycetes viz.: . . .". (He then mentions 19 species from Jan Mayen, but has forgotten to count *Pleospora magnusiana* and *Pyrenophora androsaces*, and the number should therefore be 21 and not 19.)

Lind says further (l. c. p. 142) about the fungi of Jan Mayen that they must have been carried more than 500 km from their "original growing place in Greenland or Iceland, together with fragments of the host, over to this diminutive island in the great Arctic Ocean".

In 1936 Th. Arwidsson recorded one fungus species from Jan Mayen, viz. *Sphaerulina arctica* (Rostr.) Lind on *Honckenya peploides* (L.) Ehrh. from Engelsbukta ("Englische Bucht"), collected by A. G. Nathorst in 1899 (ARWIDSSON 1936 p. 478).

In 1929 B. Lynge, making lichenological collections during a very short stay in Jan Mayen, collected one rust species which has been dealt with in the present paper, besides the lichen parasites mentioned (Norges Svalbard- og Ishavs-unders. 1937 p. 16).

In 1930 the Norwegian botanist, Johannes Lid, spent the whole summer (July 14—August 24) in Jan Mayen (cp. ORVIN 1931 pp. 367—369, 388; Norges Svalbard- og Ishavs-unders. 1937 pp. 19—21, 76, 97, 98), and brought home the most important botanical collections obtained in the island up to the present day. On his numerous botanical expeditions Lid has always paid attention to the Micromycetes and thus made valuable contributions to the knowledge of their distribution in Norway, Iceland and Arctic countries. He likewise observed some Micromycetes in Jan Mayen. Two of his rust specimens have been recorded by JØRSTAD (1932),

¹ The exact distances are: From Jan Mayen to Tromsø in Norway c. 555 nautical miles (1028.5 kilometers), to Langanes in Iceland 290 nautical miles (537.4 kilometers), and to the Liverpool Coast in Greenland 250 nautical miles (463.3 kilometers). — A. H.

viz. *Puccinia Saxifragae* Schlecht. on *Saxifraga nivalis* L. (l. c. p. 394) and *S. tenuis* (Wahlenb.) H. Sm. (l. c. p. 395).

In 1933 Lid very kindly permitted me to examine his great collection of vascular plants from Jan Mayen, and I picked out a number of parasitic Micromycetes, which are enumerated in the following list.

The localities mentioned in this list will be found in the map of LYNGE (1939), also reproduced in this paper (p. 4), and in the map of SCOTT RUSSELL & WELLINGTON (1940, Fig. 1, between pages 154—155) or KING (1939, between pages 126—127).

Our knowledge of the mycoflora of Jan Mayen is still very fragmentary, based on casual records only. For a mycologist, well trained in field work, a thorough study of the mycoflora of this extremely isolated island would be a very interesting task and well worth the trouble. I regret very much that our ship could call at Jan Mayen for only a few hours in the night when I came back from Greenland in the autumn of 1933. To my great disappointment I could not collect a single specimen during my visit ashore because of darkness.

I wish to express my gratitude to Professor Dr. R. Nordhagen, head of the Botanical Museum of the University of Oslo, and the State Mycologist, Dr. phil. I. Jørstad, for facilitating my studies, and to the latter and Mr. Johannes Lid, Curator at the Botanical Museum of Oslo, for criticizing my manuscript.

Enumeration.

(Alphabetically arranged.)

Micromycetes.

Fungi new to the mycoflora of Jan Mayen, and plants formerly not recorded from Jan Mayen as host plants of the fungi in question, are indicated with an asterisk (*). Unless otherwise stated, the specimens were collected by J. Lid in the summer of 1930.

**Bostrichonema polygoni* (Ung.) Schroet.

Syn. *B. alpestre* Ces.

On *Polygonum viviparum* L.: Wildberget, Aug. 9; conidia 21—25×12.5—18 μ .

**Exobasidium warmingii* Rostr.

On *Saxifraga oppositifolia* L.: South of Stolpen, July 17. — Havhestberget, July 19. — Grøno in Ekerolddalen, July 22.

In my opinion this *Exobasidium* on *S. oppositifolia* is specifically different from *E. warmingii* on *S. aizoon* Jacq. and ought to be described as a new species.

**Haplothecium amenti* (Rostr.) T. & S.

Syn. *Phyllachora amenti* Rostr.

On *Salix herbacea* L.: Southwest of Vallberget, July 31; not ripe.

S. herbacea is a new host of this fungus, being described on *S. reticulata* L. from Norway, and later found on *S. polaris* Wahlenb. in Spitsbergen.

**Guignardia veronicae* (Rostr.)

Syn. *Laestadia veronicae* Rostr.

On *Veronica alpina* L.: Grønberget, Aug. 18. — At Vestbreen, Aug. 5. — At Vestbreen, Aug. 7.

The host plant is only known from the three mentioned localities in Jan Mayen, and the fungus was found to be present in the material collected in all the three localities.

Melampsora epitea (Knze. & Schm.) Thuem.

Syn. *M. arctica* Rostr.

On *Saxifraga caespitosa* L.: The hill south of Nordlaguna, July 19, 1929, leg. B. Lynge; caeomasporae $16-23(33) \times 15-20 \mu$. — Havhestberget, July 19; caeomasp. $19.5-24 \times 18-22.5 \mu$. — Kreklingkrateret at Ullerengsanden, July 23; caeomasp. $14-26.5 \times 14-21.5 \mu$. — Grøno in Ekerolddalen, July 22; caeomasp. $16.5-27 \times 16.5-20 \mu$. — South of Ryggvarden, July 15; caeomasp. $17.5-26 \times 17-22.5 \mu$.

On **Salix herbacea* L.: Grøno in Ekerolddalen, July 22, II + (III); uredospores $15.5-29.5 \times 14-19.5 \mu$; in this specimen only a few very young teleutosori were seen. — Southwest of Vallberget, July 31, II + III; uredosp. $18-24.5 \times 17-19.5 \mu$; teleutosori amphigenous, teleutospores $36.5-47.5 \times 8.5-11 \mu$. — Wildberget, July 21, II + III; uredosp. $17.5-23 \times 17-20.5 \mu$; teleutosori amphigenous, teleutosp. $28-40 \times 11.5-15.5 \mu$.

In all three specimens of *S. herbacea* the uredosori occurred amphigenously, with numerous capitate, hyaline paraphyses, that generally did not exceed 80μ in length, their heads being up to 26.5μ broad.

**Peronospora alsinearum* Casp.

On *Cerastium alpinum* L. s. l.: East of Helenehytta (southwest of Sørлагuna), Aug. 22; conidiophores $6.5-8 \mu$ thick, conidia $18.5-26.5 \times 17.5-22.5 \mu$. Cp. GÄUMANN 1923 p. 62.

On *Cerastium cerastoides* (L.) Britton (syn. *C. lapponicum* Cr.): Wildberget, July 21; conidiophores $6.5-11.5 \mu$ thick, conidia $26-42 \times 20-22.5 \mu$, oospores $32.5-45 \mu$ in diameter.

Pseudorhynisma bistortae (Fr.) Juel.

On *Polygonum viviparum* L.: Kvalrossbukta, Aug. 11, 1930, juvenile stage, leg. E. Koefoed & Th. Iversen.

**Puccinia bistortae* (Str.) DC.

On *Polygonum viviparum* L.: Wildberget, III, Aug. 9; teleutosp. $18.5-25 \times 14.5-18.5 \mu$.

**Puccinia cruciferarum* Rud.

On *Cardamine bellidifolia* L.: South of Ryggvarden, July 15; teleutosp. $29-36.5 \times 13-16 \mu$. — Just south of Scottkrateret, Aug. 7; teleutosp. $30-38.5 \times 13-16 \mu$. — East of Vøringenkrateret, Aug. 12; teleutosp. $26-38.5(42.5) \times 13-15.5(17.5) \mu$, one mesospore $29 \times 13.5 \mu$.

Puccinia saxifragae Schlecht.

On **Saxifraga cernua* L.: Grøno in Ekerolddalen, July 22; teleutosp. $26.5-36.5 \times 14.5-18 \mu$, striation rather faint. — South of Willebreen, Aug. 2; teleutosp. $25-41 \times 13-19.5 \mu$, one mesospore $23.5 \times 17.5 \mu$.

On *Saxifraga nivalis* L.: Wildberget, July 21; teleutosp. $21-29 \times 15-19.5 \mu$. — At the foot of Schmelckdalen at Wildberget, Aug. 20; teleutosp. $21-30 \times 14.5-19.5(22.5) \mu$, mesospores $22.5-26 \times 14.5-17.5 \mu$. In both cases the spores were very distinctly striate.

On **Saxifraga rivularis* L.: Hageruphytta, Aug. 2; teleutosp. $(23.5)26-48.5 \times 13-18.5 \mu$, one mesospore $32.5 \times 12.5 \mu$; striation less evident, often very faint.

On *Saxifraga tenuis* (Wahlenb.) H. Sm.: Stolpen, July 17; teleutosp. $(18.5)21-32.5 \times 14.5-20 \mu$; mesospores $22.5-24 \times 17 \mu$. — Wildberget, July 21; teleutosp. $22.5-33 \times 11.5-17 \mu$, mesospores $24-26 \times 13 \mu$. — South of Vestbreen, Aug. 5; teleutosp. $19.5-32.5 \times 12-17.5 \mu$, one mesospore $22.5 \times 13 \mu$. — Spores from all the three specimens distinctly striate.

**Rhytisma salicinum* (Pers.) Fr.

On *Salix herbacea* L.: East of Arnethkrateret, Aug. 13. — At the foot of the mountain east of Margarethytta, Aug. 12. — On the sands in Engelsbukta, Aug. 15. — Kreklingkrateret at Ullerengsanden, July 23. — Vallberget, July 31.

Scutula stereocaulorum Korb.

On *Stereocaulon* cf. *rivulorum* Magn.: The hill south of Nordlaguna, July 19, 1929, leg. B. Lynge.

Ustilago inflorescentiae (Trel.) Maire.

On *Polygonum viviparum* L.: North of Vogtkrateret, 400 m above sea-level, July 15; spores $9.7-16(19.5) \times 9-13.7 \mu$. — Wildberget, July 21; spores $9.7-14.5 \times 9-12 \mu$.

**Ustilago vinosa* (Berk.) Tul.

On *Oxyria digyna* (L.) Hill: Wildberget, July 21; spores $7-9.7(11.5) \mu$ in their longest diameter.

Agaricaceae.

The specimens of Agarics were poorly preserved, but the eminent agaricologist, Mr. F. H. Møller, Nykøbing, Falster, Denmark, was kind enough to examine them, and he was able to identify the following species. The remarks below on each species are due to descriptions and drawings which Mr. Møller kindly sent me.

Galera mycenopsis Fr. (sensu Jak. E. Lange).

Majabotn in Ekerolddalen, among *Draba nivalis*, Aug. 20.

Spores ellipsoid, $9-11(12) \times 5.5-6.5 \mu$; basidia $34 \times 8-10 \mu$; the margin of the gills with cystidia, the protruding part of which was 8μ broad at the base and 4μ broad at the apex. Different authors do not agree as to the nomenclature of these species of moss Galeras, and Mr. Møller remarks that it is with some doubt that he has identified it as belonging to this species.

**Inocybe fastigiata* (Schaeff.) Fr.

South of Arneth-krateret, in a cave with *Cystopteris fragilis*, Aug. 14.

Spores oval sub-phaseoliform, $10.5-14(15) \times 6-7(7.5) \mu$; gill-edge densely set with cystidia, $36-50 \times 10-14 \mu$.

Laccaria laccata (Scop.) Berk. & Br.

Near Nordlaguna, Aug. 10, 1930, leg. E. Koefoed & Th. Iversen. Spores $9-11 \times 9 \mu$, densely and shortly spinulose. Mr. Møller writes of this specimen: "Agrees as to spore measurements with Lange's *L. laccata* var. *rosella*, but also with my *L. laccata* v. *montana* from the Færøes."

Summit of Høyberget, Aug. 13. Spores $8-12 \times 8-11 \mu$, wall 1μ thick. Mr. Møller writes of this specimen: "Resembles still more *L. laccata* var. *montana* Møll."

**Lactarius* cf. *vietus* Fr.

At the foot of Vestbreen near Krossbukta, Aug. 5.

Spores $(6)7-8 \times 5-7 \mu$ (including the points, up to 9μ long); cystidia at the edge of the gills, $42 \times 7-10 \mu$, apex 2μ broad. According to Mr. Møller the spores suggest *L. vietus*, but this determination is at present not quite certain.

**Naucoria semiorbicularis* (Bull.) Fr. (sensu Jak. E. Lange).

"Jan Mayen 1929", leg. J. Kjøllesdal.

Spores $10-12 \times 7 \mu$; body of cystidia $(8)10-14 \mu$ broad, head $8-8.5 \mu$ broad.

**Russula delica* Fr. (sensu Bresadola, POUL LARSEN 1932 p. 552, non *R. delica* sensu Jak. E. Lange).

Kapp Rudson, SW of Engelskbukta, among mosses (*Rhacomitrium hypnoides*), Aug. 15.

Spores $9-11 \times 8-10 \mu$. Cp. SCHÄFFER 1939 pp. 6-7.

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II. Fungi collected by Dr. P. F. Scholander on the Swedish-Norwegian Arctic Expedition 1931.

Dr. P. F. Scholander accompanied the Swedish-Norwegian Arctic Expedition in the summer of 1931 (leader: Prof. Dr. H. W:son Ahlmann) as botanist. He collected some fungi, chiefly in Northern Svalbard, which he kindly entrusted to me for identification. A few other specimens, however, were found by the writer when examining Dr. Scholander's plant collections at the Botanical Museum in Oslo. Dr. Scholander also brought with him two jars containing fungi conserved in formalin; all of them were more or less poorly preserved, and some of them could only be identified generically.

In spite of the small number of species, Dr. Scholander's material is of considerable interest, since many of his collections represent the northern limits of the fungi or host plants in question.

The localities in Northern Svalbard mentioned in the following list will be found in the two maps in SCHOLANDER's paper (1934). A brief summary of that paper was published by SCHOLANDER in 1936.

Enumeration.

(Alphabetically arranged.)

Calvatia cretacea (Berk.) Lloyd.

Syn. *Lycoperdon cretaceum* Berk., *Calvatia borealis* Th. C. E. Fr. Lomfjorden: Lomfjordbotnen, c. 79°23' N, Aug. 13.

I have also found this interesting species in material from the following four localities in Svalbard, viz. Kapp Mitra, Aug. 4, 1907; Ebeltoftthamna, Aug. 27, 1907; Möllerfjorden, July 31, 1907; Lilliehöökfjorden, July 29, 1907. In all four cases the specimens were collected by Hanna Resvoll-Holmsen.

C. cretacea has previously been recorded — as *C. borealis* — from Svalbard by Thore C. E. Fries: "In Mus. Ups. finden sich einige Spiritus-exemplare von typischer *C. borealis* Th. C. E. Fr. aus Spitzbergen (Crossbay 1880 leg. A. E. Nordenskiöld)" (FRIES 1914 p. 239).

It is also possible that *C. cretacea* may have been confused with other *Calvatia* (*Lycoperdon*)-species by previous authors. Karsten recorded e. g. *Lycoperdon caelatum* Bull. from Krossfjorden and Adventfjorden in Svalbard: "Ad Crossbay 1861 et frequens circa Adventbay 1868. Verisimiliter idem est ac "*Lycoperdon Bovista*", de quo mentionem facit J. Vahl" (KARSTEN 1872 p. 94). I have not, however, seen Karsten's material but I should not be surprised if his and other specimens recorded as *L. caelatum* proved to be *C. cretacea*.

In Edgeøya (South-Eastern Svalbard) Mr. A. P. G. Michelmores found a Gasteromycete on the Cambridge Expedition to Edge Island, S. E. Spitsbergen, in 1927, which was identified as *L. coelatum*. His notes on the fungi collected during this expedition are easily overlooked by mycologists and I have therefore cited them here: "I am indebted to my friend Mr. E. J. H. Corner, Assistant-Director of the Singapore Botanic Garden, for naming a few fungi which I collected. Although toadstools were common in many places, lack of time prevented systematic observations on them. The following list is therefore far from exhaustive and represents only a random collection.

"*Scleroderma aurantium* Pers. *Lycoperdon coelatum* (Bull.) Fr. *Dictyolus muscigenus* (Bull.) Qué. *Lepiota granulosa* (Batsch) Fr. *Cortinari* sp., cf. *rigidus* (Scop.) Fr. or *brunneus* (Pers.) Fr. *Naucoria* sp. possibly *N. hamadryas* Fr. *Galera hypnorum* (Schrank) Fr. *G. mniophila* (Lasch) Fr. *G. sparte* Fr. ?

"The fungi usually grew amongst moss, some in drier and some in wetter places. In one spot on the Plain of the Russian Base *Dictyolus muscigenus* was found growing in rings amongst the sodden moss of a bog. Although this species was common, it was not found growing in this way anywhere else" (MICHELMORE 1934 pp. 38—39). A remark on *Saxifraga nivalis* L. shows that MICHELMORE (l. c. p. 37) has also observed *Puccinia saxifragae* Schlecht.: "Brown rust pustules were found on the under side of leaves of plants at Whales Bay and Changing Point."

All collections of Arctic Gasteromycetes hitherto published¹ call for revision; I should like to see e. g. if the above mentioned *Scleroderma aurantium* Pers. (also recorded from moss flats in Kongsfjorden (Kings Bay) by DOBBS 1942 p. 98) really is this species. Identifications like Hariot's *Lycoperdon echinatum* Pers. (from Adventfjorden and Bellsund July—August 1892, HARIOT 1893 p. 241), *Calvatia caelata* (Bull.) Morgan and *Lycoperdon echinatum* Pers. (from Novaya Zemlya: "chaîne Nicolas, août 1908", HARIOT 1910 p. 337) and Zopf's *Lycoperdon furfuraceum* Schaef. (PAX 1892 p. 73) should also be revised.

¹ LANGE's paper (1948) not included.

Regarding the rather wide range of variation in the ornamentation of the peridium in *Calvatia cretacea*, compare LINDER 1947 p. 280.

NYBERG (1946 pp. 156—157), who records *C. cretacea* from Petsamo Lappmark in Finland, points out the special character of the capillitium of this species.

Cintractia caricis (Pers.) Magn.

On *Carex misandra* R.Br. (syn. *Carex fuliginosa* Schkuhr). Lomfjorden: Lomfjordbotnen, Aug. 13; spores often \pm polyhedral, (10)14.5—19.5 \times 10—17 μ . Dr. Scholander said that *Carex misandra* is fairly common in Sorgfjorden and Lomfjorden, and that in the latter fjord "smut had not uncommonly destroyed the achenes".

This ubiquitous smut is not often found on *Carex misandra*. I have seen it recorded on this host from Finland, Sweden, Norway, Spitsbergen, Greenland and the Canadian Eastern Arctic (LINDER 1947 p. 268), Scholander's specimen being the northernmost collection of *C. caricis* on *Carex misandra* (c. 79°23' N).

Exobasidium vaccinii myrtilli (Fuck.) Juel incl. f. *amphigena* Juel, cp. LINDER 1947 pp. 272—273.

On *Cassiope tetragona* (L.) D. Don. Lomfjorden: Lomfjordbotnen, Aug. 13. — Adventfjorden: Longyear dalen, Aug. 23.

Lomfjordbotnen (= the head of Lomfjorden, c. 79°23' N) is the northernmost locality known for this species (cp. HAGEN 1941 p. 8).

Hendersonia crepini Sacc.

On *Lycopodium selago* L. Murchisonfjorden: Snaddvika, north side, July 27; spores triseptate, 18 \times 3 μ , yellow or bright yellowish brown. According to Lind this *Hendersonia* is quite certainly a conidiostage of *Leptosphaeria lycopodina* (Mont.) Sacc. (J. Lind com. 1933). Fuckel (cp. SCHROETER 1908 p. 362) also considered *H. crepini* the imperfect stage of *Leptosphaeria crepini* (West.) DNot. = *L. lycopodina* (Mont.) Sacc. (LIND 1934 p. 19).

Hendersonia crepini is new to the mycoflora of Svalbard. *Lycopodium selago* is one of the 12 vascular plants from Svalbard (listed by LIND 1928 p. 53) on which no fungi had hitherto been found.

On another of these 12 plants, viz. *Ranunculus hyperboreus* Rottb. (collected in Sorgfjorden, inner west side, Aug. 15—16) some small dark, hard nodules were found in the living leaves. It was found to be a Pyrenomycete (resembling *Stigmatea ranunculi* Fr.), but being unripe, it could not be identified. Future collectors should look for fungi on *R. hyperboreus* in Svalbard.

Illosporium carneum Fr. f. *macrosporum* Keissl. nov. var.

I thought this *Illosporium* should be described as a new species and sent it to Dr. K. Keissler, Vienna, for description. He found that it was better considered a variety of *I. carneum* and (in 1934) kindly sent me the following diagnosis and the permission to publish it:

"Conidia elliptica, magna, ca. $12 \times 9 \mu$ metientia. Spitzbergen: in thallo *Dermatocarpi miniati* var. *complicati*,¹ Murchisonfjorden: Floraberget, 3. VIII. 1931, 200 m.s.m., leg. P. F. Scholander.

Weicht von *I. carneum*, zu der die Exemplare nach der Farbe der Sporodochien gehören, sowie von den anderen Arten dieser Gattung durch die Grösse der Konidien und die eiförmige Gestalt derselben ab. Auf Flechten aus der Gruppe der Pyrenocarpen wurde bisher, so viel ich weiss, nur *I. coccineum* auf *Endocarpon* spec. gefunden."

In my opinion there are good reasons for a specific distinction between the var. *macrosporum* and *I. carneum* Fr.

Lactarius subdulcis (Pers.) Fr.

Lomfjorden: Lomfjordbotnen, Aug. 13; collector's note: "Milk mushroom".

In spite of their small size, six of Scholander's specimens most probably belong within the range of this species, which is previously recorded from Spitsbergen by KARSTEN (1872 p. 94): "Ad Adventbay initio Augusti 1868." *L. subdulcis* and some related smaller species deserve a closer study, and it is hoped that botanists visiting Svalbard in the future will study the Lactarii in the field.

In Scholander's specimens the pileus was smooth, polished, zoneless, strongly depressed in the centre, rufous-cinnamon, 2.5 (2)—3 cm. broad. Gills crowded, brighter than the pileus, adnate (or slightly decurrent). Stem short, c. 1.5(1.2)—1.7 cm., basal part swollen, surrounded by a covering of earth and withered mosses.

A *Lactarius* from Möllerfjorden, July 31, 1907, leg. Hanna Resvoll-Holmsen, is another species; it is not so large as the specimens mentioned above and has an umbilicate pileus.

Leptotus retirugus (Bull. ex Fr.) Karst.,
syn. *Dictyolus retirugus* (Bull.) Quél.

Murchisonfjorden: Raudstupet, July 24. Scholander's specimens were attached to mosses with fine whitish threads. Gills reticularly connected with irregular folds; pileus soft, membranaceous, smooth and

¹ The host plant should be referred to *D. polyphyllum* (Wulf.) DT. & Sarnth., as it seems very uncertain whether *Dermatocarpon minutum* s. a. is really found in the Arctic (LYNGE 1938 p. 34). A. H.

zoneless, 0.5—2.5 cm. broad, greyish brown, brightening towards the base, now and then somewhat lobed.

I picked out the mosses from the specimens and sent them to Mr. E. Jørgensen, Bergen, who kindly identified them: *Calliergon richardsonii* (Mitt.) Kindb., *C. trifarium* (Web. & Mohr) Kindb., *Drepanocladus* cf. *badius* (Hn.) Roth, *D. uncinatus* (Hedw.) Warnst., *Orthothecium chryseum* (Schwaegr.) Br. & Sch., *O. rufescens* (Brid.) Br. & Sch., *O. strictum* Lor. and *Meesia triquetra* (Hook. & Tayl.) Ångstr.

SUMMERHAYES and ELTON (1928 p. 225—226) tell more about the plant community in which *L. retirugus* occurs in Northern Svalbard. C. S. Elton collected this species (det. E. M. Wakefield, Kew) on the Oxford Expedition 1924 in Liefdefjorden: Reinsdyrhalvøya, around one tarn on the plateau at about 47 m.s.m., and in his and Summerhayes' paper they write of this bog: "Farther out, other mosses, e.g. *Webera nutans*, *Polytrichum strictum* appeared with the *Hypna*, the grass being still abundant. There were also occasional plants of *Cardamine pratensis* and *Ranunculus hyperboreus*, together with small brown fungi, *Dictyolus retirugus*. Reindeer dung was very common here and was surrounded by *Hypnum brevifolium*, and covered with the small orange fungus *Cheilymenia coprinaria*, — — —". I have also seen a specimen of *Leptotus retirugus* from Magdalenefjorden in Svalbard, Aug. 24, 1928, leg. O. A. Høeg, while the presence of *L. retirugus* on Bjørnøya is recorded by KARSTEN (1872 p. 94): "*Cantharellus retirugis* (Bull.) Fr. Supra muscos paludum in Beeren Eiland 1868."

From Bjørnøya I too, have seen examples of *Leptotus lobatus* (Pers.) Karst. collected by B. M. Keilhau in 1827 (Hb. Sommerfelt, sub. nom. *Merulius lobatus* Pers.; cp. SOMMERFELT 1833 p. 232, transl.: "*Cantharellus lobatus* Fr., on *Hypnum cuspidatum* from Beeren-Eiland"). Keilhau's specimen is also mentioned by KARSTEN (l.c. p. 94): "*Supra muscos humidus in Beeren Eiland tam ab Keilhau quam Th. Fries observatus; etiam ad Adventbay Aug. 1868.*" I have seen specimens of *L. lobatus* from Möllerfjorden in Svalbard, Aug. 1, 1907, collected by Hanna Resvoll-Holmsen.

For the third Svalbard *Leptotus*, *L. muscigenus* (Bull. ex Fr.) Lundell, see DOBBS 1942 pp. 97—99 and this paper p. 13.

Lycoperdon umbrinum Pers.

Adventfjorden: Longyearbyen, June 21. The spores are globose, uniguttulate, and distinctly rough, 5 μ in diam.; the threads of the capillitium are not ramose and have a diameter of 2—3 μ . The specimen is c. 2 cm. high, 2.5—3 cm. broad, the spore-mass is greyish chocolate-brown and the periderm verrucose; basal part chambered.

A larger specimen from Van Mijenfjorden: Sveagruva, Aug. 11, 1926, leg. B. Lyngé, has non-ramose, 5 μ broad capillitium-threads and less warted, 5 μ broad spores.

Non-ramose, 2—4 μ broad threads of the capillitium have also been observed in a specimen from Bromelldalen, Aug. 9, 1926, leg. B. Lyngé; spores densely warted, 5 μ in diam.

The two last-mentioned specimens must also be identified as *L. umbrinum*, a highly variable species.

In 1934 I sent some specimens of Arctic *Gasteromycetes* to Dr. László Hollós, Szekszárd, Hungary, but unfortunately he found the material in an unsatisfactory condition which permitted only generic identifications to be made.

The *Gasteromycetes* of the Arctic regions, like the Agarics, have not yet been sufficiently studied,¹ and they are much in need of a careful systematical investigation. Only scanty material has been brought home, often only unripe specimens.

Melampsora epitea (Knze. & Schm.) Thuem., syn. *M. arctica* Rostr.

On *Saxifraga caespitosa* L. Isfjorden: Adventfjorden: Mouth of Longyeardalen, June 21; caeomaspores (15)17.5—28 \times (13.5)15—20 μ .

? *Nectria* sp.

On *Peltigera erumpens* (Tayl.) Vain. f. *typica*. Murchisonfjorden: Floraberget, July 23.

Dr. Keissler, to whom I sent this *Peltigera*-parasite in 1934, wrote about it: "Vermutlich eine *Nectria* spec. aber zu jung, daher nicht bestimmbar."

From the same locality some *Gyrophora arctica*-specimens, deformed in a curious manner, were brought home. A specimen was sent to Dr. Keissler, who examined it and gave me the following information: "Die grossen Höcker sind Faltungsgallen, Ursache wohl Wachstumsstörungen. (Keine Tier- oder Pilzgalle). Vgl. BACHMANN, Arch. f. Protistenkunde 66 (1929) p. 502—508 u. Ber. Deutsch. Bot. Ges. 52 (1934) p. 80".

Omphalia ericetorum (Fr. ex Fr.) Lundell.

Syn. *O. umbellifera* (L.) Fr., cp. Lundell & Nannfeldt 1949 p. 28.

Murchisonfjorden: Raudstupet, in tundra swamp, among mosses, July 24.

The specimens collected by Dr. Scholander were young, but typically developed. Pileus 0.7—1.1 cm. broad, stem ca. 1.3 cm. high.

Hanna Resvoll-Holmsen collected this species in Krossfjorden: Kapp Mitra, Aug. 27, 1907, and I have also seen it from Magdalenefjorden, Aug. 24, 1928, leg. O. Arbo Høeg, and from Hopen: Thorkelsen-skaret, east, Aug. 3, 1931, leg. O. Hanssen. An *Omphalia* from Möllerfjorden, Aug. 1, 1907, leg. Hanna Resvoll-Holmsen, was *O. pyxidata* (Bull.) Fr.

O. ericetorum, known from all parts of the world, is surely one of the most common Agarics in Arctic regions.

¹ After this was written, an excellent treatise on the *Gasteromycetes* of Greenland has been published by LANGE (1948).

Peziza sp.

Murchisonfjorden: Raudstupet, on mosses, July 24. The specimen brought home was so poorly preserved that an exact identification was impossible.

A related Discomycete, *Cheilymenia coprinaria* (Cooke) Boud. (det. E. M. Wakefield), was collected in Northern Svalbard by C. S. Elton on the Oxford Expedition 1924, viz. in Liefdefjorden: Reinsdyrhalvøya, near a tarn on the plateau at about 47 m.s.m., on reindeer dung (SUMMERHAYES & ELTON 1928 p. 225—226, cp. this paper p. 16).

There are also known two other *Cheilymenia* species from Svalbard, *C. rubra* (Cooke) Boud. being recorded from Brucebyen (Bruce City) in Billefjorden (Klaas Billen Bay) in 1936 by DOBBS (1942 p. 98) "on bird dung in moss bog", and *C. stercorea* (Pers.) Boud. (syn. *Peziza stercorea* Pers.) recorded by KARSTEN (1872 p. 95).

Puccinia saxifragae Schlecht.

On *Saxifraga cernua* L. Lomfjorden, west side, Aug. 14; teleutospores $24-38 \times 15.5-20.5 \mu$, one mesospore $30.5 \times 15.5 \mu$.

In Svalbard *P. saxifragae* was previously found as far north as c. $78^{\circ}15' N$ on this host. Dr. Scholander's locality is at c. $79^{\circ}30' N$, being the northernmost point in the world for *P. saxifragae* on *S. cernua*.

On *Saxifraga nivalis* L. Murchisonfjorden: Triodalén, July 29, teleutosp. $19.5-30 \times 14-21 \mu$; Floraberget, Aug. 3, teleutosp. $22.5-31 \times 15-19 \mu$.

On *Saxifraga tenuis* (Wahlenb.) H. Sm. Isfjorden: Adventfjorden: Longyearbyen, Aug. 23; teleutosp. $24-33.5 \times 14-20 \mu$, now and then mesospores, $22.5-25 \times 14-15.5 \mu$.

Mr. S. Malmberg, a member of the maritime party of the same expedition as Dr. Scholander, contributed a collection of plants which Scholander has published (cp. SCHOLANDER 1934 p. 10). On examining Malmberg's collections from Franz Josef Land, I succeeded in finding *P. saxifragae* on *S. tenuis* from Kapp Nansen (ca. $80^{\circ}32' N$), July 25; teleutosp. $22.5-34.5(39) \times 13.5-19.5 \mu$. Looking over Olaf Hanssen's plants from Franz Josef Land, I also found it on *S. tenuis* from Kapp Forbes (c. $80^{\circ}7' N$), Aug. 11, 1930; teleutosp. $22.5-33.5 \times 13.5-21 \mu$, two mesospores $22.5 \times 13.5 \mu$.

These localities are the northernmost known in the world for *P. saxifragae* on *S. tenuis*. As far as I know, only one other plant in Franz Josef Land is known as host of a rust, viz. *Saxifraga nivalis* L. (HANSEN & LID 1932 p. 20 and 21, JØRSTAD 1932 p. 394).

A remark in MICHELMORE's paper (1934 p. 37), on *Saxifraga nivalis* L., shows that he has observed *P. saxifragae* on this host on the west side of Storfjorden and in Barentsøya: "Brown rust pustules were found on the under sides of leaves of plants at Whales Bay and Changing Point."

Scutula stereocaulorum (Th. Fr.) Körb.

On *Stereocaulon botryosum* Ach. (syn. *S. fastigiatum* Anzi). Hinlopenstredet: Kalkstranda at Forsiusfjellet, Aug. 1. — Murchisonfjorden: Triodalen, July 29. — Lady Franklinfjorden: Gerardodden, July 13—14.

On *Stereocaulon rivulorum* Magn. Hinlopenstredet: Torellneset, July 4. — Wahlenbergfjorden: Ismåsefjellet, 200 m.s.m., July 2.

S. stereocaulorum seemed here to be most common on *Stereocaulon botryosum*. I also examined Scholander's collection of *S. arcticum* Lynge and *S. alpinum* Laur., but without finding the parasite on them. KEISSLER (1928 p. 4) says that it is most common on species from the *S. alpinum*-group.

S. stereocaulorum is also mentioned by Th. M. Fries as occurring at Hinlopenstredet: Lovénberget (c. 79°25' N) and Wahlenbergfjorden (c. 79°45' N): "Biatorina Stereocaulorum Th. Fr. — — — Supra thallum *Stereocauli alpini* in Lovéns berg, supra hujus ac *Stereoc. denudati* ad Wahlenbergsbay visa." He also gives a description of the species (FRIES 1867 p. 36). The host plant referred by Fries to *S. denudatum* is *S. arcticum* Lynge.

In this connection some words on our present knowledge of the lichen parasites of Svalbard.

In his excellent treatise "*Lichenes Spitsbergenses*" (1867), TH. M. FRIES records a number of lichen parasites from Svalbard, and as usual he gives very clear and accurate descriptions (I have brought his species names in accordance with Keissler's nomenclature): *Didymella epipolytropa* (Mudd.) Berl. & Vogl. var. *ulothii* (Körb.) Vouaux on *Lecanora polytropa* (Ehrh.) Rabh. from Smeerenburg, 79°40' N (FRIES 1867 p. 22), *Leptosphaeria* sp. (description l. c. p. 34, note) on *Lopadium pezizoideum* Körb. from Kobbefjorden (c. 79°40' N) and Lågøya ("paullo infra 80° 20' N"), *Torula* sp. on "*Biatorina fraudans* Hellb." (according to ZAHLBR. CATALOGUS VII, 34 = *Blastenia leucoraea* Th. Fr., but compare LYNGE 1937 p. 170) from Lovénberget, c. 79°25' N (l. c. 35), *Scutula tuberculosa* (Th. Fr.) Rehm on *Solorina saccata* (L.) Ach. from Lovénberget (l. c. p. 36), cf. *Leptosphaeria apocalypsa* (Rehm) Wint. on *Stereocaulon alpinum* Laur. from Lovénberget (l. c. p. 36, note), *Nesolechia vitellinaria* (Nyl.) Rehm on *Candelariella vitellina* (Ehrh.) Müll. Arg. ("supra crustam *Gyalolechia vitellinae* rarissima; tantummodo ad Hornsund et forsan alium quoque locum orae occidentalis a NORDENSKIÖLD inventa", l. c. p. 42, cp. FRIES 1860 p. 222), *Nesolechia associata* (Th. Fr.) Sacc. & D. Sacc. on *Ochrolechia tartarea* Körb. from Danskøya (79°40' N) and Lågøya, "paullo infra 80°20' N" (l. c. p. 42), *Leciographa urceolata* (Th. Fr.) Körb. on *Lopadium pezizoideum* Körb. from Sorgfjorden ("paullo infra 80°"), Lovénberget (c. 79°25' N), Fosterøyane (79°30' N), Murchisonfjorden (c. 80° N) and (?) Brennevinsfjorden, c. 80°20' N (l. c. p. 45, cp. FRIES 1860 p. 233), *Leciographa inspersa* (Flke.) Rehm var. *convexa*

(Th. Fr.) Keissl. "supra thallum emortuum *Physciae caesia* et *obscurae*, *Xanthoriae elegantis* atque *Acarosporae chlorophanae* ad Danskön, Treurenbergbay, Fosters öar, insulam parvam prope Stenön¹ et Low Island, ubique parcissime" (l. c. p. 45), *Conida clemens* (Tul.) Massal. on *Lecanora melanophthalma* Ram. (syn. *Placodium chrysoleucum* Link var. *opacum* (Ach.) Körb.) from Sorgfjorden (l. c. p. 46), *Pharcidia dispersa* (Lahm) Wint. (Fries' *Arthopyrenia conspurcans* n. sp. "supra squamas *Psorae rubiformis* ad Wijdebay et Treurenbergbay" is most probably this species, l. c. p. 51), *Discothecium gemmiferum* (Tayl.) Vouaux "supra thallum variarum *Lecanorarum* et *Lecidearum*, *Sporastatiae cinereae* e. s. p. Adnotata ex Hornsund, Kobbabay, Treurenbergbay et Wahlenbergsbay"² (l. c. p. 51, cp. FRIES 1860 p. 275), *Tichothecium pygmaeum* Körb. "priore multo frequentior atque thallum apotheciaque infestans non solum variorum lichenum crustaceorum (*Lecanorae polytropae*, *Lecidearum* plurimarum, *Rhizocarpi geographici*, *Biatorae rupestris*), sed etiam *Xanthoriae elegantis* et *Placodii fulgentis*. Observata e Magdalenabay (J. Vahl),³ Kobbabay, Smeerenburg, Treurenbergbay, Waijgats öar⁴ alioque loco ad fretum Hinlopen, Lommebay (Chyd.), Lovéns berg, Rypön,⁵ Brandewijnebay" (l. c. p. 51, cp. FRIES 1860 p. 275).

Except for an interesting little paper by KEISSLER on Novaya Zemlya (1928), where he lists 12 species, only casual records of Arctic lichen parasites have been published since the days of Fries. So there is still much work to be done on lichen parasites in the Arctic, as well as on lichen parasites in general.

KEISSLER (l. c. p. 3) says of *Pharcidia conspurcans* (Th. Fr.) Wint. (i. e. *Ph. dispersa* (Lahm) Wint.) on *Lecidea decipiens* (Ehrh.) Ach.: "Dieser Parasit, der übrigens von *Ph. Lichenum* Arn. kaum wesentlich verschieden sein dürfte, wurde von FRIES auf der gleichen Nährflechte auf Spitzbergen gefunden." Of *Diplodia lecanorae* Keissl. he says (l. c. p. 4): "Diese *Diplodia Lecanorae* hat auch schon FRIES auf dem Bären-Eiland (Bjørnøya) 9 m. Mt. Misery auf dem Thallus von *Lecanora Hageni* gesammelt."

PAULSON (1923 p. 81) reported *Discothecium gemmiferum* Tayl. on *Lecidea confluens* Ach., *Epicoccum neglectum* Desm.⁶ on *Lecanora tartarea* Ach., and *Tichothecium pygmaeum* Körb. on *Lecanora polytropa* Schaer. (the last one from Prins Karls Forland) from lichens collected by Mr. Victor S. Summerhayes on the Oxford University Expedition to Bjørnøya and Spitsbergen 1921.

¹ i. e. Storsteinhalvøya, c. 80° N. — A. H.

² c. 79°45' N. — A. H.

³ Magdalenefjorden, c. 79°33' N. — A. H.

⁴ Vaigattøyane, c. 79°30' N. — A. H.

⁵ "paullo infra 80°". — A. H.

⁶ *E. neglectum* occurs occasionally as a saprophyte on lichens. — A. H.

ACOCK (1940 p. 94) records the saxicolous *Lecidea elata* Schaer. from pebbles on a shingle beach at Brucebyen in Billefjorden in Vest-spitsbergen "with *Phaeospora parasitica* (Lönnr.) Arn. The first record of *Lecidea elata* as host of this lichen parasite."

LYNGE (1938 p. 36) says of *Dermatocarpon cinereum* (Pers.) Th. Fr. in Spitsbergen that "it is much exposed to attacks from parasitic fungi". Of *Peltigera erumpens* (Tayl.) Vain. he says that "it is often infested by a parasitic fungus, an *Illosporium*" (l. c. p. 52).

Tichothecium pygmaeum Körb. has also been found on *Lecidea pantherina* (Ach.) Th. Fr. in Bjørnøya (Mt. Misery, leg. N. G. Andersson 1899; LYNGE 1926 p. 27). Of *Gyrophora cylindrica* (L.) Ach. var. *delisei* (Despr.) Th. Fr. from Bjørnøya LYNGE writes (1926 p. 43): "Some plants were infested with a parasite that was submitted to Dr. Karl Keissler, Vienna: "Alte Perithezien eines Flechtenparasiten, ohne Spur eines Inhaltes. Vermutlich *Tichothecium grossum* Körb. (= *Discothecium grossum* Vouaux)."

In the same paper (p. 74) LYNGE also records the following lichen parasites from Bjørnøya (Bear Island) (all of them identified by Dr. Keissler): *Didymella pulposi* (Zopf) Vouaux on *Leptogium lichenoides* (L.) A. Zahlbr. var. *pulvinatum* (Hoffm.) A. Zahlbr., *Pleospora hookeri* (Borr.) Keissl. (syn. *P. engeliana* Wint.) on an indeterminable lichen, *Discothecium grossum* Vouaux (syn. *Tichothecium grossum* Körb.) on *Gyrophora cylindrica* (L.) Ach. var. *delisei* (Despr.) Th. Fr., *Tichothecium pygmaeum* Körb. on *Lecidea pantherina* (Ach.) Th. Fr., and *Torula lichenum* Keissl.

Among the lichen parasites listed by LYNGE (l. c. p. 74) is *Durella leicideola* (Fr.) Rehm var. *coeruleo-viridis* Keissl. This Discomycete was found by Th. M. Fries on drift-wood (Sørhamna, July 23, 1868; cp. KEISSLER 1927 pp. 164—165), and is not a lichen parasite. In this list Lyngé also mentions the fungi *Crucibulum vulgare* Tul. and *Aposphaeria* sp. ("ganz sterile Gehäuse") from Bjørnøya.

Galls on lichens may also be due to animals etc. (cp. the numerous studies on lichen galls by E. Bachmann), and some galls collected by Scholander on *Cetraria hepatizon* (Ach.) Vain. at Torellneset in Hinlopenstredet may not have been caused by a fungus. Parasitic galls on *Cladonia uncialis* (L.) Web. were found in Mariaholmen in Bellsund (LYNGE 1938 p. 58).

Ustilago inflorescentiae (Trel.) Maire.

In the inflorescence of *Polygonum viviparum* L. Murchisonfjorden: Celsiusfjellet, at the head of the fjord, July 27; spores $8.5-17 \times 8.3-12.5 \mu$. Floraberget, July 23; sp. $11-18(20.5) \times 9.3-15.5 \mu$.

Floraberget (c. $80^{\circ}3'N$) in Murchisonfjorden is the northernmost locality in the world for *U. inflorescentiae*.

Ustilago violacea (Pers.) Gray.

In the anthers of *Silene acaulis* L. Lomfjorden: Lomfjordbotnen, Aug. 13; sp. 5.5—8.4 μ in their longest diameter.

Lomfjordbotnen (c. 79°23' N) is the northern limit for *U. violacea* on *S. acaulis* (cp. WULFF 1902 p. 115 and 100).

Some unidentifiable Agarics.

According to Dr. Scholander, Agarics are very seldom met with in the north-eastern parts of Svalbard; and it may therefore be useful to mention also some specimens whose badly preserved condition made a positive identification impossible:

Russula sp.

Murchisonfjorden: Floraberget, c. July 24; collector's note: "*Russula*. Exceedingly bitter."

I also examined a *Russula* from Kapp Mitra in Krossfjorden, Aug. 27, 1907, leg. Hanna Resvoll-Holmsen, but cannot name the species, as the separation of species within this genus is always very difficult, and quite impossible in poorly preserved material.

Cortinarius sp.

Lomfjorden: Lomfjordbotnen, Aug. 13; collector's note: "Yellow just under the surface of the pileus. Often seen in Eirik Raudes Land on dung."

I also examined some specimens from Adventfjorden, Aug. 10, and from Ebeltoftthamna, July 28, 1907, leg. Hanna Resvoll-Holmsen, which seem to be *Cortinarius cinnamomeus* (L.) Fr.¹

Dr. Scholander collected another unidentifiable Agaric in Lomfjordbotnen (Aug. 13), and one at Rundhaugen in Hinlopenstredet (July 2).

On the Oxford Expedition in 1924 some Agarics were also collected in Northern Svalbard, which could only be identified generically (Dr. Elsie M. Wakefield com. 1933).

It is highly desirable that the Agarics of Svalbard and other Arctic countries be given closer study. Hitherto only occasional, badly preserved collections have been brought home. For reliable identification many procedures are necessary: the cutting and pressing of sections (the drying is often very difficult in wet and foggy climate), and the drawing of sketches and painting of water colours, since identifications and descriptions

¹ Another *Cortinarius* (from Rundhaugen in Hinlopenstredet, c. 79°40' N) was in 1949 sent to Dr. Morten Lange who kindly examined it, but could at present only identify it as *Cortinarius* (*Myxacium*) sp. Lange says that he has seen this *Myxacium* species in Greenland, and perhaps in Lapland, and that it is possible that it is an undescribed species.

can only partially be made on fresh material in the field. Every one acquainted with the conditions during Arctic expeditions will understand that the common all-round expedition botanist has found all these operations too much time-consuming, and therefore also on the whole has omitted the taking of spore prints, and the making of exact field notes about the colours (e. g. by comparison with colour charts), the taste, the smell, etc. And only the specialist can carry out really good work on these matters.

Many Norwegian botanists have brought home Agarics from Svalbard, but almost always poorly preserved specimens. Mrs. Hanna Resvoll-Holmsen collected many Agarics in 1907, in Adventfjorden, at Kapp Mitra, in Ebeltoftthamna, Möllerfjorden, Lilliehöökfjorden, Hamburgerfjorden and Magdalenefjorden, but the greater part of her material is in an imperfectly preserved condition and can only be identified generically (some of her specimens from Adventfjorden, Hamburgerfjorden and "Nunatak in Hamburgerfjorden" could not be referred to genus). A number of Mrs. Resvoll-Holmsen's specimens were studied by the eminent Norwegian agaricologist, John Egeland; he recognized a *Naucoria* sp. (Kapp Mitra, Aug. 27, 1907 and Magdalenefjorden, Aug. 20, 1907) and an *Entoloma* sp. (Ebeltoftthamna, July 25, 1907) in her collections.

Olaf Hanssen, O. Arbo Høeg and B. Lynge have also brought home (chiefly unidentifiable) specimens of Agarics from Svalbard, and Th. Iversen and E. Koefoed collected fine specimens of *Psalliota arvensis* (Schaeff.) Fr. in Adventfjorden: Hotellneset, Aug. 16, 1925 (pileus 8—10 cm. broad, stem c. 6 cm. high, c. 1.5 cm. thick).

After this communication was written (1934), DOBBS' interesting "Note on the larger Fungi of Spitsbergen" (1942) has appeared, and I should like to conclude my paper with some quotations from his introduction: "Our knowledge of the larger fungi of Spitsbergen and other high arctic countries is extremely limited and lags far behind that of all other groups of plants. — — — the difficulties are increased when the specimens are stunted and atypical, as most arctic forms are.

"The situation could be greatly improved only if an authority on agarics could find the time to visit Spitsbergen. — — — —

"When, in the summer of 1936, I visited Spitsbergen, I was surprised at the number and variety of the agarics to be found there. One purpose of this note, therefore, is to draw attention to a practically unexamined fungus flora, and to the problems of distribution which it presents."

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MAPS AND CHARTS

The following topographical maps and charts have been published separately:

Maps:

- Bjørnøya. 1:25 000. 1925. New edition 1944. Kr. 3,00.
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 Adventfjorden—Braganzavågen. 1:100 000. 1941. Kr. 2,00.
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Preliminary topographical maps [1:50 000] covering claims to land in Svalbard may be obtained separately.

Charts:

- No. 501. Bjørnøya. 1:40 000. 1932. Kr. 4,00.
 „ 502. Bjørnøyfarvatnet. 1:350 000. 1937. Kr. 4,00.
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