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REPORT

OF THE

CANADIAN ARCTIC EXPEDITION
1913-18

VOLUME IV: BOTANY

PART C: FUNGI

By JOHN DEARNNESS
Report of the Canadian Arctic Expedition, 1913-18.

**VOLUME I: GENERAL INTRODUCTION, NARRATIVE, ETC.**


(In preparation)

**VOLUME II: MAMMALS AND BIRDS**

Part B: BIRDS OF WESTERN ARCTIC AMERICA. By R. M. Anderson and P. A. Taverner.

(In preparation)

**VOLUME III: INSECTS**

INTRODUCTION. By C. Gordon Hewitt

Part A: COLEOPTERA. By L. W. Toddson

Part B: NEOTROPHIC NOCTUINS. By Nathan Banks

Part C: DIPTERA. 
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- Mosquitoes. By Howard G. Dyar

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Part D: MALLOPHAGA AND ANOPHTERA. 
- Mallophaga. By A. W. Wiker
- Anopthera. By G. E. Farnham and G. R. F. Nuttal

Part E: COLEOPTERA. 
- Forest Insects, including Iliidea, Cerambycidae, and Buprestidae. By J. M. Swaine
- Carabidae and Staphylinidae. By H. C. Fall
- Coccinellidae, Eleodes, Chrysomelidae and Rhynchophora (excluding Iliidea). By W. C. Long

Part F: HEMIPTERA. By Edward P. Van Duzee

Part G: HYMENOPTERA AND PLANT GALLS. 
- Sphegidae. (Sphegidae). By Albert D. MacGillivray
- Parasitic Hymenoptera. By Charles E. Bruce

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- Spiders. By J. J. Emerton
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TRIBUTION OF ARCTIC PLANTS. By Theo. Holm

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Part L: ABIOPHOD CRUSTACEANS. By Charles B. Wilson

Part M: CIRRIPEDIA. By H. P. Dall

Part N: THE CRUSTACEAN LIFE OF SOME ARCTIC LAGOONS, LAKES AND PONDS. By F. Johnson

(In preparation)
INTRODUCTION

At the request of the late Mr. James M. Macoun, I undertook the study of the fungi collected by the naturalists of the Southern Party of the Canadian Arctic expedition. Mr. Frits Johansen had collected about thirty species, storing the fleshly ones in alcohol and preserving the others dry.

In addition to the examination of these I have been afforded the opportunity to examine the collections of phaeorogams for fungi that might be found inhabiting them. This experience was interesting in several ways. I was surprised at the relatively small number of "summer stages" of parasitic fungi. On an equal number of affected flowering plants collected in the southern latitudes of Canada there would be a large majority of examples of the stage of fungi reproducing by conidia or "summer spores" of some kind. Most of the fungi inhabiting the arctic plants were found only in the ascosporous or mature condition.

Another unexpected difference appeared in the wider range of host plants inhabited by the same fungus species. In the south, as a rule, one fungus at a time inhabits one host plant; in the north, it was not uncommon to find two or three micromycetes on the same individual host plant, especially on those plants that grow in dense rosettes or in the pillar form. On the latter the leaves, though winter-killed or dead, remain firmly attached to the plant for years and doubtless afford it protection. Fungi thus have the opportunity to become established on a plant in successive years. Parasitism does not seem to play much part. There, as here, the mature stage of the fungus seems to be quite saprophytic or, at worst, invading the tissue only when its vitality languishes.

At Mr. Macoun's suggestion I have made notes of the findings in the important orders of the fungi listed in the available reports of the flora of American arctic regions, other than the one explored by the Canadian expedition. For that purpose the following reports were used:1

Meddeleser om Groenland, Bind III, Copenhagen, 1880, containing Oversigt ov Svampe by E. Rostrup, 1888, and Tillæg, 1891, by the same author.

Meddeleser om Groenland, Bind XVIII, Copenhagen, 1896, containing Oest Groenlands Svampe by E. Rostrup, 1894, and Champignons du Groenland Oriental.


Meddeleser om Groenland, Bind XI,III, Copenhagen, 1911-1917, containing Fungi Terrestres north of 76° N. Lat. Determ. C. F. Ferdinandsen, and Systematic List of Micromycetes, Determ. J. Lind. (The specimens were collected 1906-1908).


1 In the Report of the International Polar Expedition to Point Barrow, Alaska, Washington 1887, p. 192, Prof. Asa Gray, in a brief report on the Plants, states: "There was a quantity of fungi preserved in alcohol, but without notes of color, habit, etc., so that the specific determination is in their present state impossible. The specimens, as far as could be told, seemed to include two species of Agaricus and one of Russula."

Due d’Orleans, Croisière Océanographique accomplie à bord de la Belgica dans la mer du Grönland 1905. Bruxelles, 1907.


So far as I know these are the only reports upon collections of American arctic fungi. There have been other collections of phanerogamous plants but usually if the collectors of such plants are not looking for fungi they remove discoloured and deformed parts when they do not or cannot select clean, healthy-looking specimens.

Anyone who has observed the greatly varied and abundant fungus flora of rich woods in southern Canada and contrasted it with the scanty and poorly developed flora in an exposed and comparatively arid region is prepared to believe that within the Arctic circle the fungi will be very meagerly represented.

In the report on the cryptogamic botany of Alaska published for the Harriman Alaska Expedition in 1903-04, the editor, Dr. William Trelease, notes that up to that time only 14 species of fungi had been listed.1 Commenting thereupon, he says: “The fact remains that almost nothing is known of the fungus flora of Alaska and yet conditions are favourable for a development there of a large representation of this group of plants.” He referred to the rainfall and fogs and mists common on the long coastal region favouring as they do a large and varied phanerogamic vegetation. Besides, the lower coast of Alaska from Sitka and Yakutat to Kodiak, where much of the Harriman expedition’s collecting was done, is nearly 500 miles south of the Arctic circle. That so few Alaskan fungi had been enumerated prior to 1900 is the more surprising in view of the fact that at the same date no less than 386 Alaskan species and varieties of their congeners—the lichens—had been listed.2

Greenland’s long coast-line both on the east and west sides has been explored at many points by scientists connected with several Danish and other expeditions; and while, doubtless, there will yet be important additions made, its fungus flora is much more completely studied than that of any other extensive region of arctic America. In making comparisons it must be borne in mind, however, that its southern point is more than 450 miles south of the Arctic circle.

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<td>Melanconiae et al.</td>
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<td>Other Orders</td>
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3 The unidentified species are included.
The collections enumerated in this report were made between lat. 67° N. and lat 77° N., chiefly along the northern coast-line of the Yukon and Mackenzie districts; the positions of most of the localities are stated in the introduction to Part A of Vol. V. The median line of the chief collecting points runs from near Point Barrow to Bathurst inlet, a distance, following the coast, of over 1,200 miles and averaging about 150 miles north of the Arctic circle. The collections made in the territory near the mouth of the Sadlerochit river and in the northeast corner of Alaska are not separated in the above table from the strictly Canadian ones.

The time and locality of collection of the plants herein listed are given as exactly as the available data permitted, and, further to identify the particular plant on which the micromycete was observed, the number of the plant as preserved in the National Herbarium, Victoria Memorial Museum, Ottawa, is added. Thus under Pleospora arctica, 98416 is the herbarium number of the particular specimen of Oxytropis campestris var. sordida upon which this fungus was studied.

Mr. Frits Johansen was the collector in all instances where no other name is given.

JOHN DEARNESS.

LONDON, ONTARIO, NOVEMBER 27, 1922.
The Fungi of the Arctic Coast of America West of the 100th Meridian

Collected by the Canadian Arctic Expedition 1913-18

By John Dearness, M.A.

MYXOMYCETES.

No Myxomycetes were collected by the Canadian Arctic expedition. One species was found by the Harriman Alaska expedition. In the consulted reports of the Greenland expeditions six myxomycetes are listed.

PHYCOMYCETES.

The Phycomycetes, including the Mucors, Peronosporaceae, and about a dozen other less important families, must be rare in the arctic regions, for only five species are named in the Alaska report, and seven species in the Greenland lists. None were collected by the Canadian Arctic expedition.

ASCOMYCETES.

SORDARIACEAE.

No species of this interesting family were brought back. They are small plants, nearly all of them growing in the ordure of animals. It is extremely probable that several of them are existent in the territory. In the Amdrup expedition to northeast Greenland, between 69° and 74.30° N. lat., N. Hartz found no less than nine different species growing in the droppings of animals, four of them in Sordariaceae and three in Ascoboleae.

SPHAERIACEAE.

Gnomonia sp.


Beak 400-500 μ long, slightly enlarged at ostiole. Too old or too imperfectly developed to determine the species.

Mycosphaerella confinis (Karst.)


Mycosphaerella eriophila (Niesl.)


This species was found on the same host in Greenland. It is reported on Artemisia in western Alaska. Doubtless it is a common arctic species.

Mycosphaerella iromersa n. sp.

Perithece immersed, ostiols erumpentibus, 270 μ in diam. Asci 75 x 9-10 μ, apaphysatis. Sporidia uniseriatis, hyalini, elliptici, uni-angulati, non constrieti, 15 x 8 μ.
In foliis Cassiopis tetragonar (L.) Don.

Perithecia deeply immersed in the leaves, only the ostiola erumpent, 270 μ in diameter. Asci 75 x 9-10 μ, aseptate. Sporidia not constricted, uniseriate, hyaline, elliptic, uniformly 15 x 8 μ.

On leaves of Cassiopis tetragonar (L.) Don. Camden bay, July 2, 1914, 98763.

Mycosphaerella inconspicua (Schroet.)


On leaves and flower stems of Cassiope tetragonar (L.) Don. Bernard harbour, August, 1915, 98762.

The species is common on this host.

Mycosphaerella minor (Karst.)

Sphaerella minor Karst. Myc. Fenn. 11, 171.


Gregarious, connected at base by radiating hyphae. Asci 30-33 μ; sporidia 9-12 x 3 μ.

A form of this species on Saxifraga, having larger fruit—asci about 50 x 15 μ and sporidia 15-18 x 5 μ—and a brown subiculum visibly colouring the affected areas of the leaf and connecting the species with Sphaerella trichophila Karst., was described in Mycologia IX, 346. The distinction between the two species seems to hinge on the bristly appendages and the size of the fruit. On the collections in hand considerable difference in these features are found on the same host plant, making it difficult to determine to which species the fungus should be referred.

On Saxifraga Nelsoniana D. Don. Camden bay, June 7, 1914.

Mycosphaerella minor (Karst.) var. reticulata n. var.

Perithecia 75-140 μ ad subiculum. Asci 50-65 x 10-15 μ. Sporidia 15-16 x 4-5 μ.

In foliis mortuis Salicii reticulatae L.

The radiating, brown, septate, branching fibers bearing the gregarious perithecia are innate and raise the cuticle on the lower side of the leaf into areas of ash colour 2-4 mm. in diameter. These areas are quite opaque when held against the light. Some of the perithecia are bristly, suggesting the characters of Venturia. These were described in 1917 and published in Mycologia IX, 347 under the name of Venturia subercolus. Subsequent examination of additional material showed forms approaching Karsten’s Sphaerella minor in habit and structure but with larger perithecia, asci and sporidia. The smoother and smaller perithecia are much like those of Mycosphaerella minor but the fructification is generally larger and the subiculum denser. The largest and most bristly perithecia might be taken for Mycosphaerella trichophila (Karst.) which is also innate and subiculate. It is intermediate between them but all things considered it seems nearer to M. minor and in the meantime is disposed of as a variety of that species. Further study of sufficient material may yet show it to be a distinct species.

On leaves of Salix reticulata L. Camden bay, June 29, 1914.

Mycosphaerella prope oothecam (Sacc.)

Sphaerella ootheca Sacc.


The asci and sporidia are so variable on this material that the determination of the species is uncertain. A Phytophthora near Drabae (Focke) and Pleospora vulgaris Niessl were also present on this collection of Ranunculus affinis.
Mycosphaerella pachyasca (Rostr.) Vgr.
- On *Astragalus alpins* L. Collinson point, July 17, 1914, 98214.
- This species seems to be the commonest pyrenomycete on dicotyledons in the region.

Mycosphaerella Pedicularis (Karst.)
*Sphaerella Pedicularis* Karsten. Fungi Spetsb. No. 53.

Mycosphaerella Tassiana (de Not.) Johans.
- Judging from the Greenland reports and that of the *Fram* expedition, this fungus is the one most commonly found on the grasses of our northeast arctic region.

Physalospora Crepiniana Sacc. and March.
- Perithecia are hypophyllous. Aecium paraphysate, 60-75 μ. Ascospores 18-21 x 8 μ.

Didymosphaeria Johansenii n. sp.
- Perithecia hypophyllous, dispersis, immersis, globosis. circa 100 μ in diam.; ostioli emergentibus, perforatis. Asci subglobo-paraphysata, breviter stipitatis, 33-45 x 18-25 μ. Sporidia sub-biseriata, conglobatae. Hyaline, denique fuligineis, 12-16 x 4.5-6 μ.
- On the same host, but immature, west of Martin point, end of July, 1914, 98959.

Metasphaeria sp. [probably *Empetrum* (Fr.) Sacc.]
- Aecium paraphysata, 60 x 8-11 μ, sporidia hyalina, 3-septata, 15 x 3-4.5 μ.
Leptosphaeria prope borealem E. and E.
This collection is too old for certain determination of the species. The features extant correspond with those of L. borealis.

Leptosphaeria prope Hierochloa Ouds.
Sporidia 5-7-septate, third cell larger than the others, the cells mostly about 11 μ in each dimension in the largest spores.
As a rule, the size and form of the asci and sporidia in the Sphaeriaceae are so constant in the same species that the measurements and septation have considerable diagnostic value. In the same perithecia in this collection these organs show considerable disparity. The largest asci measured were fully twice as large as the smallest ones.

Massarina Dryadis Rostr.
In the dense mass of small revolute leaves three fungi were found, namely Mycosphaerella pachyacca, Pleospora sp., and a few leaves with a Massarina-like species which is probably Massarina Dryadis Rostr.
In the original description Rostrup does not give the measurements. The sporidia here were 5-7-septate, constricted, 30-35 μ long and 15 μ wide in the widest part. Rostrup found his species on dead leaves of Dryas from Greenland. Trelease found what he thought might be Rostrup’s species on Dryas integrifolia collected by Murdoch at Point Barrow, Alaska, upon which he makes the remark “not entirely mature.”
The collector’s note reads: “A yellow fungus-blight turning the leaves of the common Dryas a yellow colour.” From the material examined I could not determine which, if any, of the fungi found caused the blighting of the leaves.

Pleospora arctica Fuckl.

Pleospora Drabaec Schröt. var. nuda n. var.
Peritheciis nudis; sporidios constrictis.
Schröter in Nord. Pilze gives the perithecia as surrounded at the base by creeping hyphae, otherwise smooth. The perithecia on this material are naked but are collapsing and papillate as in Schröter’s description. The sporidia are constricted and primarily 3-septate; when they become 5-septate the three primary cells remain distinct; the larger part of the sporidium is superior to the middle constriction.

Pleospora herbarum (Pers.) Rabh.
On Papaver nudicaule L. Konganevik, June 27, 1914, 97870.
On *Potentilla palustris* R. Br. Collinson point, June 18, 1914, 98820.


In Mededelekken on Groenland, 43, 155, L. Lind states that what he calls *Pleospora arctica* Farkl. (not *Pleospora arctica* Karst.) is very probably the same fungus that E. Rostrup in Fungi Groenlandiae repeatedly calls *Pleospora harbarum* (Pers.). Rostrup held that there is no difference between the two species. Lind, however, contends that there are differences, and he mentions that the sporidia of *P. arctica* are the smaller and when mature are the darker of the two. Lind would probably call the examples listed above by the latter name. His diagnosis of *P. arctica* is as follows: “Perithecia 350 μ x 230 μ; ascis oblongis curvatis, 100-128 μ x 23-28 μ; paraphysibus numerosis, hyalinis, multiguttulatis; sporidia initio flavis, dein saturate brunneis, 34-36 μ x 14-16 μ; 6-septatis medio constrictis, parte supera parum tumidior longimotatorius 1-2-septatis.”

**Pleospora vulgaris** Niessl.


On *Papaver nudicaule* L. Bernard harbour, Aug. 25, 1915, 97855. The fructification on this host is rather small for *P. vulgaris* and much smaller than that of *Pleospora papaveraceae* (de Not.).


On *Sausurea angustifolia* DC. Herschel island, August, 1914, 98973.

**Pleospora sp.**

On stems of *Papaver nudicaule* L. Victoria strait, August 22, 1918, Capt. J. F. Bernard.

The perithecia bear radiating brown hyphae at base and have constricted sporidia, upper “half” larger. The species bears a close resemblance to Schroeter’s *P. Drabae*.

**Clathrospora Elynae** Rabl.

*Pleospora Elynae* Ces. and de Not.


*Clathrospora* has clathrate, amber-coloured sporidia differing from *Pleospora* in that the cells all lie in one plane. The ascis and sporidia in this collection on *Juncus* are smaller than the measurements given by Lind as found by him on *Luzula* collected in Greenland. The sporidia on the Bernard harbour material are very variable in size, reaching a maximum of about 45 x 20 μ. They show about 25 cells on the side and 7 or 8 on the edge.

**Clathrospora pentamera** (Karst.) Berlese


The species was first described by Karsten on material found in Spitzbergen. It is reported in Greenland on a half-dozen or more species of grasses and also in western Alaska on *Dipontiia*; hence it is probably a widely distributed inhabitant of the arctic grasses.

The sporidia, when viewed on the flat side, are somewhat pear-shaped.

**Clathrospora platyspora** Sacc.

On *Streps Arctica* L. forma subalpina (Terez.) Simm. Cape Bathurst, August 18, 1900, Rev. L. O. Stringer, 62225.
Pyrenophora chrysospora (Niessl) Sacc.


*On Oxytropis campestris* (L.) DC. var. *sativida* Willd. Bernard harbour, August 1915, 98415.


This fine species is reported from East and West Greenland and from Alaska.

Pyrenophora comata (Awd. and Niessl) Sacc.

*Pleospora* comata Awd. and Niessl. Trans. in Ell. and Evr. N. Am. Pyr., p. 349.


*On leaves of Daskeanthe* frigidum Cham. and Schlecht. Herschel island, August, 1914, 98825.

Pyrenophora paucitricha (Fuckl.) Berl. and Vogl.


Associated with a *Phoma* on *Oxytropis* Rustioli *Ostf.* Bernard harbour, August 1, 1915, 98406.

The perithecia are here crowned by a group of septate, brown bristles, 90-150 \( \times \) 5-6 \( \mu \). Linal comments on the variation in the size of the sporidia in this species as found in Greenland collections. The smaller sizes are near 27 \( \times \) 11 \( \mu \) and the largest reach 45 \( \times \) 22 \( \mu \).

*On Pappus* many of the sporidia were 3-septate but not mariform. In mature asci longitudinal as well as transverse septa were evident.

Pyrenophora sp.


This is different from the foregoing but not in condition to determine.

Teichospora sp.

*On a fragment of bark of one of the willows bearing Selerodermis* falшивa (Fr.). Saddlecreek river, November, 1913. This seems to be related to *T. papillosa* E. and E., and to *T. patellaroides* Sacc. Sporidia 5-septate, mariform, dark-brown. The perithecia bear short, basal, brown hyphae.

The foregoing enumeration includes thirty sphaeriocones species inhabiting phanerogams most of which grew in the country around Bernard harbour.

Captain Fielden and H. C. Hart collected fungi on the Nares expedition. These were determined by the Rev. M. J. Berkeley who found only three sphaeriocones species, indeed only t.v. for one, a *Charactium*, grown on a damp surface in the cabin of the Alert and is cosmopolitan. The other two were *Venturia* *hyrticii* Cke. *on Cassinia* and *Myoscaphrella* *lindleyi* (Desm.) *on a grass.*

Mr. H. G. Simmons, connected with the second Nares expedition on the *Etron*, collected nine of the foregoing species on Ellesmere island, viz.:

*Pleospora* herbarum (Pers.). *On Aznica alpina*, *Tara* *tenuifolia*, *Agrostis* *tibitrica*, *Petriolaris* *capitata*, *P. lima*, *Chamaenerion* *latifolium*, *Poltenilla* *rubricaulis*, *Saxifraga* *azorica*, *S. ericoida*, *S. groenlandica*, *S. hirculus*, *S. nivalis*, *Draba* *nivalis*, *D. glaucifolia*, *Papaver* *radicum*, *Ranunculus* *salplicus*, *R. officinalis*, *Melandrium* *officinale*, *Stellaria* *longipes*, *Alnus* *verna*, *Oxyria* *digyna*.

*Pleospora* *Draba* *Schroet.* *On Draba* *alpina*.

*Pleospora* *ulmariae* Niessl. *On Potentilla* *emeryana*, *Cystopteris* *frigida*, and *Lycopodium* *Selago*.


**DOTHIDEACEAE.**

**Dothidella sphaerelloides** n. sp.


In foliis vivis Saxifragae Hirculus L. Stomata epiphyllous, usually one, sometimes two or three on the same leaf. Perithecia or emergent locules stromatiously connected, black, shining, 30-36 persq. mm., shortly conical, terminating in obtuse, paler ostiolum. Loculi 50-180 μ in section parallel to the plane of the stroma. Ascii apaphysate or nearly so, fusoid or clavate, 40-45 x 8-9 μ. Sporidiae hyalinae, sub-biserialis, uniseptate, upper cell rounded at end and larger than the lower cell, the latter conically truncate to sub-acute, 13-16 μ in length and 3 μ in width at the septum. The number of sporidia in the ascus is usually 8 but sometimes 6 or even 4.


Dr. Anderson found this again on the 15th of August 1915, at Cape Barrow on the same host, 91432.
Dohidella betulina (Fr.) has been found at more than one station in both Greenland and Alaska. Both this and Phyllachora graminis (Pers.) are likely existent on their respective hosts here and there throughout the Canadian arctic regions.

**Hysteriaceae.**

Lophodermium arundinaeum (Schrad.) Chev.

*L. calycinenum* Fr.


Asco-pores linear, mostly about 55 x 2 μ.

In this family two species are named in the Alaska list (Harriman expedition) and eleven in the Greenland lists. Mr. H. G. Simmons collected two in Ellesmere land, the one named above, and *Lophodermium maculare* (Fr.) on *Myrtillus uliginosus*.

**Stictidaceae.**

Propolis angulosa Karst.

On a fragment of bark of *Salix*, probably *Richardsonii* Hook. Sadelrochit river, Camden bay, November, 1913.

This attractive fungus is not mature enough for certain determination. It is immersed in the parenchyma of its host and has the gray-green hymenium of *P. angulosa*. The margin of whitish, triangular laciniae imparts to the apothecia a stellate appearance.

There are six Stictide in the Greenland lists but the family is unrepresented in the other American arctic lists consulted.

**Pezizaceae.**

Scleroderris fuliginosa (Fr.) Karst.

On branchlets of *Salix Richardsonii* Hook. Fifty miles up the Sadelrochit river, Camden bay, Nov. 13, 1913.

On *Salix sp.* On tundra southwest of Collinson point, June 7, 1914. Associated with *Mastomyces proboscidea* (Fr.) Sacc.

Apotheci., nearly black, densely gregarious and cepitose. Asco-pores 60-75 μ long.

This species seems to be common on willows in northern Europe. The only other American collection I have seen was made by Dr. House, on Bald mountain in New York State.

Not many of the Peziaceae are directly parasitic, at least in their ascigerous stage, but Rosstrup has proved that in Denmark, where he found *Scleroderris fuliginosa* on several species of willow, it is truly parasitic and that it killed affected branches in a short time.

In Mr. Johansen’s collection at Collinson point a few pyramids of the conidial stage were observed on the same branches with the mature plants. One of the branches bore a thin crustose lichen with orange, peziza-like apothecia which R. S. Williams determined to be *Caloplaea corina* (Ehrh.) Zahlb.

Peziza micropus Pers. var. *flavida* Phil.

Growing upon and under old sacks along the pond behind Teller, July 31, 1913.
Paraphyses gradually thickened at summit; sporidia 15-18 x 8-0 μ. Fibers of the sucking are retained in the mycelium at base of stem.

Scutellina scutellata (L.)
Peziza scutellata L. (Fr. Syst. Myc. II: 85)
Growing on rotten wood lying in water at Nome, August 20, 1916.
This seems to have had a red-orange hymenium. The margin is beset with long, rigid bristles, 1.5-1 mm. long; the sporidia are broad-elliptic, grannous, 10-21 μ.

No Helvelias or large Pezizas were collected. I find only one species of Morella and one Helvella reported in the Greenland lists.

Between 40 and 50 Pezizas or pezizoid species are enumerated in the Greenland lists and twelve in the Alaska one (Harriman expedition). Mr. Berkeley found two in the Nares collection, Peziza stercorea Pers., and Uredula Hartii Berk., and Mr. Simmons found five in Ellesmere land, viz.:  

Sclerotinia Vahlina Rostr.,  
Mollis grahamis (Desm.),  
Trochila junceola Rostr.,  
Trochila ignobilis Karst.,  
Niptera melaleuca (Larch.).

UREDINACEAE.

Aecidium of (?) Uromyces Phacae-frigidae (Wahl.) Har.
On the same host, Herschel island, August 9, 1914.
Failing to connect this aecidial stage, whose golden coloured spore cover the under surface of the leaves of its host, with the mature stage, I submitted examples of it to Professor H. S. Jackson, of Purdue University. He reports, in effect, that the aecidium is quite new to the North American flora, and that there is in northern Europe on this host a Uromyces described as having teluotospores only, which are evenly distributed on the leaf surface. He is of opinion that Uromyces Phacae-frigidae is an Opis-Uromyces and that we probably have here a hitherto undiscovered aecial stage of the fungus.

Melampsora Bigelowii Thüm.
Uredo Bigelowii (Thüm.) Thüm. Arth.
On Salix pulchra Cham. Collinson point, June 13, 1914, 93809.
Urediospores catenate, rough, 18-21 μ, paraphyses with heads 23-30 μ in diameter and pedicels 15-65 x 6 μ. The walls of the spores are 2.5-3.5 μ thick. Melampsora Bigelowii Rostr. has been found on three species of willow in Greenland while M. Bigelowii is not recorded from there in the lists consulted.

Puccinia Arenariae Schum.

One might reasonably expect to find a considerable number of species of this very large and widely distributed family of fungal parasites on one or another of the 230 species of vascular plants, many of them in numerous specimens, collected by Mr. Johansen and other members of the expedition. The
expectation was enhanced by the fact that 23 species have been recorded on Greenland hosts and no less than 40 in the Alaska list (op. cit.). Although every plant in the Canadian Arctic collection was scrutinized for rusts in any stage, only the three named above were detected.

In 1909 Professor A. S. Hitchcock, Agrostologist to the U.S. Dept. of Agriculture, made a collecting trip through interior Alaska and part of Yukon in the neighborhood of Dawson. He collected five Uredines in Yukon which Dr. J. C. Arthur identified as follows:

_Puccinia tubaciencis_ (Johanns.) on _Galeum boreale_; _Accidium Apheli Clint._ on _Shepherdia canadensis_; _Melampsora Rebsa-Salicum_ Bubak _L._ on _Salix glauca_; _Melampsora tricolor_ (Peck) Arth. II on _Ledum groenlandicum_; and _Podosphaera boreale_ Arth. & Kern on _Pinus canadensis._

It is to be noted that Dr. Simmons did not find any Uredineae in Ellesmereland. Rev. Mr. Berkeley determined a single example brought back by the Nares expedition, collected at base, to be _Tricholoma Pyrole Berk._

**USTILAGINACEAE.**

_Schizonella melanogramma_ (DC.) Schroet.

In good fruit, parasitic on the leaves of _Carex stans_ Drej. Herschel island, Aug. 9, 1914, 97661.

I find no record of any other collection of this smut in the arctic regions.

Dr. Simmons collected _Sphaerella _Hydropiperis_ (Schum.) de By. on _Polygonum viviparum_ L. and _Convolvulus_ Cariciis (Pers.) Magn. on _Elymus herbardii_ (All.) K. Koch.

The Alaska list (op. cit.) names three species of _Ustilago_ and a _Tubercinia._

The smuts like the rusts seem to be rare in the Canadian arctic regions.

**BASIDIOMYCETES.**

**POLYPORACEAE.**

_Boletus scaber_ Fr.

On Herschel island, July 31, 1916.

The specimen had been preserved in alcohol. Soaking in water recovered some of its characters, particularly the viscidity of the pileus. The spores are very large, 16-18 x 5-6 _μ_, exceptionally reaching 20 _μ_ in length with the extreme width 8 _μ_. This is the only collection of a _Boletus_ that I find recorded west of Greenland.

It is not to be wondered at that the wood-inhabiting Thelephores, Hydnans and Polypores should be rare or absent where stunted willows and birches are the only kindred of the temperate forests.

**AGARICACEAE.**

_Cantharellus muscigenus_ Fr.

Pihunhalerskiak island, off Cockburn point, July 15, 1916.

Small gray-brown plants, 2 cm. high, having their mycelium apparently parasitic on the mosses.

_Russula_ sp.

On igh tundra, Herschel island, July 31, 1916.

Collector's note: "Shining, purple-rose, otherwise white."

The spores are echinate, globose, 10 _μ_; cystidia numerous, obtusely con.

30-35 x 12 _μ._
Hygrophorus cantharellus Fr.

Hygrophorus sp.

Omphalia umbellifera Fr.
In tundra swamp, Herschel island, July 31, 1916. Mr. Johansen's note on this collection states that the plant is "uniformly yellow-brown." In southern Ontario it varies from white to dingy striamineous. C. Ferdinandson in Greenland Fungi," restates remarks upon the strong yellow colour which this species assumes in mountain altitudes and in the arctic regions. Judging from the number of records this might seem to be the most commonly occurring agaric in the American arctic region.

Galera Hypnorum Batsch.
On tundra at Cape Bathurst, July 26, 1916. The spores are brown, ellipitic-ovate, 7-10 x 5-6 μ. These plants are larger than common for Galera Hypnorum.

Galera tenera Schueff.
In dried-out tundra swamp, Bernard harbour, August 16, 1915. Collector's note: "15 mm. high, cap 6 mm., stalk 3 mm. thick at base, brown."

Inocybe flocculosa Berk.
On tundra, Bernard harbour, August 22, 1915. Small plants about 1 cm. in width and in height. Spores smooth; cystidia crystal-capped, 60-70 μ.

Naucoria sp.
On tundra, Bernard harbour, August 22, 1915.

Hebeloma fastibile Fr.
Bernard harbour, September 1, 1915.

"Today (July 27, 1914)", writes Mr. Johansen, "I found growing in the bare sand ashore on the sandspit (at Martin Point, Camden Bay), a big Agaricus caespitis, shooting up from the ground, upper surface sand-covered. Total height 3 4 inch., stalk 2 4 inch. long and 1 inch thick at base; greatest diameter of hat-disk 3 4 inches, flat; with purple-coca-colored lamellae and almost ripe spores." I did not see this specimen. The species named has three arctic records—Cape Stewart, Greenland; Fram's fjord; Ellesmere land and Kadiak, Alaska.

Mr. F. Johansen's notes on other unidentified agarics:
No. 1. "Hat and stalk above leather brown; ripe lamellae purple-brown; ring on stalk; east end of Herschel Island," July 31, 1916.
No. 2. Same date as No. 1, at higher elevation; "a smaller yellow-brown mushroom."
No. 3. Same place as No. 1; "Russula sp., hat above shining, lighter or darker purple-rose, otherwise white; on higher tundra." Note.—The globose-cecumate spores about 9 μ, the shining pileus and other features suggest Russula ecmatica Fr.
Fungi

Dated August 17, 1915, at Bernard harbour Mr. Johansen's journal contains this note: "Much rain during the latter part of this month makes quite a few (terrestrial) fungi come out."

For their certain identification many kinds of agarics require expert study of the fresh specimens with notes on such non-persistent characters as presence or lack of vividness, differences between the young and mature stages and tests of odour and taste. On the Amundsen Expedition to the East Coast of Greenland Agarics in six genera were collected but, according to Rostrup, the species of only one kind was determinable.


H. G. Simmons on the 2nd Norwegian expedition collected agarics on Ellesmere land which E. Rostrup determined as follows: *Mycovera punicea* (Bull.), *Collybia hypophila* (Bull.), *Trioheloma cactus* (Fr.), *Omphalina umbilicata* (L.), *Heloheloma fastidii* (Fr.), *Nanoria festiva* (Fr.), *N. muscorum* (Fr.), *Galeria hypnorum* (Batsch.), *Paullinia campistriata* (L.), *P. fuscata* (Peck), *Pseudocybe poliaria* Rostr., *Russulina lutea* (Huds.), *Cantharellus luteus* (Pers).

**Lycoperdaceae.**

*Calvatia cretacea* (Ner.) Lloyd


On clay slopes, Herschel island, August 9, 1914.

On tundra hilly slopes, Kay point, Mackenzie river delta, August 17, 1914.

J. J. O'Neill.

On stony tundra, Bernard harbour, August 10, 1915.

Of the last collection Mr. Johansen writes: "four white specimens growing two together and two others together, white, the interior of dark green mass."

In some respects this is one of the most interesting fungi collected. According to Mr. C. G. Lloyd, to whom I submitted a specimen for determination, there are only two previous collections on record, one on Bellot island by Captain Fielden of the Nares expedition in August, 1876, the type specimen, and another by Thore Fries in Lapland in 1910. Mr. Lloyd counts another found in Greenland and described by Ferdinand and Winge as *C. arctica* which he thinks will prove to be the same species. The fine place of *C. arctica* in Mecklenburg on Greenland, Band 33, which Mr. Lloyd had not seen, shows that it is not the same species as *C. cretacea*.

Berkeley's description (op. cit.): "Sessile, globuloid-depressum, pallide fulvum; stem, so pulveraceum, sumum cretaceum, in areolos rigidos pyramidalis fissum; capillitio fuscō; mycelio repente niveō.

Mr. Lloyd had photographed the type which is at Kew, f. 929 in the above citation, thus making a valuable supplement to Berkeley's imperfect description.

The material now on hand enables me to complete the description as follows: Peridium sub-globosum, 4-5 cm.: the prominent, pyramidal warts of the upper cortex gradually reduced on sides and base to a granulate or even prismatic layer; gleba purplish-brown; sterile base shallow, radiating; spores globosum, echiulata, apiculata, average 6.2 μ; capillitium olive-brown, main lines about 12 μ thick, branches much smaller, about 6 μ thick.

This note is a revision of one published by the writer in *Mycologia* 9: 351, 1917.

50278—2
An immature specimen collected on Herschel island, July 31, 1916, preserved in alcohol, seems to be this species.

**Lycoperdon umbrinum** Pers.

On Herschel island, end of July, 1916.

A single specimen 4 cm. high, turbinate head 2-5 cm. wide, and nearly cylindrical stem 1.5 cm. thick with the typically large-celled interior. Identification confirmed by Mr. C. ti. Lloyd.

The Alaska list (op. cit.) gives two identified and two unidentified puff-balls. Seven members of the family are reported in the Greenland lists, *Lycoperdon gemmatum* being the commonest Greenland species.

W. S. Bruce in his very interesting little book on Polar Exploration speaks of the commonness of "deadman's snuff," the spores of the puff-ball species. Puff-balls may be common in the Old World arctic regions but the species do not seem to be numerous in the American arctic country.

**Fungi Imperfecti.**

**Leptostromaceae.**

**Leptothevrium pulchrum** n. sp.

*Pycnidia* epiphyllis, orbiculatis vel late ellipticis, nigris, depressis, diverse apertis, interdum fissis, 200-450 µ. *Conidia* hyalini, 3-8 x 1-1.5 µ. *Basidii* 15-28 x 1-1.5 µ.

In folis mortuis *Salix palustris* Cham.

*Pycnidia* epiphyllis, circular to wide-elliptic, black, shining, centrally depressed, opening variously, in some cases cleft or gaping, 200-450 µ. *Conidia* hyalini, 3-8 x 1-1.5 µ on long sporophores 15-28 x 1-1.5 µ.

On dead leaves of *Salix pulchra* Cham. Collinson point, June 11, 1914.

The general colour of the dead leaves is chocolate-brown. The *pycnidia* are scattered on much der spots that are translucent when held to the light.

**Leptostroma herbarum** (Fr.) Sacc.


Long narrow *pycnidia*: Spores 4-7 x 1.5-2 µ.

**Leptostromella Drabae** n. sp.

*Pycnidia* sub-orbicularibus, discoideis concavisve, vel elliptico-oblungis, hysteroides, brunneis, 65-160 µ. longis. *Conidia* sessilibus vel sub-sessilibus, hyalini, crescentibus, extremis partibus acutis, continuis, 15-18 x 2-2.5 µ.

In caulibus *Draba corymbosa* R. Br.

*Pycnidia* suborbicular, discoid or concave to elliptico-oblung, hysteroid, thickly scattered on stem, brownish, sub-superficial, 65-160 µ long. *Stylospores* on short basidia or sessile, hyaline, crescentic, gradually narrowing, acute at each end, continuous, 15-18 x 2-2.5 µ. The yellowing of the affected stems seems to be due to the fungus.

The type on stems of *Draba corymbosa* R. Br. Bernard harbour, August 7, 1915, 98661.

On *Draba alpina* L. Bernard harbour, July 10, 1915, 98618.

**Discosia acuta** n. sp.

*Pycnidia* nigris, planis vel centraliter depressis, ostiolatis, 120-170 µ. *Conidia* hyalini, 2-septati, curvis, angustis, acutis, 18-24 x 1-1.5 µ. *Aristis* 5-9 µ longis.
Fungi

In canibus *Ranunculus nivalis* L.

Pyenidia shining black, plane to centrally depressed, distinctly ostiolate, 120-170 μ. Conidia hyaline, 2-septate, curved, narrow, acute, aristate at one end, on basidia less than half their length, 18-24 x 1-1.5 μ; bristles 5-9 μ long.

On stems of *Ranunculus nivalis* L. Collinson point, June 14, 1914, 97916.

**SPHAERIOIDACEAE.**

Phoma herbarum West.


Sporangia various in size, some of them irregular. 2-7 μ.

Phoma Cerastii-maximi n. sp.

Pyenidia atris, cellis polygonis, muris crassis. Conidiis subglobosis, irregularibus, hyalinis, 5-7 μ.

In foliis *Cerastium maximum* L.

Pyenidia black, individual cells dark-brown, polygonal, 7-9 μ, thick-walled.

Conidia subglobose, irregular, hyaline, 5-7 μ.

This is distinct from *Phoma nebulosa* (Fr.) Mont. var. *Cerastii* Pass. which has bacillar spores.

On leaves of *Cerastium maximum* L. Cape Krusenstern, March, 1916, J. R. Cox, 101931.

Phoma sp.


Sporangia nucleate at each end, 9 x 3 μ.

Dendrophoma Lupini-arctici n. sp.

Pyenidia atris, subcuticularibus, papillatis, 270-360 μ; ostiolis perforatis, erumpentibus, 30 μ. Basidii valde ramosis. Conidiis hyalinis, oblongis, angustis, nucleatis, 6-9 x 2-5-3 μ.

In canibus *Lupinus arcticus* Watson.

Pyenidia black, large, sub-elliptica, papillata; the large perforate ostiola 36 μ — erumpent. Conidia borne on many-branched sporophores, hyaline, fuliginosus in the mass, narrowly oblong, minutely nucleate at each of the rounded ends, 6-9 x 2-5-3 μ.


Diplodina minor n. sp.

Pyenidia nigricantibus ad basim saceae sed non semper hyphis perpendiceo evidentis. Conidiis hyalinis, oblongis, extremis partibus nucleatis, uniseptatis, 5-8 x 2-2.5 μ, pleurocystis 7 x 2.5 μ.

In caulis plantae ignotae.

Pyenidia dark-coloured, scantily surrounded at the base, but not in every example, by brown, radiating hyphae. Conidia hyaline, oblong, nucleate at each end, uniseptate, 5-8 x 2-2.5 μ, mostly 7-2.5 μ.


A very similar species was found on stems and leaves of *Populus tomentosa* L., at Clifton point near the mouth of the Croker river by the Rev. H. Girling, July 1, 1916, 100472. The fructification was slightly larger, the largest conidia reaching 11 or 12 μ.
Mastomyces proboscidea (Fr.) Sacc.
On branches of Salix sp. Southwest of Collinson point, June 7, 1914. These interesting pycnidia are related to Selcroderis fuliginosa (Fr.) Karst.

Diplodia Calamagrostidis n. sp.
Pyenidiis nigris, inclusi, ostiolis crumpeientibus, 270 µ. Conidiis fuliginis, uniseptatis; basidiis 15-24 µ longis, plerunque 20 x 5-6.5 µ.
In foliis Calamagrostis purpurascens R. Br. Pyenidia black, covered except the perforate ostiola, average size 270 µ. Conidia fuliginous, uniseptate, on relatively short basidia, varying in length from 15 to 24 µ, but mostly 20 x 5-6.5 µ.
On leaves of Calamagrostis purpurascens R. Br. Bernard harbour, August 14, 1915, 91330.

Septoria Ammodeniae n. sp.
Pyenidiis plerunque hypophyllis, valde numerosis, nigris, globosis, 80-90 µ.
Sporulis rectis, hyalinis, 15-20 x 1-1.5 µ.
In foliis vivis Halianthus plectronoides (L.) Fr. The leaves of the host plant are discoloured by the fungus. Pyenidia very numerous, black, small, 80-90 µ, globose, mostly hypophyllous. Sporules straight or nearly so, 15-20 x 1-1.5 µ.
On languishing or dead leaves of Halianthus plectronoides (L.) Fr. West of Martin point, July 30, 1914, 98330.
This fungus was sought in both Septoria and Rhabdospora. The leaves do not seem to be truly maeulate. If the tissues of the host were known to be dead when they were attacked by the fungus, an investigator would look for it in the latter form-genus.

Rhabdospora Drabae (Fuekkl.) Berl. and Vogl.
Sporules 18-23 x 1.5 µ in the middle, curved, acutely pointed.
Lind in his Micromycetes of Northeast Greenland devotes a page or more to the discussion of the probable synonymy of this rather common species. He names a dozen host-genera which it inhabits in Greenland; all of them are dicotyledons.

No Leptostromata or Sphaeropsides are reported in the Nares collections. The 2nd Norw. Arc. Fram Exp. collections in Ellesmere land contained:

Phoma Cichoriacearum Sacc. on Taraxacum hyparcticum.
" alpina Spec. on Saxifraga groenlandica.
" Caricois (Fr.) on Carex membranopaca.
Coniopygium Saxifragae Rostr. on Saxifraga triunispidata.
Diplodia Simunii Rostr. on Luzula arcuata.
Stagonospora Caricois (Oud.) on Carex nardina and C. misandra.
" Eriohora Rostr. on Eriophorum polystachyum.
" Alopecurus Rostr. on Alopecurus alpinus.
Septoria ceresverpa Rostr. on Ranunculus affinis.
" semitumaris Joh. on Extrema Edwardsii.
" minuta Karst. on Luzula arcuata.
" nebula Rostr. on Poa glauca.
" punctata Karst. on Elyna Bellordii and Kobresia caricina.
Fungi

DEMATIACEAE.

Hormiscium stilbosporum (Cda.) Sacc.
On Salix pulchra Cham. Camden bay, September 27, 1913, 93765.
On same host, Collinson point, June 13, 1914, 93809.

Cladosporium herbarum (P.) Link?
On Salix leaves. Sadlerochit river, November 13, 1913.

Rhytisma?
On young twigs of Salix rotundifolia Trautv.
A black rhytismoid fungus not in fruit. Kouganevik June 30, 1914.
Rhytisma salicinum (P.) is reported on the foliage of several species of willow in Greenland.

Needles of Picea canadensis (Mill.) BSP., collected at Sandstone rapids on the lower Coppermine, February, 1915, by Mr. F. Johansen, and at Escape rapids on the same river by Dr. A. M. Anderson in February, 1916, furnish an unsolved problem. Mucedo-like tufts, concolorous with the dead leaves, were found on nearly every leaf of the twigs collected but spores were not found in situ. Failure of the functions of the twig may have caused the death of the leaves and directions of the latter strengthened this supposition. I submitted affected material to Mr. J. R. Weir, Forest Pathologist at Washington, D.C., who replied that he had not before seen spruce leaves in this condition. He is disposed to agree with me that the fungus is saprophytic. A distorted twig taken at the first named collection suggested to Mr. Johansen the effects produced by some species of Peridermium. In it I found the sloughs of Chermes-like insects but nothing else.

LIST OF NEW SPECIES AND VARIETIES

Mycosphaerella immersa n. sp.
  minor (Karst.) var. reticulata n. sp.
Didymosphaeria Johansenii n. sp.
Pleospora Drabae Schroet. var. nuda n. var.
Dothidella sphaerelloides n. sp.
Leptothyrium pulchrum n. sp.
Leptostromella Drabae n. sp.
Discosia acuta n. sp.
Phoma Cerastii-maximi n. sp.
Dendrophoma Lupini-arctici n. sp.
Diplodina minor n. sp.
Diplodia Calamagrostidis n. sp.
Septoria Ammodeniae n. sp.
INDEX OF HOST PLANTS

Alnopecurus alpinus
Clathrospora pentameca
Anemone parviflora
Rhabdospora Drabe
Mycosphaerella confinis
Arnica alpina
Pleospora herbarum
Artemisia hyperborea
Mycosphaerella pachyacea
Artemisia Richardsoniana
Pleospora vulgaris
Astragalus alpinus
Mycosphaerella pachyacea
Calamagrostis purpureascens
Diplodia Calamagrostidis
Campanula uniflora
Pyrenophora chrysospora
Carex stans
Schizonella melanogramma
Cassiope tetragna
Mycosphaerella immersa
Mycosphaerella inconspicua
Cerastium maximum
Phoma Cerasti-maximi
Dodecatheon frigidum
Mycosphaerella minor
Pyrenophora comata
Draba alpina
Leptosstromella Drabe
Draba corymbosa
Leptosstromella Drabe
Draba nirolis
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Duosia Fischeri
Leptosphaeria Heterochoae
Elymus mollis
Lophodermium acuminatum
Pleospora herbarum
Emetrum nigrum
Mycosphaerella sp.
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Epilobium latifolium
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Mycosphaerella criophila
Pleospora vulgaris
Pyrenophora sp.
INDEX OF HOST PLANTS—Continued

Erysimum inconspicuum
   Phoma herbarum
Festuca rubra var. arctica
   Lophodermium arundinaceum
Helianthus peplodes
   Septoria Ammodoniace
Hesperis Pollux
   Pleospora herbarum
Juniperus arctica
   Clathrospora Elynae
Lesquerella arctica
   Pleospora herbarum
Lupinus arcticus
   Dendrophoma Lupini-arctici
Lychnis apetala
   Pleospora vulgaris
Mycosphaerella
   Puccinia Arenariae
Mertensia silvatica
   Didymosphaeria Johansenii
Muscari
   Cantharellus muscigenus
Oxyria digyna
   Mycosphaerella pachyasca
   Pyrenophora comata
Oxytropis campstretis var. sordida
   Pyrenophora chrysospora
   Pleospora arctica
Oxytropis nigrescens
   Pyrenophora chrysospora
Oxytropis Rosedale
   Pleospora herbarum
   Pyrenophora paeicirica
Papaver nudicaule
   Diplodina minor
   Mycosphaerella pachyasca
   Pleospora vulgaris
     " herbarum
     " sp.
   Pyrenophora paeicirica
Parrya arctica
   Mycosphaerella pachyasca
     " sp.
   Pleospora herbarum
Parrya maecocarpa
   Pyrenophora chrysospora
Pedicularis sudetica
   Mycosphaerella Pedicularis
   Pedicularis sp.
   Phoma sp.
Phacca frigida
   Urolyces Phaeae-frigidae
   Pleospora vulgaris
Picca canadensis
   Mucedo
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Polemonium caeruleum
   Leptosstroma herbarum
Potentilla palustris
   Mycosphaerella pachyacea
Potentilla pulchella
   Pleospora herbarum
Ranunculus affinis
   Mycosphaerella ootheca
Potentilla pulchella
   Pleospora vulgaris
   Rhabdospora sp.
Ranunculus nivalis
   Discosia acuta
Salix anglorum
   Melampsora Bigelowii
Salix ovalifolia var. camdensis
   Melampsora Bigelowii
Salix pulehra
   Hormiscium stilbosporum
   Leptosphaeria borealis
   Leptothyrium pulchrum
   Melampsora Bigelowii
Salix reticulata
   Mycosphaerella minor var. reticulata
   (Venturia subcutanea)
Salix Richarsonii
   Gnomonia sp.
   Propolis angulosa
   Scleroderris fuliginosa
Salix rotundifolia
   Rhytisma sp.
Salix sp.
   Cladosporium herbarum?
   Leptosphaeria borealis
   Mastomyces proboscidea
   Scleroderris fuliginosa
   Teichospora sp.
Saussurea angustifolia
   Pleospora vulgaris
Saxifraga Hirculus
   Dothidella sphaerelloides
Saxifraga Nelsoniana
   Mycosphaerella minor f.
Statice Armeria f. sibirica
   Clathrospora platyspora
Trisetum spicatum
   Mycosphaerella Tassiana.
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