

A CONTRIBUTION TO THE MYCOLOGIC FLORA AND THE MYCETOZOA OF THE ROCKY MOUNTAINS.

By *W. N. Cheesman, F.L.S.*

The appended lists of Fungi and Mycetozoa were collected in the Rocky Mountains and Western Canada in the autumn of 1909, during a holiday after the meeting of the British Association at Winnipeg. Although ideal conditions for the growth of Fungi did not exist in the centre of the Dominion, yet from the foot-hills of the Rockies at Calgary to the Pacific coast, the moist warm atmosphere, always prevailing, was favourable to the growth of these organisms quite up to expectation. The hurried journey precluded the collection or observation of but few of the fleshy Agarics, and attention was mainly directed to those species which would suffer the least and allow of future examination. These were found to be the wood-loving fungi, for out of the eighty-seven species collected quite nine-tenths were growing on wood, and about one-third of the total number consisted of polypores.

As a varied geological country produces a varied phanero-gamic flora, so a varied arboreal country produces a varied fungal flora; and it was a little disappointing to notice that many of the deciduous trees flourishing in Ontario and on the Atlantic sea board were unable to endure the rigorous winters of Winnipeg, and this diminution was more pronounced when the prairie, an immense treeless plain, was crossed. So it may be expected then that Western Canada, with its diminished number of species of forest trees, will not be so rich mycologically as the Eastern Provinces with their more varied arboreal flora. The Rocky Mountains were clothed with coniferous forests, fringed with species of *Betula*, *Populus*, *Alnus* and *Salix*, and the grassy places were gay with *Artemisia*-like *Compositæ*. A panorama of one hundred miles of magnificent scenery is seen from Banff to Revelstoke, from whence to the Pacific snow-capped peaks with wooded sides and fertile valleys dominate the landscape. It will be seen that some species like *Schizophyllum commune*, *Polystictus hirsutus*, *P. versicolor*, *Hymenochaete rubiginosa*, &c., are cosmopolitan and found in every quarter of the globe. Others like *Troglia crispa*, *Polyporus chioneus*, *Fomes connatus*,

Caldesiella ferruginosa, and many others, are found only in the Northern Hemisphere, whilst others like *Polyporus distortus*, *P. radicans*, *Fomes leucophaeus*, *F. conchifer*, *Daedalea pallidofulva*, &c., have so far only been found in North America. Further investigations will undoubtedly reveal an extended range of distribution in the various species of fungi.

The present list adds several new records to the Mycology of the New World. I have to express my thanks to our member Mr. G. C. Lloyd, of Cincinnati, for the examination and determination of most of the polypores, and to Miss Annie Lorraine Smith, F.L.S., for the information respecting distribution.

The abbreviations for distribution are:—*Eu.* = Europe; *As.* = Asia; *Af.* = Africa; *Am.* = N. America; *Aust.* = Australasia.

AGARICACEÆ.

- Armillaria mucida* (Schr.) Fr. (*Eu.*, *As.*, *Am.*, *Aust.*). On beech tree. Stanley Park, Vancouver.
- Clitocybe* sp. Nelson, B.C.
- Mycena alcalina* Fr. (*Eu.*, *Am.*). On decaying wood. Revelstoke.
- Mycena tenerrima* Berk. (*Eu.*, *As.*, *Am.*). On fir cones. Lake Minnewanka, Banff.
- Crepidotus mollis* (Schæff.) Fr. (*Eu.*, *Am.*, *Aust.*). On growing wood. Medicine Hat.
- Hypholoma fasciculare* (Huds.) Fr. (*Eu.*, *As.*, *Af.*, *Am.*, *Aust.*). On stumps, base of post, &c. Frequent.
- Anellaria separata* (Linn.) Karst. (*Eu.*, *Am.*) In rank places. Revelstoke.
- Coprinus comatus* (Fl. D.) Fr. (*Eu.*, *N. Am.*). Near dwellings. Winnipeg, Glacier, &c.
- Coprinus atramentarius* (Bull.) Fr. (*Eu.*, *N. Am.*). Near dwellings. Sicamous Junction.
- Coprinus ephemerus* (Bull.) Fr. (*Eu.*, *Af.*, *Am.*, *Aust.*). Near dwellings. Kicking Horse Pass.
- Bolbitis titubans* (Bull.) Fr. (*Eu.*, *Aust.*). Among grass in wet place. Banff.
- Cantharellus cibarius* Fr. (*Eu.*, *Am.*, *Aust.*). On roadside bank. Stanley Park, Vancouver.
- Cantharellus aurantiacus* (Wulf.) Fr. (*Eu.*, *Am.*, *Aust.*). Round pine stump. Nelson.
- Marasmius graminum* (Lib.) B. & Br. (*Eu.*, *Am.*). On stems, grass, &c. Frequent.
- Lentinus fasciatus* Berk. (*Aust.*). On felled logs. Winnipeg, Banff.
- Panus torulosus* (Pers.) Fr. (*Eu.*, *Am.*, *Aust.*). On willow stump. Revelstoke.

- Trogia crispa* (Pers.) Fr. (*Eu., Am.*). On birch, poplar, willow, &c. Frequent.
- Schizophyllum commune* Fr. (*Universal*). On dead wood. Niagara, Chicago, Winnipeg, &c.
- Lenzites betulina* (Linn.) Fr. (*Eu., As., Am., Aust.*). On birch. Winnipeg, Rocky Mountains.
- Lenzites sæpiaria* (Wulf.) Fr. (*Eu., Siberia, Am.*). On birch. Winnipeg, Rocky Mountains, &c.

POLYPORACEÆ.

- Polyporus adustus* (Willd.) Fr. (*Eu., As., Am., Aust.*). Often on charred wood. Frequent.
- Polyporus Schweinitzii* Fr. (*Eu., Himalayas, Am.*). On pine stumps. Sicamous Junction.
- Polyporus distortus* Schw. (*Carolina*). On pine stumps. Stanley Park, Vancouver.
- Polyporus chioneus* Fr. (*Eu., Siberia*). On birch. Kamloops.
- Polyporus cæsius* Fr. (*Eu., Carolina*). On pine trunks. Beacon Hill Park, Victoria.
- Polyporus radicatus* Schw. (*Pensylvania*). On pine trunks. Revelstoke.
- Polyporus dichrous* Fr. (*Eu., Aust.*). On pine trunks. Minnewanka Lake, Banff.
- Polyporus albiceps* Peck. On pine trunks. Crows Nest Pass.
- Fomes pinicola* Swz. (*Eu., Siberia, Am., Cuba*). On pine trunks. Banff, Revelstoke, &c.
- Fomes salicinus* (Gmel.) Fr. (resupinate form) (*Eu., Am., Aust.*). On poplar. Bow River Falls, Banff.
- Fomes connatus* Fr. (*Eu., N. Am.*). On poplar. Frequent.
- Fomes carneus* Nees. (*Eu., As., Am., Aust.*). On pine logs. Nakusp, Arrow Lakes.
- Fomes igniarius* (Linn.) Fr. (typical) (*Eu., As., Am., Aust.*). On poplar trunks. Stanley Park, Vancouver.
- Fomes igniarius* (Linn.) Fr. (resupinate form). On fallen poplar trunks. Stanley Park, Vancouver.
- Fomes fomentarius* (Linn.) Fr. (*Eu., Siberia, Am., Malay*). On stump. Revelstoke.
- Fomes leucophaeus* Mont. (*Ohio*). On worked pine wood. Moose Jaw.
- Fomes applanatus* (Pers.) Wallr. (*Eu., Am., Aust.*). On poplar stump. Sicamous Junction.
- Polystictus radiatus* (Sow.) Fr. (*Eu., Am., Aust.*). On alder, birch &c. Banff, Vancouver, &c.
- Polystictus hirsutus* (Schrad.) Fr. (*Universal*). On alder, birch, &c. Niagara Falls to Vancouver.
- Polystictus zonatus* (Nees) Fr. (*Eu., As., Am.*). On alder, birch, &c. Elm Park, Winnipeg, Banff.

- Polystictus versicolor* (Linn.) Fr. (*Universal*). On deciduous trees. Banff, Laggan, &c.
Polystictus conchifer Schwitz. (*U.S.A.*). Crows Nest Pass.
Polystictus abietinus (Dicks) Fr. (*Eu., N. Am.*). On fir trees. Frequent.
Poria viticola Schw. (*U.S.A.*). On fallen branches. Goat River Canon.
Poria vulgaris Fr. (*Eu., As., Af., Am., Aust.*). On fallen branches. Frequent.
Poria pulchella Schwitz. (*N. Am.*). On fallen branches. Stanley Park, Vancouver.
Trametes hispida Bagl. (*Italy, Algiers*). On wood. Calgary.
Daedalea pallido-fulva Berk. (*U.S.A.*). On dead branches. Medicine Hat.

HYDNACEÆ.

- Caldesiella ferruginosa* (Fr.) Sacc. (*Eu., U.S.A.*). On fallen wood. Frequent.
Hydnum ochraceum (Gmel.) Fr. (*Eu., As., Am., Aust.*). On larch branches. Nakusp, Arrow Lakes.
Tremellodon gelatinosum (Scop.) Fr. (*Eu., Am., Aust.*). On rotting wood. Revelstoke.
Irpex cerasus Fr. (syn. *I. paradoxus* Schrad.). Nelson.
Radulum orbiculare Fr. (*Eu., U.S.A., S. Af.*). On elm trunk. Winnipeg beach.
Phlebia vaga Fr. (*Eu., U.S.A.*). On fallen branches. Mount Royal, Montreal, Banff.
Grandinia granulosa Fr. (*Eu., As., Am., Aust.*). On decaying wood. Frequent.
Odontia fimbriata (Pers.) Fr. (*Eu., U.S.A.*). On decaying wood. Kootnay Landing.

THELEPHORACEÆ.

- Thelephora laciniata* (Pers.) Fr. (*Eu., Carolina*). On pine stumps. Revelstoke.
Stereum hirsutum (Willd.) Fr. (*Eu., Am., As., Aust.*). On deciduous trees. Frequent.
Hymenochæte rubiginosa (Dicks.) Lév. (*Eu., As., S. Af., Am., Aust.*). On birch, poplar, &c. Banff, Sicamous Junction.
Hymenochæte fuliginosa Lév. (*Eu., As., Am.*). On birch, poplar, &c. Beacon Hill Park, Victoria.
Corticium calceum (Pers.) Fr. (*Eu., As., Am.*). On fallen branches. Frequent.
Peniophora quercina (Pers.) Cooke (*Eu., U.S.A.*). On fallen branches. Kicking Horse Pass.
Coniophora sulphurea (Fr.) Mass. On fallen branches. Kamloops.

Solenia anomala (Pers.) Fr. (*Eu., Siberia*). On fallen logs. Frequent.

CLAVARIACEÆ.

Clavaria crispula Fr. (*Eu., Am., Aust.*). Base of poplars. Banff.
Calocera viscosa (Pers.) Fr. (*Eu., U.S.A., Malacca*). On pine logs. Common.
Typhula erythropus (Pers.) Fr. (*Eu.*). On plant stems. Stanley Park, Vancouver.

TREMELLACEÆ.

Auricularia mesenterica (Dicks.) Fr. (*Eu., U.S.A., Aust.*). Simulating *Stereum hirsutum*. Niagara, Banff, &c.
Exidia glandulosa (Bull.) Fr. (*Eu., As., Af., Am., Aust.*). On dead branches. Revelstoke.
Tremella frondosa Fr. (*Eu., Am., Aust.*). On wet rotting twigs. Beacon Hill Park, Victoria.

LYCOPERDACEÆ.

Lycoperdon echinatum Pers. (*Eu., Am.*). On the ground. Sicamous Junction.

NIDULARIACEÆ.

Cyathus striatus (Huds.) Pers. (*Eu., Am., Af.*). On ashes. Nakusp, Arrow Lakes.
Sphærobolus stellatus (Tode) Pers. (*Eu., As., Af., Am., Aust.*). On moist wood. Medicine Hat, Stanley Park, Vancouver.
Sphærobolus minutissimus Schw. (*N. Am.*). On moist wood. Goat River Canon.

PYRENOMYCETES.

Hypomyces rosellus (A. & S.) Tul. (*Eu., N. Am.*). On *Polyporus chioneus*. Kamloops.
Xylaria anisopleuron Mont. (*Am., As.*). Stanley Park, Vancouver.
Daldinia concentrica (Bolt.) Ces. & de Not. (*Eu., As., Am., Aust.*). On poplar. Banff, Calgary.
Byssosphæria aquila (Fr.) On dead branches. Revelstoke, Glacier.
Psilosphæria spermoides Cke. On rotting wood. Maple Creek.
Melanomma pulvis-pyrius (Pers.) Fckl. (*Eu., N. Am.*). Elm Park, Winnipeg, Moose Jaw, West Robson.
Wallrothiella minima Fckl. (*Germany*). Crows Nest Pass.

DISCOMYCETES.

- Leotia lubrica* (Pers.) Fr. (*Eu., N. Am., Aust.*). In moist grass. Calgary.
- Dasyscypha calycina* (Schum.) Fckl. (*Europe*). On pine twigs. Revelstoke, Banff.
- Erinella Nylanderi* Rehm. (*Europe*). On dead stems. Medicine Hat, Kootenay.
- Mollisia cinerea* (Batsch) Karst. (*Eu., As., Af., Am., Aust.*). On rotting wood. Winnipeg, Vancouver, &c.
- Orbilia rubella* (Pers.) Karst. (*Europe*). On wet bark. Banff.
- Coryne sarcoides* (Jacq.) Tul. (*Eu., Am., Aust.*). On pine stumps. Revelstoke, Fort William.

MYCETOZOA.

The Mycetozoa are abundant in all temperate and moist tropical countries, but there seems to be an absence, so far as we can ascertain, of records of Canadian gatherings, except that made by A. and G. Lister in 1897, which Miss G. Lister kindly sent for comparison, and as this list has not been published hitherto it is with permission here given as a first instalment.

Localities. *Mus.* = Muskoka, *Tor.* = Toronto, *Mon.* = Montreal.

PHYSARUM GLOBULIFERUM Pers. (*Mus.*) *P. BIVALVE* Pers. (*Mus.*) *P. CONTEXTUM* Pers. (*Mus.*) *P. VIRIDE* Pers. (*Tor.*) *P. INAEQUALE* Peck. (*Mus.*) *FULIGO SEPTICA* Gmel. (*Mon.*) *CRATERIUM PEDUNCULATUM* Trent. (*Mus.*) *C. LEUCOPHALUM* Ditm. (*Mus.*) *CHONDRIODERMA TESTACEUM* Rost. (*Mus.*) [*C. RADIATUM* Rost. *Seattle.*] *C. SPUMARIOIDES* Rost. (*Mus.*) *DIACHAEA ELEGANS* Fr. (*Mus.*) *DIDYMIUM EFFUSUM* Link. (*Mus.*) *D. NIGRIPES* Fr. v. *EXIMIUM* Peck. (*Mus.*) *D. FARINACEUM* Schrad. (*Mus.*) *SPUMARIA ALBA* DC. (*Mus.*) *STEMONITIS FUSCA* Roth. (*Mon. and Mus.*) *S. FERRUGINEA* Ehr. (*Mon. and Mus.*) *LAMPRODERMA ARCYRIONEMA* Rost. (*Mus.*) *CRIBRARIA INTRICATA* Schrad. near *C. SPLENDENS* Pers. (*Tor.*) *C. INTRICATA* v. *DICTYDIOIDES* List. (*Mon.*) *DICTYDIUM UMBILICATUM* Schrad. (*Mon.*) var. *B. FUSCUM* List. (*Tor.*) *TUBULINA FRAGIFORMIS* Pers. (*Mus.*) *TRICHIA PERSIMILIS* Karst. (*Mus.*) *T. SCABRA* Rost. (*Mus., Tor.*) *T. FALLAX* Pers. (*Mus.*) *T. BOTRYTIS* Pers. v. *MUNDA* List. (*Glacier*) *HEMITRICHIA CLAVATA* Rost. (*Mon., Tor.*) *ARCYRIA ALBIDA* Pers. (*Mon., Tor.*) *A. PUNICEA* Pers. (*Mon., Tor.*) *A. FLAVA* Pers. (*Mon., Tor.*)

Massee's "Myxogastres" (1892) has a few references to Canadian species. Lister's "Mycetozoa" (1894) further extended the localities and it is hoped that the new edition of the latter work (now in the press) will bring the information quite up-to-date.

Prof. Macbride's "North American Slime Moulds" contains no reference to any Canadian gatherings, but in all probability the species found in the United States of America will occur also in Canada.

Several species were found growing on charred wood (the effect of forest fires), but when we consider the marvellous life history of these organisms we can understand their adaptability to this strange "host-plant". Some were found to be abundant in Western Canada and rare here in Britain, whilst others common here were rare in Western Canada.

Our most common "Myxos," such as *Physarum nutans*, *Didymium difforme*, *Trichia varia*, *Lycogala minutum* and *Arcyria punicea* were conspicuous by their rarity, their places being occupied by such species as *Chondrioderma globosum*, *Physarum contextum*, *Hemitrichia clavata* and *Lycogala flavofuscum*.

Epiphyllous species were fairly plentiful, especially on Poplar, Elm and other deciduous trees, but the wood and leaves of Conifers (of which the forests are mainly composed) did not appear to be favoured resting places for these organisms. Very few plasmodia were seen. Perhaps this would be due to the dry weather at the time of the visit, but several patches of sclerotia were gathered, and partly cultivated out at home, the cultures were by accident made too warm, and the plasmodia rising into sporangia were ruined with infusoria, probably *Paramæcia*.

Since returning, Prof. A. H. R. Buller has sent several species found in the neighbourhood of Winnipeg, including the rare *Lachnobolus occidentalis* (Macb.) hitherto only found in the United States of America. Professor Macbride records it from Maine, Iowa, Missouri and Nebraska, and Professor Farlow from New Hants. Prof. Buller also reports that a considerable number of species occur in the Winnipeg district, and await investigation.

I am particularly indebted to Miss Gulielma Lister, F.L.S., for her kindness in examining, verifying and determining the species, and for the notes dealing with their distribution recorded in the following list.

Ceratiomyxa mucida Schr. Revelstoke. Very widely distributed and common.

Badhamia utricularis Berk. Laggan. Widely distributed, but we have seen no specimens from the tropics, and have few specimens from the United States of America, though it does not appear to be rare there.

Badhamia panicea Rost. Banff. Medicine Hat. Fairly common in the British Isles and in Europe. We have seen no examples from the tropics. (A specimen from Dominica

- we named at first *B. panicea* turned out to be *B. orbiculata* Rex.). Professor Macbride writes "this appears to be a purely western species," N.A.S.L.M., p. 64. We have a number of gatherings from Colorado.
- Physarum variabile* Rex. Medicine Hat. Sicamous Junction. Macbride gives New York and Iowa as localities for this species. We have it also from Venezuela—the var. sessile, which is a very striking form and is perhaps worthy of specific rank. We have it from Philadelphia, S. Carolina, Antigua, Japan and Ceylon.
- Physarum auriscalpium* Cke. Revelstoke. Kicking Horse Pass. B.C. So far we have it from New England, S. Carolina, Colorado, from France, repeatedly from Germany, and from Portugal.
- Physarum didermoides* Rost. Winnipeg Beach. Nakusp. Arrow Lakes. Glacier. A widely distributed species, found in both temperate and tropical regions.
- Physarum nutans* Pers. Bow River Falls, Banff. Abundant and widely distributed.
var. *leucophaeum* Lister. Banff. Laggan. Rocky Mountains. Niagara. Apparently this subspecies is more frequent in temperate than tropical regions.
- Physarum bivalve* Pers. Laggan. Widely distributed in temperate and tropical regions.
- Physarum contextum* Pers. Kootenay Landing, B.C. Widely distributed in the north and south temperate regions; Professor Macbride records it from Nicaragua; this is the only record I know of from the tropics, but that is not very significant!
- Fuligo septica* Gmel. Lake Minnewanka, Banff. Common and widely distributed.
- Craterium pedunculatum* Trent. Hot Springs, Banff. Common and widely distributed.
- Craterium leucocephalum* Ditm. Revelstoke. Common and widely distributed.
- Leocarpus vernicosus* Link. Vancouver. Common in temperate regions; not recorded from the tropics, as far as I know.
- Chondrioderma globosum* Rost. Bow River Falls, Banff. Elm Park, Winnipeg. Common in North America, fairly abundant in Europe: apparently rare in the British Isles. I have no record of this from elsewhere.
- Didymium difforme* Duby. Stanley Park, Vancouver. Glacier, Rocky Mountains. Widely distributed but not common in the tropics.
- Didymium clavus* Rost. Banff. Widely distributed; but not common in the tropics.

- Spumaria alba* DC. Elm Park, Winnipeg. Beacon Hill, Victoria, B.C. Common in the British Isles, Europe and United States of America. Elsewhere we have it only from Bolivia.
- Stemonitis fusca* Roth. Nakusp, Arrow Lakes. Very common and widely distributed.
- Stemonitis ferruginea* Ehrenb. Banff. (Spores 6-7 μ). Very common and widely distributed.
- Comatricha typhoides* Rost. Glacier, Rocky Mountains. Common and widely distributed.
- Dictydium umbilicatum* Schrad. Stanley Park, Vancouver. Common and widely distributed.
- Tubulina fragiformis* Pers. Emerald Lake, Field. Rocky Mountains. Common and widely distributed.
- Enteridium Rozeanum* Wing. Stanley Park, Vancouver. Except perhaps for the type gathered near Paris (about which there is a doubt) the only records of this are from North America. Macbride writes "very common, especially west."
- Lycogala flavo-fuscum* Rost. University Gardens, Toronto. Winnipeg. Revelstoke. Widely distributed, but apparently nowhere common.
- Lycogala miniatum* Pers. Crows Nest Pass, Rocky Mountains. Very common and widely distributed.
- Trichia scabra* Rost. Hot Springs, Banff. Common in the British Isles and Europe. Mr. Petch records several gatherings in Ceylon; "Not uncommon in North America," Macbride.
- Trichia varia* Pers. Moose Jaw. Bow River Falls, Banff. Common in the British Isles, Europe and North America. Mr. Petch finds it "fairly common" in Ceylon. We have it also from Teneriffe. It is probably widely distributed.
- Trichia fallax* Pers. Vancouver (Hotel Garden). Common and widely distributed.
- Oligonema nitens* Rost. Bow River Falls, Banff. Apparently distributed over North America and Europe, but not common. *O. flavidum* Peck (including *O. breviflum* Peck) is more abundant there than *O. nitens*: we have received thirty specimens of the former and three of the latter, including your gathering, from Banff. We have no record of either species of *Oligonema* from elsewhere.
- Hemitrichia rubiformis* List. Glacier. Fairly common throughout Europe and the United States: it is also recorded from Madagascar, Ceylon, Java and the West Indies.
- Hemitrichia clavata* Rost. Banff. Sicamous Junction. Common and widely distributed.

- Arcyria ferruginea* Saut. Medicine Hat. Banff. Abundant in the British Isles and fairly so throughout Europe. We have it recorded from German East Africa, Ceylon (one gathering), New Zealand. Macbride writes "rare" for North America; we have seen several gatherings from New England, and have it also from the state of Washington.
- Arcyria punicea* Pers. Stanley Park, Vancouver. Very common and widely distributed.
- Arcyria flava* Pers. Glacier. Banff. Not uncommon and widely distributed.
- Perichaena populina* Fr. Kootenay Landing. Fairly abundant throughout Europe and the British Isles; we have it also from Ceylon, Singapore and Tasmania: "apparently not common" in United States of America," Macbride writes.
- Perichaena variabilis* Rost. Revelstoke. Widely distributed, but not common, perhaps overlooked.