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LIST OF, AND NOTES UPON, THE LICHENS COLLECTED BY
DR. T. H. BEAN IN ALASKA AND THE ADJACENT REGION IN
1880.

By Dr. J. T. ROTHROCK.*

Many new species of lichens from a boreal region were hardly to be expected, inasmuch as the similarity of the northern flora is great in all longitudes. It is not surprising, however, that we do find in this collection quite a number of interesting forms, which illustrate the laws of variation inside specific limits in connection with geographical distribution. One new *Biatora*, however, from Eastern Siberia, rewarded Dr. Bean's active search.

For whatever accuracy in names this list may have I am indebted to my friend Mr. Henry Willey, who has kindly gone over the collection.

It will be observed that there are no notes given in this list (save of locality, &c.) until the genus *Bæomyces* is reached. This is because the recent publication of Professor Tuckerman's invaluable "North American Lichens" includes all the species before this genus, and hence renders anything more unnecessary.

Considering how inconspicuous the lichens usually are, and also how varied Dr. Bean's duties were, it is a matter of surprise that he has been able to obtain so satisfactory a collection.

LIST OF SPECIES.

Ramalina geniculata, Hook. and Tayl.

Ramalina calicaris, (L.) Fr., var. *farinacea*, Fr.

Little Koniuschi Island, Shumagin group.

Ramalina polymorpha, Ach.

Saint Paul's Island, Behring Sea.

Usnea barbata, (L.) Fr.

Locality not given. Sterile.

* It is due to Mr. Willey to say that it was his desire to correct the proof. This, however, has been prevented by want of time in the printing. It is hoped that no errors of importance will be found.—J. T. R.

Usnea barbata, (L.) Fr., var. *dasy-poga*, Fr.

Old Sitka.

Alectoria ochroleuca, (Ehrh.) Nyl., var. *sarmentosa*, Nyl.

Old Sitka. Sterile.

Alectoria ochroleuca, (Ehrh.) Nyl., var. *nigricans*, Nyl.

Chernofski, Unalashka. Sterile.

Alectoria jubata, (L.) Ach.

No locality given. Sterile.

Cetraria Fahlunensis, (L.) Schaer.

No locality given.

Cetraria Islandica, (L.) Ach.

Plover Bay, Siberia.

Cetraria cucullata, (Bell.) Ach.

Chamisso Island, Arctic Ocean.

Cetraria nivalis, (L.) Ach.

Plover Bay, Eastern Siberia.

Cetraria lacunosa, Ach.

Sterile specimens from logs on island in Cross Sound, Baranoff Island, Sitka.

Cetraria glauca, (L.) Ach.

Luxuriant but sterile specimens from Cook's Inlet, Alaska.

Cetraria aleurites, (Ach.) Th. Fries.

Stein has said of this species that it is an evident transition, resembling *Cetraria* in its fruit and spermagonia, and *Parmelia* in its habit, and hence often placed by the later lichenologists in the latter genus. Cook's Inlet, Alaska; also, Eschscholtz Bay, on the bark of the Coniferæ.

Cetraria juniperina, (L.) Ach.

Small sterile specimens from Chamisso Island in Eschscholtz Bay; on bark.

Theloschistes parietinus, (L.) Norm.

Port Clarence, Alaska.

Theloschistes parietinus, (L.) Norm., var. *polycarpus*, Ehrh.

Widely diffused over the Arctic regions and apparently very common, being obtained at a number of points.

Parmelia saxatilis, (L.) Fr.

Cape Lisburne. Unalashka. On logs in Cross Sound, Alaska.

Parmelia saxatilis, (L.) Fr. var. *omphalodes*, Fr.

Near Cape Lisburne.

Parmelia physodes, (L.) Aeh.

Elephant Point, Eschscholtz Bay, Arctic Ocean. Port Mulgrave, Yakutat Bay. Fort Alexander, in Cook's Inlet.

Physcia stellaris, (L.) Nyl.

Chamisso Island, in Eschscholtz Bay. Little Koniushi Island, of Shumagin group. Glacier Spit, in Cook's Inlet, Alaska.

Umbilicaria hyperborea, Hoffm.

Plover Bay, Siberia. Unalaska.

Umbilicaria proboscidea, (L.) Stenh.

Saint Matthew's Island.

Sticta pulmonaria, (L.) Aeh.

Point Althorp, Alaska; fertile. Old Sitka; sterile.

Nephroma arcticum, (L.) Fr.

On Chamisso Island, in Eschscholtz Bay.

Peltigera apthosa, (L.) Hoffm.

Port Mulgrave, Yakutat Bay.

Peltigera canina, (L.) Hoffm.

Old Sitka. Port Mulgrave. Unalaska. Port Chatham, Cook's Inlet.

Pannaria hypnorum, (Hoffm.) Koerb.

Unalaska Island.

Pannaria brunnea, (Sw.) Mass.

On logs on island in Cross Sound, Alaska. Chernofski Island.

Collema pulposum, (Bernh.) Aeh.

Cape Lisburne, Alaska.

Placodium elegans, (Link.) DC.

Chamisso Island. Elephant Point, in Eschscholtz Bay. Chernofski Bay.

Placodium murorum, (Hoffm.) DC.

Plover Bay, Eastern Siberia.

Placodium murorum, (Hoffm.) DC. var. *miniatum*, Tuckerman.

Placodium crenulatum, (Wahlenb.)

Plover Bay, Eastern Siberia. Sitka, on Baranoff Island.

Placodium vitellinum, (Ehrh.) Naeg. & Hepp.

Port Clarence, Alaska.

Placodium cerinum, (Hedw.) Naeg. & Hepp.

Icy Cape, Arctic Ocean.

Placodium ferrugineum, (Huds.) Hepp.

Port Clarence, Alaska, and elsewhere; not rare.

Placodium variabile, (Pers.) Nyl.

Port Clarence, Alaska.

Placodium nivale, Koerb.

Locality not given.

Lecanora muralis, (Schreb.) Schær.

Cliffs on Saint Matthew's Island, Saint Paul's Island, Sitka, Unalashka, and elsewhere: apparently very common.

Lecanora gelida, (L.) Ach.

Chernofski Island, Unalashka. Belkofski, Aliaska Peninsula.

Lecanora pallescens, (L.) Schær.

Chugachick Bay, Cook's Inlet.

Lecanora tartarea, (L.) Ach.

Shumagin Group. Unalashka Island. Cape Lisburne, Arctic Ocean.

Lecanora atra, (Huds.) Ach.

Cape Lisburne, Alaska.

Lecanora subfusca, (L.) Ach.

Cook's Inlet. Unalashka. Port Clarence.

Lecanora subfusca, (L.) Ach. var. *hypnorum*, Schær.

Port Clarence. Cape Lisburne.

Lecanora Hageni, Ach.

Cape Lisburne, Alaska.

Lecanora varia, (Ehrh.) Nyl.

Plover Bay, Eastern Siberia.

Lecanora cinerea, (L.) Sommerf.

Port Clarence, Icy Cape, and Cape Lisburne, in Alaska.

Lecanora cinerea, (L.) Sommerf. var. *gibbosa*, Nyl.

Lecanora cinerea, (L.) Sommerf. var. *lacustris*, (With.) Nyl.

Plover Bay, Eastern Siberia.

Lecanora verrucosa, (Ach.) Laur.

Eschscholtz Bay, Arctic Ocean.

Lecanora glaucomela, Tuckerm.

Lecanora cervina, (Pers.) Nyl.

Eschscholtz Bay.

Lecanora cervina, (Pers.) Nyl. var. *discreta*, Sommerf.

Port Clarence, Alaska.

Rinodina nimbosea, (Fr.) Th. Fr.

Cape Lisburne, Arctic Ocean.

Rinodina sophodes, (Ach.) Nyl.

Cape Lisburne.

Rinodina sophodes, (Ach.) Nyl. var. *confragosa*. Nyl.

Rinodina turfacea, (Wahl.) Nyl.

Pertusaria communis, DC.

Port Clarence, Cape Lisburne, and Port Althorp, Alaska.

Pertusaria bryontha, (Ach.) Nyl.

Unalashka Island.

Pertusaria dactylina, (Ach.) Nyl.

Plover Bay, Eastern Siberia, and Aliaska Peninsula, Alaska.

Pertusaria velata, (Turn.) Nyl.

Warm Springs, Sitka.

Pertusaria glomerata, (Ach.) Schær.

Port Mulgrave.

Urceolaria scruposa, (L.) Ach.

Stereocaulon paschale, (L.) Fr.

Common and everywhere met.

Pilophorus acicularis, (Ach.) Tuck.

Saw-Mill Creek, Sitka.

Cladonia pyxidata, (L.) Fr.

Chamisso Island. Eschscholtz Bay, at Elephant Point. Aliaska Peninsula.

Cladonia pyxidata, (L.) Fr. var. *symphycarpa*, Fr.*

Cook's Inlet at Fort Alexander.

Cladonia vermicularis, Ach.

[*Thamnolia vermicularis*, (Sw.) Schær. in Tucker man's North American Lichens, part 1, p. 256.?]]

Cladonia cenotea, (Ach.) Schær.

Island in Cross Sound, Alaska; and from Cook's Inlet and Sitka forms, which Mr. Willey doubtfully refers here.

Cladonia squamosa, Hoffm.

Sitka, at Warm Springs.

Cladonia rangiferina, (L.) Hoffm.

Common, though collected sparingly and at few points.

Cladonia cornucopioides, (L.) Fr.

Eastern Siberia, at Plover Bay. Port Althorp, Alaska.

Cladonia bellidiflora, (Ach.) Schær.

Eastern Siberia, at Plover Bay.

* See Tuckerman's American Lichens, p. 239.

Cladonia digitata, L. Hedm.

Old Sitka.

Ecmyces aeruginosus (Scop.) Nyl.

Sitka and Port Althoop, Alaska.

Spores narrowly oblong acute at either extremity, colorless, uniseptate. 19×4 mic.

Elasora sanguineo-atra, Fr.

Old Sitka, on logs.

Spores oblong, simple, colorless, 19×5 mic.

Elasora milhana, Fr.

Shumagin Group of Islands.

Spores 16-22 \times 3-6 mic.

Elasora Stoumensis, Willey, sp. nov.

Port Providence, Flower Bay, East Siberia.

Thallus effuse, whitish or pale flesh-colored, granulose; apothecia pale flesh-colored, soon convex and unmarginate; hypothecium pale; paraphyses complanate. Reaction of hymenium with iodine blue; spores arctular, few locular, 22-27 mic. long, 3-4 mic. broad.

Heterothecium sanguinarum, (Fl.) Tokh.

Eschscholtz Bay; Yakutat Bay; Cook's Inlet.

Heterothecium sanguinarum, (Fl.) Tokh. var. *alpinum*, Fr.

Shumagin Group of Islands.

Lecidea albo-carmilcescens, Fr.

"Hypothecium nigrescent, sporæ magnæ." (H. Willey.)

(By my measurements the simple spores are $11-16 \times 8-11$ mic. J. T. P.)

Lecidea albo-carmilcescens, Fr. var. *flavocarmilcescens*, Tokhema. In ed.

Alaska Peninsula.

Spores colorless, simple 8-16 mic. long by 3-11 wide.

(Peculiar for the brown color of the apothecium arising from oxidation. — Willey.)

Lecidea contigua, Fr.

Flower Bay, Eastern Siberia. Unalaska. Alaska Peninsula. Chukchi Island. Eschscholtz Bay.

A specimen from Unalaska with hypothecium black and spores $13-19$ mic. long \times 6-7 mic. wide. Willey.

Alaska Peninsula.

Lecidea contigua, Fr. var. *spetrea* (Ach.) Nyl.

Lecidea entolentia, Fr.

Chukchi Island in Eschscholtz Bay. Port Clarence. Cape Lisburne. Old Sitka.

Spores simple, colorless, $13-22$ mic. long \times 5-7 mic. wide.

Lecidea enteroleuca, Fr. var. *latypea* (Ach.) Nyl.

Lecidea sp̄ota, Fr.

Cape Lisburne, Arctic Ocean.

Spores simple, ellipsoid or oblong 9-11 mic. long \times 4-6 wide.

Lecidea fuscoatra, Fr.

Lecidea panæola (Ach.) Fr.

Chernofski Bay, Unalashka Island.

Spores large, in one instance as much as 27 mic. long by 22 broad, simple, colorless, or slightly tinged with dark, somewhat smoky-hued. In Mr. Willey's notes I find he gives spores 23-30 mic. long \times 11-16 wide. The epispore is very large and distinct.

Buellia atro-alba (Fr.).

St. Paul's Island. Unalashka Island. Plover Bay, Siberia.

Spores 16-23 mic. long \times 11-13 wide, blackish-brown, (among them were a number of well-formed and colored spores apparently of this species only 12 \times 7 mic.).

Buellia atro-alba, Fr. var. *chlorospora*, Nyl.

Chamisso Island in Arctic Ocean.

Spores uniseptate, colorless, 18-23 mic. long \times 11-13 wide.

Buellia parasema (Ach.) Kbr.

Port Clarence, Alaska. Plover Bay, Siberia.

Spores 16-19 mic. \times 5-8, brown, uniseptate, 2-nucleated.

Buellia myriocarpa (DC.), Mudd.

Port Clarence, Alaska.

Spores 9-16 mic. long \times 4-8 wide, oblong, brownish, uniseptate and with a distinct epispore.

Buellia albo-atra (Hoffm., Nyl.) Th. Fr.

Unalashka.

Tuckerman (Gen. Lich., p. 188) writes of this species that it "mediates satisfactorily between the bi-quadrilocular *B. parasema* and *papillata*, and the distinctly uniform-multilocular *B. oidalea*."—*B. albo-atra*, "the regularly quadrilocular spores of which soon exhibit plain indications of the next or muriform modification, is not uncommon." Spores brown, usually 4-celled, sometimes 3-, or even 2-celled, oval to oblong, 11-19 mic. long \times 8 mic. wide.

Buellia alpicola (Nyl.) Anz.

Head of Plover Bay, East Siberia.

The solitary satisfactory spore I have been able to obtain was 25 mic. long \times 10 mic. wide, brown and uniseptate. I had supposed it

was the same as *Lecidea alpicola*, Schær., but that, Leighton (Lichen Flora of Great Britain, p. 328) states, has colorless spores.

Buellia petræa, (Fl.) Tuck.

Saint Paul's, Kodiak. Port Clarence, Alaska. Plover Bay, Siberia.

Apparently very variable. Th. with potassium hydrate and lime brown, with lime light yellow. Spores elliptical or oblong murali-ocular (apparently); in my specimens only 1 or 2 in an ascus 50-55 mic. long, by 35 broad; epispore thick, interior light greenish brown.

Buellia petræa, (Fl.) Tuck. var. *Montagnei*, (Fl.) Tuck.

Cook's Inlet and Port Clarence, Alaska.

Spore oblong-elliptical, murali-ocular, 50 to 60 mic. long, by 15 to 30 broad, epispore usually very thick (5 mic.); somewhat distinctly constricted or transversely marked; interior greenish yellow.

Buellia petræa, (Fl.) Tuck. var. *Oederi*, (Ach.) Kbr.

Locality not given.

Buellia geographica, (L.) Br. & Rostr.

Alaska Peninsula.

A widely diffused and variable species; spores dark-brown, irregularly 2-celled or murali-ocular, 22-35 mic. long, by 13-16 mic. wide.

Xylographa opegraphella, Nyl.

Cook's Inlet, Alaska.

Spores simple, colorless, oblong, obtuse or acutish, straight or very slightly curved, often somewhat clearly nucleated at each end. My own measurements give for the spores 11-12 mic. long by 2-4 mic. wide. Mr. Willey finds them varying from 9-15 mic. long by 4-6 mic. wide.

Xylographa parallela, (Ach.) Fr. var. *pallens*, Nyl.

Island in Cross Sound, Alaska.

Spores simple, elliptical, colorless, 10-15 mic. long by 5-8 wide.

Sphærophorus globiferus, (L.) DC.

Saint Matthew's Island in Behring Sea; also at Port Mulgrave and Little Koniushi Island of the Shumagin Group.

Spores globular, simple, with a dark violet epispore* 8-11 mic.; when without epispore colorless or greenish, 5-8 mic. in diameter.

* "Leighton describes the spores as hyaline and double-walled, and ascribes their black color and irregular granulated form to their contents, which are blackish or bluish black granules, and which when they escape adhere to the exterior of the mother-cell. Tulasne speaks of the epispore as black and tuberculated, while the endospore is pale but thick; and the phenomena of germination prove the correctness of this view."—Popular History of British Lichens, by W. Lauder Lindsay, M. D., p. 258. See also Leighton, Lichen Flora of Great Britain, 3d edition, p. 48. I have accepted here the view of Tulasne as that which my observation more fully confirms, but at the same time, find a large quantity of the same material as that of which the so-called epispore is composed, and which appears to have no relation to epispore.—J. T. R.

Endocarpon cinereum, Pers.

Saint Paul's Island, Behring Sea.

Verrucaria maura, (Wahl.) Nyl.

Fort Alexander, Cook's Inlet.

Spores simple, colorless, oblong, 12-15 mic. long by 6-8 broad.

Verrucaria ceuthocarpa, Wahl.

Fort Alexander, with the above species. Sterile.

Verrucaria intercedens, Nyl.

Cape Lisburne, Alaska.

"Paraphyses dissolving; gelatina hymenea vinous red with iodine. Spores 8, muriform, plurilocular, colorless, 23-32 mic. long by 11-13 wide."—WILLEY.

Verrucaria intermedia, (Th. Fr.)

"Paraphyses dissolving; gelatina hymenea vinous red with iodine. Spores 8, muriform, few-celled, 18-23 by 11-13 mic."—WILLEY.

ON THE CHLOROPHYLLOID GRANULES OF VORTICELLA.

By JOHN A. RYDER.

In *Science*, No. 45, note 487, p. 772, the researches of Th. W. Engelmann, of Utrecht, are noticed and criticised. Having had occasion several years since to study one of our American forms of green *Vorticellæ*, which at the time was identified as *V. chlorostigma*, I would now take the opportunity to record what was then observed, inasmuch as the facts as interpreted by me seem to lead to conclusions differing very considerably from those reported by Professor Engelmann. Observations which I have made within the present year on the relations of the *Schizomyces* to living and dead Protozoa, have also led me to conclusions at variance with that author's interpretations.

In order to understand the points in dispute, it will be necessary to describe the morphology of the form studied by the writer, as well as the position and relations of the included chlorophylloid granules, all of which may be more clearly comprehended by reference to the accompanying figure which shows the form in question enlarged 140 times, and taken from drawings made several years since from the living subjects.

The form was similar to other *Vorticellæ* in everything except the presence and orderly arrangement of the green granules. There was a hollow stalk, *st*, which ensheathed a muscle, *m*, which in turn was inserted into the very faintly striated base *b* of the body of the animalcule. There was, as usual, an outer cuticular layer, *c*, covering the body and continuous with the stalk *st*. Within the cuticle the ectosarc or ectoplasm *ec* formed the outer or cortical portion of the body of the ani-