THE LICHENS OF ALASKA

BY

CLARA E. CUMMINGS

HARRIMAN ALASKA EXPEDITION
WITH COOPERATION OF WASHINGTON ACADEMY OF SCIENCES

ALASKA

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CRYPTOGAMIC BOTANY

BY J. CARDOT, CLARA E. CUMMINGS, ALEXANDER W. EVANS,
C. H. PECK, P. A. SACCARDO, DE ALTON SAUNDERS,
I. THÉRIOT AND WILLIAM TRELEASE

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Our knowledge of the lichens of Alaska and their distribution has been materially increased by the collections of the Harriman Expedition. Over 800 specimens were collected, representing 217 species, 75 of which were new to Alaska. At the same time that I received the Harriman lichens, various specimens from the United States National Herbarium were placed in my hands. These were collected by C. H. Townsend, in connection with the work of the U. S. Fish Commission Steamer *Albatross* at Attu Island; by Frederick Funston, in the upper Yukon Valley; and by Walter H. Evans and J. Henry Turner. These collections add 5 species new to Alaska which are not represented in the Harriman collection, and 3 species not new to Alaska, but not otherwise represented in this enumeration. Later, the lichen collections made in Alaska in the summer of 1899 by the botanical faculty of the University of California were sent to me for determination. These collections, chiefly the work of Professor Setchell, numbered 135 specimens, representing 82 species, 4 of which were new to Alaska. The collection of Professor Setchell was also valuable for the new

localities added, most of the specimens having been collected at Cape Nome or St. Michael, where no collecting had been done by the members of the Harriman Expedition. Summing up, we find 84 species new to Alaska recorded in this list. Of these, 6 are reported in Dr. Nylander's list as occurring on the coast of Siberia, 3 are new to America, and 2 are new to science.

Reviewing briefly the previous collections made in Alaska, we find that Hooker and Arnott[1] enumerate 16 species; Babington,[2] 21 species and varieties; Rothrock,[3] 40 species; Hooper,[4] 4 species; Rothrock,[5] 110 species and varieties. The material on which this last list is based was collected by Dr. T. H. Bean in 1880, in Alaska and the adjacent region. Knowlton[6] adds one species. In 1888 appeared Dr. Nylander's Enumeratio Lichenum Freti Behringii.[7] The collection upon which this was based was made by Dr. E. Almquist, who was connected with the Expedition of the Vega. Dr. Almquist collected at three points on the Asiatic coast, St. Lawrence Bay, Konyam Bay, and Bering Island, while only two Alaskan stations were explored, St. Lawrence Island and Port Clarence. Dr. Nylander lists 197 species, 4 varieties, and 16 forms, a total of 217, the same number as in the present enumeration. In comparing these lists, however, allowance should be made for the well-known fact that Dr. Nylander was inclined to multiply species, while Professor Tuckerman, whose arrangement I have in the main followed, showed a tendency to group somewhat varying forms under one specific name. In 1891, Miss Grace E. Cooley collected in Alaska, the lichens being submitted to me[8] for determination. The list numbers 31 species and

[1] Hooker and Arnott, in Botany of Beechey's Voyage to the Pacific and Behring's Strait, 133–134. 1841.

[2] Babington, Churchill, in Botany of the Voyage of H. M. S. Herald by Seeman, 47, 49. 1852–1857.

[3] Rothrock, in Flora of Alaska, Smithsonian Report. 1867.

[4] Hooper, in Cruise of the Corwin. 1881.

[5] Rothrock, in Proceedings of the United States National Museum, 1–9. 1884.

[6] Knowlton, in Proceedings of the National Museum. 1886.

[7] Nylander, William. Enumeratio Lichenum Freti Behringii, 1–91. 1888.

[8] Cummings, Clara E., in Cooley, Miss Grace E., Plants Collected in Alaska and Nanaimo, B. C., July and August, 1891. Bull. Torr. Club, vol. XIX, 248, 249. 1892.

varieties. That same year Dr. Charles Willard Hayes, of the U. S. Geological Survey, collected a few lichens in Alaska, which were also submitted to me.[1] The list comprises 20 species and varieties. In the Report of the Fur Seal Investigation,[2] J. M. Macoun publishes a list of 70 species; he also publishes a list of 9 species collected by William Palmer and determined by W. J. Calkins.[3] In the summer of 1900 Mr. Arthur J. Collier, in connection with the work of the U. S. Geological Survey, collected 10 species and varieties, which were submitted to me[4] for determination. Kurtz, in his Chilcat Flora,[5] mentions two species, while Professor Farlow[6] records 4 from Point Barrow. Professor Tuckerman[7] gives various Alaska stations for different species, collected principally by Wright and Kellogg. Wainio, in his recently published monograph on *Cladonia*,[8] gives additional localities for species of this genus. Summing up, we find that before the publication of the present list 386 species and varieties had been enumerated. The present list adds 76 species and varieties new to Alaska, making a total of 462 species and varieties.

The lichen flora of Alaska is essentially like that of other northern regions. Constant comparison has been made with the works of Fries,[9] Lindsay,[10] and Arnold,[11] for the distribu-

[1] Cummings, Clara E., in An Expedition through the Yukon District, by Charles Willard Hayes; National Geographic Magazine, vol. IV, 160–162. 1892.

[2] Macoun, J. M., in Dr. Jordan's Report on the Fur Seals and Fur Seal Islands of the North Pacific, Part 3. 1899.

[3] Calkins, W. J., in Jordan's Report on the Fur Seals and Fur Seal Islands of the North Pacific, Part 3. 1899.

[4] Cummings, Clara E., in Reconnaisances in the Cape Nome and Norton Bay Regions, Alaska, in 1900, by Alfred H. Brooks, George B. Richardson, Arthur J. Collier and Walter C. Mendenhall, United States Geological Survey, 167. 1901.

[5] Kurtz, Die Flora des Chilcatgebietes, Engler's Botanische Jahrbücher, vol. XIX, 431. 1895.

[6] Farlow, William G., in Ray's Report of the International Polar Expedition to Point Barrow, Alaska, 192. 1885.

[7] Tuckerman, Synopsis North American Lichens, vol. I, 1882; vol. II, 1888.

[8] Wainio, Monographia Cladoniarum, vol. I, 1887; vol. II, 1894.

[9] Fries, Th. M. Lichenes Arctoi. 1860.

[10] Lindsay, W. Lauder. Observations on the Lichens collected by Dr. Robert Brown in West Greenland in 1867. Transactions of the Linnæan Society of London, vol. XXVII, 305–368, tab. 48–52. 1871.

[11] Arnold, Dr. F., in Labrador. 1896.

Arnold, Dr. F. Lichenologische Fragmente, 35, Newfoundland, Separat-Abdruck aus der 'Oester. botan. Zeitschrift,' Jahrg. 1896, Nr. 4. u. ff.

tion of the species, as well as structural characteristics. One element which has added to the difficulty of determination is the frequency with which different genera and species were found growing together, one small fragment of rock, not more than an inch square, showing often four distinct species, sometimes as many genera. The commingling of earth forms, which is so common a characteristic of northern lichens, is also noticeable.

I would acknowledge my great indebtedness to Dr. Farlow for the free use of the Tuckerman Herbarium of Lichens, without which I should have found it impossible to do this work, as well as for many other courtesies; to Dr. Trelease of the Missouri Botanical Garden, and Miss Day of the Gray Herbarium, for assistance in finding the literature of the subject; and to Miss Maude Metcalf, graduate student of Wellesley College, for her kindness in making the drawings.

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Family VERRUCARIACEÆ.

PYRENULA.

1. **Pyrenula gemmata** (Ach.) Naeg. & Hepp.

Verrucaria gemmata ACHARIUS, Meth. Lich. 120. 1803.
Pyrenula gemmata NAEGELI & HEPP, Flecht. Eur. No. 104.

Disenchantment Bay (Trelease, 803*b*, 821, 842 in part, 1170 in part). On bark of shrubs, associated with *Buellia*. New to Alaska.

Common in New England, according to Tuckerman, but no other American localities are given in his Synopsis.

VERRUCARIA.

KEY TO THE SPECIES.

Thallus obsolete ..... *thelodes*.
Thallus evident.
  Thallus yellowish-white, margining the apothecium..... *fulva*.
  Thallus brownish or blackish.
    Thallus breaking up into small areolæ..... *fuscella*.
      Apothecia entirely immersed, level with the surface of the thallus..... *mucosa*.
      Apothecia elevated above the surface of the thallus..... *maura*.

2. **Verrucaria maura** Wahl.

Verrucaria maura WAHLENBERG in Acharius, Meth. Lich. 19. 1803.—SOWERBY, Eng. Bot. *t. 2456.*

Sitka (Trelease, 958); Port Wells, Prince William Sound (Trelease, 934). Rothrock reports it from Fort Alexander, in Bristol Bay, and from Cook Inlet; Nylander, from St. Lawrence Island.

3. **Verrucaria mucosa** Wahl.

Verrucaria mucosa WAHLENBERG in Acharius, Meth. Lich. Suppl. 23. 1803.

Orca (Trelease and Saunders, no number, and 303). New to Alaska.

Though new to Alaska, this has been reported from St. Lawrence Bay, Siberia, by Nylander.

4. **Verrucaria fuscella** (Turn.) Ach.

Lichen fuscellus TURNER, Trans. Linn. Soc. 7: 90. *t. 8. fig. 2.* 1804.—SOWERBY, Eng. Bot. *t. 1500.*
Verrucaria fuscella ACHARIUS, L. U. 289. 1810.

Hot Springs, Baranof Island (Trelease, 959, 960). On rock. New to Alaska. Reported by Tuckerman in Genera Lichenum from only Alabama and Vermont.

5. **Verrucaria thelodes** Smrft.

Verrucaria thelodes SOMMERFELDT, Suppl. 140.

Hidden Glacier Inlet, Yakutat Bay (Trelease, 946). On rock. The species is credited to Port Clarence by Nylander.

6. **Verrucaria fulva** sp. nov.

Thallus a small rounded body from .75–1.5 mm. in diameter, either distinct or aggregated in masses which may equal 5 mm. in diameter. The thallus is of a creamy color, chinky-areolate, nearly or entirely concealing the embedded apothecium. Gonidia abundant, scattered throughout the medullary layer. Apothecia .20–.35 mm. in diameter, dark brown, ampithecium yellowish-brown. Paraphyses distinct in young specimens, gelatinizing in older ones. Spores muriform-multilocular, brown, $\frac{63-84}{24-38}$ μ. Number of spores in ascus unknown.

Collected by Prof. William Trelease at Port Wells, June 26, 1899, on rocks (No. 918) and on moss (No. 1175). Type specimen (No. 918) in the Herbarium of the Missouri Botanical Garden; a duplicate in my own herbarium.

The fact that the walls of the ascus gelatinize so early rendered it impossible to determine the number of spores in an ascus. In no case were mature spores seen within the ascus.

The species would seem to approach nearly *V. verrucosa-areolata* Nyl., but differs markedly in that the perithecium is entire and brown, while in the species cited it is dimidiate and black.

The limits of the genus *Verrucaria* are very differently placed by different authors. Some, as Th. Fries in Lichenes Arctoi, admit only such species as have simple colorless spores, while other authors, as Professor Tuckerman and Dr. Nylander, recognize great diversity in spore types, from simple to muriform-multilocular. Equally diverse characters are given for the perithecium, which varies from colorless to coal black.

While this species hardly has the appearance of the more typical Verrucarias, in view of these admitted variations it seems best to place it here until a thorough revision of these lower forms is made.

The following additional species of *Verrucaria* have been reported from Alaska or adjacent islands: *V. lævata* Ach., *V. acrotella* Ach., *V. aurantii* Mass., *V. sublectissima* Nyl., *V. chlorotica* Ach., *V. leptaleoides* Nyl., on rock, St. Lawrence Island (Nylander); *V. fallax* Nyl., on branches, St. Lawrence and Port Clarence (Nylander); *V. pyrenophora* Ach., *V. muralis* Ach., forma *dolosula* Nyl., *V. integra* Nyl., *V. hymenogonia* Nyl., *V. obnigrescens* Nyl., *V. prominula* Nyl., *V. obtenata* Nyl., *V. exalbida* Nyl., *V. discedens* Nyl., *V. thelodes* Smrft., on rock, Port Clarence (Nylander); *V. intercedens*, on argillaceous schistose rocks, Port Clarence (Nylander) and Cape Lisburne (Rothrock); *V. punctiformis* Ach., on branches, Port Clarence (Nylander); *V. nigrata* Nyl., *V. pernigrata* Nyl., *V. bryospila* Nyl., *V. bryophila* (Loennr.) Nyl., on mossy earth, Port Clarence (Nylander); *V. intermedia*, no definite locality (Rothrock); *V. ceuthocarpa* Wahl., Fort Alexander, in Bristol Bay (Rothrock). James M. Macoun records *Verrucaria* sp. (?) as occurring on rocks, St. George Island, one of the Pribilof Islands. Tuckerman, in his Genera Lichenum, credits Mr. Wright with having collected *V. terrestris* (Th. Fr.) Tuck. on earth, at Bering Strait. Dr. Nylander[1] segregates the following additional species, based upon material collected by Dr. Bean, which formed the basis of Dr. Rothrock's lists:[2] *V. subumbrina* Nyl., on rock, Cape Lisburne; *V. maurioides* (Schaer.) Nyl. and forma *conyzoides* Nyl., no locality given.

[1] Nylander, Dr. William. Enumeratio Lichenum Freti Behringii. 1888.

[2] Rothrock, J. T. Lists of and Notes upon the Lichens collected by Dr. T. H. Bean in Alaska and the adjacent region in 1880. Proceedings of the United States National Museum. 1884.

Family SPHÆROPHORIACEÆ.

SPHÆROPHORON.

KEY TO THE SPECIES.

Thallus densely cæspitose, slightly branched, branches of same size. *fragile.*

Thallus more open, freely branched, terminal branches very fine. *coralloides.*

7. **Sphærophoron coralloides** Pers.

Sphærophoron coralloides PERSOON in Ust. Ann. 1: 23. 1794.

Alaska (Brewer and Coe, 304); Lowe Inlet, British Columbia (Trelease, 1277); Sitka (Trelease, 1278); Broughton Strait (Trelease, 1267); Juneau, 2000 ft. (Trelease, 1273); Yakutat (Trelease, 1289); Wrangell (Brewer and Coe, 405); Orca (Trelease, 1271); Point Gustavus, Glacier Bay (Brewer and Coe, 781, 782); Hall Island (Trelease, 1213, 1282; Brewer and Coe, 2060, 2062); St. Matthew Island (Trelease, 1216); St. Lawrence Island (Trelease, 1210, 1275, 1285); St. Michael (Setchell); Unalaska (Setchell); Cape Nome (Setchell).

Dr. Nylander reports its occurrence on earth and moss on St. Lawrence Island; Dr. Rothrock credits it to Alaska, with no definite station. Under the synonym *S. globiferus* (L.) DC., it is reported by J. M. Macoun as growing on rock on St. Paul and St. George Islands. Dr. Grace Cooley collected it at Loring, and also at Salmon Creek, near Juneau, and Dr. Bean at Port Mulgrave and on Little Koniuji Island, of the Shumagin group. It seems to be one of the most widely distributed of the Alaska lichens, the material collected by the members of the Harriman Expedition being obtained on the mainland and on islands near the coast from British Columbia to Cape Nome.

All the specimens are sterile excepting those from Glacier Bay and St. Michael, which are large and well fruited. Usually the southern forms are more finely divided than those from the northern stations. This species seems to be more abundant and more widely distributed than the following one.

8. **Sphærophoron fragile** (Crantz) Pers.

Lichen fragilis CRANTZ, Inst. 7. h. 1: 78. 1766.
Sphærophoron fragile PERSOON, Ust. N. Ann. 1: 23. 1794.—SOWERBY, Eng. Bot. *t. 2474.*

Summit of White Pass, 3000 ft. (Trelease, 1284, 1286); St. Matthew Island (Trelease, 1283); Port Clarence (Trelease, 1280); St. Michael Island (Setchell); Cape Nome (Setchell).

Dr. Nylander records it as growing on earth and moss on St. Lawrence Island; Dr. Rothrock and J. M. Macoun record its occurrence, but give no localities. The specimen from St. Matthew Island is fruited, the others are sterile.

The genus *Siphula* was not found among the Harriman collections, but *Siphula dactyliza* Nyl. and *S. ceratites* (Wahl.) Tr. are reported by Dr. Nylander as growing on quartz rock on St. Lawrence Island, the latter species also on moss associated with *Lecidea suballinita* Nyl. In Tuckerman's Genera Lichenum *S. ceratites* is credited to Bering Strait (Mr. Wright), the only American locality given for it.

Family ARTHONIACEÆ.

ARTHONIA.

9. **Arthonia punctiformis** Ach.

Arthonia punctiformis ACHARIUS, L. U. 141. 1810.

Sitka (Trelease, 839). New to Alaska.

Growing on *Alnus oregana*. Spores 2–3–4-septate. Thallus not uniform, and thus varying from most of the specimens in the Tuckerman Herbarium. A widely distributed species.

Arthonia mediella alnicola Nyl. is reported by Dr. Nylander as having been collected on branches at Port Clarence.

Family OPEGRAPHIACEÆ.

GRAPHIS.

10. **Graphis scripta** (L.) Ach.

Lichen scriptus LINNÆUS, Spec. Pl. ed. 2. 2 : 1606. 1764.

Graphis scripta ACHARIUS, L. U. 265. 1810.—SOWERBY, Eng. Bot. *t. 1813.*

Orca (Trelease, 1801). New to Alaska.

Growing on the bark of dead coniferous trees. Reported from Newfoundland by Arnold, but I find no record of its occurrence in Greenland.

No. 811, collected at Sitka by Trelease, is evidently a *Graphis*. Unfortunately the spores are not developed, and therefore it is impossible to place it. Apparently it belongs in the section *Fissurina*, which is characteristically tropical.

XYLOGRAPHA.

11. **Xylographa opegraphella** Nyl.

Xylographa opegraphella NYLANDER, Enum. Lich. 128. 1857.

Alaska (Trelease, number lost). On dead wood with *Lecidea enteroleuca* and *Placodium ferrugineum*.

Collected at Cook Inlet by Dr. Bean.

In addition to the species given above, Dr. Bean collected *X. parallela pallens* Nyl. on an island in Cross Sound.

OPEGRAPHA.

12. **Opegrapha varia** Pers.

Opegrapha varia PERSOON, Ust. Ann. Bot. 7 : 30. 1794.

Port Wells (Trelease, 835 in part); Orca (Setchell, 1218). New to Alaska.

No. 835 is on the bark of coniferous trees with *Biatora cinnabarina* and *Heterothecium sanguinarium affine*. The spores are broader than usual and often 3-septate. Common throughout the United States.

Family LECIDIACEÆ.

BUELLIA.

KEY TO THE SPECIES.

Thallus yellow.
- Areoles of the thallus scattered.....*geographica atrovirens.*
- Areoles of the thallus massed.
  - Hypothallus distinct..... *geographica.*
  - Hypothallus not evident.....*geographica contigua.*

Thallus never yellow.
- Spores bilocular.
  - Growing on the earth or dead mosses.....*papillata.*
  - Growing on trees or rocks.
    - Thallus smooth, whitish.....*parasema.*
    - Thallus scurfy, variously colored.
      - Thallus ash-colored .....*myriocarpa.*
      - Thallus greenish ash-colored.....*myriocarpa chloropolia.*
- Spores plurilocular or muriform-multilocular.
  - Thallus brownish or blackish .....*petræa.*
  - Thallus variously colored.
    - Thallus ash-colored, apothecia small.....*petræa grandis.*
    - Thallus violet-colored, apothecia large.....*petræa montagnæi.*

13. **Buellia geographica** (L.) Tuck.

Lichen geographicus LINNÆUS, Spec. Pl. ed. 2. 2 : 1607. 1764.—SOWERBY, Eng. Bot. *t. 245.*

Buellia geographica TUCKERMAN, Gen. Lich. 190. 1872.

Summit of White Pass (Trelease, 951 in part, 951*a*); Kadiak (Trelease, 899, 900, 902, each in part); Hall Island (Trelease, 891*b*, 893, each in part); St. Matthew Island (Trelease, 999); Port Wells (Tre-

lease, 936 in part); Port Clarence (Trelease, 890); Cape Nome (Setchell); St. Michael Island (Setchell). Collected on Alaska Peninsula by Dr. Bean, and on St. George Island by J. M. Macoun.

All the specimens are on rock and are associated with various species of *Parmelia*, *Lecanora*, *Pertusaria*, and *Lecidea*. This is one of the most widely distributed of alpine and arctic lichens. Small bits of the sterile thallus were found with several rock specimens which are not listed above.

14. **Buellia geographica contigua** (Schaer.).

Lecidea geographica α contigua SCHAERER, Spicil. 124. 1828.

Haenke Island, Disenchantment Bay (Coville and Kearney, 1116); Kadiak (Trelease, 897, 898, each in part, 901); Hall Island (Trelease, 891, 891*a* in part). New to Alaska.

Associated with species of *Pertusaria*, *Lecanora*, and *Lecidea*. No. 1116 has the thallus more distinctly areolate than any specimen in the Tuckerman Herbarium.

15. **Buellia geographica atrovirens** (L.)Tuck.

Lichen atrovirens LINNÆUS, Spec. Pl. ed. 2. 2: 1607. 1764.

Summit of White Pass, 3000 ft. (Trelease, 888, in part). New to Alaska.

On rock, associated with *Lecanora cinerea gibbosa*.

16. **Buellia petræa** Tuck.

Lecidea petræa WULF. in Jacq. Coll. III, 116. *t. 6. f. 2. a.* 1789.
Buellia petræa TUCKERMAN, Gen. Lich. 190. 1872.—SOWERBY, Eng. Bot. *t. 246.*

Broughton Strait (Trelease, 850); Plover Bay, Siberia (Trelease, 993); St. Michael (Setchell).

The specimen from Broughton Strait is on wood, those from Plover Bay and St. Michael on rock. The species has been recorded by Rothrock from St. Paul Island, from Kadiak and Port Clarence, Alaska, and from Plover Bay, Siberia.

17. **Buellia petræa grandis** (Flk.) Tuck.

Lecidea petræa β fuscoatra C. *grandis* FLOERKE, Flora. 620. 1828.
Buellia petræa b. *grandis* TUCKERMAN, Syn. N. A. L. 2: 102. 1888.

Alaska, locality lost (Trelease, 968). New to Alaska. Previously reported from Greenland to California and southward.

Compares well with the specimen in the Tuckerman Herbarium which was collected in the White Mountains of New Hampshire.

18. **Buellia petræa montagnæi** (Flot.) Tuck.

Lecidea montagnæi FLOTOW in Koerb. Syst. 258. 1855.
Buellia petræa c. *montagnæi* TUCKERMAN, Syn. N. A. L. 2: 102. 1888.

Hot Springs, Baranof Island (Trelease, 964); summit of White Pass, 3000 ft. (Trelease, 952); Kadiak (Trelease, 914*a* in part, 945 in part, 946); Unalaska (Trelease, 923); St. Paul Island (Trelease, 931). Specimens were collected at Cook Inlet and Port Clarence by Dr. Bean. Nylander records its occurrence at St. Lawrence Island under the synonym *Lecidea geminata* Flot.

All the specimens are on rock, No. 914*a* being associated with *Lecanora cinerea*.

19. **Buellia myriocarpa** (DC.) Mudd.

Patellaria myriocarpa DE CANDOLLE, Fl. Franc. 2: 346. 1805.
Buellia myriocarpa MUDD, Man. Brit. Lich. 217. 1861.

Port Clarence (Trelease, 939 in part).

Associated with *Lecanora varia* and its variety *intricata*, and with *Parmelia saxatilis omphalodes*. Dr. Rothrock and Dr. Nylander report its occurrence at St. Lawrence Bay and Konyam Bay, Siberia; Dr. Rothrock at Port Clarence, Alaska.

20. **Buellia myriocarpa chloropolia** (Fr.) Th. Fr.

Lecidea chloropolia FRIES, S. V. Sc. 1: 115. 1846.
Buellia myriocarpa chloropolia TH. FRIES, Lich. Scand. 595. 1871.

Kadiak (Trelease, 1170 in part). New to Alaska.

On dead wood, associated with *Theloschistes lychneus*. Tuckerman does not recognize this variety, and I find no other American record of it.

21. **Buellia papillata** (Smrft.) Tuck.

Lecidea papillata SOMMERFELDT, Suppl. 154. 1827.
Buellia papillata TUCKERMAN, Gen. Lich. 186. 1872.

Alaska (Funston, 8). New to Alaska.

The specimen grows on earth. It has been reported from Greenland. Wright collected the variety *albo-cincta* on the islands of Bering Strait.

22. **Buellia parasema** (Ach.) Th. Fr.

Lecidea parasema ACHARIUS, Meth. Lich. 35. 1803.
Buellia parasema TH. FRIES, Lich. Scand. 589. 1871.

Disenchantment Bay (Trelease, 842 in part); Yakutat (Trelease, 844 in part); Farragut Bay (Trelease, 837); Kukak Bay, Alaska Peninsula (Trelease, 836 in part; Kincaid, 836*a* in part); St. Michael (Setchell).

In addition to the stations mentioned above, it was collected by Dr. Hayes at Prince William Sound and by Dr. Bean at Port Clarence, Alaska, and at Plover Bay, Siberia.

On bark and dead wood. Associated with species of *Physcia*, *Lecanora*, *Placodium*, and *Pyrenula*.

23. **Buellia parasema triphragmia** (Nyl.) Th. Fr.

Lecidea triphragmia NYLANDER, Prod. 141. 1857.
Buellia parasema triphragmia TH. FRIES, Lich. Scand. 590. 1871.

Orca, 1150 feet (Trelease, 813), St. Michael (Setchell). New to Alaska.

On *Alnus*. The thallus is exceptionally smooth and not limited by the hypothallus. An examination of numerous specimens shows that the thallus is usually smoother when growing on the bark of living trees than it is on decaying trees or on the earth.

Widely distributed; may occur anywhere.

In addition to the species named above, Rothrock records the following species as having been collected by Dr. Bean: *B. albo-atra* (Hoffm. Nyl.) Th. Fr., at Unalaska; *B. atro-alba* Fr., on St. Paul Island and Unalaska Island and at Plover Bay, Siberia; *B. atro-alba chlorospora* Nyl., on Chamisso Island in the Arctic Ocean. The two latter species are given by Tuckerman as synonyms of *B. colludeus* (Nyl.) Tuck. J. M. Macoun collected *B. alpicola* (Nyl.) Anz. at St. George Island, also a *Buellia*, species undetermined. Tuckerman records the occurrence of *B. parmeliarum* (Smrft.) Tuck., parasitic on *Cetraria fahlunensis*, collected by Wright on islands in Bering Strait.

LECIDEA.

KEY TO THE SPECIES.

Thallus interspersed with reddish tubercles.....*panæola*.
Thallus not interspersed with reddish tubercles.
  Apothecia innate.....*tessellata*.
  Apothecia superficial, or if innate, becoming emergent.
    Apothecia innate, becoming emergent.
      Thallus yellowish-white, apothecia medium size.....*contigua*.
      Thallus grayish, apothecia very small.....*nigrocinerea*.
    Apothecia always superficial.
      Thallus smooth.
        Thallus thick.
          Thallus glaucescent.....*albocærulescens*.
          Thallus orange-red.....*albocærulescens flavocærulescens*.

Thallus thin or obsolete.
Apothecia small, thallus usually evident.....*platycarpa*.
Apothecia large, thallus obsolete.....*platycarpa steriza*.
Thallus granulate.
Surface of the apothecium shining as if polished.
melancheima.
Surface of the apothecium dull.
Thallus ash-colored.
Apothecia small .....*enteroleuca*.
Apothecia large .....*confluens*.
Thallus yellowish .....*enteroleuca flavida*.

24. **Lecidea melancheima** Tuck.

Lecidea melancheima TUCKERMAN, Syn. Lich. N. E. 68. 1848.

St. Lawrence Island (Trelease, 832 in part). New to Alaska.

The specimen is on wood associated with *Placodium ferrugineum*. Tuckerman reports its occurrence in New England and Colorado.

25. **Lecidea enteroleuca** Ach.

Lecidea enteroleuca ACHARIUS, L. U. 177. 1810.—SOWERBY, Eng. Bot. *t. 1450*.

Sitka (Trelease, 825*a* in part); Hot Springs, Baranof Island (Trelease, 963); Port Clarence (Trelease, 942); St. Michael (Setchell). Both Nylander and Rothrock report this from Port Clarence. Rothrock also lists it for Sitka, Chamisso Island, and Cape Lisburne, collected by Dr. Bean.

26. **Lecidea enteroleuca flavida** Fr.

Lecidea enteroleuca δ flavida FRIES, Vet. Akad. Handl. 261. 1824.

Sitka (Trelease, 825*a* in part). New to Alaska.

On wood associated with *L. enteroleuca*, *Placodium*, and *Xylographa*.

This differs from the specimens in the Herb. Tuck. in not having limiting hypothallus. Professor Tuckerman records its occurrence in New England, and suggests that it probably occurs throughout the United States and Canada.

27. **Lecidea platycarpa** Ach.

Lecidea platycarpa ACHARIUS, L. U. 1810.

Alaska (Trelease, 967); Hot Springs, Baranof Island (Trelease, 983 in part); White Pass, 1250 ft. (Trelease, 965), 1925 ft. (Trelease, 955); summit of White Pass, 3000 ft. (Trelease, 954); Kadiak (Trelease, 897 in part, 902 in part, 914*a*); Port Wells (Trelease,

905); Unalaska (Setchell); St. Matthew Island (Trelease, 999 in part). New to Alaska.

On rock associated with various species of *Lecanora* and *Buellia*. A widely distributed species.

28. **Lecidea platycarpa** forma **steriza** (Ach.).

Lecidea confluens steriza ACHARIUS, Meth. Lich. 40. 1803.

Orca (Trelease, 912); Kadiak (Trelease, 944). New to Alaska.

Reported from Newfoundland and Labrador by Arnold. The locality given by Tuckerman is the White Mountains of New Hampshire, no western stations being given.

29. **Lecidea albocærulescens** (Wulf.) Schaer.

Lichen albo-cærulescens WULFEN. in Jacq. Coll. 2: 184. *t. 15. f. 1.* 1788.
Lecidea albocærulescens SCHAERER, Spicil. 142. 1828.

Orca, 1000 ft. (Trelease, 906, 912*a*), 1200 ft. (Trelease, 907); Kadiak (Trelease, 910, 910*a*). Collected in Alaska by Dr. Bean, as recorded by Rothrock; locality not given.

The specimen from Kadiak numbered 910 has apothecia which are almost entirely without the pulverulence which is so characteristic of this species.

30. **Lecidea albocærulescens flavocærulescens** Schaer.

Lecidea albocærulescens b. *flavocærulescens* SCHAERER, Spicil. 143. 1828.

Summit of White Pass, 3000 ft. (Trelease, 919); Kadiak (Trelease, 909); Unalaska (Setchell); Hall Island (Trelease, 908); Cape Nome (Setchell); St. Michael (Setchell). Collected by Dr. Bean on Alaska Peninsula, as recorded by Rothrock.

31. **Lecidea confluens** (Web.) Ach.

Lichen confluens WEBER, Spicil. 180 *t. 2* (excl. syn.). 1778.
Lecidea confluens ACHARIUS, Meth. Lich. 40. 1803.—SOWERBY, Eng. Bot. *t. 1964.*

St. Michael (Setchell). New to Alaska.

On rock. Professor Tuckerman gives as known localities on this continent, Arctic America and Greenland.

32. **Lecidea contigua** Fr.

Lecidea contigua FRIES, L. E. 208. 1831.

Kadiak (Trelease, 896 in part, 898 in part, 913*a*, 914, 915); Hall Island (Trelease, 891*a* in part, 891*b* in part, 903).

Nylander records it for the three Asiatic stations in his Bering Sea list, while Rothrock adds three other Alaskan stations: Unalaska,

Alaska Peninsula and Chamisso Island, Eschscholtz Bay, the material having been collected by Dr. Bean. Tuckerman's records are New York and New England. The specimens are variously associated with *Lecanora atrosulphurea* and *Buellia geographica*.

33. **Lecidea nigrocinerea** Nyl.

Lecidea nigrocinerea NYLANDER, Lich. Pyreno-Orient. 25. in notula. 1891.

Port Wells (Trelease, 936 in part). New to Alaska. Tuckerman makes no record of its occurrence in North America.

Though this species is new to Alaska, Nylander lists it for Lawrence Bay, Konyam Bay, and St. Lawrence Island, Siberia.

34. **Lecidea panæola** Ach.

Lecidea panæola ACHARIUS, L. U. 201. 1810.

Summit of White Pass, 3000 ft. (Trelease, 950); Cape Nome (Setchell); St. Michael (Setchell). Also collected by Dr. Bean at Unalaska.

35. **Lecidea tessellata** Flk.

Lecidea tessellata FLOERKE, D. Lich. 64. 1821.

St. Michael (Setchell). New to Alaska.

On rock. Previously reported in America from New England, Greenland, Rocky Mts., California, and other localities.

OTHER ALASKA SPECIES.

In addition to the species given above, Tuckerman records the occurrence of *Lecidea enteroleuca muscorum* Koerb., *L. arctica* Sommerf., *L. assimilata* Nyl., all collected by Wright at Bering Strait; the last species is credited to St. Lawrence Island and Port Clarence by Nylander. Rothrock records the following species as having been collected by Dr. Bean, no definite locality being given: *L. contigua speirea* (Ach.) Nyl., *L. enteroleuca latypea* (Ach.) Nyl., *L. fuscoatra* Fr. Nylander records fifty-two additional species divided into thirteen groups. Many of these sections would be variously distributed among different genera by other writers, but in this list I shall retain the arrangement made by Nylander. With the exception of *L. subduplex* Nyl., which was collected on rock at Port Clarence, all the members of the first group grow on wood, moss, or on the earth. These species might be placed in the genus *Biatora*. Nine were collected at Port Clarence only, namely: *L. albohyalina* Nyl., *L. meiocarpa* Nyl., *L. internectens* Nyl., *L. insperabilis* Nyl., *L. denotata* Nyl., *L. sabuletorum* Flk., *L. syncomista* Flk., *L. meiobola* Nyl., *L. triplicans* Nyl.; seven were found only on St. Lawrence Island, namely:

L. epiphæa Nyl., *L. ramulosa* Fr., *L. atrorufa* Ach., *L. sanguineoatra* (Fr.) Nyl., *L. pallidella* Nyl., *L. ternaria* Nyl., *L. subballinita* Nyl., while *L. tornoensis* Nyl. was collected at both localities. In the second group are two species collected at Port Clarence on the earth or on moss: *L. muscorum* (Sw.) Nyl. and *L. subfuscula* Nyl. In the third group only two species are represented, one, *L. fecunda* Fr. fil., collected on earth and moss at Port Clarence, the other, *L. pezizoidea* Ach., found in similar habitats both on St. Lawrence Island and at Port Clarence. The fourth group is also represented by two species—*L. limosa* Ach. and *L. dovrensis* Nyl., the former on earth, the latter on rock, at Port Clarence. In the fifth group are the following species: *L. subnegans* Nyl., *L. candida* Ach., *L. parasema*, forma *euphora* Flk., and *L. incongrua* Nyl. The sixth group includes: *L. tenebrosa* forma *subsparsa* Nyl., *L. laurentiana* Nyl. *L. brachyspora* Fr., growing on rock on St. Lawrence Island; *L. contigua* forma *meiospora* Nyl. and *L. crustulata* (Ach.) Nyl., on rock, collected at Port Clarence. Of the seventh group there is only one representative—*L. disciformis* forma *insignis* Naeg. There are three representatives of the eighth group: *L. jemtlandica* (Fr. fil.), on earth, St. Lawrence Island; *L. atroalbens* Nyl., on rock, St. Lawrence Island; and *L. chionea* Norm., on rock, Port Clarence. In the ninth group the following species are included: *L. confervoides* (DC.) Nyl., *L. atrocæsia* Nyl., *L. geminata* Flot., *L. excentrica* Ach., the first three on rock on St. Lawrence Island, the last one on rock at Port Clarence. The tenth group is represented by *L. alpicola* Schaer., growing on rock on St. Lawrence Island. The eleventh group contains one species—*L. rhexoblephara* Nyl., which was found on earth on St. Lawrence Island. In the twelfth group are *L. sanguinaria* Ach., growing on the earth on St. Lawrence Island, and *L. affinis* Schaer., growing on the earth on St. Lawrence Island and at Port Clarence. The thirteenth group is represented by *L. paraphanella* Nyl., on rock from St. Lawrence Island. The following species are given in the body of the text, but not arranged in the foregoing groups: *L. associata* Fr. fil., *L. hypopodia* forma *subassimilata* Nyl., growing on the earth on St. Lawrence Island, and *L. scabrosa* Ach., growing on the earth at Port Clarence. In addition to the list based upon the specimens collected by Dr. Almquist, Nylander revises Rothrock's[1] list with the following changes: *L. spilota* Fr. = *L. plana* Lahm.; *Buellia petræa* = *Lecidea geminata* Flot.; *L. enteroleucodes* Nyl.

[1] Rothrock, Dr. J. T. List of, and Notes upon, the Lichens collected by Dr. T. H. Bean in Alaska in 1880. Proc. U. S. Nat. Museum. 1884.

is classed as *Buellia parasema* by Rothrock. One new species is described—*Lecidea alaskensis* Nyl., based upon material collected by Dr. Bean and forwarded to Nylander by Willey. Macoun indicates that two species of *Lecidea* were collected on rocks on St. George Island, but no specific names are given.

HETEROTHECIUM.

KEY TO THE SPECIES.

Hypothecium red.....*sanguinarium.*
Hypothecium colorless.....*sanguinarium affine.*

36. **Heterothecium sanguinarium** (L.) Flot.

Lichen sanguinarius LINNÆUS, Sp. Pl. ed. 2. 2 : 1607. 1764.
Heterothecium sanguinarium FLOTOW in Bot. Zeit. 1850. — SOWERBY, Eng. Bot. *t. 155.*

Vancouver Island, Broughton Strait (Trelease, 807); Yakutat (Trelease, 840, 843); White Pass, 1300 ft. (Trelease, 834); Virgin Bay (Trelease, 847); Port Wells (Trelease, 835*b* in part); Unalaska (Setchell). In addition to the stations mentioned above it was collected by Wright on the islands of Bering Strait; by Dr. Cooley at Juneau and at Sheep Cove, near Juneau; and by Dr. Bean at Eschscholtz Bay, Yakutat Bay, and Cook Inlet.

On the bark of various trees. In this species there is usually only a single spore in an ascus. Tuckerman says: "The lichen is now bisporous in Europe." The measurements given for a single spore are $\frac{54\text{-}92}{24\text{-}48}$ μ. No. 840 from Yakutat and the specimen from Broughton Strait are bisporous, with spore measurements $\frac{45\text{-}52}{31}$ μ.

37. **Heterothecium sanguinarium affine** (Schaer.) Flot.

Lecidea affinis SCHAERER, Enum. 132. 1850.
Heterothecium sanguinarium affine FLOTOW in Bot. Zeit. 1850.

Orca (Trelease, 841, 848); Virgin Bay (Trelease, 1119). New to Alaska.

On the bark of coniferous trees. While the forma *affine* is new to Alaska, the species was collected on the islands of Bering Strait by Wright.

In addition to the species given above, Tuckerman notes that *H. pezizoideum* (Ach.) Flot. was collected by Wright on mosses on the islands of Bering Strait.

BIATORA.

KEY TO THE SPECIES.

Apothecia scarlet.....*cinnabarina.*
Apothecia variously colored.
Apothecia lemon-yellow.....*lucida.*

Apothecia brick-colored, brown or blackening.
Spores simple.
Apothecia difform and conglomerate.....*granulosa.*
Apothecia not difform and conglomerate.
Thallus white..... *apochrœiza.*
Thallus grayish-green.....*viridescens.*
Spores compound.
Spores 1–2-locular .....*vernalis.*
Spores 4–9-locular.....*hypnophila.*

38. **Biatora hypnophila** (Turn.) Tuck.

Lecidea hypnophila TURNER in Ach. L. U. 199. 1810.
Biatora hypnophila TUCKERMAN, Syn. N. A. L. 2: 35. 1882. — SOWERBY, Eng. Bot. *t. 2217.*

Yakutat (Trelease, 830); St. Michael (Setchell); Unalaska (Setchell). New to Alaska.

On bark of living trees (Trelease); on earth (Setchell). The thallus of the specimen on bark is not granulate and the apothecia are somewhat larger than most of those in the Tuckerman Herbarium. The spores are usually bilocular. The range of this plant is from Greenland to Florida.

39. **Biatora lucida** (Ach.) Fr.

Lichen lucidus ACHARIUS, Lich. Suec. Pr. 39. 1798.
Biatora lucida FRIES, L. E. 279. 1831.—SOWERBY, Eng. Bot. *t. 1550.*

White Pass (Trelease, 973). New to Alaska.

Growing on earth. Previously reported from Arctic America.

40. **Biatora vernalis** (L.) Fr.

Lichen vernalis LINNÆUS, Syst. Nat. 3: 234. 1767.
Biatora vernalis FRIES, L. E. 260. 1831.—SOWERBY, Eng. Bot. *t. 845.*

Disenchantment Bay (Trelease, 803*c*); Orca, 1105 ft. (Trelease, 813). Reported by Nylander from Port Clarence under synonym of *Lecidea vernalis* (L.).

The specimen from Disenchantment Bay is on the bark of dead shrubs. The thallus is almost obsolete and the apothecia are smaller and more regular than in the specimens on moss. The thallus seems entirely obsolete in the specimen from Orca. This species has been reported from Greenland.

41. **Biatora cinnabarina** (Smrft.) Fr.

Lecidea cinnabarina SOMMERFELDT, Vet. Ak. Handl. 115. 1821.
Biatora cinnabarina FRIES, Lich. Arct. 191. 1860.

Summit of White Pass, 3000 ft. (Trelease, 833); Port Wells (Trelease, 835*a*). New to Alaska.

The specimen from Port Wells is only a fragment on the bark of a coniferous tree associated with *Opegrapha* and *Heterothecium*. The species has been reported from Labrador and Greenland, but not from the western coast.

42. **Biatora viridescens** (Schrad.) Fr.

Lichen viridescens SCHRADER in Gmel. Syst. Nat. 2 : 1361. 1791.
Biatora viridescens FRIES, Act. Acad. Sc. Stockh. 268. 1822.

Farragut Bay (Trelease, number lost). New to Alaska.

On bark of trees and shrubs. Apothecia smaller and more regular, thallus smoother and not so well developed as in the specimens on dead wood in the Tuckerman Herbarium. A widely distributed species.

43. **Biatora granulosa** (Ehrnb.) Mass.

Lichen granulosus EHRENBERG, Crypt. N. 145. 1785.
Biatora granulosa MASSALONGO, Ric. 124. 1852.—SOWERBY, Eng. Bot. *t. 1185.*

St. Matthew Island (Trelease, 852). New to Alaska.

On dead wood. The apothecia are rather smaller and more numerous and the thallus less developed than in the specimens in the Tuckerman Herbarium. Previously reported from Arctic America, Canada, New England, Rocky Mts., Oregon, and other localities.

44. **Biatora apochrœiza** (Nyl.).

Lecidea apochrœiza NYLANDER, Flora 443. 1885.

Hall Island (Trelease, 863*a*; Coville and Kearney, 206*c*).

Growing over mosses. Reported from St. Lawrence Island by Nylander.

A specimen numbered 822, collected on dead wood at Sitka, may possibly be referred to *Biatora varians*. The spores are immature and the determination is therefore uncertain.

ADDITIONAL ALASKA SPECIES.

The following species of *Biatora* have been reported from Alaska which do not occur in the Harriman collection: *B. cuprea* (Sommerf.) Fr. and *B. artyla* (Ach.) Tuck., collected by Wright on the Islands of Bering Strait; *B. laureri* (Hepp.) Tuck., collected in Alaska by Hall; *B. milliaria* Fr., Shumagin group of islands, and *B. sanguineo-atra* Fr., on logs at old Sitka, collected by Dr. Bean; and *B. sphæroides* (Dicks.) Tuck., collected by Wright on the islands of Bering Sea, and, under the synonym *Lecidea sphæroides*, reported by Nylander from Port Clarence.

BÆOMYCES.

45. **Bæomyces æruginosus** (Scop.) DC.

Lichen æruginosus SCOPOLI, Fl. Carn. ed. 1. 1760.
Bæomyces æruginosus DE CANDOLLE, Fl. Franç. 2, 353. 1805.

Orca (Trelease, 828, 1006, 1016*a*); Sitka (Trelease, 1015); Hot Springs, Baranof Island (Trelease, 1080); Fraser Reach (Trelease, 1013); Farragut Bay (Trelease, 1014); Port Wells (Trelease, 1079). Collected by Dr. Bean at Sitka and Port Althorp; by Dr. Cooley at Loring and at Salmon Creek, near Juneau; by Dr. Hayes on Prince William Sound; and by Hall at Sitka. Under the synonym *B. icmadophilus* (Ehrh.) Nyl., Nylander reports its occurrence at Port Clarence, and Rothrock at Sitka and Port Althorp.

Family CLADONIACEÆ.

THAMNOLIA.

KEY TO THE SPECIES.

Thallus very slender, prostrate.....*vermicularis subuliformis.*
Thallus swollen, more erect.....*vermicularis taurica.*

46. **Thamnolia vermicularis subuliformis** Schaer.

Thamnolia vermicularis subuliformis SCHAERER, Enum. 243. 1850.

Metlakatla (Trelease, 1218); St. Lawrence Island (Trelease, 1212); Unalaska (Setchell); Cape Nome (Setchell). New to Alaska.

The specimen from St. Lawrence Island is very lax and long. With the other specimen is this note: "Floating masses in ponds."

47. **Thamnolia vermicularis taurica** Schaer.

Thamnolia vermicularis taurica SCHAERER, Enum. 243. 1850.

Agattu Island (Townsend, 77); Hall Island (Trelease, 1228; Brewer and Coe, 673); St. Matthew Island (Trelease, no number); St. Lawrence Island (Trelease, 1232). New to Alaska.

Nylander records the occurrence of the species at St. Lawrence Island and Port Clarence. In his synopsis he does not recognize either variety, both being given as synonyms of the species itself. It is probable that both varieties were represented. As I have followed Tuckerman in separating the varieties, this makes the first Alaskan record of the distinct varieties.

CLADONIA.

KEY TO THE SPECIES.

Apothecia scarlet.
Cups of the podetia large and evident.
Cups cupulæform and erect.....*deformis.*

Cups dilated and cyathiform.
Podetia smooth or squamulose.....*coccifera.*
Podetia powdery above .....*coccifera pleurota.*
Cups of the podetia small or obsolete.
Podetia without squamules.
Podetia powdery above ....*macilenta.*
Podetia not powdery above.....*bellidiflora hookeri.*
Podetia with squamules.
Podetia scarcely branched .....*bellidiflora.*
Podetia freely branched.
Squamules on the podetia few, thin, appressed.
bellidiflora coccocephala.
Squamules on the podetia numerous, thick, spreading.
bellidiflora ramulosa.
Apothecia never scarlet.
Apothecia pale flesh-colored or reddish.
Podetia unbranched.....*carneola.*
Podetia branched.
Dichotomously branched.....*uncialis.*
Irregularly branched.....*amaurocræa.*
Apothecia brown.
Thallus sulphur-colored or straw-colored.
Thallus densely thyrsoid entangled.....*alpestris.*
Thallus open, not densely thyrsoid entangled.
sylvatica sylvestris.
Thallus grayish-green or brownish.
Podetia club-shaped.
Bearing squamules.
Podetia not subulate.
Branches not proliferous.....*squamosa.*
Branches proliferous from the margin.....*crispata.*
Podetia subulate.
Epidermis granulate .....*squamosa muricella.*
Epidermis smooth.....*furcata racemosa.*
Without squamules.
Podetia cancellate-carious.....*cariosa corticata.*
Podetia not cancellate-carious.
Thallus irregularly branched.....*furcata palamæa.*
Thallus dichotomously or trichotomously branched.
rangiferina.
Podetia not club-shaped.

Bearing squamules.
Podetia powdery.....*fimbriata simplex.*
Podetia not powdery.
Cups proliferous.
From the center ..... *verticillata.*
From the margin.
Podetia smooth .....*gracilis dilatata.*
Podetia granulate-furfuraceous..... *degenerans.*
Cups not proliferous.....*pyxidata.*
Without squamules.
Podetia short .....*pyxidata.*
Podetia elongated.
Podetia powdery.....*cornuta.*
Podetia smooth.
Podetia very slender, subulate.....*gracilis chordalis.*
Podetia not so slender, often ventricose.
gracilis elongata.

48. **Cladonia macilenta** Hoffm.

Cladonia macilenta HOFFMANN, Deutschl. Fl. 126. 1795.

Wrangell (Trelease, 1318). Collected at Loring by Dr. Cooley.

Wainio, in his Monographia Cladoniarum, reports its occurrence on Vancouver Island.

49. **Cladonia deformis** (L.) Hoffm.

Lichen deformis LINNÆUS, Spec. Pl. 2 : 1152. 1753.
Cladonia deformis HOFFMANN, Deutschl. Fl. 120. 1795.—SOWERBY, Eng. Bot. *t. 1394.*

Alaska (Evans, 504); Wrangell (Trelease, 1290; Coville and Kearney, 412); White Pass (Trelease, 1332*a*); St. Michael (Turner, 852); Keystone Pass (Tibetts). Babington and Rothrock report its occurrence at Kotzebue Sound, while Nylander credits it to Port Clarence.

No. 412 from Wrangell is large and well fruited, the others are sterile or have only immature apothecia.

50. **Cladonia bellidiflora** (Ach.) Schaer.

Lichen (*Scyphophorus*) *bellidiflorus* ACHARIUS, Meth. Lich. 335. 1803.
Cladonia bellidiflora SCHAERER, Lich. Helv. Spic. 21. 1823.—SOWERBY, Eng. Bot. *t. 1894.*

Alaska (Evans, 39, 193, 399, 502); Fraser Reach, Princess Royal Island, B. C. (Trelease, 1314; Brewer and Coe, 300); Wrangell (Brewer & Coe, 413); New Metlakatla (Trelease, 1317); Yakutat

(Trelease, 1324); Vancouver Island, Broughton Strait (Trelease, 1315); Sitka (Trelease, 1321, 1322, 1355); Hot Springs, Baranof Island (Trelease, 1319, 1319*a*); White Pass (Trelease, 1325); summit of White Pass, 3000 ft. (Trelease, 626*a*); Orca (Trelease, 1323; Setchell, 1220); Port Wells (Trelease, 1326); Virgin Bay (Trelease, 1327); Attu Island (Townsend, 72); St. Matthew Island (Trelease, 2117); St. Lawrence Island (Trelease, 1329); Cape Nome (Setchell). In addition to the localities given above, Nylander reports its occurrence on St. Lawrence Island, Macoun states that it is common on St. George and St. Paul Islands, while Wainio credits it to St. Paul Island and to Sitka.

One of the most widely distributed of all the lichens of this collection. It varies greatly in size and in the development of the squamules. Usually the plants are abundantly fruited.

51. **Cladonia bellidiflora coccocephala** (Ach.) Wainio.

Cenomyce coccocephala ACHARIUS, L. U. 540. 1810.
Cladonia bellidiflora coccocephala WAINIO, Monographia Cladoniarum 224. 1887.

Juneau 1800 ft. (Saunders, 1331); White Pass (Trelease, 1325*a*); Virgin Bay (Trelease, 1312, 1328). Under the synonym *C. bellidiflora* f. *gracilenta*, Nylander reports its occurrence on St. Lawrence Island.

52. **Cladonia bellidiflora hookeri** (Tuck.) Nyl.

Cladonia hookeri TUCKERMAN, Syn. Lich. N. E. 55. 1848.
Cladonia bellidiflora hookeri NYLANDER, Syn. 221. 1860.

Broughton Strait (Trelease, 1316); Wrangell (Trelease, 1318 in part); Hot Springs (Trelease, 1320 in part). Wainio reports its occurrence at Sitka and St. Paul Island.

The specimens from Wrangell and Hot Springs are mixed with the species.

53. **Cladonia bellidiflora ramulosa** Wainio.

Cladonia bellidiflora ramulosa WAINIO, Monographia Cladoniarum, 1: 210. 1887.

Hall Island (Trelease, 1330, 1335); St. Lawrence Island (Trelease, 1333); Cape Nome (Setchell). New to Alaska and to America.

The specimens agree with the descriptions of this variety excepting that the podetia are very scaly, while the variety is described as lacking scales, or somewhat scaly.

54. **Cladonia coccifera** (L.) Willd.

Lichen cocciferus LINNÆUS, Spec. Pl. 2 : 1151. 1753.
Cladonia coccifera WILLDENOW, Fl. Berol. 361. 1787.—SOWERBY, Eng. Bot. *t. 2051.*

Alaska (Funston, 3) ; Broughton Strait (Trelease, 1336) ; Wrangell (Trelease, 1337); Sitka (Trelease, 1343); White Pass (Trelease, 1332); summit of White Pass, 3000 ft. (Trelease, 626, 1332*a*, 1332*b*); Point Gustavus, Glacier Bay (Coville and Kearney, 769); Popof Island (Kincaid, no number); Hall Island (Coville and Kearney, 2065); St. Paul Island (Trelease, 1342, 1342*a*); St. Matthew Island (Coville and Kearney, 2123); Port Clarence (Trelease, 1345); St. Michael (Setchell); Cape Nome (Setchell). Under the synonym *C. cornucopioides* (L.) Fr., Babington records its occurrence at Kotzebue Sound and makes this note: "Very fine, fertile." Under the same name Nylander credits it to St. Lawrence Island and Port Clarence, Rothrock to Port Althrop (Dr. Bean, collector), while Macoun states that it is common on St. Paul and St. George Islands.

Very variable, many of the specimens sterile or with immature fruit. The specimen from Point Gustavus is infected with a small black fungus.

55. **Cladonia coccifera pleurota** (Floerk.) Schaer.

Capitularia pleurota FLOERKE, Beschr. Rothfr. Becherfl. 218. 1808.
Cladonia coccifera pleurota SCHAERER, Lich. Helv. Spic. 25. 1823.

Virgin Bay (Trelease, 1346, sterile). Seward Peninsula (Collier). In Nylander's list the species is credited to St. Lawrence Island and Port Clarence.

56. **Cladonia uncialis** (L.) Web.

Lichen uncialis LINNÆUS, Spec. Pl. 1153. 1753.
Cladonia uncialis WEBBER in Wiggers, Prim. Fl. Hols. 90. 1780, pr. p.—SOWERBY, Eng. Bot. *t. 1247.*

Sitka (Trelease, 1243) ; Unalaska (Setchell) ; St. Lawrence Island (Trelease, 1250); Port Clarence (Trelease, 1255; Cole, no number); Reindeer Station, Port Clarence (James L. White); St. Michael (Setchell); Cape Nome (Setchell); Seward Peninsula (Collier). In addition to these stations, Babington credits it to Kotzebue Sound and Rothrock records its occurrence at Sitka and Kotzebue Sound. Under the synonym *Cenomyce uncialis* Ach., Hooker and Arnott include it in their list of species from Kotzebue Sound, while Nylander credits it to Port Clarence as *Cladonia uncialis* (Hoffm.).

A widely distributed northern lichen. Most of the specimens are the form recognized by Tuckerman as var. *adunca*. Wainio, in his

Monographia Cladoniarum, gives forty-five different varietal names which have been applied to different forms of this protean lichen, and therefore he seems wise in excluding all these varieties.

57. **Cladonia amaurocræa** (Floerk.) Schaer.

Capitularia amaurocræa FLOERKE, Beschr. Braunfr. Becherfl. 334. 1810.
Cladonia amaurocræa SCHAERER, Spicil. 34. 1823.

St. Michael Island (Turner, 843; Setchell); St. Lawrence Island (Trelease, 1230); Fort Cosmos (Huff, no number); Cape Nome (Setchell). Also found at Port Clarence, according to Nylander.

A subalpine and arctic lichen.

58. **Cladonia carneola** Fr.

Cladonia carneola FRIES, Lich. Eur. 233 (a). 1831.

Sitka (Trelease, 1344). New to Alaska.

Other North American stations are Greenland, Oregon, and Washington.

59. **Cladonia alpestris** (L.) Rabenh.

Lichen rangiferinus alpestris LINNÆUS, Spec. Pl. 1153. 1753.
Cladonia alpestris RABENHORST, Clad. Eur. 11. 1860.—DILL. Hist. Musc. *t. 16. f. 29.*

Summit of White Pass, 3000 ft. (Trelease, 1244); Orca (Coville and Kearney, 1203; Trelease, 1246); Virgin Bay (Saunders, 1248; Coville and Kearney, 1224); Columbia Fiord, Prince William Sound (Coville and Kearney, 1402); Kadiak (Trelease, 1239); Hall Island (Coville and Kearney, 2061); St. Matthew Island (Trelease, 1256); St. Michael Island (Turner, 844; Setchell); St. Lawrence Island (Trelease, 1249, 1251, 1258; Coville and Kearney, 2009; Cole, no number); Port Clarence (Trelease, 1253); Cape Nome (Setchell); Seward Peninsula (Collier). Under the synonym *Cladonia rangiferina alpestris*, Nylander records its occurrence on St. Lawrence Island, while Macoun states that it is common on St. George Island.

This is a common alpine and arctic form, and shows great variation in the delicacy and fineness of the thallus. This is one of the finest collections of this species that I have ever seen.

60. **Cladonia sylvatica sylvestris** Oed.

Cladonia sylvatica sylvestris OEDER in Fl. Dan. **3**: 4. *t. 539.* 1770.

Alaska (Funston, no number; Townsend, 57*a*); New Metlakatla (Trelease, 1241); Juneau (Trelease, 1259); Sitka (Trelease, 1242; Coville and Kearney, 881 in part); summit of White Pass, 3000 ft. (Brewer and Coe, 625); Port Wells (Trelease, 1245); Orca (Trelease,

1262); Virgin Bay (Trelease, 1247, 1260); Sturgeon River Bay, Kadiak Island (Trelease, 1240); Akun Island (Townsend, no number); Attu Island (Townsend, 73); Atka Island (Townsend, 90); Hall Island (Trelease, 1252 in part); Pastoliak River (Newhall); Seward Peninsula (Collier). Nylander records *C. sylvatica* (Hoffm.) as occurring at Port Clarence, and *C. rangiferina sylvatica* on St. Lawrence Island. Under the synonym *C. rangiferina* var. *sylvatica*, Macoun records its occurrence on St. George Island, Rothrock credits it to 'all Russian America,' while Dr. Cooley collected it at Salmon and Sheep Creeks, near Juneau.

All the specimens are sterile. Associated with this species are mosses and various other lichens growing in inextricable confusion.

61. **Cladonia rangiferina** (L.) Web.

Lichen rangiferinus LINNÆUS, Spec. Pl. 2: 1153. pr. p. 1753.
Cladonia rangiferina (L.) WEBBER in Wiggers, Prim. Fl. Hols. 90. n. 994, pr. p. 1780.—SOWERBY, Eng. Bot. *t. 2249.*

Alaska (Evans, 389); Wrangell (Coville and Kearney, 406); White Pass (Trelease, 1264); Orca (Trelease, 1263); Hall Island (Coville and Kearney, 2063 in part); St. Lawrence Island (Trelease, 1238 in part); Fort Cosmos (Huff, *c*); St. Michael (Setchell); Cape Nome (Setchell). Reported by Nylander from Port Clarence and from St. Lawrence Island; by Macoun as common on St. Paul and St. George Islands; by Dr. Cooley from Salmon Creek and Sheep Creek, near Juneau; by Rothrock from 'all Russian America'; collected also on St. Paul Island by William Palmer and determined by W. W. Calkins. Under the synonym *Cenomyce rangiferina* Hooker and Arnott report its occurrence at Kotzebue Sound.

Some of the specimens are mixed with other species of *Cladonia*, *Thamnolia*, and *Cetraria*. The specimens vary greatly, some being very delicate and finely branched, while others are coarse and not so profusely branched.

62. **Cladonia furcata racemosa** (Hoffm.) Floerk.

Cladonia racemosa HOFFMANN, Deutschl. Fl. 2: 144. 1795.
Cladonia furcata racemosa FLOERKE, Clad. Comm. 152. 1828.

Alaska (Evans, 195). Also collected by Macoun on St. Paul Island and St. George Island.

63. **Cladonia furcata palamæa** (Ach.) Nyl.

Bæomyces spinosus b. *palamæus* ACHARIUS, Meth. Lich. 359. 1803.
Cladonia furcata palamæa NYLANDER, Lich. Scand. 56. 1861.—DILL. Hist. Musc. *t. 16. f. 25, 27.*

Orca (Trelease, 1261); Sturgeon River Bay, Kadiak Island (Tre-

lease, 1225); St. Matthew Island (Trelease, 1223). Macoun collected it on the earth on St. Paul Island and on St. George Island. Hooper figures it in Cruise of the Corwin, plates 1–2.

64. **Cladonia crispata** (Ach.) Flot.

Cenomyce allotropa C. *crispata* ACHARIUS, Meth. Lich. 341. 1803.
Cladonia crispata FLOTOW, Merkw. Hirschb. 4. 1839.

Wrangell (Trelease, 1288); Virgin Bay (Trelease, 1293). Credited to Port Clarence in Nylander's list.

Specimens very finely divided.

65. **Cladonia squamosa** (Scop.) Hoffm.

Lichen squamosus SCOPOLI, Fl. Carn. ed. 2. 2: 368. 1772.
Cladonia squamosa HOFFMANN, Deutschl. Fl. 2: 125. 1795.—SOWERBY, Eng. Bot. *t. 2362.*

Alaska (Evâns, 29). Reported by Nylander as occurring at Port Clarence, by Rothrock at Sitka, and by Dr. Cooley at Sheep Creek, near Juneau.

Plants fertile.

66. **Cladonia squamosa muricella** (Del.) Wainio.

Cenomyce squamosa muricella DEL. in Dub. Bot. Gall. 626. 1830.
Cladonia squamosa B. *muricella* WAINIO, Mono. Clad. 1: 431. 1887.

New Metlakatla, Annette Island (Coville and Kearney, 368*b*); Sitka (Trelease, 1056); Cape Nome (Setchell). New to Alaska. Wainio reports its occurrence on Vancouver Island.

67. **Cladonia cornuta** (L.) Schaer.

Lichen cornutus LINNÆUS, Spec. Pl. 1152. n. 63. pr. p. 1753.
Cladonia cornuta SCHAERER, Lich. Helv. Spic. 373. 1836.—HORNEM. Fl. Dan. 13: *t. 2210.*

Alaska (Funston, 10). Credited to Sitka by Wainio.

Lyell and Macoun had collected this species in British Columbia, and it has been collected from the Asiatic side of Bering Strait.

68. **Cladonia verticillata** Hoffm.

Cladonia verticillata HOFFMANN, Deutschl. Fl. 2: 122. 1795.

Port Clarence (Trelease, no number). New to Alaska.

A very diminutive specimen likewise collected at Port Clarence may be referred here.

69. **Cladonia gracilis elongata** (Jacq.) Floerk.

Lichen elongatus JACQ. Misc. 378. 1781.
Cladonia gracilis elongata FLOERKE, Clad. Comm. 38. 1828.—JACQ. Misc. 2. *t. 11. f. 1.*

Summit of White Pass, 3000 ft. (Trelease, 1234); St. Matthew Island (Trelease, 1229); St. Lawrence Island (Trelease, 1230*a*, 1231,

1233); Port Clarence (Trelease, 1222, 1227, 1235); Cape Nome (Setchell); St. Michael (Setchell); Seward Peninsula (Collier). Nylander credits it to St. Lawrence Island and Port Clarence, while Macoun states that it is rare on St. Paul Island. Wainio gives as additional stations, Sitka and Kotzebue Sound. Kurtz and Knowlton credit it to Alaska as *Cladonia gracilis elongata macroceras*.

70. **Cladonia gracilis chordalis** (Floerk.) Schaer.

Capitularia gracilis B. *chordalis* FLOERKE, Beschr. Braunfr. Becherfl. 324, 1810, in part.
Cladonia gracilis chordalis SCHAERER, Lich. Helv. Spic. 32. 1823. — SOWERBY, Eng. Bot. *t. 2260.*

Juneau (Coville and Kearney, 600; Saunders, 1220); Wrangell (Trelease, 1291, 1292); summit of White Pass, 3000 ft. (Trelease, 1219, 1287); Port Wells (Trelease, 1226); Unalaska (Setchell); Hall Island (Trelease, 1221); St. Lawrence Island (Trelease, 1224); Keystone Pass (Tibbett). Collected also on St. Lawrence Island, according to Nylander.

71. **Cladonia gracilis dilatata** (Hoffm.) Wainio.

Cladonia dilatata HOFFMANN, Deutschl. Fl. 126. 1795.
Cladonia gracilis dilatata WAINIO, Monog. Clad. 2 : 87. 1894. — DILL. Hist. Musc. *t. 14. fig. 13A.*

Glacier Cascade (Canby, 509). Reported from Kotzebue Sound by Babington as *Cladonia gracilis* B. *hybrida*.

72. **Cladonia degenerans** (Floerk.) Spreng.

Bæomyces degenerans FLOERKE in Berl. Magaz. 283. 1807.
Cladonia degenerans SPRENGEL, Linn. Syst. Veg. 4 : 273. 1827.

Alaska (Evans, 503; Funston, 11); New Metlakatla (Coville and Kearney, 368*c*); Wrangell (Trelease, 1254; Coville and Kearney, 429); Juneau, 1800 ft. (Saunders); Hot Springs (Trelease, 1353); Yakutat (Trelease, 1351); St. Lawrence Island (Trelease, 1359); St. Michael (Setchell); Cape Nome (Setchell). On earth, St. Paul Island, collected by Macoun; and under the synonym *Cladonia degenerans* f. *trachyna* (Ach.) Nylander records its occurrence at Port Clarence.

The specimen from St. Lawrence Island is smaller and less branched than most of the others. It most closely resembles a specimen from Labrador in the Tuckerman Herbarium.

73. **Cladonia fimbriata simplex** (Weis) Flot.

Lichen fimbriatus c. *simplex* WEIS, Pl. Crypt. 84. 1770.—DILL. Hist. Musc. *t. 14. fig. 6A.*
Cladonia fimbriata simplex FLOT.

Locks of the Columbia River, Oregon (Coville and Kearney, 253); New Metlakatla (Trelease, 1352); Sitka (Trelease, 1309); Point

Gustavus, Glacier Bay (Coville and Kearney, 786, 786*a*); Hidden Glacier, Russell Fiord (Coville and Kearney, 966); Yakutat (Brewer and Coe, 645*b*—a fragment); Farragut Bay (Trelease, 1306; Brewer and Coe, 623*a*). It appears in Dr. Cooley's list under the synonym *Cladonia fimbriata* b. *tubæformis*, collected at Sheep Creek, near Juneau.

Cladonia fimbriata is one of the most variable of the *Cladonias*. Wainio, in his Monographia Cladoniarum Universalis, recognizes thirty-one varieties and forms of this species. Though new to Alaska, it has been collected in California by Bolander.

74. **Cladonia pyxidata** (L.) Fr.

Lichen pyxidatus LINNÆUS, Spec. Pl. 2: 1151. pr. p. 1753.
Cladonia pyxidata FRIES, Nov. Sched. Crit. 21. 1826.

Alaska (Evans, 67; Funston, 61; Trelease, 1313); New Metlakatla (Coville and Kearney, 368); Juneau (Trelease, 1331*a*, 1338); Egg Island, Disenchantment Bay (Coville and Kearney, 1019); Hidden Glacier Inlet (Trelease, 1347); Point Gustavus, Glacier Bay (Trelease, 787); Yakutat (Trelease, 1348, 1349, 1350; Saunders, 1152); Indian Camp, Yakutat Bay (Brewer and Coe, 645*a*); Unalaska (Setchell); Hall Island (Trelease, 1341); St. Paul Island (Coville and Kearney, 1822); St. Lawrence Island (Trelease, 1340); Port Clarence (Trelease, 1360); Plover Bay, Siberia (Trelease, 1339); St. Michael (Setchell). Additional localities: Dr. Bean collected this species on Chamisso Island, at Elephant Point, Eschscholtz Bay; and on Alaska Peninsula, according to Rothrock, who reports its occurrence at Kotzebue Sound; Macoun collected it on St. Paul and St. George Islands.

75. **Cladonia cariosa corticata** Wainio.

Cladonia cariosa γ *corticata* WAINIO, Monog. Clad. Univ. 2: 53. 1894.

Alaska (Funston, 55). New to Alaska.

ADDITIONAL SPECIES.

The following species, arranged according to Wainio's Monographia Cladoniarum, have been reported from Alaska: *C. papillaria* (Ehrh.) Hoffm., collected on St. Paul Island by William Palmer, determined by W. W. Calkins; *C. digitata* Schaer., collected at Sitka by Dr. Bean; *C. coccifera stemmatina* Ach., credited to Sitka by Wainio; *C. reticulata* (Russell) Wainio, reported by Nylander under the synonym *Cladina lacunosa* as occurring on St. Lawrence

Island; *C. furcata* (Huds.), collected on St. Paul Island by William Palmer, determined by W. W. Calkins; *C. rangiformis* Hoffm., reported for Kotzebue Sound by Hooker and Arnott, under synonym *Cenomyce pungens* Del.; *C. crispata* f. *divulsa* (Del.) Arn., recorded by Nylander for Port Clarence under the synonym *C. crispata* f. *cetrariæformis* Del.; *C. subsquamosa* Nyl. (Emend.), recorded by Nylander as occurring at Port Clarence; *C. cenotea* (Ach.) Schaer., reported by Nylander as occurring at Port Clarence, and by Rothrock as having been collected by Dr. Bean on an island in Cross Sound, while forms were brought from Cook Inlet and Sitka which are doubtfully referred here; *C. mitrula* Tuck., collected at Juneau by Dr. Cooley; *C. decorticata* (Floerke) Spreng., collected by Macoun on St. Paul Island; *C. acuminata* (Ach.) Norrl., reported by Nylander as having been collected at Port Clarence; *C. gracilis* (L.) Willd., reported by Rothrock[1] for Sitka and Kotzebue Sound, figured by Hooper[2] (pl. 1–2), and recorded for Kotzebue Sound by Hooker and Arnott under the synonym *Cenomyce ecmocyna* Ach.; *C. gracilescens* (Floerk.) Wainio, reported by Nylander, under the synonym *Cladina lepidiota* (Ach.) Nyl., as having been collected on St. Lawrence Island; *C. pyxidata pocillum* (Ach.) Flot., collected on the islands of Bering Strait by Wright, reported from Port Clarence by Nylander, who also separates a form as f. *cervina* which is included by Wainio under the var. *pocillum; C. fimbriata* (L.) Fr., collected by William Palmer on St. Paul Island, determined by W. W. Calkins, also collected at Loring by Dr. Cooley, by whom a doubtful form was collected at Sheep Creek, near Juneau; *C. fimbriata radiata* (Schreb.) Coem., reported by Hooker and Arnott for Kotzebue Sound under the name *Cenomyce radiata* Ach.; *C. foliacea alcicornis* (Lightf.) Schaer., collected by Macoun under damp, overhanging rocks on St. Paul Island, and recorded as *C. alcicornis;* and *C. cyanipes* (Sommerf.) Wainio, reported by Nylander as collected at Port Clarence.

PILOPHORUS.

KEY TO THE SPECIES.

Podetia short, stout, apothecia elongated.....*cereolus hallii.*
Podetia more elongated, apothecia rounded.....*cereolus acicularis.*

76. **Pilophorus cereolus hallii** Tuck.

Pilophorus cereolus hallii TUCKERMAN, Obs. Lich. 4: 177. 1877.

Orca, 1500 ft. (Trelease, 1305). New to Alaska.

[1] Rothrock, Dr. J. T. Flora of Alaska, Smithsonian Report, 1867.
[2] Hooper, Cruise of the Corwin, 1881.

The only specimen in the Tuckerman Herbarium is from the Cascade Mountains in Oregon. This specimen is much more delicate, being not more than two-thirds as long as the Alaska plants, while the apothecia are about half as thick.

77. **Pilophorus cereolus acicularis** (Ach.) Tuck.

Bæomyces acicularis ACHARIUS, Meth. Lich. 328. 1803.
Pilophorus cereolus acicularis TUCKERMAN, Suppl. L. 427. 1858–9.

Broughton Strait (Trelease, 1302); Sitka (Trelease, 1303; Setchell, 1265); Mount Verstovia, Sitka (Coville and Kearney, 929); Juneau (Coville and Kearney, 584; Setchell, 1245); Orca (Trelease, 1304; Setchell, 1222). Reported by Rothrock[1] as occurring in Russian America; collected by Dr. Bean at Sawmill Creek, Sitka; by Dr. Cooley at Juneau, 3000 ft. alt., and at Salmon Creek and Gold Creek Canyon, near Juneau.

One additional variety of this genus has been reported from Alaska, *P. cereolus robustus* Tuck., which was collected by Wright on the islands of Bering Strait; Macoun collected it "under overhanging rocks" on St. Paul Island. Nylander records its occurrence at Port Clarence, under the synonym *Pilophoron polycarpum* Tuck.

STEREOCAULON.

KEY TO THE SPECIES.

Thallus dwarfed.
Tomentose, phyllocladia wart-like.....*tomentosum alpinum.*
Not tomentose, phyllocladia confluent.....*denudatum.*
Thallus of good size.
Slightly tomentose, apothecia subterminal, dilated.....*paschale.*
Densely white tomentose, apothecia lateral, minute, not dilated.
tomentosum.

78. **Stereocaulon denudatum** Flk.

Stereocaulon denudatum FLOERKE, Deutsch. Lich. Anmerk. 4: 13. 1821.—TUCKERMAN, Syn. N. A. L. 1: 233.

Unalaska (Setchell); St. Michael (Setchell).

Dr. Nylander records this species as occurring at Lawrence Bay, on the Siberian coast. According to Professor Tuckerman it has been collected in Alaska by Dr. Kellogg. Common in Greenland and Scandinavia. Reported also from Newfoundland. Pennsylvania is the most southern station given in Tuckerman's North American Lichens.

[1] Rothrock, Dr. J. T. Flora of Alaska. Smithsonian Report. 1807.

79. **Stereocaulon tomentosum** Fr.

Stereocaulon tomentosum FRIES, Sched. Crit. 20. 1826.

Juneau, 1200–1800 ft. (Saunders, 1274; Coville and Kearney, 609); Muir Glacier, Glacier Bay (Trelease, 1298, 1299, 1300, 1301); Hidden Glacier Inlet, Yakutat (Trelease, 1294); Disenchantment Bay, Yakutat Bay (Trelease, 1296, 1297); Nunatak moraine, Yakutat Bay (Coville and Kearney, 1295); Point Gustavus, Glacier Bay (Coville and Kearney, 761); Hidden Glacier, Russell Fiord (Coville and Kearney, 981); Orca (Trelease, 1269); Kadiak (Trelease, 1311); Hall Island (Trelease, 1267); St. Matthew Island (Coville and Kearney, 2121); Port Clarence (Trelease, 1266); Postoliak River (Newhall).

Other Alaskan localities are: Port Clarence, as listed by Nylander; Kotzebue Sound, recorded by Babington; while Dr. Cooley collected it at Sheep Creek, near Juneau, and at Davidson Glacier.

80. **Stereocaulon tomentosum alpinum** (Laur.) Th. Fr.

Stereocaulon alpinum LAURER in Fries, L. E. 204. 1821.
Stereocaulon tomentosum alpinum TH. FRIES, Lich. Scand. 48. 1871–74.—SCHEUCHZ. It. Alp. 2. *t. 19.*

Alaska (Evans, 196; Funston, 16; Turner); locality lost (Trelease, 6112); Muir Glacier, Glacier Bay (Trelease, 1307, 1298*a*); summit of White Pass, 3000 ft. (Trelease, 1270); Disenchantment Bay, Yakutat Bay (Trelease, 1310); Kadiak (Trelease, 1279); St. Matthew Island (Trelease, 1268). The species was collected on the islands in Bering Strait by Wright and reported from St. Lawrence Island in Nylander, Lich. Fr. Behr.

Many of the specimens are beautifully fruited. A widely distributed alpine and arctic lichen, and in some of its forms only with difficulty separated from *S. paschale.*

81. **Stereocaulon paschale** (L.) Ach.

Lichen paschalis LINNÆUS, Sp. Pl. ed. 2. 2: 1621. 1764.
Stercocaulon paschale ACHARIUS, Meth. Lich. 315. 1803.—SOWERBY, Eng. Bot. *t. 282.*

Hidden Glacier, Russell Fiord (Coville and Kearney); Muir Glacier, Glacier Bay (Trelease, 1300); Orca (Trelease, 1272); St. Michael (Setchell); Cape Nome (Setchell). Reported by Hooker and Arnott as having been collected at Kotzebue Sound. Dr. Rothrock, in his report on Dr. Bean's collection, writes: "Common and everywhere met."

Sterile, poorly developed specimens.

Two additional species have been credited to Alaska: *S. coralloides* Fr., collected on St. Paul Island by William Palmer, determined by W. W. Calkins, and *S. wrightii* Tuck., collected by Wright on the islands of Bering Strait.

Family LECANORIACEÆ.

PERTUSARIA.

KEY TO THE SPECIES.

Plants growing on the earth, incrusting mosses, etc.
  Lobes of the thallus finger-shaped, apothecia solitary.....*dactylina*.
  Lobes of the thallus flat, apothecia crowded.....*glomerata*.
Plants growing on bark or on rocks.
  Apothecia underneath the bark, becoming emergent...*carneopallida*.
  Apothecia external.
    Apothecia compound, difform.
      Apothecia and spores medium to large size.....*communis*.
      Apothecia and spores small.....*pustulata*.
    Apothecia not compound.
      Thallus thin, not sorediate, apothecia soon powdery. *multipuncta*.
      Thallus irregularly thickened, often sorediate, apothecia not powdery. .....*pocillaria*.

82. **Pertusaria glomerata** (Ach.) Schaer.

Porina glomerata ACHARIUS, L. U. 310. *t. 7. f. 2.* 1810.
Pertusaria glomerata SCHAERER, Spicil. 66. 1823.

Hall Island (Trelease, 863); Port Clarence (Trelease, 864).

The specimens which grow over mosses are well fruited. A specimen which Rothrock lists was collected at Port Mulgrave. Wright collected it on the islands of Bering Strait, while Nylander records it for Konyam Bay and Bering Island, on the Asiatic side of the Strait, and Dr. Bean collected it at Port Mulgrave. It has been collected on the White Mountains, but I find no record for Labrador, Newfoundland, or Greenland.

83. **Pertusaria pustulata** (Ach.) Nyl.

Porina pustulata ACHARIUS, L. U. 309. 1810.
Pertusaria pustulata NYLANDER, Prodr. Gall. 195. 1857.

Yakutat Bay (Trelease, 819); Farragut Bay (Trelease, 523). New to Alaska.

The most northern station recorded in North America is Oregon,

where it was collected by Hall; its most southern record is Florida. It occurs also in tropical America, Japan, and Australia.

84. **Pertusaria communis** DC.

Lichen pertusa HOFFMANN, Enum. 16. *t. 3. f. 3.*
Pertusaria communis DE CANDOLLE, Fl. Fr. 2 : 320. 1805.

Kadiak (Trelease, 897 and 900 in part, 917, 947, 948, 981); St. Michael (Setchell).

On rocks associated with various species of *Lecanora*, *Lecidea*, and *Buellia*. As listed by Rothrock it occurs also at Port Clarence, Cape Lisburne, and Port Althorp.

85. **Pertusaria carneo-pallida** (Nyl.) Nyl.

Lecidea carneo-pallida NYLANDER in Bot. Notis. 183. *t. 853.* 1853.
Pertusaria carneo-pallida NYLANDER, Lich. Fr. Behr. 65. 1888.—SOWERBY, Eng. Bot. *t. 2010.*

Disenchantment Bay, Yakutat Bay (Trelease, 802, 803, 820). On bark. Reported from Port Clarence by Nylander.

A lichen which is common in Scandinavia and other European countries, but whose only other American station is Port Clarence, as noted above.

86. **Pertusaria dactylina** (Ach.) Nyl.

Lichen dactylinus ACHARIUS, Prod. 89. 1798.
Pertusaria dactylina NYLANDER, Lapp. Or. 240. 1867.

Alaska (Trelease, 921).

Sterile, on the earth. Reported by Nylander from Port Clarence; by Rothrock from Alaska Peninsula, collected by Dr. Bean; and by Tuckerman from the islands of Bering Strait, where it was also collected by Wright.

A strictly alpine and arctic species.

87. **Pertusaria multipuncta** (Turn.) Nyl.

Variolaria multipuncta TURNER, Trans. Linn. Soc. 9 : 137. 1808.
Pertusaria multipuncta NYLANDER, Not Sällsk. F. 1857.

Yakutat (Trelease, 804); Sitka (Trelease, 812). New to Alaska.

On bark. No. 812 is sterile, but is without doubt referable here. Common throughout the United States.

In addition to the species of *Pertusaria* given above, several sterile specimens were collected. One of them may probably be referred to—

88. **Pertusaria rhodocarpa** Koerb.

Pertusaria rhodocarpa KOERBER, Syst. Lich. Ger. 384. 1855.

Farragut Bay (Trelease, 806).

Another may well be referred to—

89. **Pertusaria communis isidioidea** Schaer.

Port Wells, Prince William Sound (Trelease, 969). On moss.

No. 80 (Trelease, Sitka) is on the bark of shrubs. The whitish thallus is very smooth. Immature apothecia are present with a lecanorine disk of a yellowish color.

No. 827 (Trelease, Sitka) is on dead wood. The thallus is very smooth and thin, scarcely evident, of a light pink color. The immature apothecia are single, with a lecanorine disk, the disk being flesh-colored, with a lighter margin.

90. **Pertusaria pocillaria** sp. nov.

Thallus rather thin, creamy white, verrucose, sorediate. Apothecia lecanorine, small, .5 mm. in diameter. Spores colorless, simple, 2–8 in an ascus, $\frac{28-45}{17-28}$ μ. Paraphyses slender, branched.

Type specimen in the herbarium of the Missouri Botanical Garden, and a duplicate in my own herbarium; collected by Prof. William Trelease on *Alnus* at Farragut Bay, June 5, 1899, no. 806*a*.

The species approaches *Pertusaria xanthostoma* (Sommerf.) Fr., but differs in the distinctly smaller spores. The measurement given for the spores of *P. xanthostoma* is $\frac{55-74}{22-38}$ μ.

In many cases the hymenial layer of the apothecium has fallen out, leaving the exciple as an empty cup, a fact which has suggested the specific name chosen. Undoubtedly this fact has an ecological significance in the distribution of the spores, as M. Miyoshi[1] has recorded for *Sagedia macrospora*.

The following additional species of the genus *Pertusaria* are credited to Alaska: *P. bryontha* (Ach.) Nyl., collected by Wright on the islands of Bering Strait, by Dr. Bean on Unalaska Island, and reported by Nylander as collected at Port Clarence, by Dr. Almquist; *P. panyrga* (Ach.) Nyl., collected by Macoun on rocks on St. Paul Island and reported by Nylander as having been collected at Port Clarence; *P. velata* (Turn.) Nyl., collected by Dr. Bean at Warm Springs, Sitka; *P. trochiscea* Norm., *P. subobducens* Nyl., *P. subdactylina* Nyl., *P. sommerfeldtii* (Flk.) Nyl., all collected by Dr. Almquist at Port Clarence; *P. subplicans* Nyl., *P. glomerata corniculata* Nyl., and *P. rhodoleuca* Fr. fil., collected on St. Lawrence Island by Dr. Almquist, determined by Nylander. In his correction

[1] Miyoshi, M. Ueber die Sporocarpenevacuation und darauf erfolgendes Sporenausstreuen bei einer Flechte. The Journal of the College of Science Imperial University, Tokyo, Japan. 15[3]: 367–370. *t. 18.* 1901.

of Dr. Rothrock's list of the species collected by Dr. Bean, Nylander states that under the name *P. communis* DC. rock forms of *P. rhodoleuca* Fr. fil. are included.

RINODINA.

KEY TO THE SPECIES.

Thallus incrusting mosses.....*turfacea.*
Thallus on wood or rock.
Thallus brown, hypothallus conspicuous.....*sophodes atrocinerea.*
Thallus white, hypothallus inconspicuous.....*sophodes confragosa.*

91. **Rinodina sophodes confragosa** (Ach.) Tuck.

Parmelia confragosa ACHARIUS, Meth. Lich. Suppl. 33. 1803.
Rinodina sophodes confragosa TUCKERMAN, Syn. N. A. L. 208. 1882.

Farragut Bay (Trelease, 826). On old boards. According to Rothrock, Dr. Bean collected this species in Alaska, but no definite locality is given. Tuckerman, Syn. N. A. L. 208, indicated the Pacific Coast as the habitat of this species in this country; I can find no other records of it.

92. **Rinodina sophodes atrocinerea** (Diks.) Nyl.

Lichen atrocinereus DIKSON, Crypt. Brit. 14. *t. 9. f. 2.* 1785–1801.
Rinodina sophodes b. *atrocinerea* NYLANDER, Lich. Par. N. 43. 1855.—SOWERBY, Eng. Bot. *t. 2096.*

Plover Bay, Siberia (Trelease, 992). On rock. New to the Alaskan region.

93. **Rinodina turfacea** (Wahl.) Th. Fr.

Lichen turfaceus WAHLENBERG, Fl. Lapp. 408. 1812.
Rinodina turfacea TH. FRIES, Lich. Arct. 126. 1860.

St. Matthew Island (Trelease, 866 in part); St. Michael (Setchell). The specimen from St. Michael grew on moss with *Biatora hypnophila* and *Placodium jungermanniæ.* Collected by Wright on the islands of Bering Strait, and recorded by Rothrock as occurring in Dr. Bean's collection, but with no definite locality. Nylander records it under the synonym *Lecanora turfacea* as collected at Port Clarence. Reported also from British Columbia, Greenland, and Labrador.

Additional Alaskan species of *Rinodina* are as follows: *R. nimbosa* (Fr.) Th. Fr. and *R. sophodes* (Ach.) Nyl., collected by Dr. Bean, no definite locality being recorded, *R. sophodes* being listed also by Nylander for Port Clarence; *R. turfacea roscida* Th. Fr. and *R. turfacea miniarea* Nyl., collected by Wright on islands in Bering Strait.

LECANORA.

KEY TO THE SPECIES.

Thallus lobed, subfoliaceous.
Thallus having brown radiately chinked warts .....*gelida.*
Thallus not having brown radiately chinked warts.
Thallus crustaceous-foliaceous ..... *muralis.*
Thallus monophyllous, of many round-lobed, branch-like divisions.
Disk of apothecia olivaceous or black.....*rubina opaca.*
Disk of apothecia yellowish or red.
Thallus black beneath, margin of apothecia reflexed..*rubina.*
Thallus white beneath, margin of apothecia not reflexed.
straminea.
Thallus nearly uniform.
Apothecia innate, becoming emergent.
Spores many, very small.....*privigna revertens.*
Spores few, medium size.
Thallus incrusting mosses .....*occulata.*
Thallus on rocks.
Thallus subtartareous, areolæ smooth .....*cinerea.*
Thallus tartareous, areolæ prominent .....*cinerea gibbosa.*
Apothecia superficial.
Spores medium size.
Disk of apothecium black or greenish-black.
Disk greenish-black.
Apothecia small, margin entire, reflexed..*varia intricata.*
Apothecia larger, crenate, not reflexed.....*atrosulphurea.*
Disk of apothecium shining black.
Margin of apothecium dark gray.....*subfusca coilocarpa.*
Margin of apothecium shining white.
Apothecia more or less pruinose, margin crenulate.
pacifica.
Apothecia not pruinose, margin entire ..... *atra.*
Disk of apothecia never black.
Apothecia buff-colored.
Thallus cream-colored, disk of apothecia white pruinose.
pallida.
Thallus pale-greenish or yellowish, apothecia not pruinose.
varia.
Apothecia reddish-brown.
Thallus smooth, thin, whitish.
Apothecia very small and crowded.....*hageni.*

Apothecia medium size.
Disk of apothecium shining brown.
subfusca argentata.
Disk of apothecium pruinose .....*pacifica.*
Thallus not smooth, dirty white or yellowish.
Margin of apothecia reflexed.....*varia symmicta.*
Margin of apothecia not reflexed.
Thallus of rounded, turgid warts.....*frustulosa.*
Thallus contiguous, chinky.
Apothecia rather small, margin entire.....*subfusca.*
Apothecia medium size, margin flexuose and crenate .....*subfusca allophana.*
Spores very large.
Thallus chinky or plicate.....*pallescens.*
Thallus not chinky, either tartareous, granulate, or nodulose.
Lobes of the thallus short..... *tartarea.*
Lobes of the thallus elongated.
Thallus finely divided.....*tartarea frigida.*
Thallus coarsely divided.....*tartarea pterulina.*

94. **Lecanora privigna revertens** Tuck.

Lecanora privigna revertens TUCKERMAN, Syn. N. A. L. 1 : 204. 1882.

Kadiak (Trelease, 900 in part). New to Alaska.

With *Buellia geographica*, *Lecanora varia intricata*, and *Pertusaria communis*. This variety has been collected in California by Bolander.

95. **Lecanora cinerea** (L.) Smrft.

Lichen cinereus LINNÆUS, Mant. 132. 1767.
Lecanora cinerea SOMMERFELDT, Suppl. Lapp. 99. 1826.—SOWERBY, Eng. Bot. *t. 1751.*

Summit of White Pass, 3000 ft. (Trelease, 951 in part); Kadiak (Trelease, 945); Port Clarence (Trelease, 941). All on rock. Collected by Dr. Bean at Port Clarence, Icy Cape, and Cape Lisburne.

The specimen from White Pass, which is mixed with *Buellia geographica*, differs from themore common form, in that the thallus is not continuous, but broken into areoles. The specimen from Port Clarence has the apothecia urceolate, and sometimes white pruinose. Interspersed in the thallus are reddish-gray, granulose warts. This is a very variable and widely distributed species, which has been classified under several generic names. Common in Greenland and in alpine and arctic regions.

96. **Lecanora cinerea gibbosa** (Ach.) Tuck.

Urceolaria gibbosa ACHARIUS, Meth. Lich. 144. 1803.
Lecanora cinerea gibbosa NYLANDER, Lich. Scand. 154. 1861.—TUCKERMAN, Syn. N. A. L. 1: 198. 1882.

Summit of White Pass, 3000 ft. (Trelease, 888, 851 in part); Kadiak (Trelease, 894, 895); Muir Glacier, Glacier Bay (Trelease, 887); Cape Nome (Setchell). *Buellia geographica* and its variety *atrovirens* are with the specimens from White Pass. Rothrock lists this variety as collected by Dr. Bean, but gives no locality. Nylander records its occurrence at Konyam Bay, on the Siberian coast of Bering Strait.

97. **Lecanora occulata** (Diks.) Ach.

Lichen occulatus DIKSON, Pl. Cr. Br. 2: 17. *t. 5. f. 5.* 1785–1801.
Lecanora occulata ACHARIUS, Syn. 148. 1814.—SOWERBY, Eng. Bot. *t. 1833.*

Kadiak (Trelease, 1217); Unalaska (Setchell); Cape Nome (Setchell); Hall Island (Trelease, 1204); St. Matthew Island (Trelease, 1020). Growing over mosses and other lichens. Reported by Macoun from St. Paul Island; by Tuckerman as collected by Wright on the islands of Bering Strait; and by Nylander, under the synonym *Pertusaria occulata*, from St. Lawrence Island.

A widely distributed northern lichen.

98. **Lecanora tartarea** (L.) Ach.

Lichen tartareus LINNÆUS, Sp. Pl. 2: 1141. 1753.
Lecanora tartarea ACHARIUS, L. U. 371. 1810.—SOWERBY, Eng. Bot. *t. 156.*

Alaska (Dr. Kellogg, no number); summit of White Pass, 3000 ft. (Trelease, 1137); Unalaska (Trelease, 975; Setchell); Hall Island (Trelease, 862); St. Matthew Island (Trelease, 867, 868, 972); St. Lawrence Island (Trelease, 1019); Cape Nome (Setchell). Most of the specimens are sterile. Macoun reports it as "common and variable" on St. George and St. Paul Islands. Rothrock adds Cape Lisburne, Unalaska, and the Shumagin group of islands as localities where it was collected by Dr. Bean.

The species, with its varieties, is one of the most abundant of the northern lichens, and was formerly of considerable commercial value in the coloration of fabrics and the manufacture of litmus.

99. **Lecanora tartarea frigida** (L. fil.) Sw.

Lichen frigidus LINNÆUS FIL. in SWARTZ, Meth. Musc. 1781.
Lecanora tartarea frigida SWARTZ, Meth. Musc. *t. 1. f. 4.* 1781.—SOWERBY, Eng. Bot. *t. 1879.*

Kadiak (Trelease, 871); Hall Island (Coville and Kearney, 2066); St. Lawrence Island (Trelease, 1018). The specimen from St. Law-

rence Island is well fruited, the others are sterile. The variety has been reported from St. Paul Island by Macoun and from Port Clarence by Nylander; and under the synonym *Parmelia tartarea frigida* it is recorded by Babington as collected at Kotzebue Sound.

100. **Lecanora tartarea pterulina** Nyl.

Lecanora tartarea pterulina NYLANDER, Lich. Fr. Behr. 44. 1888.

Kadiak (Trelease, 870); Hall Island (Trelease, 869, 1017; Coville and Kearney, 2064); St. Matthew Island (Brewer and Coe, 678).

The specimens are very fine. The one from Kadiak was growing on dead herbaceous spermatophytes. The material examined by Nylander was collected on St. Lawrence Island. Dr. Lindsay, in his Observations upon West Greenland Lichens, gives an interesting account of the variation of *L. tartarea* as exhibited by the Greenland specimens.

101. **Lecanora pallescens** (L.) Schaer.

Lichen pallescens LINNÆUS, Sp. Pl. 2: 1142. 1753.
Lecanora pallescens SCHAERER, Enum. 78. 1850.—HOFFM. Plant. Lich. *t. 21. f. 2 a, b.*

Broughton Strait, Vancouver Island (Trelease, 851). On dead wood. The other Alaskan records are Sheep Creek (Dr. Cooley); Chugachik Bay, Cook Inlet (Rothrock); and Port Clarence (Nylander).

102. **Lecanora varia** (Ehrh.) Ach.

Lichen varius EHRHART, Plant. Crypt. Dec. 7: n. 68. 1785.
Lecanora varia ACHARIUS, L. U. 377. 1810.—SOWERBY, Eng. Bot. *t. 1666.*

Chichagof Bay (Palache, 925); Sitka (Trelease, 810, 822*a*); Kadiak (Trelease, 899 in part); Port Clarence (Trelease, 890 in part, 939 in part); Whale Island, St. Michael (Setchell). Specimens are on bark of *Alnus oregona*, on dead wood and on rock. Mixed with this species are *Buellia geographica*, *B. myriocarpa*, *Lecanora atrosulphurea*, and *Parmelia saxatilis omphalodes*. New to Alaska.

Though new to Alaska, it has been reported by Rothrock from Plover Bay, Siberia, collected by Dr. Bean.

103. **Lecanora varia intricata** (Ach.) Nyl.

Lecanora intricata ACHARIUS, L. U. 380. 1810.
Lecanora varia intricata NYLANDER, Lich. Scand. 164. 1861.

Kadiak (Trelease, 900 in part); Port Clarence (Trelease, 939 in part, 940). Mixed with *Buellia geographica*, *B. myriocarpa*, *Lecanora varia* and *L. privigna revertens*, *Pertusaria communis*, and *Parmelia saxatilis omphalodes*. New to Alaska. Reported from Konyam Bay by Nylander.

An alpine and arctic species.

104. **Lecanora varia symmicta** Ach.

Lecanora varia symmicta ACHARIUS, L. U. 379. 1810.

St. Lawrence Island (Trelease, 1156 in part). On dead wood, with *Parmelia saxatilis omphalodes*. New to Alaska.

Lecanora varia, with its varieties, is a widely distributed species, and it is therefore rather surprising that three new Alaskan records should be made for this species and its varieties in this collection.

105. **Lecanora atrosulphurea** (Wahl.) Ach.

Lichen atrosulphureus WAHLENBERG, Fl. Lapp. 471. 1812.
Lecanora atrosulphurea ACHARIUS, Syn. 149. 1814.

Kadiak (Trelease, 891*a*, 896, 897, 898, 899 in part); Plover Bay, Siberia (Trelease, 994). The specimens are all on rock. Those from Kadiak are mixed with various species of *Lecanora*, *Pertusaria*, *Buellia*, and *Lecidea*. Nylander records it as occurring on St. Lawrence Island. It has been collected in Arctic America and Greenland.

106. **Lecanora pacifica** Tuck.

Lecanora pacifica TUCKERMAN, Syn. N. A. L. 1: 191. 1882.

Port Wells (Trelease, 828). On bark. New to Alaska.

It has been reported from Oregon and California.

107. **Lecanora atra** (Huds.) Ach.

Lichen ater HUDSON, Fl. Angl. ed. 2. 530. 1798.
Lecanora atra ACHARIUS, Syn. 146 a. 1814.—SOWERBY, Eng. Bot. *t. 949*.

Alaska (Funston, 25*a*); Port Wells (Trelease, 935*a*). The specimen from Port Wells is too old for satisfactory determination, but seems better placed here than elsewhere. Rothrock's locality is Cape Lisburne. In Nylander's list it is given as occurring at Konyam Bay and Bering Island on the Siberian side of Bering Strait.

108. **Lecanora hageni** Ach.

Lecanora hageni ACHARIUS, L. U. 367. 1810.—HAG. Hist. Lich. 1. *f. 5*.

Muir Glacier (Trelease, 933). On rock. The species has been reported from Port Clarence in Nylander's list, and from Cape Lisburne by Rothrock. It is found also in Greenland, the Rocky Mts., and California.

109. **Lecanora subfusca** (L.) Ach.

Lichen subfuscus LINNÆUS, Spec. Pl. ed. 2. 2: 1609. 1764.
Lecanora subfusca ACHARIUS, L. U. 393. 1810.—SOWERBY, Eng. Bot. *t. 930, 2109*.

Yakutat (Trelease, 817, 844 in part, 928); Kukak Bay (Kincaid, 836*a* in part). On bark and rock. No. 844 is with *Buellia para-*

sema, and 836*a* with *Buellia parasema*, *Placodium cerinum*, etc. The localities that Rothrock gives are Cook Inlet, Unalaska, and Port Clarence. Nylander reports its occurrence on Bering Island, on the Asiatic side of Bering Strait.

110. **Lecanora subfusca allophana** Ach.

Lecanora subfusca allophana ACHARIUS, L. U. 395. 1810.

Mouth of Sturgeon River, Kadiak Island (Trelease, 857 in part); St. Lawrence Island (Trelease, 854); Cape Fox (Trelease, 855); St. Michael (Setchell). New to Alaska.

All except the specimen from St. Michael growing on dead wood, and all well fruited. *Theloschistes lychneus pygmæus* is with No. 857. Reported from Greenland, and common throughout the United States.

111. **Lecanora subfusca argentata** Ach.

Lecanora subfusca argentata ACHARIUS, L. U. 393. 1810.

Cape Fox (Trelease, 856). On dead wood. New to Alaska.

The most northern record for this variety.

112. **Lecanora subfusca coilocarpa** Ach.

Lecanora subfusca coilocarpa ACHARIUS, L. U. 393. 1810.

Muir Glacier, Glacier Bay (Trelease, 814, on *Salix*); Virgin Bay, Prince William Sound (Trelease, 978, on rock with *Placodium murorum*). New to Alaska.

I find no record for Greenland, but reference is made to it in Dr. Arnold's list of Newfoundland lichens.

113. **Lecanora frustulosa** (Diks.) Ach.

Lichen frustulosus DIKSON, Crypt. Brit. 3: 13. *t. 8. f. 1.* 1785–1801.
Lecanora frustulosa ACHARIUS, L. U. 405. 1810.—SOWERBY, Eng. Bot. *t. 2273.*

Kadiak (Trelease, 911, 943); St. Michael (Setchell). No spores are developed, and therefore the determination is not absolutely certain. It compares well with authentic specimens in the Tuckerman Herbarium. It has been found in Greenland. A specimen collected by Dr. Hayes at Taku seems to belong here.

114. **Lecanora pallida** (Schreb.) Schaer.

Lichen pallidus SCHREBER, Spicil. 155. 1771.
Lecanora pallida SCHAERER, Enum. 78. 1850.—SOWERBY, Eng. Bot. *t. 2154.*

Orca (Trelease, 808). On bark. New to Alaska, though reported from Arctic America by Richardson.

115. **Lecanora straminea** (Wahl.) Ach.

Parmelia straminea WAHLENBERG in Ach. Meth. Suppl. 47. 1803.
Lecanora straminea ACHARIUS, L. U. 432. 1810.—WAHL. Fl. Lapp. *t. 28. f. 1.* 1812.

Kadiak (Trelease, 902 in part); Unalaska (Setchell); St. Paul Island (Trelease, 883, 888, 1136); St. Matthew Island (Trelease, 881). The specimen from Kadiak is mixed with *Buellia geographica*, *Lecidea platycarpa*, and *Parmelia stygia*. Nylander reports it from St. Lawrence Island.

116. **Lecanora muralis** (Schreb.) Tuck.

Lichen muralis SCHREBER, Spicil. 130. 1771.
Lecanora muralis TUCKERMAN, Syn. N. A. L. 1: 184. 1882.—HOFFM. Enum. 64. *t. 9. f. 1.*

Alaska (Funston, 20). Rothrock reports that it is "apparently very common in Alaska," and gives the following definite localities where Dr. Bean collected specimens: cliffs on St. Matthew Island, St. Paul Island; Sitka; and Unalaska.

117. **Lecanora rubina** (Vill.) Ach.

Lichen rubinus VILLARS, Dauph. 3: 977. 1789.
Lecanora rubina ACHARIUS, L. U. 412. 1810.—HOFFM. Pl. Lich. *t. 32. f. 1.*

Alaska (Trelease, 1140 in part; Funston, 25); Hot Springs, Baranof Island (Trelease, 961); St. Paul Island (Trelease, 882, 884); Cape Fox (Trelease, 1142). No. 1140 is mixed with fragments of *Physcia cæsia* and *Theloschistes lychneus*. New to Alaska.

Reported from Arctic America by Richardson, and from Greenland.

118. **Lecanora rubina opaca** (Ach.) Tuck.

Lecanora chrysoleuca β opaca ACHARIUS, L. U. 411. 1810.
Lecanora rubina opaca TUCKERMAN, Syn. N. A. L. 1: 183. 1882.

St. Matthew Island (Trelease, 926); Bering Island; Plover Bay, Siberia (Trelease, 994 in part). New to Alaska.

Both specimens are on rock. The one from Bering Island is mixed with *Theloschistes lychneus pygmæus*. This variety has been collected in the Rocky Mts. and in California.

119. **Lecanora gelida** (L.) Ach.

Lichen gelidus LINNÆUS, Suec. Prod. 74.
Lecanora gelida ACHARIUS, L. U. 428. 1810.

Muir Glacier (Trelease, 986, 987, 987*a*, 987*b*, 987*c*, 987*d*, 987*e*, 989); Hidden Glacier Inlet, Yakutat Bay (Trelease, 924); Port Wells (Trelease, 979); Port Clarence (Trelease, no number); Cape

Fox (Trelease, 997, 998). This species has been reported from Greenland and British Columbia. In Alaska it has been discovered on Chernofski Island, Unalaska, and Belkofski, Alaska Peninsula, by Dr. Bean.

ADDITIONAL SPECIES.

The following species were collected by Dr. Almquist and determined by Nylander: *Lecanora fuscolutea* (Diks.) Nyl., *L. cæsiorufa* (Ach.) Nyl., on earth and moss only; *L. contractula* Nyl., *L. subradiosa* Nyl., *L. atrynea* Ach., *L. atrynea* forma *cenisia* Ach., *L. epiglypta* Norl., *L. subradians* Nyl., *L. lacustris* (With.) Nyl., *L. fuscata* (Schrad.) Nyl., on rock only; *L. lobulata* (Sommerf.) Nyl. and *L. crenata* Nyl., on earth and on rock; all collected on St. Lawrence Island. The following species were collected by Dr. Almquist at Port Clarence: *L. tetraspora* Nyl., *L. stillicidiorum* forma *chloroleuca* (Sommerf.) Nyl., *L. cæsiorufella* Nyl., *L. pyracea ramulicola* Nyl., *L. mniaræa* Ach., *L. mniaræa pachnea* Ach., *L. hypnorum deaurata* (Ach.) Nyl., *L. epibrya* Ach., *L. chlarona* Ach., *L. subintricata* Nyl., *L. upsaliensis* (L.) Nyl., *L. inæquatula* Nyl., *L. gyalectina* Nyl., all growing on the earth or upon moss (*L. tartarea upsaliensis* is reported from Kotzebue Sound by Hooker and Arnott); *L. pyracea* (Ach.) Nyl., *L. irrubata* (Ach.) Nyl., *L. disceptans* Nyl., *L. umbrina* (Ehrnb.) Nyl., *L. ochromicra* Nyl., *L. quadruplans* Nyl., *L. suaveolens* (Ach.) Nyl., *L. lævata* var. *candida* Anzi, *L. belonioides* Nyl., all rock forms. *L. stillicidiorum* (Oed.) Nyl. was found growing upon earth and moss, both at St. Lawrence Island and at Port Clarence. *L. smaragdula* (Whlnb.) Nyl. was found growing upon rock on St. Lawrence Island. Nylander, in his correction of Rothrock's list, states that *L. cervina* should be called *L. smaragdula*. *L. ventosa* (L.) Ach. was collected by Wright on the islands of Bering Strait, by Macoun on rocks on St. George Island, and reported by Hooker and Arnott for Kotzebue Sound. In Rothrock's list, based upon Dr. Bean's collection, the following additional species are found: *L. glaucomela* Tuck., no definite locality given; *L. subfusca hypnorum* Schaer., Port Clarence and Cape Lisburne—also collected by Wright on the islands of Bering Strait; *L. cervina* (Pers.) Nyl., Eschscholtz Bay, Arctic Ocean; *L. cervina discreta* Sommerf., Port Clarence; and *L. verrucosa* (Ach.) Laur., Eschscholtz Bay, Arctic Ocean. Dr. Cooley has collected two additional species: *L. elatina ochrophæa* Tuck., at Sheep Creek, near Juneau, and *L. pallescens rosella* Tuck., in the same locality. Mr. William Palmer collected *L. thamnitis* Tuck. on St. Paul Island. Mr. J. M. Macoun has made

the following addition: *L. occulata gonatodes* Ach., on rock on St. Paul Island. Of another plant he notes: "*Lecanora saxicola* Schaer. —Specimens which may prove to represent a new species have been provisionally referred here by Mr. Branth."

PLACODIUM.

KEY TO THE SPECIES.

Thallus well developed, typically lobed at the circumference.
  Thallus orange-colored..... *elegans.*
  Thallus bright yellow..... *murorum.*
Thallus poorly, or not at all, developed, not lobed at the circumference.
  Spores simply bilocular.
    Thallus orbicular, crenate-granulose..... *crenulatum.*
    Thallus effuse, granules usually crowded into heaps, sometimes scattered..... *vitellinum.*
  Spores polar-bilocular.
    Growing over mosses..... *jungermanniæ.*
    Growing on wood or stone.
      Thallus very uneven, warted..... *aurantiacum.*
      Thallus comparatively smooth.
        Hypothallus bluish-black..... *cerinum.*
        Hypothallus obsolete.
          Apothecia orange-colored beneath and on the margin. *cerinum.*
          Apothecia greenish beneath and on the margin. *fuscoatra.*

120. **Placodium vitellinum** (Ehrh.) Naeg. & Hepp.

Lichen vitellinus EHRHART, Crypt. n. 155. 1785.
Placodium vitellinum NAEGELI & HEPP, Sporen der Flecht. Eur. n. 70. 1853. —SOWERBY, Eng. Bot. *t. 1792.*

Hot Springs, Baranof Island (Trelease, 963 in part). On rocks with *Lecidea enteroleuca* and *Parmelia saxatilis*. Wright collected this species at Bering Strait, while Rothrock reports it from Port Clarence. Under the synonym *Lecanora vitellina* Ach., Nylander reports its occurrence on St. Lawrence Island.

It is a widely distributed species and closely related to the following, which may, perhaps, be considered as developed from it.

121. **Placodium crenulatum** (Wahl.) Tuck.

Lichen murorum γ crenulatus WAHLENBERG, Lapp. 416. 1812.
Placodium crenulatum TUCKERMAN, Syn. N. A. L. 1: 180. 1882.

Hot Springs, Baranof Island (Trelease, 984); Plover Bay, Siberia (Trelease, 995, 996). On stones. In Rothrock's list this is reported

from Plover Bay, Siberia, and Sitka, which is on Baranof Island. Thus the localities are practically identical. Nylander, in Lich. Fr. Behr., records it from Konyam Bay and Bering Island, Siberia.

Several specimens show new thalli forming on the decaying remnants of old thalli.

122. **Placodium fuscoatrum** (Bayrh.).

Lecanora fuscoatra BAYRHOFFER, Zw. Exs. 96.

Kadiak (Trelease, 949). On rock. New to Alaska and to America.

123. **Placodium ferrugineum** (Huds.) Hepp.

Lichen ferrugineus HUDSON, Fl. Ang. ed. 2. 526. 1778.
Placodium ferrugineum HEPP, Sporen der Flechten Europas. 1853.— SOWERBY, Eng. Bot. *t. 1650.*

Alaska (Dr. Kellogg, no number); Sitka (Trelease, 825*c*); Yakutat (Trelease, 831); Farragut Bay (Trelease, 829); St. Lawrence Island (Trelease, 832 in part). A lichen of wide distribution; reported by Tuckerman as having been collected in Alaska by Dr. Kellogg. Rothrock reports its occurrence at Port Clarence, as determined from the collection of Dr. Bean; Nylander states in his correction of Rothrock's list that this specimen should be named *Lecanora cæsiorufa* (Ach.).

On bark and dead wood. The specimen from St. Lawrence Island is on bark, with *Lecidea melancheima*. The specimen from Sitka is very small and is associated with *Lecidea enteroleuca*.

124. **Placodium jungermanniæ** (Vahl) Tuck.

Lichen jungermanniæ VAHL, Nat. Selsk. Sk. 2: 29.
Placodium jungermanniæ TUCKERMAN, Syn. N. A. L. 1: 176. 1882.

Unalaska (Setchell); St. Matthew Island (Trelease, 866 in part); St. Michael (Setchell). Collected on the islands of Bering Strait by Wright; Nylander reports it from St. Lawrence Bay, Konyam Bay, and Bering Island, all on the Asiatic side of Bering Strait.

The St. Matthew specimen was growing on moss, with *Rinodina turfacea* and the sterile thallus of a *Pertusaria;* the St. Michael specimen was on moss, with *Rinodina turfacea* and *Biatora hypnophila.*

125. **Placodium cerinum** (Ehrh.) Naeg. & Hepp.

Lichen cerinus EHRHART, Plant. Crypt. n. 216. 1785.
Placodium cerinum NAEGELI & HEPP, Sporen der Flechten Europas. 1853.— SOWERBY, Eng. Bot. *t. 627.*— HEDW. Stirp. Crypt. 2: 62. *t. 21. f. B.*

Kukak Bay (Kincaid, 836*a* in part); Kadiak (Trelease, 1134). The locality given for this in Dr. Rothrock's list is Icy Cape, Arctic

Ocean. Tuckerman records it as having been collected in Arctic America (on mosses) by Wright. Th. Fries, in Lichenes Arctoi, states that it is common in Scandinavia, Spitzbergen, and Greenland.

The specimen from Kukak Bay is on bark, with *Buellia parasema* and a *Physcia*. The specimen from Kadiak has immature spores and is doubtfully referred here. On the same piece of wood are three different species of *Cetraria* and three of *Parmelia*.

126. **Placodium aurantiacum** (Lightf.) Naeg. & Hepp.

Lichen aurantiacus LIGHTFOOT, Fl. Scot. 2: 810. 1777.
Placodium aurantiacum NAEGELI & HEPP, Sporen der Flechten Europas. 1853.

St. Lawrence Island (Trelease, 853). On dead wood. New to Alaska.

This species was collected in Arctic America by Richardson.

127. **Placodium murorum** (Hoffm.) DC.

Lichen murorum HOFFMANN, Enum. 63. *t. 9. f. 2.* 1784.
Placodium murorum DE CANDOLLE, Fl. Fr. 2: 378. 1805.

Virgin Bay, Prince William Sound (Trelease, 978 in part); Kadiak (Trelease, 982, on slate rock). New to Alaska. Collected by Richardson in Arctic America.

With NO. 978 is a specimen of *Lecanora subfusca coilocarpa*.

128. **Placodium elegans** (Link) DC.

Lichen elegans LINK, Ann. 1: 37. 1791.
Placodium elegans DE CANDOLLE, Fl. Fr. 2: 379. n. 1026. 1805.—SOWERBY, Eng. Bot. *t. 2181.*

Alaska (Funston, 24); White Pass, 900 ft. (Trelease, 980); Vancouver Island, Broughton Strait (Trelease, 985 in part); Unalaska (Setchell); St. Michael (Setchell). Collected by Wright on the islands of Bering Strait, by Dr. Bean on Chamisso Island, at Elephant Point, in Eschscholtz Bay, and on Chernofski Island, and by Macoun on St. Paul Island. This lichen has been reported from various points in Arctic America, and it seems to be common through all the mountainous and northern regions of America, from the Atlantic to the Pacific.

No. 985 has with it a lichen which is apparently a sterile *Lecidea*.

129. **Placodium coralloides?** Tuck.

Placodium coralloides TUCKERMAN, Syn. N. A. L. 1: 169. 1882.

St. Paul Island (Trelease, 1000). On the earth.

A very interesting specimen which may possibly be referred here. Unfortunately it is not fruited, and therefore its classification is uncer-

tain. It differs from *P. coralloides* in its stouter branches and lighter color. The thallus is sorediate, with a dull surface, while *P. coralloides* is not sorediate and has a shining surface.

Additional Alaskan species of the genus are: *Placodium variabile* (Pers.) Nyl., collected at Port Clarence by Dr. Bean, and *P. nivale* (Koerb.) Tuck., collected by Dr. Bean, but no definite locality given. According to Tuckerman, *P. sinapispermum* (Auct.) Hepp was collected by Wright on the islands of Bering Strait. Nylander, in his revision of Rothrock's list, records *P. granulosum* Muell., named by Rothrock, as growing on rock on St. Matthew Island, and also states that *P. murorum miniatum* Tuck., of Rothrock's list, should be named *P. elegans tenue* (Wahlb.).

Family COLLEMACEÆ.

LEPTOGIUM.

KEY TO THE SPECIES.

Thallus fringed with white cilia ..... *albociliatum.*
Thallus not fringed with white cilia.
Thallus granulate above ..... *myochroum.*
Thallus not granulate above ..... *myochroum saturninum.*

130. **Leptogium myochroum** (Ehrh.) Tuck.

Lichen myochrous EHRHART, Plant. Crypt. n. 286. 1785. — SCHAERER, Spicil. 534. 1771. — SOWERBY, Eng. Bot. *t. 1980.*
Leptogium myochroum TUCKERMAN, Genera 99. 1872.

Disenchantment Bay (Trelease, 1098*b*). A small, sterile fragment, perhaps best placed here.

131. **Leptogium myochroum saturninum** (Schaer.) Tuck.

Leptogium saturninum SCHAERER, Spicil. 534. 1840.
Leptogium myochroum saturninum TUCKERMAN, Syn. N. A. L. 1 : 166. 1882.

Muir Glacier (Trelease, 1131); Disenchantment Bay (Trelease, 1095, 1097*a*). New to Alaska.

Rhizoids on the under surface poorly developed.

132. **Leptogium albociliatum** Desmaz.

Leptogium albociliatum DESMAZIÈRES, Ann. Sci. Nat. IV. 4 : 132. 1855.

Port Wells, Prince William Sound (Trelease, 1161). It is recorded by Tuckerman for California and Oregon. New to Alaska. On rocks near tide.

This is represented only by a very small specimen on which the cilia are not abundant.

The following additional species of the genus *Leptogium* have been reported from Alaska: *L. muscicolum* (Sw.) Fr., *L. tenuissimum* (Diks.) Koerb., *L. myochroum tomentosum* Tuck., collected by Wright on the islands in Bering Strait; *L. tremelloides* (L. fil.) Fr., collected by Dr. Cooley at Salmon Creek, near Juneau; *L. scotinum* Ach. and *L. parculum* Nyl., reported from Port Clarence by Nylander.

COLLEMA.

This genus is represented by two specimens, both of which are sterile. One was collected by Frederick Funston under NO. 21, locality not given. The other was collected by Trelease. The latter specimen is numbered 1160, but bears no other data. It may possibly be referred to *C. pulposum*. No. 21 is so fragmentary and incomplete that no determination can be made.

Species of *Collema* recorded for Alaska: *C. melænum polycarpum* Schaer., collected by Wright on the islands of Bering Strait; *C. melænum* Ach., *C. triptodes* Nyl., *C. tenax* Ach., *C. furvum subhirsutulum* Nyl., reported from Port Clarence by Nylander; and *C. pulposum* (Bernh.) Ach., collected by Dr. Bean at Cape Lisburne. Nylander records *Collemopsis flotoviana* (Hepp) as having been collected at Port Clarence.

EPHEBE.

133. **Ephebe pubescens** Fr.

Ephebe pubescens FRIES, S. O. V. 356. 1825. — NYL. Syn. 1: *t. 2.1* and 17–20. 1860.

Mountain west of Muir Glacier (Trelease, 974). Sterile. New to Alaska. It has been reported from Greenland, but I find no record of it for Newfoundland or Labrador.

Family PANNARIACEÆ.

PANNARIA.

KEY TO THE SPECIES.

Thallus white, powdery. ..... *lanuginosa.*
Thallus brown or blackening.
Thallus of rounded branchlets..... *lepidiota coralliphora.*
Thallus squamulose.
Thallus yellowish and reddish-brown, apothecia sessile, with a broad, thin, light-colored margin..... *hypnorum.*
Thallus darker, apothecia appressed or immersed, margin not so conspicuous and of nearly the same color as the disk... *brunnea.*

134. **Pannaria lepidiota coralliphora** Tuck.

Pannaria lepidiota coralliphora TUCKERMAN, Syn. N. A. L. 1 : 122. 1882.

Hot Springs (Trelease, 962). New to Alaska.

A small specimen on rock. This variety was described from material collected at Vancouver Island by Professor John Macoun. I have carefully compared this with the type specimen in the Tuckerman Herbarium. The apothecia are not quite so convex as in the type where the margin is excluded. The thallus of the type specimen is nearly black, while this is a dark gray. No other localities are recorded for the variety.

135. **Pannaria brunnea** (Sw.) Mass.

Lichen brunneus SWARTZ in Act. Upsal. 4 : 247. 1784.
Pannaria brunnea MASSALONGO, Ric. 115. 1852.—SOWERBY, Eng. Bot. *t. 1246.*

Alaska (Evans, 272); Hot Springs, Baranof Island (Trelease, 858, 874); Hidden Glacier Inlet, Yakutat Bay (Trelease, 861); Unalaska (Setchell); Hall Island (Trelease, 878*a*). Collected by Wright on the island in Cross Sound and on Chernofski Island, and by Macoun on earth and rock on St. George Island.

A common alpine and arctic lichen.

136. **Pannaria hypnorum** (Vahl) Koerb.

Lichen hypnorum VAHL, Fl. Dan. 6 : *t. 956.* 1787.
Pannaria hypnorum KOERBER, Syst. Lich. Germ. 108. 1855.—SOWERBY, Eng. Bot. *t. 740.*

Hidden Glacier, Russell Fiord (Coville and Kearney, 965); Disenchantment Bay (Trelease, 860, 879, 879*a*, 970); Egg Island, Disenchantment Bay (Coville and Kearney, 1018); Muir Glacier (Trelease, 876, 877, 877*a*); Hidden Glacier Inlet, Yakutat Bay (Trelease, 859); Orca (Trelease, 873); Port Wells (Trelease, 872); Unalaska (Setchell); Hall Island (Trelease, 878*a*); Plover Bay, Siberia (Trelease, 875); St. Michael (Setchell). This is a very common and widely distributed alpine and arctic lichen, although the only other Alaskan record is Unalaska, where it was collected by Dr. Bean.

The specimens are usually well fruited, the apothecia varying greatly in size and in the indentation of the margin, which is sometimes nearly entire.

137. **Pannaria lanuginosa** (Ach.) Koerb.

Parmelia lanuginosa ACHARIUS, Meth. Lich. 207. 1803.
Pannaria lanuginosa KOERBER, Syst. Lich. Germ. 106. 1855.—HOFFM. Enum. Lich. *t. 10. f. 9.* 1784.

White Pass, 1925 ft. (Trelease, 971). Sterile. New to Alaska.

I find no record of this for Newfoundland, Labrador, or Greenland. Th. Fries, in his Lichenes Arctoi, 79, records its occurrence in Finland, and expresses his conviction that it is found in many other northern localities.

Nylander credits *Pannaria nigra* (Huds.) Nyl. to Port Clarence under the synonym *Pannularia nigra* (Huds.).

Family PELTIGERIACEÆ.

SOLORINA.

KEY TO THE SPECIES.

Thallus orange-saffron-colored beneath.....*crocea*.
Thallus white beneath.....*saccata spongiosa*.

138. **Solorina saccata spongiosa** (Sm.) Nyl.

Solorina spongiosa SMITH in Sowerby, Eng. Bot. *t. 1374*.
Solorina saccata spongiosa NYLANDER, Syn. 331. 1860.

Disenchantment Bay (Trelease, 880). One fragmentary specimen. This is a common alpine and arctic lichen. Collected at Bering Strait by Wright and reported from Port Clarence by Nylander, both much more northern localities than the present record.

139. **Solorina crocea** (L.) Ach.

Lichen croceus LINNÆUS, Fl. Suec. ed. 2. 1101. 1755.
Solorina crocea ACHARIUS, L. U. 149. 1810.—SOWERBY, Eng. Bot. *t. 498*.—HOFFM. Pl. Lich. *t. 41. f. 2–4*.

Disenchantment Bay (Burroughs, 1106); Point Gustavus (Coville and Kearney); Orca (Trelease, 1104); Pinnacle Rock, Chichagof Bay, 2700 feet (Palache, 1082); St. Matthew Island (Trelease, 1078, 1083).

A common alpine and arctic lichen. Collected on St. Paul Island by Macoun and on the shores of Bering Strait by Wright.

According to Tuckerman, *Solorina saccata* (L.) Ach. was collected by Wright on the islands of Bering Strait.

PELTIGERA.

KEY TO THE SPECIES.

Thallus small, veins underneath black.....*venosa*.
Thallus medium-sized to large.
  Upper surface of thallus besprinkled with brown warts.....*apthosa*.
  Upper surface of thallus without warts.
    Surface of the thallus smooth.
      Thallus small, cream-colored underneath.....*canina spuria*.
      Thallus of medium size or large.

Thallus very thin, covered beneath with a network of cream-colored veins..... *canina membranacea.*
Thallus thicker, veins dark-colored.
Apothecia transversely oblong, veins blackening. *horizontalis.*
Apothecia elongated, revolute, veins brown...*polydactyla.*
Surface of the thallus downy or granulate.
Thallus granulate.....*pulverulenta.*
Thallus downy.
Thallus reddish-brown, crisped on the edges.....*rufescens.*
Thallus greenish-gray or ash-brown, not crisped on the margins.
Thallus with distinct veins underneath.....*canina.*
Thallus covered with a spongy nap underneath. *canina spongiosa.*

140. **Peltigera canina** (L.) Hoffm.

Lichen caninus LINNÆUS, Fl. Suec. 1100. 1755.
Peltigera canina HOFFMANN, Fl. Germ. 2: 106. 1795.—SOWERBY, Eng. Bot. *t. 1119.*

Locality not given (Coville and Kearney, 576); Lowe Inlet, B. C. (Trelease, 1089); Vancouver Island, Broughton Strait (Trelease, 1084); Yakutat (Trelease, 1065, 1065*a*); Aguadulce River, Yakutat Bay (Trelease, 1064); Hidden Glacier Inlet, Yakutat Bay (Trelease, 1063, 1093*b*); Disenchantment Bay, Yakutat Bay (Trelease, 1091, 1096, 1097, 1098); Juneau (Setchell, 1243, 1249); Muir Glacier (Trelease, 1054, 1100*z*); Farragut Bay (Trelease, no number); Orca (Trelease, 1061); Port Wells (Trelease, 1056*c*); Kadiak (Trelease, 1055, 1075); Agattu Island (Townsend, 76); Cape Fox (Trelease, 1070, 1085). Other Alaskan records are: Sitka, Port Mulgrave, Unalaska, Port Chatham in Cook Inlet, Dr. Bean, collector; St. Paul Island and St. George Island, collected by Macoun. Dr. Cooley collected specimens at Salmon Creek, near Juneau, which are doubtfully referred to this species. Under the synonym *Peltidea canina* Ach., Babington reports its occurrence at Kotzebue Sound.

With these specimens were fragments of *Leptogium*, *Nephroma*, and other species of *Peltigera*. A number of the specimens are sterile.

141. **Peltigera canina spongiosa** Tuck.

Peltigera canina spongiosa TUCKERMAN, Genera Lichenum 38. 1872.

Alaska (Funston, 12); St. Paul Island (Trelease, 1086). Collected by Macoun on St. Paul and St. George Islands.

142. **Peltigera canina membranacea** (Ach.) Nyl.

Peltidea canina membranacea ACHARIUS, L. U. 518. 1810.
Peltigera canina membranacea NYLANDER, Syn. 324. 1860.

Alaska (Evans, 184); head of Russell Fiord (Trelease, 959); Sitka (Trelease, 1042; Setchell, 1272); Hot Springs, Baranof Island (Trelease, 1039*a*); Vancouver Island, Broughton Strait (Trelease, 1033, 1058, 1084); Point Gustavus, Glacier Bay (Coville and Kearney, 778); Farragut Bay (Coville and Kearney, 474*a*); Unalaska (Trelease, 1043); St. Paul Island (Trelease, 1044); St. Michael (Setchell); Pastoliak River (Newhall).

The specimens from Sitka are especially large and well developed. Most of the specimens are fertile. This is a common form on the northwest coast of America.

143. **Peltigera canina spuria** (Ach.) Nyl.

Peltidea canina spuria ACHARIUS, L. U. 518. 1810.—SOWERBY, Eng. Bot. *t. 1542.*
Peltigera spuria NYLANDER, Syn. 325. 1860.

Lowe Inlet, B. C. (Trelease, 1059*a*); Yakutat (Trelease, 1065*b*). Collected on St. Paul Island by Macoun.

Both specimens well developed and fertile.

144. **Peltigera rufescens** (Neck.) Hoffm.

Lichen rufescens NECKER, Meth. Musc. 79. 1771.
Peltigera rufescens HOFFMANN, Fl. Germ. 2: 107. 1795.—SOWERBY, Eng. Bot. *t. 2300.*

Wrangell (Trelease, 1101*b*, 1127); Juneau (Setchell, 1246); Muir Glacier (Trelease, 1102*a*, 1102*b*); Cape Fox (Trelease, 1070*a*); St. Michael (Setchell). New to Alaska. Nylander reports it from Konyam Bay on the Asiatic side of Bering Strait.

145. **Peltigera pulverulenta** (Tayl.) Nyl.

Peltidea pulverulenta TAYLOR in Hook. Lond. Journ. Bot. 6: 184. 1847.
Peltigera pulverulenta NYLANDER, Syn. 325. 1860.

Alaska (Evans, no number); Disenchantment Bay (Trelease, 1096*b*); Port Wells (Trelease, 1056, 1056*b*); Hall Island (Trelease, 1067); Cape Nome (Setchell). New record for Alaska.

Tuckerman, in his Syn. N. A. L., 108, records it as being in Herb. Babington, from Kotzebue Sound. In Babington's list of the Flora of Western Eskimaux Land no mention is made of this species, although four other species of *Peltigera* are recorded from Kotzebue Sound. The specimens vary greatly in the amount of granulation of the thallus, NO. 1056 being the most typical in that respect.

146. **Peltigera polydactyla** (Neck.) Hoffm.

Lichen polydactylus NECKER, Meth. Musc. 132. 1771.
Peltigera polydactyla HOFFMANN, Fl. Germ. 2: 106. 1795.—DILL. Hist. Musc. *t. 28, f. 107–108.*

Lowe Inlet, B. C. (Coville and Kearney, 343); Sitka (Trelease, 1041; Setchell, 1271); Hot Springs (Trelease, 1039); Farragut Bay (Trelease, 1034; Coville and Kearney, 472); Orca (Trelease, 1036*a*, 1037, 1060); Unalaska (Setchell). Collected by Dr. Cooley at Gold Creek Cañon, near Juneau. Rothrock records its occurrence at 'Kotzebue Sound, Sitka, etc.,' but does not give the names of the collectors.

Most of the specimens are sterile, and the determination is therefore not without question. After careful comparison with the large series of specimens in the Tuckerman Herbarium it seems best to refer these specimens here.

147. **Peltigera horizontalis** (L.) Hoffm.

Lichen horizontalis LINNÆUS, Mant. 132. 1771.
Peltigera horizontalis HOFFMANN, Fl. Germ. 2: 107. 1795.—SOWERBY, Eng. Bot. *t. 888.*

Aguadulce River, Yakutat Bay (Trelease, 1099); Yakutat (Trelease, 1094); Egg Island, Disenchantment Bay (Coville and Kearney, 1010).

All the specimens are sterile, and therefore there must remain some question about their determination.

148. **Peltigera apthosa** (L.) Hoffm.

Lichen apthosus LINNÆUS, Fl. Suec. 1098. 1755.
Peltigera apthosa HOFFMANN, Fl. Germ. 2: 107. 1795.—SOWERBY, Eng. Bot. *t. 1119.*

Multnomah Falls, Oregon (Trelease, 1053); locality lost (Trelease, 1032); Alaska (Evans, 409); Fort Cosmos (Huff, 6); Lowe Inlet, B. C. (Trelease, 1059, 1103); Wrangell (Trelease, 1101); Hot Springs, Baranof Island (Trelease, no number, also 1040); Juneau (Trelease, 1090); Hidden Glacier Inlet, Yakutat Bay (Trelease, 1062, 1093); Kadiak (Trelease, 1076); Orca (Trelease, 1036, 1036*a*); Port Wells (Trelease, 1056*a*); Virgin Bay (Trelease, 1035); Farragut Bay (Brewer and Coe, 705); Egg Island, Disenchantment Bay (Coville and Kearney, 1009); Shumagin Islands, Popof Island (Saunders, 1081); Attu Island (Townsend, 74); Unalaska (Setchell); Pastoliak River (Newhall). Rothrock reports the species as having been collected at Port Mulgrave, Yakutat Bay, by Dr. Bean, and also as having been collected at 'Kotzebue Sound, Sitka, etc.,' the collectors' names not

being given. Dr. Cooley collected it at Loring and at Sheep Creek, near Juneau; Macoun adds St. George Island and St. Paul Island to the list of localities. Under the synonym *Peltidea apthosa* Ach., Nylander credits it to Port Clarence; in the lists of Hooker and Arnott, and Babington, it is reported from Kotzebue Sound.

There is great difference in the size of the fronds in the different specimens. No. 1040, from Hot Springs, is characterized by very long and narrow lobes, the specimen being sterile. The three fertile specimens, 1053, 1062, and 1076, are all small.

149. **Peltigera venosa** (L.) Hoffm.

Lichen venosus LINNÆUS, Fl. Suec. ed. 2. 1097. 1755.
Peltigera venosa HOFFMANN, Pl. Lich. *t. 6. f. 2.* 1790–1801.—SOWERBY, Eng. Bot. *t. 887.*

Juneau (Setchell, 1242); Hidden Glacier Inlet, Yakutat Bay (Trelease, 1077, 1105); Unalaska (Setchell). Fertile. Collected by Wright on the islands of Bering Strait. In Rothrock's Flora of Alaska it is credited to Kotzebue Sound, under the synonym *Peltidea venosa* (L.) Nyl. Babington records its occurrence at Kotzebue Sound; Nylander lists it as collected at Port Clarence.

Other Alaska species of the genus are: *P. scabrosa* Fr., reported by Nylander from St. Lawrence Island and Port Clarence; *P. canina sorediata* Schaer., collected by Wright on banks of islands in Bering Strait; and *Peltidea polydactyla scutata* Fries, reported by Babington as having been collected at Kotzebue Sound.

NEPHROMA.

KEY TO THE SPECIES.

Thallus greenish straw-colored ..... *arcticum.*
Thallus brown.
  Thallus tomentose beneath ..... *tomentosum.*
  Thallus naked.
    Thallus not sorediate ..... *lævigatum.*
    Thallus sorediate ..... *lævigatum parile.*

150. **Nephroma lævigatum** Ach.

Nephroma lævigatum ACHARIUS, Syn. 242. 1813.—SOWERBY, Eng. Bot. *t. 305.*

Juneau (Setchell, 1244); Sitka (Trelease, 1072); Yakutat Bay (Trelease, 1065*a*, 1092, 1100 in part); Virgin Bay (Trelease, 1073); Port Clarence (Trelease, 1071, 1087*c*); Cape Nome (Setchell). New to Alaska.

No. 1100 is with *Physcia tribacea* and *Sticta crocata*. Most of the specimens are sterile. A common northen lichen.

151. **Nephroma lævigatum parile** Nyl.

Nephroma lævigatum parile NYLANDER, Syn. 320. 1860.—SOWERBY, Eng. Bot. *t. 2360.*

Disenchantment Bay (Trelease, 1091*b*, 1097, 1098*c*). New to Alaska.

No. 1098*c* was found with *Peltigera* and *Leptogium*. No. 1097 is very large, measuring 150 cent. in diameter. All the specimens are sterile. Nylander, in Lich. Fr. Berh., reports its occurrence on Bering Island, under the name of *Nephromium parile*.

152. **Nephroma tomentosum** (Hoffm.) Koerb.

Peltigera tomentosa HOFFMANN, Fl. Germ. 2: 108. 1795.
Nephroma tomentosum KOERBER, Systema Lich. Ger. 56. 1855.
Lichen resupinatus DILLEN., Hist. Musc. *t. 28. f. 105.* 1741.

Point Gustavus (Coville and Kearney, 775*b*). A small fragment of a thallus with large thin apothecia. Found with *Sticta anthraspis*. Reported by Dr. Cooley from Salmon Creek, near Juneau.

153. **Nephroma arcticum** (L.) Fr.

Lichen arcticus LINNÆUS, Sp. Pl. 2: 1148. 1753.
Nephroma arcticum FRIES, Lich. Arct. 41. 1860.
Lichen grœnlandicus Fl. Dan. *t. 466.*

Virgin Bay (Trelease, 1047); Orca (Trelease, 1046 in part); summit of White Pass, 3000 ft. (Trelease, 1048); St. Lawrence Island (L. J. Cole, no number); Hall Island (Trelease, 1049); St. Matthew Island (Trelease, 1050; Coville and Kearney, 2122); St. Michael Island (Turner, 835; Setchell); Port Clarence (Trelease, 1052; Coville and Kearney, 1923, 1923*a*); Cape Nome (Setchell); Seward Peninsula (Collier). Collected by Dr. Bean on Chamisso Island, in Eschscholtz Bay, and by Dr. Hayes at Taku. Under the synonym *Nephroma polaris* Ach. Babington reports its occurrence at Kotzebue Sound.

With these specimens are usually found various species of *Cladonia*, *Sphagnum*, and *Dicranum*. With the specimen from Orca are fragments of *Thamnolia*. The specimen from Virgin Bay is fertile. This is a very common arctic and alpine lichen.

Additional Alaska species are: *Nephroma expallidum* Nyl., reported by Nylander as having been collected by Dr. Almquist at Port Clarence, and *Nephroma lætevirens*, reported by Macoun under the synonym *Normandina lætevirens* Turn. and Borr., as growing among tufts of moss on St. George Island.

STICTA.

KEY TO THE SPECIES.

Thallus sorediate.
  Soredia lemon-colored ..... *crocata.*
  Soredia grayish..... *anthraspis.*
Thallus not sorediate.
  Thallus greenish-yellow, edges very finely cut. ..... *oregana.*
  Thallus brownish, edges not very finely cut.
    Thallus with urceolate cyphels..... *quercizans.*
    Thallus without cyphels.
      Thallus large, with elongated lobes..... *pulmonaria.*
      Thallus small, with round, crenate lobes.... *pulmonaria linita.*

154. **Sticta anthraspis** Ach.

Sticta anthraspis ACHARIUS, Meth. Lich. 280. 1803.

Point Gustavus, Glacier Bay (Coville and Kearney, 775). New to Alaska.

Plant well developed, but sterile. Acharius founded the species on material collected on the coast of California by Menzies. Tuckerman records it as found in Oregon by Hall. Macoun's Canadian Lich. NO. 153 was collected at Victoria.

155. **Sticta crocata** (L.) Ach.

Lichen crocatus LINNÆUS, Mant. 310. 1771.
Sticta crocata ACHARIUS, Meth. Lich. 277. 1803.—DEL. Stict. 56. *t. 4. f. 10.*

Yakutat (Trelease, 1100 in part). Sterile specimen on dead coniferous twigs with *Nephroma lævigatum* and *Physcia tribacea*. New to Alaska.

This is a widely distributed lichen. Arnold records it from Newfoundland, J. M. Macoun from Canada. It is not mentioned in Fries' Lich. Arct., and the Yakutat station would seem to be the most northern one established on this continent.

156. **Sticta quercizans** (Michx.) Ach.

Lichen quercizans MICHAUX, Fl. Bor. Amer. 2 : 524. 1803.
Sticta quercizans ACHARIUS, Syn. 234. 1814.

Unalaska (Setchell). New to Alaska.

A small sterile specimen, growing on the earth.

Described from material collected by Michaux on Grandfather Mountain, North Carolina. It is common throughout the Southern States, ranging northward to Canada and Oregon.

157. **Sticta oregana** Tuck.

Sticta oregana TUCKERMAN, Bull. Torr. Club 5 : 4, 20. 1873.

Lowe Inlet, B. C. (Trelease, 1023; Coville and Kearney, 339, 350); Fraser Reach, Princess Royal Island, B. C. (Coville and Kearney, 305, 311); Sitka (Setchell, 1218); Broughton Strait (Trelease, 1021); Juneau (Setchell, 1248); Yakutat (Trelease, 1028); Point Gustavus, Glacier Bay (Coville and Kearney, 779). Collected by Dr. Cooley at Loring and at Sheep Creek, near Juneau. Tuckerman, in his Syn. N. A. L., gives Oregon as the only station for this species. In my own herbarium I have specimens from Vancouver Island and Washington.

All the specimens are sterile with the exception of No. 339.

158. **Sticta pulmonaria** (L.) Ach.

Lichen pulmonarius LINNÆUS, Fl. Suec. 1087. 1755.
Sticta pulmonaria ACHARIUS, L. U. 449. 1810.—SOWERBY, Eng. Bot. *t. 572.*—DELIS. Stict. *t. 14. f. 60–65.*

Alaska (Evans, 6); Fraser Reach (Coville and Kearney, 311 in part); Lowe Inlet, B. C. (Trelease, 1024); Juneau, 1800 ft. alt. (Trelease, 1026, 1057); Juneau (Coville and Kearney, 608); Broughton Strait (Trelease, 1022); Farragut Bay (Trelease, 1025; Coville and Kearney, 474); Point Gustavus, Glacier Bay (Coville and Kearney, 780); Orca (Trelease, 1030, 1031, 1031*a*, 1038, 1045); Port Wells (Trelease, 1029, 1029*a*); Aguadulce River, Yakutat Bay (Trelease, 1027); Attu Island (Townsend, 71). Dr. Cooley collected it at Salmon Creek, near Juneau, Dr. Bean at Port Althorp and Sitka. The specimens collected by Dr. Bean are placed by Nylander under the following number as *Lobaria linita* (Ach.). Under the synonym *Sticta pulmonacea* Ach., Babington[1] reports its occurrence at Kotzebue Sound. He writes: "The specimens are rather small, neatly crisped, and pale ferrugineous below, approaching the form called *S. linita.*"

This Alaska form differs from the type in various particulars. The lobes of the thallus are broader and much more irregularly divided. The lobes are usually round and crenate at the apex, while the type is described as 'retuse-truncate.' The upper surface of the thallus is lighter brown in color and not so deeply lacunose, while the under surface shows fewer white spots. These specimens fruit much more freely than the type. The apothecia are large, chestnut brown, granulate on the under side, and are scattered over the thallus and not confined to the edges, as is usually the case in *Sticta pulmonaria.*

[1] Botany of the voyage of H. M. S. Herald, by Seeman. Lichens determined by Churchill Babington, 1852–1857.

The spores are similar to those of the type. The specimen from Fraser Reach shows also fragments of *Sticta oregana*. Judging from the specimens submitted, this must be one of the most abundant and characteristic lichens of the Alaskan coast. It is noticeable that in the collection here listed the species does not appear north of the Aleutian Islands. In the northern region its place is taken by the variety *linita*, which is represented by nine specimens, only three of which were collected south of the Aleutian Islands, and those all at one place. Arnold reports it from Newfoundland but not from Alaska. Dr. Lindsay[1] says of it: "Not in the present collection and not given at all by Th. Fries as a Greenland lichen. But in the Kew Herbarium I saw specimens of the ordinary form labeled 'Davis Straits.' The labels, however, unfortunately did not inform us on which coast the plant was collected, east or west." Fries reports it from Lapland, Norland, and the Samoyede country. Nylander records its occurrence in Scandinavia, but not its frequency. Tuckerman has recorded it for California.

159. **Sticta pulmonaria linita** (Ach.) Nyl.

Sticta linita ACHARIUS, Syn. 234. 1814.—DELIS. Stict. 145. *t. 18. f. 65.* 1825. *Sticta pulmonaria linita* NYLANDER, Syn. 96. 1860.

Lowe Inlet, B. C. (Coville and Kearney, 339*b*, 342, 344); Unalaska (Setchell); Hall Island (Trelease, 1088); St. Matthew Island (Trelease, 1069); Port Clarence (Trelease, 1068, 1087, 1087*a*, 1087*b*); Cape Nome (Setchell). All sterile. Collected by Macoun on St. Paul Island. It is reported from Port Clarence by Nylander.

Nylander, in his revision of Rothrock's list, states that Dr. Bean's specimen, which is listed as *Sticta pulmonaria* by Rothrock, should be placed under this variety. This rock form is the more widely distributed alpine and arctic form.

Additional Alaska species of the genus are: *Sticta limbata* (Sm.) Ach., collected by Dr. Cooley at Sheep Creek and at Salmon Creek, near Juneau; and *Sticta scrobiculata* (Scop.) Mass., credited by Rothrock to Kotzebue Sound, no collector being given.

Family UMBILICARIACEÆ.

UMBILICARIA.

KEY TO THE SPECIES.

Thallus with fibrils on the under side.

Thallus blackish-brown.

Thallus one-leaved, not lacerate underneath.....*proboscidea.*

[1] Lindsay, Dr. W. Lauder. Observations on the Lichens collected by D. Robert Brown, M.A., F.R.G.S., in West Greenland in 1867. Transactions of the Linnæan Society, vol. XXVII, 327. 1871.

Thallus often many-leaved, lacerate and shaggy underneath. *muhlenbergii alpina.*

Thallus of a grayish color.

Fibrils pale.....*hirsuta.*

Fibrils black.....*cylindrica.*

Thallus without fibrils on the under side.

Thallus of a grayish color..... *vellea tylorrhiza.*

Thallus blackish-brown.

Upper surface of thallus smooth, not perforate on the edge. *anthracina.*

Upper surface of the thallus not smooth, more or less perforate on the edge.

Thallus smooth underneath.....*hyperborea.*

Thallus ridged underneath.....*erosa.*

160. **Umbilicaria vellea tylorrhiza** Nyl.

Umbilicaria vellea tylorrhiza NYLANDER, Lich. Lapp. Orient. 122. 1867.

Alaska, locality lost (Trelease, 1101); summit of White Pass (Trelease, 1002). Both sterile. New to Alaska.

The only record we have for this continent is southern Colorado, Brandegee. Nylander records it for eastern Asia and Europe.

161. **Umbilicaria hirsuta** (Ach.) Stenh.

Umbilicaria hirsuta ACHARIUS in Vet. Ac. Handl. 1794. *t. 3, f. 1.* 1821. *Umbilicaria hirsuta* STENHAMMER, Sched. Crit. 4: 1825. DILL. Hist. Musc. *t. 30. f. 117.*—SOWERBY, Eng. Bot. *t. 2486.*

Muir Glacier (Trelease, 1006). Sterile. New to Alaska.

Professor Tuckerman does not give definite notes of its distribution in North America in his Syn. N. A. L. I find no mention of it in Arnold's lists of the lichens of Newfoundland and Labrador. Lindsay does not mention it in his West Greenland Lichens. Branth and Grönlund, in Grönland's Lichen-Flora, recognize the var. *papyria*, giving three stations for it. In the alpine and arctic regions of Europe it seems to be quite widely distributed.

162. **Umbilicaria muhlenbergii alpina** Tuck.

Umbilicaria muhlenbergii alpina TUCKERMAN, Syn. New Eng. Lich. 74. 1848.

Locality lost (Trelease, 1004). New to Alaska.

The variety was described from specimens from "Alpine rocks in the White and Green Mountains, Tuckerman; and in Hastings county, Canada, Macoun."

163. **Umbilicaria erosa** (Web.) Hoffm.

Lichen erosus WEBER, Spicil. Fl. Götting. 259. 1778.
Umbilicaria erosa HOFFMANN, Pl. Lichen. 3[1]: 7. *t. 70.* 1801.—SOWERBY, Eng. Bot. 29. *t. 2066.* 1809.

Muir Glacier (Trelease, 1007); Kadiak (Trelease, 1009); St. Michael (Setchell). Reported from St. Paul and St. George Islands by Macoun.

Fertile. One of the specimens which was collected at Muir Glacier (1007*b*) might perhaps be separated out as forma *subradicans* Nyl.

164. **Umbilicaria hyperborea** Hoffmann.

Umbilicaria hyperborea HOFFMANN, Fl. Germ. 110. 1795.

Muir Glacier (Trelease, 1007*b*); summit of White Pass, 3000 ft. (Trelease, 1003); Sturgeon River, Kadiak Island (Trelease, 1008); Hall Island (Trelease, 1010, 1010*b*); Cape Nome (Setchell); Seward Peninsula (Collier). In Rothrock's List it is given as collected at Plover Bay, Siberia, and at Unalaska by Dr. Bean. It has also been collected on St. Paul Island by William Palmer.

Fertile. A widely diffused northern form.

165. **Umbilicaria anthracina** (Wulf.) Schaer.

Lichen anthracinus WULFEN in Jacq. Misc. 2. 84. *t. 9. f. 4.* 1781.
Umbilicaria anthracina SCHAERER, Helv. no. 154. 1823–1852.

Kadiak (Trelease, 1005). Sterile. New to Alaska.

This is an alpine and arctic form which has been reported from Arctic America, Greenland, Newfoundland, and from northern Europe.

166. **Umbilicaria proboscidea** (L.) DC.

Lichen proboscideus LINNÆUS, Sp. Pl. 2: 1150. 1753.—Fl. Dan. *t. 471. f. 3.*
Umbilicaria proboscidea DE CANDOLLE, Fl. Franç. 2: 410. 1805.

Muir Glacier (Trelease, 1007*c*); Unalaska (Setchell); St. Matthew Island (Trelease, 1011); Cape Nome (Setchell). Rothrock reports it from St. Matthew Island, and Macoun from St. Paul and St. George Islands. Under the synonym *Gyrophora proboscidea* Dr. Nylander records its occurrence on St. Lawrence Island.

The specimen from Muir Glacier is doubtfully referred here. It is small, with branching fibrils beneath. The development of fibrils on this specimen is much more evident than on the more mature specimens.

167. **Umbilicaria cylindrica** (L.) Dub.

Lichen cylindricus LINNÆUS, Afz. Act. Sc. Sv. 1788.
Umbilicaria cylindrica DUBY, Bot. Gall. 595. 1829.—DILL. Hist. Musc. *t. 29. f. 116.*

Unalaska (Setchell). Collected by Macoun on St. Paul and St. George Islands, Bering Sea.

A common and widely distributed northern lichen.

Additional species of *Umbilicaria:* Wright collected *U. flocculosa* Hoffm. at Bering Strait, Macoun collected *U. rugifera* Nyl. on rocks on St. Paul and St. George Islands.

Family PARMELIACEÆ.

PHYSCIA.

KEY TO THE SPECIES.

Thallus brown.
  Thallus closely adnate to the substrate, lobes very thin and flat. *adglutinata.*
  Thallus not closely adnate to the substrate, the tips rounded and erect..... *pulverulenta.*
Thallus gray.
  Thallus granulate or sorediate.
    Lobes of thallus very narrow, granulate at tips..... *tribacea.*
    Lobes of thallus rather wide, sorediate..... *cæsia.*
  Thallus neither granulate nor sorediate.
    Lobes of thallus rather broad, with white fibrils underneath. *stellaris.*
    Lobes of thallus narrow, with black fibrils beneath. *stellaris apiola.*

168. **Physcia adglutinata** (Floerk.) Nyl.

Lecanora adglutinata FLOERKE in Deutsch. Lich. Lief. 4: 7. 1815.
Physcia adglutinata NYLANDER, Syn. 428. 1860.
Lichen elænius SOWERBY, Eng. Bot. *t. 2158.*

Muir Glacier (Trelease, 1154*b*). New to Alaska. On *Salix* with *Parmelia olivacea.* Specimen fertile.

Not recorded as occurring in Greenland, Newfoundland, or Labrador, but widely distributed to the west and south.

169. **Physcia cæsia** (Hoffm.) Nyl.

Lichen cæsius HOFFMANN, Enum. *t. 12. f. 1.* 1784.
Physcia cæsia NYLANDER, Syn. 426. 1860.—SOWERBY, Eng. Bot. *t. 1052.*

Yakutat (Trelease, 1139*b*); Farragut Bay (Trelease, 1141); Kukak Bay, Alaska Peninsula (Coville and Kearney, 1515*c* in part);

St. Paul Island (Trelease, 1147). Credited to St. Lawrence Island by Nylander.

The specimens from Muir Glacier and St. Paul Island are fertile. With the specimen from Kukak Bay are small fragments of *Theloschistes polycarpus*.

170. **Physcia tribacea** (Ach.) Tuck.

Lecanora tribacea ACHARIUS, Syn. 191, in part, 1814.
Physcia tribacea TUCKERMAN, Syn. N. A. L. 75. 1884.

Yakutat (Trelease, 1100, 1144). No. 1144 is on dead twigs of Coniferæ. No. 1100 is associated with *Nephroma lævigatum* and *Sticta crocata*. Reported from Port Clarence by Nylander.

171. **Physcia stellaris** (L.) Nyl.

Lichen stellaris LINNÆUS, Fl. Suec. ed. 2. 1082. 1755.
Physcia stellaris NYLANDER, Syn. 424. 1860.—SOWERBY, Eng. Bot. *t. 1697.*

Muir Glacier (Trelease, 1133, 1135); Unalaska (Setchell). On bark of trees. Collected by Dr. Bean on Chamisso Island, in Eschscholtz Bay, on Little Koniuji Island, of the Shumagin group, and on Glacier Spit, in Cook Inlet. Nylander, in his enumeration of Rothrock's list based upon Dr. Bean's collection, states that *Physcia melops* (Duf.) Nyl. appears under the name *Physcia stellaris*. Arnold reports this from Newfoundland, Lindsay from West Greenland, and Fries[1] writes of it as being widely distributed in Scandinavia as well as in West Greenland.

No. 1133 is especially well fruited.

172. **Physcia stellaris apiola** (Ach.) Nyl.

Parmelia apiola ACHARIUS, Meth. Lich. 209. 1803.
Physcia stellaris apiola NYLANDER, Lich. Scand. 111. 1861. — DILL. Hist. Musc. *t. 24. f. 70.*

Alaska (Funston, 23); Yakutat (Trelease, 1139); Muir Glacier (Trelease, 1012); Virgin Bay (Trelease, 977); St. Michael (Setchell). New to Alaska.

All the specimens are sterile.

173. **Physcia pulverulenta** (Schreb.) Nyl.

Lichen pulverulentus SCHREBER, Spicil. 128. 1771.
Physcia pulverulenta NYLANDER, Syn. 419. 1860.—HOFFM. Pl. Lich. *t. 8. f. 2.*

St. Paul Island (Trelease, 1116, 1116*a*). New to Alaska. Dr. Lindsay mentions it in his West Greenland Lichens,[2] and mentions

[1] Fries, Th. M. Lichenes Arctoi, 64. 1860.

[2] Lindsay, W. Lauder. Observations on the Lichens collected by Dr. Robert Brown in West Greenland in 1867. Transactions of the Linnæan Society, vol. XXVII, 332. 1871.

having seen a specimen in the Kew Herbarium which was collected by Parry and labeled as from the 'North Pole.' Dr. Arnold makes no mention of its occurrence in Newfoundland or Labrador in his lists of the lichens of those regions. Neither of the St. Paul specimens shows apothecia, and both are only slightly pulverulent. They may possibly be referred to *P. muscigena* of Fries' Lichenes Arctoi.

Additional Alaska species: *P. obscura* (Ehrnb.) Nyl., listed by Rothrock as having been collected at Kotzebue Sound; *P. obscura sciastra* (Ach.) Nyl., and *P. muscigena* (Wahl.) Nyl., both recorded by Nylander as occurring at Port Clarence; and *P. melops ossicola* Nyl., collected on St. Lawrence Island, as recorded by Nylander.

PARMELIA.

KEY TO THE SPECIES.

Thallus straw-colored.
  Thallus large, often isidiophorous, lobes variously divided..*conspersa.*
  Thallus small, sorediate, dichotomously divided.....*ambigua.*
Thallus variously colored.
  Thallus olivaceous brown.
    Lobes of thallus flat, rounded crenate.....*olivacea.*
    Lobes of thallus linear or terete.
      Palmately divided.....*stygia.*
      Dichotomously divided..... *lanata.*
  Thallus glaucescent or blackening.
    Thallus small, dichotomously divided, sorediate.
      ambigua albescens.
    Thallus large, not dichotomously divided.
      Thallus gray, sometimes with blackening borders.
        Thallus more or less reticulate, not inflated.
          Thallus whitish, sorediate .....*saxatilis.*
          Thallus grayish, not sorediate .....*saxatilis sulcata.*
        Thallus not reticulate, inflated.
          Lobes of thallus wide and much inflated, not black-margined .....*physodes enteromorpha.*
          Lobes of thallus narrow, somewhat inflated.
            Lobes of thallus not black-margined .....*physodes.*
            Lobes of thallus black-margined.....*physodes vittata.*
      Thallus blackening all over.
        Lobes of thallus flat, broad, not inflated.
          saxatilis omphalodes.
        Lobes of thallus rounded, narrow, inflated.
          physodes obscurata.

174. **Parmelia ambigua** (Wulf.) Ach.

Lichen ambiguus WULFEN in Ap. Jacq. Coll. 4 : 239. *t. 4. f. 2.* 1790.
Parmelia ambigua ACHARIUS, Meth. 207. 1803.

Alaska (Funston, 36) ; Juneau (Setchell, 1247) ; Virgin Bay (Trelease, 1143). Sterile, on dead wood. Reported by Nylander as occurring at Port Clarence, under the synonym *Parmeliopsis ambigua* (Wulf.).

175. **Parmelia ambigua albescens** Wahl.

Parmelia ambigua albescens WAHLENBERG, Fl. Suec. 852. 1826.
Parmelia ambigua albescens SCHAERER, Spicil. 468. 1840.—Fl. Dan. *t. 2512. f. 1 b & d.*

Virgin Bay (Trelease, 846). Sterile, on dead wood. New to Alaska.

Neither *Parmelia ambigua* nor the variety *albescens* is mentioned in Fries' Lichenes Arctoi, or by Branth and Grönlund in Grönlands Lichen Flora, or in Dr. Lindsay's West Greenland Lichens. *Parmelia ambigua* has been reported from Arctic America (Richardson) and from British Columbia (Macoun).

176. **Parmelia conspersa** (Ehrh.) Ach.

Lichen conspersus EHRHART in Ach. Prod. 118. 1798.
Parmelia conspersa ACHARIUS, Meth. Lich. 205. 1803.—SOWERBY, Eng. Bot. *t. 2097.*

Sitka (Trelease, 1146) ; summit of White Pass, 3000 ft. (Trelease, 1138) ; St. Michael (Setchell). New to Alaska.

No. 1138, which bears apothecia, has finely divided lobes approaching the variety *stenophylla* of Acharius. The other specimen is sterile.

177. **Parmelia lanata** (L.) Wallr.

Lichen lanatus LINNÆUS, Fl. Suec. 1125. 1755.
Parmelia lanata WALLROTH, Fl. Germ. 529. 1831.—SOWERBY, Eng. Bot. *t. 846.*

Hot Springs, Baranof Island (Trelease, 1176) ; Unalaska (Setchell) ; Muir Glacier (Trelease, 1159, 1177). New to Alaska.

All the specimens are sterile. No. 1176 is much more finely divided than any specimen in the Tuckerman Herbarium. The species has been reported from Arctic America.

178. **Parmelia stygia** (L.) Ach.

Lichen stygius LINNÆUS, Sp. Pl. 2 : 1143. 1753.
Parmelia stygia ACHARIUS, Meth. Lich. 203. 1803.—SOWERBY, Eng. Bot. *t. 2048.*

Summit of White Pass, 3000 ft. (Trelease, 1162*b*) ; Kadiak (Trelease, 902). On rocks. New to Alaska.

No. 902 is mixed with *Buellia geographica*, *Lecanora straminea*, and *Lecidea platycarpa*. Common in Arctic regions.

179. **Parmelia olivacea** (L.) Ach.

Lichen olivaceus LINNÆUS, Sp. Pl. 2 : 1143. 1753.
Parmelia olivacea ACHARIUS, L. U. 462. 1810.—SOWERBY, Eng. Bot. *t. 2180.*—NYL. Syn. *t. 1. f. 1.*

Wrangell (Trelease, 1153) ; Hidden Glacier Inlet (Trelease, 991) ; Sitka (Trelease, 1107*b*, 1117) ; Muir Glacier (Trelease, 988, 990, 1154) ; Whale Island, St. Michael (Setchell). On bark of *Alnus oregona* and on rock. Reported by Nylander as having been collected at Port Clarence.

The specimens are well developed, but all but two are sterile. Dr. Lindsay states in West Greenland Lichens, 331, that all the forms which he examined were sterile. All the specimens which I have collected in Massachusetts are sterile, but more northern forms from Maine, New Hampshire, Idaho, and Oregon show apothecia well developed.

The species has been reported from Alaska but once before. It was found at Port Clarence, a much more northern locality than any reported in this list. It appears to be a common arctic form, and therefore its comparative scarcity in Alaska is the more noticeable.

180. **Parmelia physodes** (L.) Ach.

Lichen physodes LINNÆUS, Fl. Suec. ed. 2. 1755.
Parmelia physodes ACHARIUS, Meth. Lich. 250. 1803.—SOWERBY, Eng. Bot. *t. 126.*

Alaska (Evans, 255), with *Usnea longissima*, etc. ; Sitka (Trelease, 1149, 1149*a*, 1151) ; Kadiak (Trelease, 1134, on dead wood) ; Fraser Reach (Coville and Kearney, 296). Recorded by Rothrock as occurring at Elephant Point, Eschscholtz Bay, Arctic Ocean, Port Mulgrave, Yakutat Bay, and Fort Alexander, in Cook Inlet.

Specimens small and sterile. No. 299 may be considered a transitional form approaching the variety *vittata*.

181. **Parmelia physodes obscurata** Ach.

Parmelia physodes obscurata ACHARIUS, Syn. 218. 1814.

Unalaska (Setchell) ; St. Matthew Island (Trelease, 1163*b*, also a specimen with no number) ; Hall Island (Trelease, 1164*b*) ; Port Clarence (Trelease, 1112), mixed with *Cetraria cucullata*, *Parmelia saxatilis*, and *Alectoria divergens*.

The unnumbered specimen from St. Matthew Island is well fruited, the others are sterile. Mixed with this specimen is a sterile fragment, apparently a *Cladonia*, and also *Alectoria divergens*. This variety has been reported from Alaska but once before. Tuckerman records that it was collected by Wright on the islands of Bering Strait.

Acharius, in establishing the variety, records it as occurring in Helvetia, on the limbs of pines. No reference is made to it in Lichenes Arctoi by Fries, or in the Lichen Flora Grönland's, by Branth and Grönlund.

182. **Parmelia physodes enteromorpha** (Ach.) Tuck.

Parmelia enteromorpha ACHARIUS, Meth. Lich. 252. 1803.
Parmelia physodes enteromorpha TUCKERMAN, Syn. N. A. L. 1: 60. 1882.

Broughton Strait (Trelease, 1108, 1114); Sitka (Trelease, 1126; Setchell, 1273); Wrangell (Coville and Kearney, 403); Farragut Bay (Coville and Kearney, 466); Glacier Bay (Coville and Kearney, 769); Orca (Trelease, 1110); Kadiak (Trelease, 1134*a*). Collected by Dr. Cooley at Sitka, Loring, and Juneau, and at Sheep Creek, near Juneau. Tuckerman states that it was collected in Alaska by Dr. Kellogg.

On several of the specimens were minute, black, cup-shaped fungi, either scattered or so crowded that the cups formed a continuous stroma-like mass. These fungi were most abundant in NOS. 1108, 1114, and 769.

Two-thirds of the specimens were fruited, the apothecia often large, one measuring 25 μ.

This variety was described from specimens from California, and seems to be very abundant on our northern coast. It has also been reported from northern Asia, Australia, and New Zealand.

183. **Parmelia physodes vittata** Ach.

Parmelia physodes vittata ACHARIUS, Syn. 218. 1814.

Wrangell (Trelease, 1109); Point Gustavus, Glacier Bay (Coville and Kearney, 784); Virgin Bay (Trelease, 1111), with *Polytrichum*. Collected at Loring by Dr. Cooley and on St. Paul Island by Macoun.

Parmelia physodes seems to be more widely distributed than any of its varieties. It is found in Europe, North and South America, Asia, Africa, New Zealand, etc. The variety *vittata* has been reported from Europe, North America, and South America.

184. **Parmelia saxatilis** Ach.

Parmelia saxatilis ACHARIUS, Meth. Lich. 204. 1803.—SOWERBY, Eng. Bot. *t. 603*.

Alaska (Evans, 368); Sitka (Trelease, 1148, 1150); Hot Springs (Trelease, 1123, 1123*a*, 1113, and 963 in part); Yakutat (Trelease, 1066, 1121*a*, 1121*b*); Virgin Bay (Trelease, 1074); Sturgeon River Bay (Trelease, 1134*b*, also a specimen with no number); Kukak (Coville and Kearney, 1515); Unalaska (Setchell); St. Michael (Set-

chell); Port Clarence (Trelease, 1113, 1112, fragments with *Cetraria*, etc.). Reported by Babington from Kotzebue Sound, by Nylander for St. Lawrence Island; collected by Dr. Bean at Cape Lisburne, Unalaska, and on logs in Cross Sound, and by Macoun on St. Paul and St. George Islands.

This species is represented entirely or in part by sixteen different numbers, and exhibits great variation as to color of thallus and presence or absence of isidioid growths. The most normal forms are represented by numbers 1113 and 1150. It will be noted that 1113 was collected at Port Clarence, the most northern station for this species, and 1150 at Sitka, the most southern station.

Numbers 1123*a*, 1066, and 1074 are characterized by a change of color of a portion, or in 1074 of nearly all, of the thallus, to a reddish-brown. Macoun notes the same fact in the following words: "Frequently found abnormally colored from a red brown to a beautiful violet." This is a change which often occurs in specimens of a normal color which have been kept in a damp condition in a collecting box for two or three days. Certain specimens, as No. 368, show a tendency toward the blackening which is characteristic of the variety *omphalodes*.

The most interesting variation, however, is that caused by the development of the isidioid growths. This is only slightly evident in 1121*a* and 1123, but very strongly developed in Nos. 368, Evans; 1515, Coville and Kearney; 1130 and 1134*b*, Trelease. In these cases the greater portion of the thallus, the periphery being excepted, is densely covered with a growth which resembles minute specimens of *Sphærophoron coralloides* or *Cladonia papillaria*. This is the form which Dr. Lindsay refers to as *sphærophoroidea*, in his Observations on West Greenland Lichens, 328. None of the reddish-brown forms show any isidioid growths. Macoun collected an isidiferous form on earth on St. George Island.

No. 1066 is interesting as showing the development of minute secondary laciniæ upon the surface or at the edge of the lobes of the thallus.

Only two of the sixteen specimens bear fruit, or one-eighth of the whole number, and the apothecia are poorly developed in these cases. An examination of eleven specimens in my herbarium, including material from Canada and Newfoundland, shows that six of the eleven specimens (more than half) are fruited. The sterility of these Arctic forms has been noted by Dr. Lindsay in his Observations upon the Lichens of West Greenland.

185. **Parmelia saxatilis sulcata** (Tayl.) Nyl.

Parmelia sulcata TAYLOR in Mack. Fl. Hib. 145. 1836.
Parmelia saxatilis sulcata NYLANDER, Syn. 1: 389. 1860. — MICH. Ord. 22. *t. 49.* C. D.

Alaska (Funston, 7); Sitka (Trelease, 1149); Yakutat (Trelease, 2299); Virgin Bay (Trelease, 1118). Collected by Macoun on St. George Island and reported by Nylander under the synonym *Parmelia sulcata* Tayl. as occurring on St. Lawrence Island and at Port Clarence.

In NO. 1121 the lobes are short and somewhat overlapping, tending toward the variety *panniformis*, while in NO. 1118 they are narrow, more elongated and spreading. All the specimens are sterile.

186. **Parmelia saxatilis omphalodes** (L.) Fr.

Lichen omphalodes LINNÆUS, Fl. Suec. 1755.
Parmelia saxatilis omphalodes FRIES, L. E. 62. 1831.—DILL. Hist. Musc. *t. 24. f. 80.*—SOWERBY, Eng. Bot. *t. 604.*

Kadiak (Trelease, 1132); summit of White Pass, 3000 ft. (Trelease, 1120); St. Paul Island (Trelease, 1115); St. Matthew Island (Trelease, 1165); St. Lawrence Island (Trelease, 1156), associated with *Lecanora varia symmicta;* Port Clarence (Trelease, 1129); St. Michael (Setchell); Cape Nome (Setchell). Collected by Dr. Bean near Cape Lisburne and reported by Nylander under the synonym *P. omphalodes* (L.) as occurring on St. Lawrence Island.

No. 1129 shows the development of minute laciniæ and NO. 1105 of isidia which have been mentioned as characteristic of some forms of *Parmelia saxatilis*. No apothecia are developed on any of these specimens.

Additional Alaska species: *P. austerodes* Nyl., recorded by Nylander as having been collected on St. Lawrence Island and at Port Clarence; and *Parmeliopsis aleurites* (Ach. Sommerf.) Nyl., recorded by Nylander as occurring at Port Clarence. Rothrock reports *P. perlata* (L.) Ach., *P. perforata* (Jacq.) Ach., and *P. tiliacea* (Hoffm.) Floerk., as having been collected at Kotzebue Sound. Hooker and Arnott, in their list of Kotzebue lichens, include *P. diatrypa* Ach., which may be referred to *P. pertusa* (Schrank.) Schaer

THELOSCHISTES.

KEY TO THE SPECIES.

Thallus not powdery on the margin .....*polycarpus.*
Thallus powdery on the margin.
Lobes flat, linear, profusely granulate.....*lychneus.*
Lobes erect, terete, branched.....*lychneus pygmæus.*

187. **Theloschistes lychneus** (Nyl.) Tuck.

Physcia parietina lychnea NYLANDER, Syn. 411. 1860.
Theloschistes lychneus TUCKERMAN, Syn. N. A. L. 1: 50. 1882.—HEPP, Sporen. *t. 99. f. 871.*

Sitka (Trelease, 1169); Kadiak (Trelease, 1170 in part); Unalaska (Trelease, 1154); St. Paul Island (Trelease, 930). Collected on St. Paul Island by William Palmer, and reported by Nylander, under the synonym *Physcia lychnea* (Ach.) Nyl., as occurring on St. Lawrence Island.

All sterile, on rocks or old rails. The specimen from Kadiak was on rails with *Buellia myriocarpa chloropolia.*

188. **Theloschistes lychneus pygmæus** (Fr.) Tuck.

Parmelia parietina l. *pygmæa* FRIES, L. E. 73.
Theloschistes lychneus pygmæus TUCKERMAN, Syn. N. A. L. 1: 51. 1882.

Muir Glacier (Trelease, 1167); Sturgeon River Bay, Kadiak Island (Trelease, 1171); Unalaska (Setchell); St. Paul Island (Trelease, 886, 1173); St. Matthew Island (Trelease, 1172); St. Michael (Setchell). This species has been collected on St. Paul Island by J. M. Macoun, who states that it is 'rare.' Also collected on St. Paul Island by William Palmer, and in Alaska, no locality given, by Dr. Kellogg, and on the islands in Bering Strait by Wright.

Nos. 1172 and 1173 are sparingly fruited. No. 1173 was found growing with fragments of *Physcia* on tufts of moss.

189. **Theloschistes polycarpus** (Ehrh.) Tuck.

Lichen polycarpus EHRHART, Plant. Crypt. 136. 1785.
Theloschistes polycarpus TUCKERMAN, Syn. N. A. L. 1: 50. 1882.—SOWERBY, Eng. Bot. *t. 1795.*

Muir Glacier (Trelease, 1168) on *Salix;* Kukak Bay, Alaska Peninsula (Coville and Kearney, 1515*b*); St. Paul Island (Trelease, 1174). Mixed with the specimen from Kukak is a fragment of *Physcia* sp. All are fertile. A specimen collected by Professor Setchell at St. Michael may possibly be placed here. Rothrock, in his list based upon Dr. Bean's collection, places this as a variety under *T. parietinus*, and writes: "Widely diffused over the Arctic regions and apparently very common, being obtained at a number of points." In his correction of Rothrock's list, Nylander refers the specimen to *Physcia lychnea*, a synonym for *T. lychneus.*

One additional species of this genus has been collected in Alaska—*T. parietinus* (L.) Norm., collected by Dr. Bean at Port Clarence, and reported by Babington under the synonym *Parmelia parietina* Ach., as occurring at Kotzebue Sound.

Family USNEACEÆ.

ALECTORIA.

KEY TO THE SPECIES.

Thallus straw-colored.
  Not blackening at the tips.
    Divaricately branched.....*ochroleuca.*
    Densely intertangled.....*ochroleuca sarmentosa.*
  Blackening at the tips.
    Branches rounded.....*ochroleuca rigida.*
    Branches flattened.....*ochroleuca circinata.*
Thallus variously colored.
  Thallus light brown.....*nigricans.*
  Thallus chestnut-colored or blackish-brown.
    Thallus robust, tips forked.....*divergens.*
    Thallus slender, tips not forked.
      Thallus paler at the ends.....*jubata bicolor.*
      Thallus all the same color.
        Thallus pendulous.....*jubata.*
        Thallus prostrate or subpendulous.....*jubata chalybeiformis.*

190. **Alectoria ochroleuca** (Ehrh.) Nyl.

Lichen ochroleucus EHRHART, Beytr. 3: 82. 1788.
Alectoria ochroleuca NYLANDER, Prod. 47. 1857.
Usnea ochroleuca HOFFMANN, Pl. Lich. 2. *t. 26. f. 2.*

Unalaska (Setchell). Nylander reports its occurrence on St. Lawrence Island and at Port Clarence; Hooker and Arnott credit it to Kotzebue Sound, under the synonym *Cornicularia ochroleuca* Ach., and Babington to the same locality, under the synonym *Evernia ochroleuca* Fries.

191. **Alectoria ochroleuca rigida** (Vill.) Fr.

Lichen rigidus VILLARS, Dauph. 3: 938. 1789.
Alectoria ochroleuca rigida FRIES, Lich. Arct. 27. 1860.—SOWERBY, Eng. Bot. *t. 2374.*

Alaska (Evans, 428); Orca (Trelease, 1202); Kadiak (Trelease, 1189). All sterile.

Intermixed with these specimens are fragments of *Alectoria jubata*, *Sphærophorus*, and various mosses. This is an alpine and arctic species. Collected at Taku by Dr. Hayes, and at Seward Peninsula by Arthur J. Collier.

192. **Alectoria ochroleuca sarmentosa** (Ach.) Nyl.

Lichen sarmentosus ACHARIUS, Prod. 180. 1798.
Alectoria ochroleuca sarmentosa NYLANDER, Syn. 282. 1860.—HOFFM. Pl. Lich. *t. 72.*

New Metlakatla (Trelease, 1186); Broughton Strait (Trelease, 1184); Wrangell (Coville and Kearney, 398); Yakutat (Trelease, 1028*b*, 1188). Collected at Sitka by Dr. Bean, and in the same locality by Dr. Cooley, who also found it at Salmon Creek and Sheep Creek, near Juneau.

All the specimens sterile except NO. 1188 from Yakutat. That is fertile and especially well developed.

193. **Alectoria ochroleuca circinata** (Fr.) Tuck.

Evernia ochroleuca circinata FRIES, Lich. Eur. 22. 1831.
Alectoria ochroleuca circinata TUCKERMAN, Syn. N. A. L. 1: 45. 1882.
Lichen sarmentosus SOWERBY, Eng. Bot. *t. 2040.*

Unalaska (Setchell). New to Alaska.

The range of this lichen as given in Tuckerman's Synopsis N. A. L. is limited, only two stations being noted, Newfoundland and the White Mountains. Various stations are given for it in Fries' Lichenes Arctoi.

194. **Alectoria nigricans** (Ach.) Nyl.

Cornicularia ochroleuca β nigricans ACHARIUS, L. U. 615.
Alectoria nigricans NYLANDER, Lich. Scand. 71. 1861.—NYL. Syn. *t. 8. f. 17.*

Agattu Island (Townsend, 78); Unalaska (Setchell); St. Michael (Turner, 840 and an unnumbered specimen; Setchell); St. Lawrence Island (Trelease, 1265); Cape Nome (Setchell). All sterile. Reported by Nylander as occurring on St. Lawrence Island and at Port Clarence, and collected by Dr. Bean at Chernofski, Unalaska. Macoun records it, under the synonym *Alectoria thulensis* Th. Fr., as occurring on St. Paul and St. George Islands.

This is essentially an alpine and arctic form. It has been reported from Labrador and Newfoundland, though not reported from Greenland. Mixed with some of the specimens are fragments of mosses and other lichens.

195. **Alectoria jubata** (L.) Ach.

Lichen jubatus LINNÆUS, Fl. Suec. 1124. 1755.
Alectoria jubata ACHARIUS, L. U. 592. *t. 13. f. 1.* 1810.

Alaska (Evans, 255 in part); between Cook Inlet and Tanana River (Capt. Glenn, no number); Broughton Strait (Trelease, 1179, 1185); Hot Springs (Trelease, 1183); Sitka (Trelease, 1178); Wran-

gell (Coville and Kearney, 402*b*). Collected by Dr. Bean, no locality being given.

All sterile. The specimen collected by Mr. Evans is on the bark of spruce and is intermixed with *Usnea longissima*, *Parmelia physodes*, and *Cetraria glauca*.

196. **Alectoria jubata bicolor** (Ehrh.) Tuck.

Lichen bicolor EHRHART, Beytr. 3 : 82. 1788.
Alectoria jubata bicolor TUCKERMAN, Syn. N. A. L. 1: 44. 1882.—SOWERBY, Eng. Bot. *t. 1853*.

Broughton Strait (Trelease, 1184*b* in part); Sitka (Trelease, 1132); Yakutat (Trelease, 1181). New to Alaska.

The specimen from Yakutat is dwarfed and poorly developed, and shows fragments of *Mnium* and *Dicranum*. The specimen from Broughton Strait is mixed with fragments of *Usnea longissima*.

197. **Alectoria jubata chalybeiformis** (L.) Ach.

Lichen chalybeiformis LINNÆUS, Sp. Pl. 2: 1155. 1753.
Alectoria jubata chalybeiformis ACHARIUS, L. U. 593. 1810.—Fl. Dan. *t. 262*.

Alaska (Funston, 13); Sitka (Trelease, 1180). The only other recorded Alaska locality is St. Paul Island, J. M. Macoun, collector.

This variety occurs in a dwarfed form on the earth in alpine regions, elongated and pendulous on trees farther south.

198. **Alectoria divergens** (Ach.) Nyl.

Cornicularia divergens ACHARIUS, Meth. Lich. 305. *t. 6. f. 1*. 1803.
Alectoria divergens NYLANDER, Syn. 1: 278. 1860.

Kadiak (Trelease, 1194*b* in part, 1208 in part); St. Michael (Turner, 838; Setchell); Agattu Island (Townsend, 78); Hall Island (Trelease, 1209 in part); St. Matthew Island (Trelease, no number); Port Clarence (Trelease, 1112 in part); Cape Nome (Setchell); Seward Peninsula (Collier). Reported by Nylander from Port Clarence and St. Lawrence Island, by Rothrock as occurring in various localities, by Farlow as having been collected at Point Barrow, by Tuckerman as having been collected by Wright on the islands of Bering Strait. Macoun collected it on St. Paul Island, under synonym *Cornicularia divergens* Ach.; Hooker and Arnott report its occurrence at Kotzebue Sound; Babington credits it to Norton Sound and Kotzebue Sound as *Evernia divergens* Fries. It has also been collected on Seward Peninsula by Arthur J. Collier.

Mixed with these specimens are fragments of *Cetraria islandica* and *C. cucullata*, *Parmelia saxatilis*, *Cladonia rangiferina*, and vari-

ous mosses. The specimen from Agattu Island is the best developed and shows no intermixture of other lichens. All the specimens are sterile. A common arctic form.

The only additional Alaskan species of which I find record is *A. fremontii* Tuck., collected by Dr. Cooley at Sitka and at Salmon Creek, near Juneau.

USNEA.

KEY TO THE SPECIES.

Thallus short, tufted.
- Thallus fine, nearly smooth.....*barbata.*
- Thallus coarse, papillate.....*barbata florida.*

Thallus elongated, pendulous.
- Thallus profusely subdichotomously branched, without spreading fibrils.....*barbata plicata.*
- Thallus scarcely branched, covered with spreading fibrils, very much elongated.....*longissima.*

199. **Usnea longissima** Ach.

Usnea longissima ACHARIUS, L. U. 626. 1810.

Alaska (Dr. Kellogg, 6; Evans, 255 in part); Fort Cosmos (Huff, *a*); Sitka (Setchell, 1259 in part, 1262, 1264); Broughton Strait (Trelease, 1184). Tuckerman records it as having been collected in Russian America by Dr. Kellogg.

The specimen collected by Mr. Evans has with it *Cetraria glauca*, *Alectoria jubata*, *Parmelia physodes* and *U. barbata plicata*. No. 1259, collected by Professor Setchell at Sitka, is mixed with *Alectoria jubata*. With the specimen from Broughton Strait is the following note: "Strangling evergreens close to the seaside." Mixed with the specimen are fragments of *Alectoria* and of species of *Dicranum* and *Polytrichum*.

200. **Usnea barbata** Fr.

Usnea barbata FRIES, Sched. Crit. 9: 34. 1824–1833.

Fraser Reach (Coville and Kearney, 301); Broughton Strait, Vancouver Island (Trelease, 1184*e*), with *Usnea longissima*. Both specimens sterile. Collected by Dr. Bean, but no definite locality given.

201. **Usnea barbata florida** (L.) Fr.

Lichen floridus LINNÆUS, Fl. Suec. 1130. 1755.
Usnea barbata florida FRIES, L. U. 18. 1831.—SOWERBY, Eng. Bot. *t. 872.*

Sitka (Trelease, 1180*b*). A very much dwarfed, sterile specimen, which would seem best placed here. New to Alaska.

202. Usnea barbata plicata (L.) Fr.

Lichen plicatus LINNÆUS, Fl. Suec. 1122. 1755.
Usnea barbata plicata FRIES, L. E. 18. 1831.—SOWERBY, Eng. Bot. *t. 257.*

Alaska (Evans, 255 in part); Hot Springs, Baranof Island (Trelease, 1187). New to Alaska.

The specimen from Hot Springs is finely developed, though sterile. It measures nine centimeters in length and is freely branched.

I have found record of only one additional form, *U. barbata dasypoga* Fr., collected by Dr. Bean at old Sitka.

CETRARIA.

KEY TO THE SPECIES.

Thallus straw-colored or yellow.
  Thallus depressed, sorediate ..... *juniperina pinastri.*
  Thallus erect, more or less branched, not sorediate.
    Thallus finger-shaped, hollow ..... *arctica.*
    Thallus flat, lobed.
      Margins of thallus connivent ..... *cucullata.*
      Margins of thallus not connivent ..... *nivalis.*
  Thallus chestnut brown ..... *ciliaris.*
  Thallus variously colored.
    Thallus erect, branching.
      Lobes of thallus connivent ..... *islandica.*
      Lobes of thallus not connivent.
        Lobes of thallus narrow, freely branched..... *islandica delisæi.*
        Lobes of thallus broad, moderately branched.
          islandica platyna.
  Thallus flat, lobed.
    Lobes of thallus narrow, elongated, channeled..... *fahlunensis.*
    Lobes of thallus not channeled.
      Thallus ciliate on the margin, sorediate.
        sæpincola chlorophylla.
      Thallus not ciliate on the margin.
        Thallus deeply lacunose..... *lacunosa.*
        Thallus not lacunose ..... *glauca.*

203. Cetraria juniperina pinastri Ach.

Cetraria juniperina pinastri ACHARIUS, Meth. Lich. 298. 1803. — HOFFM. Plant. Lich. *t. 7. f. 1.*

Alaska (Funston, 4); St. Michael (Setchell); Cape Nome (Setchell). New to Alaska, though it has been reported from Arctic America by Richardson.

204. **Cetraria glauca** (L.) Ach.

Lichen glaucus LINNÆUS, Fl. Suec. ed. 2. 1094. 1755.
Cetraria glauca ACHARIUS, Meth. Lich. 296. 1803.—SOWERBY, Eng. Bot. *t. 1606.*

Broughton Strait, Vancouver Island (Trelease, 1108 in part); Sitka (Trelease, 1124); Wrangell (Coville and Kearney, 402); Point Gustavus, Glacier Bay (Coville and Kearney, 786*b*); Orca (Trelease, 1122). Collected by Dr. Cooley at Sheep and Salmon Creeks, near Juneau, and at Sitka; by Dr. Hayes at Prince William Sound; and by Dr. Bean at Cook Inlet. Rothrock reports that it has been collected at Kotzebue Sound.

The specimens from Sitka and Point Gustavus show a fine development of the coralloid branchlets on the margin of the lobes.

205. **Cetraria lacunosa** Ach.

Cetraria lacunosa ACHARIUS, Meth. Lich. 295. *t. 5. f. 3.* 1803.

Sitka (Trelease, 1125); Virgin Bay (Trelease, 1089); Kadiak (Trelease, 1134*e*); Unalaska (Trelease, 1128; Setchell). Collected by Dr. Hayes at Prince William Sound; by Macoun on St. George and St. Paul Islands; and by Dr. Bean, "sterile specimen from logs on an island in Cross Sound, Baranof Island, Sitka."

The specimen from Unalaska, collected by Professor Trelease, in its general aspect and coloration suggests *Parmelia saxatilis omphalodes*, but it is undoubtedly a *Cetraria*. The specimen from Virgin Bay shows a change in coloration to reddish-brown, but it is especially interesting as showing the development of isidia, which are very characteristic of *Cetraria glauca*, but of which no mention is made in any description of *Cetraria lacunosa* to which I have access.

206. **Cetraria sæpincola chlorophylla** (Humb.) Th. Fr.

Lichen chlorophyllus HUMBOLDT, Fl. Fri. Sp. 1793.
Cetraria sæpincola chlorophylla TH. FRIES, Lich. Arct. 40. 1860.

Sitka (Trelease, 1107); Yakutat (Trelease, 1155). Sterile. New to Alaska.

The only stations which Tuckerman gives in Syn. N. A. L. 1: 35, are Oregon and the coast of California. Th. Fries, Lichenes Arctoi, 40, records its occurrence in Finland.

207. **Cetraria ciliaris** Ach.

Cetraria ciliaris ACHARIUS, L. U. 50. 1810.

Kadiak (Trelease, 1134*d*). New to Alaska.

Fibrils on the margins of the thallus poorly developed. Apparently not common so far north.

208. **Cetraria fahlunensis** (L.) Schaer.

Lichen fahlunensis LINNÆUS, Fl. Suec. no. 107. 1755.
Cetraria fahlunensis SCHAERER, Spicil. 255. 1833.—SOWERBY, Eng. Bot. *t. 653.*

Muir Glacier (Trelease, 1158); summit of White Pass (Trelease, 1162); Kadiak (Trelease, 1134*c*); Unalaska (Setchell); Hall Island (Trelease, 1164); St. Matthew Island (Trelease, 1163, 1166); Cape Nome (Setchell). Collected on St. Paul Island by Macoun. Rothrock includes it in his list of species collected by Dr. Bean, but with no indication of special locality.

Schaerer recognizes two forms, one indicated as *a. major*, having lobes of the thallus broad and granulate on the margin, the other *b. minor*, having the lobes of the thallus narrow and scarcely at all granulate on the margins. No. 1166 is a good example of the first form, and 1164 of the second, while 1158 and 1162 are transition forms. An examination of material in my herbarium from the mountains of New Hampshire and from Labrador shows that both forms are found on the same specimen, and therefore it hardly seems worth while to attempt to discriminate.

209. **Cetraria nivalis** (L.) Ach.

Lichen nivalis LINNÆUS, Fl. Suec. 413. 1755.
Cetraria nivalis ACHARIUS, Meth. Lich. 294. 1803.—SOWERBY, Eng. Bot. *t. 1994.*

Alaska (Funston, 32); Agattu Island (Townsend, 75); St. Michael (Turner, 836); St. Matthew Island (Trelease, 1190). Collected by Dr. Hayes at Taku; by J. M. Macoun on St. George and St. Paul Islands. Under the synonym *Platysma nivale* (L.) Nylander records its occurrence at Port Clarence.

The specimen from Agattu Island by C. H. Townsend is a specimen from the U. S. Fish Commission Steamer *Albatross*. The segments of the thallus are dwarfed and, at the same time, broader than the common forms. No. 836, from St. Michael, has fragments of *Cladonia rangiferina* mixed with it.

210. **Cetraria cucullata** (Bell.) Ach.

Lichen cucullatus BELLARDI, App. Fl. Pedem. 1792.
Cetraria cucullata ACHARIUS, Meth. Lich. 293. 1803.—HOFFM. Plant. Lich. *t. 66. f. 2.*

Agattu Island (Townsend, 756); Unalaska (Setchell); St. Michael (Turner, 842; Setchell); St. Lawrence Island (Trelease, 1238, a fragment with *Cladonia rangiferina*); St. Lawrence Island, North-

east Cape (Coville and Kearney, 2008); Port Clarence (Trelease, 1254, 1112, the latter a fragment mixed with *Parmelia saxatilis*, *Parmelia physodes* and *Alectoria divergens*); Cape Nome (Setchell). All specimens sterile. Collected at Taku by Dr. Hayes, and on St. Paul Island by J. M. Macoun; Hooker and Arnott report its occurrence at Kotzebue Sound, and Babington credits it to the same locality. Nylander lists *Platysma cucullata* Hoffm. as occurring at Port Clarence.

This species is distributed from about latitude 40° N. to the Arctic regions, both in the Old and New Worlds.

211. **Cetraria islandica** (L.) Ach.

Lichen islandicus LINNÆUS, Fl. Suec. 1085. 1755.
Cetraria islandica ACHARIUS, Meth. Lich. 293. 1803.—SOWERBY, Eng. Bot. *t. 1330.*—NYL. Syn. *t. 8. f. 32.*

Summit of White Pass (Trelease, 1193); Kadiak (Trelease, 1194, 1194*a*, 1194*b*), mixed with *Alectoria* and *Cladonia;* Unalaska (Setchell); Hall Island (Trelease, no number); St. Matthew Island (Coville and Kearney, 2113); St. Lawrence Island (Trelease, 1206); Port Clarence (Trelease, 1198, 1207); St. Michael (Setchell); Cape Nome (Setchell). Babington reports its occurrence at Norton Sound and Kotzebue Sound; Hooker and Arnott credit it to the latter locality. J. M. Macoun collected it on St. Paul and St. George Islands, the forms *gracilis* and *robustus* growing with the type. Also collected on Seward Peninsula by Arthur J. Collier.

This is a very variable species, and the transition forms between the species and its varieties are very puzzling. No. 1207 may be considered one of the most typical forms, though these specimens are somewhat lighter than is normal. The thallus grows nearly upright, branching freely. The fibrils on the edge of the lobes of the thallus are short and unbranched. The specimen from Port Clarence (NO. 1198) is much abbreviated, and in the broadening of its shining lobes tends toward the variety *platyna*. The most interesting variation, however, is in the specimens from the summit of White Pass (NO. 1193) and from Kadiak Island (NO. 1194*a*). In these specimens the lobes are long, narrow, and flexuous, thickly beset on the edge with long fibrils, which in the specimen from White Pass are variously branched. Dr. Lindsay, in West Greenland Lichens, 321, suggests that this state "might appropriately bear the name (if name is required) of form or variety *leucomeloides*" because of its resemblance to *Physcia leucomela*. All these specimens are sterile.

212. **Cetraria islandica delisei** (Bory.) Schaer.

Cetraria delisei BORY in Schaerer, Enum. 16. 1850.
Cetraria islandica delisei SCHAERER, Enum. 16. 1850.—WESTR. Faergh. *t. 16 c.*

Hall Island (Trelease, 1197); St. Matthew Island (Trelease, 1195, 1205); St. Lawrence Island (Trelease, 1196); Plover Bay, Siberia (Trelease, 1199); Cape Nome (Setchell). Recorded by Farlow as having been collected on the expedition to Point Barrow; J. M. Macoun collected it on St. Paul Island; Nylander credits it to St. Lawrence Island.

It is noticeable that the development of the marginal fibrils is very slight in the variety *delisei*. No. 1205 from St. Matthew Island shows a few fibrils on the finer branches, near the apex of the fronds. All these forms are somewhat coarser than those of the variety *delisei* in the Tuckerman Herbarium, and all are sterile. With the specimen from Hall Island is a species of *Dicranum*.

213. **Cetraria islandica platyna** (Ach.) Th. Fr.

Cetraria platyna ACHARIUS, Syn. 229. 1814.
Cetraria islandica platyna TH. FRIES, Lich. Arct. 35. 1860.

Hall Island (Trelease, 1201, 1202); St. Lawrence Island (Trelease, 1200); Plover Bay, Siberia (Trelease, 1203). New to the Alaska region.

The specimens of this variety have a much richer chestnut color than the type, while the surface of the thallus is very highly polished and the marginal fibrils are very slightly developed. Not mentioned in Tuckerman's Synopsis of N. A. Lichens, but given by Fries as occurring in Greenland.

214. **Cetraria arctica** (Hook.) Tuck.

Dufourea arctica HOOKER in Richards., Frankl. Narr. 762, append. 47. *t. 31.* 1823.
Cetraria arctica TUCKERMAN, Syn. N. A. L. 1: 30. 1882.

Locality lost (Trelease, 1236); St. Matthew Island (Coville and Kearney, 2117*a*); Plover Bay, Siberia (Trelease, 1237; Coville and Kearney, 1850). Sterile. Reported by Farlow as occurring at Point Barrow; collected by Macoun on St. Paul Island, and by Dr. Hayes at Taku. Hooker and Arnott report it from Kotzebue Sound under the synonym *Dufourea arctica* Br., and Nylander records its occurrence at Port Clarence and on St. Lawrence Island under the synonym *Dactylina arctica* (Hook.).

Mixed with it are *Cetraria islandica* and various mosses.

Additional Alaska species: *Cetraria delisei submedia* Nyl., Port Clarence; *C. crispa* (Ach.), Port Clarence; *C. nigricans* Nyl., Port Clarence and St. Lawrence Island; *Platysma tilesii* Ach., Port Clarence; and *P. sæpincola* forma *minuta* Nyl., Port Clarence — all recorded by Nylander only; *Platysma septentrionale* Nyl., listed by Nylander from Port Clarence and by Rothrock from Kotzebue Sound; *C. glauca substraminea* Babington, reported by Babington from Kotzebue Sound. Dr. Bean collected two species, *C. juniperina* (L.) Ach., sterile specimens, on Chamisso Island in Eschscholtz Bay, and *C. aleurites* (Ach.) Th. Fr. at Cook Inlet and, on the bark of coniferæ, at Eschscholtz Bay. Concerning the latter species Rothrock[1] writes: "Stein has said of this species that it is an evident transition, resembling *Cetraria* in its fruit and spermagonia, and *Parmelia* in habit, and hence often placed by later lichenologists in the latter genus." J. M. Macoun collected *C. aculeata* (Schreb.) Fr. on St. Paul Island and Nylander reports its occurrence at Port Clarence. Dr. Hayes added one species to the list, *C. glauca stenophylla* Tuck., collected at Prince William Sound. Tuckerman reports two additional species, *C. ramulosa* (Hook.) Tuck., a common alpine and arctic form, and *C. chrysantha* Tuck. The range of the latter species is very interesting. It was collected by Wright on the islands in Bering Strait, and is represented by a specimen in the Babington Herbarium collected on rocks at Kotzebue Sound; the only other locality given is Japan, where fertile specimens were collected by Wright.

RAMALINA.

KEY TO THE SPECIES.

Thallus rather elongated, finely divided.....*pusilla geniculata.*
Thallus short, compressed, coarsely divided .....*polymorpha.*

215. **Ramalina polymorpha** Ach.

Ramalina polymorpha ACHARIUS, L. U. 600. 1810.

Unalaska (Setchell); St. Paul Island (Trelease, 1192). Sterile. An alpine and arctic species. Previously reported from the islands in Bering Strait, collected by Wright, and from St. Paul Island by Macoun and Dr. Bean. Rothrock's determination of Dr. Bean's specimen is revised by Nylander, who makes it *R. polymorpha emplecta.*

[1] Rothrock, Dr. J. T. List of and Notes upon the Lichens collected by Dr. T. H. Bean in Alaska and the Adjacent Regions in 1880. Proceedings of the United States National Museum, 7: 1884.

216. **Ramalina pusilla geniculata** (Hook. & Taylor) Tuck.

Ramalina geniculata HOOKER & TAYLOR, Lond. Jour. Bot. 3 : 655. 1844.
Ramalina pusilla geniculata TUCKERMAN, Syn. N. A. L. 1 : 26. 1882.

Fraser Reach, Princess Royal Island, British Columbia (Coville and Kearney, 304); St. Michael (Setchell); St. Matthew Island (Trelease, 1191, 1257). All the specimens are sterile. A specimen collected by Dr. Bean and determined by Rothrock was referred here. Nylander, in his revision of Rothrock's list, places the specimen under the species *R. minuscula* Nyl., which Nylander records as also occurring at Port Clarence and on St. Lawrence Island.

No. 304 is very finely divided, many of the branches ending in capitate soredia. It resembles specimens in the Tuckerman collection from Anticosti and the Gaspé coast. The species as represented in the Tuckerman Herbarium shows great variation in the fineness of the division of the terminal segments and in the regularity of branching as well as in the presence of soredia.

Additional Alaska species are: *R. cuspidata*, collected by J. M. Macoun on St. Paul Island; and *R. calicaris farinacea* Fr. collected by Dr. Bean on Little Koniuji Island, Shumagin group.

ADDITIONAL GENERA.

Five genera of which there are no specimens in the Harriman collection have been recorded as occurring in Alaska. A list of these, with the recorded species, is appended.

Varicellaria microsticta Nyl., reported by Nylander from Port Clarence; *Sphinctrina turbinata* (Pers.) Nyl., from the same locality as the preceding; *Pycnothalia cladinoides*, collected by William Palmer on St. Paul Island, determined by W. W. Calkins; *Urceolaria scruposa* (L.) Ach., collected by Dr. Bean, no special locality being recorded; *Gyalecta convarians* Nyl., reported for Port Clarence by Nylander; *Gyalecta rhexoblephara* (Nyl.) Tuck., collected by Wright on the islands of Bering Sea; and *Evernia thamnodes* (Flot.) Nyl., reported from Port Clarence by Nylander.

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PLATE VIII.

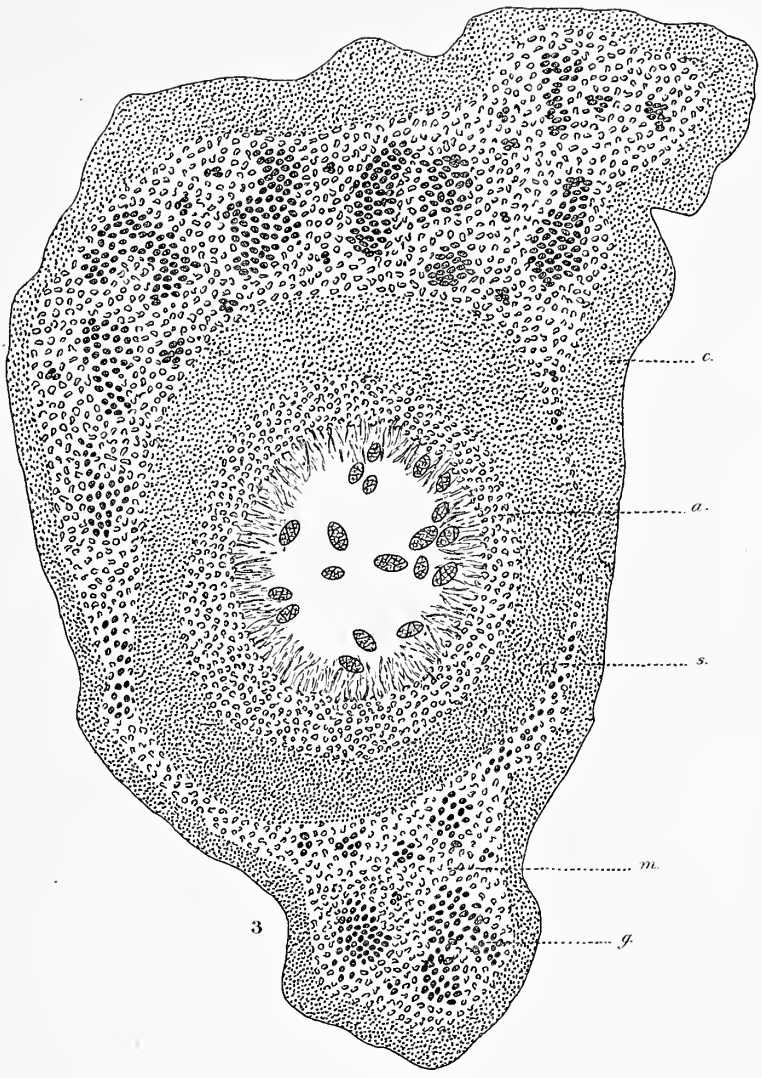
Verrucaria fulva sp. nov.

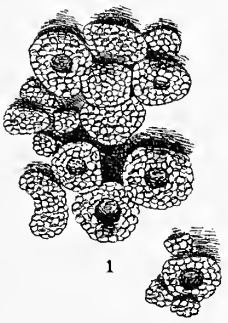
FIG. 1. Thalli showing grouping (×5).

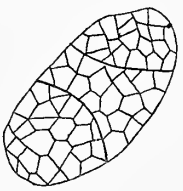
2. Spores (×250).

3. Section of apothecium (×48). *a*, ampithecium; *p*, perithecium; *m*, medullary layer; *g*, gonidia; *c*, cortical layer.

The figures are drawn from specimens collected by Dr. Trelease at Port Wells. (NO. 918.)







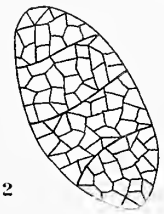


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PLATE IX.

Pertusaria pocillaria sp. nov.

FIG. 1. Portion of fruited thallus (× 8). *c*, cup formed by the evacuation of the asci.

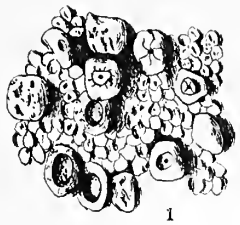
2. Vertical section of thallus and apothecia (× 24).

3. Vertical section of apothecium (× 96).

4. Asci and paraphyses (× 187).

5. Spores (× 375).

The figures are drawn from specimens collected by Dr. Trelease at Farragut Bay. (NO. 806*a*.)



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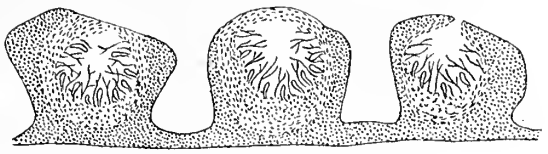

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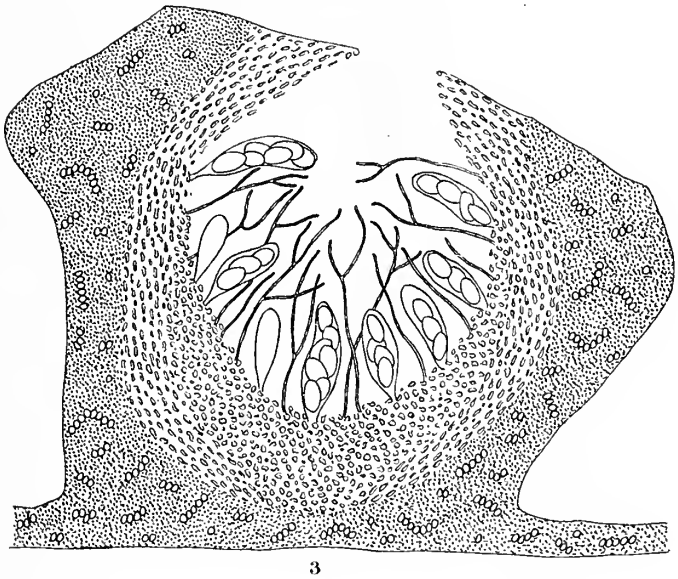

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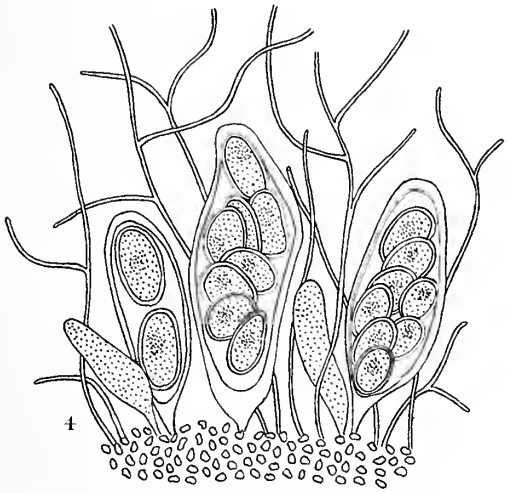

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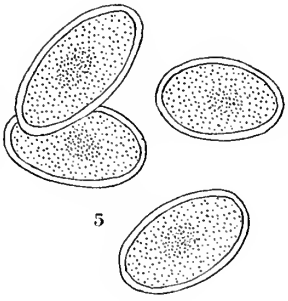

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