

## Four hundred and seventy-eighth meeting.

March 13, 1860.—MONTHLY MEETING.

The PRESIDENT in the chair.

The Corresponding Secretary read letters relating to the exchanges of the Academy. He also presented from the author the following paper, viz.:—

*Observations on North American and some other Lichenes.* By  
EDWARD TUCKERMAN, A. M.

LEPTOGIUM DACTYLINUM, Tuckerm. in litt.: thallo subeffuso imbricato tenui fragili fusco-viridi, lobis minusculis adscendentibus rotundatis crenato-incisis margine dactylino-dentatis; apotheciis (mediocribus) vix elevatis planis rufo-fuscis margine integerrimo albido demum disparente. Sporæ ellipsoideæ diam. duplo longiores. (Nyl. Syn. Lich. p. 123.) Rocks, Vermont, *Mr. Frost*. Nearest to small states of *L. tremelloides*, from which it appears to be quite distinct.

PARMELIA CHLOROCHROA, Tuckerm. in litt.: thallo substellato-multifido decumbente coriaceo lævi nudo flavo-virescente (stramineo) laciniis discretis laxè intricatis repetito-dichotomis marginibus recurvis (conniventibus) subtus fuscis (nigrescentibus) fibrillis nigris subpannosis; apotheciis. . . . . *P. congruens*, Herb. Floerk., non Ach. (Kamtschatka, *Tilesius* in herb. Floerk.) On the earth, in sterile spots, on the Upper Missouri, near Fort Clark, and near Cannon-ball River, *Dr. F. V. Hayden*. On sand, Inscription Rock (U. S. Pacif. R. R. Survey), *Dr. Bigelow*, Herb. Torr. At the Black Water of the Platte, and the head of the Platte, Rocky Mountains, *Dr. H. Engelmann*. Near to *P. conspersa*, of which it might be taken for a state, differenced by its peculiar habitat; but unmistakably related also to *P. Camtschadalis*, Ach., which was founded on a specimen from Tilesius. Floerke appears to have been acquainted with the collections of the latter (as see Eschw. Bras. p. 202), but referred his specimen of the present Lichen to another species. The *P. congruens*, Ach. Lichenogr. p. 491, was founded on a specimen collected by Swartz, which the latter says (Lich. Amer. p. 5) inhabits trees in North America, and particularly New England. ("Incolit arbores Americæ borealis. In Nova Anglia observata." Sw. l. c.) Whatever this species may prove to be,—and it is now quite unknown to Lichenists,—it is enough to say that the



Lichen before us differs too much from the character of *P. congruens*, and the figure in Swartz's work, to be referred to it. Our plant has nothing of the look of a tree-lichen, and probably never inhabits trees; and there is little reason to suppose that it occurs in New England.

PHYSCIA, Nyl. — This genus, as limited by Dr. Nylander, includes, beside the sharply defined section of *Parmelia*, of the same name, of Fries, and the nearly akin group of Lichens represented by *P. parietina* (*Physcia*, Koerb. pr. p.), also the more receding, eveniform, subpendulous group (*Everniæ* sp., Fr.) represented here as yet only by *P. flavicans*. So far as this species is concerned, it appears far from difficult to connect it very closely with forms of *P. chrysophthalma*, and so with the genus. I propose here to review briefly all the North American Lichens known, referable to *Physcia*; and especially to consider what is probably the true rank of a number of species described by authors from North American specimens.

The genus, with us, falls into two great sections, separated by color, and also by the spores; and between these two, *P. euploca*, from Texas, appears to stand by itself. The first of these sections is made up of *P. parietina*, and the Lichens related to it, distinguished by the more or less yellow color of the thallus, and the colorless spores, in which the contained fluid matter, or protoplasm, separates finally into two opposite roundish masses, or sporoblasts, connected often by a narrow isthmus (*sporæ polari-dyblastæ*, Koerb. Syst. Lich. Germ. p. 90). From this group, *P. euploca* differs in its glaucous-fuscescent coloration, and simply once-septate spores, which are still colorless. And the large remaining section (*Physcia*, Fr.) is well defined by the glaucous-cinerascent (or at length fuscescent) thallus, and once-septate fuscescent spores.

§ I. *Species flavescentes sporis incoloribus polari-dyblastis.*

1. *P. CHRYSOPHTHALMA* (L.), DC., a. *Parmelia chrysophthalma*, Auct.; Moug. & Nestl. Cr. Vog. n. 254; Tuckerm. Lich. Exs. n. 80. On trunks and branches of trees, especially near the coast; and also rarely inland. North America, *Jacquin* (Collect. 1, p. 117, t. 4), 1786. *Hoffmann* (Pl. Lich. 2, p. 23, tab. 31, f. 1), 1794. Pennsylvania, *Muhlenberg*. New York, *Torrey*. New England to Annapolis, Maryland; and westward to Illinois, *Mr. Russell*, and Minnesota, *Mr. Lap- ham*. Thickets and bottoms of the Blanco, Texas, *Mr. Wright*.

Var.  $\beta$ . PUBERA, Wallr. Flecht. 2, p. 333; Nyl. Enum. Gen. in Act. Cherb., V. p. 106. *Borrera pubera*, Ach. Lichenogr. p. 502. On



smaller branches of trees, Texas, *Mr. Wright*. Monterey, California, *Dr. Gregg*. Delicately downy; the smallest states with the habit of the species, but more slender: the larger ones scarcely distinguishable from the next, which occurs pubescent according to Swartz (Wallr. l. c.) and Fries (Lichenogr. p. 28). Apothecia sparingly radiate-ciliate, or oftener entire.

Var.  $\gamma$ . FLAVICANS, Wallr. l. c.; Eschw. Bras. p. 224. *Parmelia* dein *Borrera*, Ach. *Physcia*, DC.; Nyl. Enum. Gen. l. c. On trees, South Carolina, *Mr. Ravenel*. Elongated, as the last, but smooth; pale yellow above; the branches compressed at the axils, and often channelled: apothecia with a thin, not ciliate, but obsoletely crenulate thalline margin, which at length disappears, when the disk (as in other species) appears to possess a thin, more or less evident proper margin. Louisiana, on trees, fertile, *Dr. Hale*. Wallroth (Naturgesch. der Flecht. 2, pp. 333 – 340) was perhaps the first to connect the above Lichens as forms of one species; but his view embraces plants removed even generically from the present type, and others of doubtful relation to it. Eschweiler follows Wallroth as respects his own Brazilian specimens, and also adopts the general view of the former. The rich collections of Mr. Wright, in Texas, where at least two of the forms occur, sufficiently show that the elongated Southern Lichens are inseparable from *P. chrysophthalma*, except as varieties. *Physcia exilis*, Michx. Fl. Bor. Amer. 2, p. 327 (*Borrera*, Ach.; *Parm. chrysophthalma*, c, Fr. Lichenogr. p. 75; *Physcia flavicans*, var. *exilis*, Nyl. l. c.) from trees in Carolina, (*Bosc, Michaux*), appears to be a smallish, slender, pallescent condition of the present variety. I have Louisiana specimens (*Dr. Hale*) which entirely resemble a South American Lichen referred to *P. exilis* in Herb. Berol. — *P. chrysophthalma* is perhaps (as suggested by Schærer, Spicil. p. 489, and by Eschweiler, l. c.) only *P. parietina*, *ascendent*, and at length *elongated*, analogous to the *ascendent* and *elongated* states of *P. speciosa*; and further attention may well be given to this point on our sea-coast, where the typical forms of both species grow copiously, and often together.

2. *P. PARIETINA* (L., Duf.), Nyl., *a*, Auct.; Tuckerm. Synops. Lich. N. E. p. 30, & Lich. Exs. n. 79. On trunks and stones near the sea, and also, more rarely, inland, New England. Bristol, Illinois, *Mr. Russell*.

Var.  $\beta$ . POLYCARPA (Ehrh.), Fr.: *microphyllina*, *suborbicularis*,



flava; lobis complicatis; apotheciis majusculis aurantiacis confertissimis. *Parm. parietina*, f. Fr. Lichenogr. p. 73, & Lich. Suec. n. 106; Schær. Spicil. p. 477; Koerb. S. L. Germ. p. 91. On trees. Arctic America (the specimens intensely colored, and approaching  $\delta$ ), *Richardson* (Hook. in Frankl. Narr. p. 760). New England, common on apple-trees, a conspicuous Lichen, which has passed here for var. *rutilans*, but differs in no respect from Fries's specimen above cited, except greater size. Ohio, *Lea*. Lake Superior, *Prof. Agassiz*. Wisconsin and Minnesota, *Mr. Lapham*. New Mexico (intensely colored, like  $\delta$ ), *Mr. Fendler*. California (on Live Oak), *Mr. Wright*. The apothecia in this are sometimes fibrillose beneath, as in the next.

Var.  $\gamma$ . *LYCHNEA*, Schær.: microphyllina, suborbicularis, fulva, lobis planis laciniatis apice palmato-incisis crenatis margine adscendentibus pulverulentis granulosus; apotheciis majusculis aurantiacis. On trees, Cambridge. On trees and stones, Ipswich, *Mr. Oakes*. The specimens on stones are regularly orbicular, substellate, of the common pale-yellow color of  $\alpha$ , and differing in the narrower, divided lobes, which considerably resemble those of var. *ectanea*, Ach., Schær. (Zw. Exs. n. 57), to which our plant might perhaps well be referred, notwithstanding that the margins are more ascendent, and much more granulate; but the latter passes into states which I cannot well distinguish from the present variety. This development is seen in the higher-colored tree-specimens, in which the erectish, densely-granulate margins of the pulvinate thallus give quite a crustaceous aspect to the Lichen, which resembles, often also in color, the var. *fulva*, Schær. Lich. Helv. n. 383, which is hardly other than a state of his var. *lychnea*, n. 549. A specimen from Bavaria (*Physcia controversa*, Massal., Koerb. Parerg. I. p. 38), which I owe to the kindness of Mr. Von Krempelhuber, is larger and better developed than my specimens of the Swiss Lichen; but the American surpasses even that as a well-marked form of *P. parietina*. The spores of our plant are entirely those of the species; varying in size, but often as large as in any form. The base of the apothecia is often fibrillose. On cedars, Inscription Rock (Pacif. R. R. Survey), *Dr. Bigelow*. Lobes flat, wide, but truncate, and irregularly heaped, the margins scarcely ascendant, and naked in the specimens. On charred wood, New Mexico, *Mr. Fendler*. With much the aspect of at least one of the specimens of Schær. Lich. Helv. n. 382 (*P. candelaris*), which I cannot but refer here; the learned author not distinguishing his var.



*lychnea* from his var. *candelaris*, at the date of the *Spicilegium*. Arctic America, *Richardson* (Herb. Hook.) ; approaching the next.

Var.  $\delta$ . LACINIOSA, Duf.: microphyllina, suborbicularis, lacero-dissecta, e flava aurantiaca ; laciniis planis adscendentibus nudis. *Parm. parietina*, e, Fr. *Lichenogr.* p. 73. Schær. *Spicil.* p. 477, & *Lich. Helv.* n. 381. Koerb. S. L. Germ. p. 91. On trees, New England, very common on the coast, the apothecia smallish and scattered ; and extending to Virginia. South Carolina, *Mr. Ravenel*. Alabama, *Mr. Peters*. Texas, *Mr. Wright*.

Var.  $\epsilon$ . RAMULOSA, Tuckerm.: microphyllina, e virescente flava ; lobis pumilis dispersis laxe decumbentibus semiteretibus dichotomoramulosis ; apotheciis concoloribus. Report on Lich. U. S. N. Pacif. Expl. Exp. ined. On bushes, Mare Island, California, *Mr. Wright*. The lobes pass in this curious variety into subterete branchlets. Spores as in the species.

Var.  $\zeta$ . FINMARKICA, Ach.: microphyllina, flavo-aurantiaca ; lobis erectis laceris lacunosis complicatis apice demum multifido-ramulosis. *Lecanora candelaria*, var. *Finmarkica*, Ach. Syn. p. 192. *P. parietina*, var. *pygmæa*, Fr. *Lichenogr.* p. 73 ; Moug. & Nestl. Cr. Vog. n. 743, d. Rocks, Behring's Straits, *Mr. Wright*. An extreme form, referred to *Borrera*, according to Fries, l. c., by Bory.

3. P. CANDELARIA (Ach.), Nyl. Prodr. Gall. p. 60. *Lecanora*, Ach. *Lichenogr.* p. 416, a ; Syn. p. 192, a. Moug. & Nestl. Cr. Vog. n. 743, a. *Parmelia parietina*, i. concolor, Fr. *Lichenogr.* p. 73 ; Tuckerm. Synops. Lich. N. E. &c., p. 31. *P. parietina*,  $\epsilon$ . *candelaris*, Schær. *Spicil.* p. 477, & *Lich. Helv.* n. 382, pr. p. *Candelaria vulgaris*, Massal., Koerb. S. L. G. p. 120. On trees. Arctic America, *Richardson* (Hook. in Frankl. Narr. p. 760). Pennsylvania, Muhl. Catal. New York, *Halsey*. New England. Ohio (infertile), *Dr. Hayden*. Louisiana (infertile), *Dr. Hale*. Thallus spreading irregularly, greenish-yellow ; the crowded, minute, dissected squamules powdery at the margin, and often passing into a subgranulose crust ; apothecia smallish, of the same color. Spores smaller than those of the preceding species, and the spore-sacs always containing many (20) instead of eight spores, as in that. Distinguishable from the small-lobed varieties of *P. parietina*, but the important character of the Lichen is the microscopical one of polysporous spore-sacs ; the value of which, in the system, has probably been over-estimated by those writers who have sought to found a generical distinction upon it.



Var. STELLATA, Nyl.: thallo orbiculari stellato viridi-flavo; laciniis planis ambitu multifidis demum subconnatis; apotheciis saturate flavis rufescentibus margine thallino integro demum plicato subtus radiato-fibrillosis. Sporæ minutæ, ellipsoideæ, incolores, "polari-dyblastæ," plures (c. 20) in thecis. *P. candelaria*, v. *stellata*, Nyl. Enum. Gen. l. c. p. 106. *Parmelia diversicolor*, Ach. Syn. p. 210, pro p. *P. (Physcia) fibrosa*, Fr. Pl. Homon. p. 284; Lichenogr. p. 75. *P. fibrosa*  $\beta$ . *stellata*, Tuckerm. in Darl. Fl. Cestr. p. 440, & Lich. Exs. n. 88. On trees and rocks. Pennsylvania, *Muhlenberg*, 1796 (e Hoffm. D. Fl. 2, p. 159). New England, common. New York, *Dr. Sartwell*. Ohio, *Dr. Hayden*. North Carolina, *Dr. Curtis*. South Carolina, *Mr. Ravenel*. Alabama, *Mr. Peters*. Louisiana, *Dr. Hale*. Texas, *Mr. Wright*. The relation of this Lichen to *Physcia* was pointed out by Fries, l. c.; but its full determination, as a stellate, foliaceous form of the European *Parmelia candelaria*,  $\alpha$ , of Acharius, was left for the microscope, in the able hands of Dr. Nylander. The presence of fibres on the under side of the thalline exciple is a far less uncommon feature in American Lichens than it is in European.

§ II. *Species thallo glauco-fuscescente; sporis hyalinis uniseptatis.*

4. *P. EUPLOCA*, Tuckerm.: thallo suborbiculari molliusculo fragili glabro e laciniis tereti-compressis dichotomo-ramosissimis apice furcatis implexis appressis glauco-fuscescentibus subtus albidis nudis; apotheciis sessilibus disco fuscescente demum convexo marginemque crassiusculum subcrenulatum excludente. Sporæ suboctonæ in thecis, parvulæ, oblongæ, incolores, uniseptatæ, diam.  $3 - 3\frac{1}{2}$ -plo longiores. Tuckerm. Suppl. in Amer. Journ. Sci. 25, p. 424. Rocks on the banks of creeks in the hills of the Blanco, Texas, *Mr. Wright*. An elegant species without near affinity, that I can trace, to any other.

§ III. *Species thallo glaucescente (fuscescente); sporis fuscescentibus uniseptatis.*

5. *P. ERINACEA*, Ach. Lichenogr. p. 599; Syn. p. 222. On trees, California, *Menzies*. Sea-coast of California, *Dr. Parry* (Herb. Torr.). The entire thalline margin of the apothecia appears to distinguish this Lichen, which, in the thallus, resembles the next species, and also some forms of *P. speciosa*.

6. *P. CILIARIS* (L.) DC. var. *ANGUSTATA*, Tuckerm. Synops. p. 32.



*Borrera angustata*, Bory in Herb. Berol. *B. Boryi*, Willd. in Feé, Ess. p. 96, tab. 2, fig. 23, e Fr. Lichenogr. p. 76. *Physcia solenaria*, Dub. Bot. Gall. II. p. 612, non *Borr. solenaria*, Ach. *P. ciliaris*, v. *solenaria*, Auctt. On the earth and upon rocks. Arctic America (*B. ciliaris*), *Richardson* (Frankl. Narr. p. 761). Newfoundland, Bory in Herb. Berol. Rocky Mountains, fertile, Herb. Hook. Shores of Lake Superior, fertile, *Mr. C. G. Loring, jun.* Shores of Willoughby Lake, Vermont, *Mr. Frost*. Does not appear to differ from a Corsican specimen of *P. solenaria*, Dub., from Von Krempelhuber, which is infertile, but with yellowish "cephalodia"; but the cited name, which was given to a different Lichen by Acharius, is hardly to be preferred to that of Bory. Apothecia similar to those of the species, but smaller; the disk black, with a white bloom; the erect margin torn, or at length radiate-fimbriate; spores (of the species) large, olivaceous-fuscous, obliquely ellipsoid, once-septate, about thrice longer than wide. The Lichen is among our rarest.

7. *P. AQUILA* (Ach.), Nyl. var. *DETONSA*: e glauco fuscescens; laciniis elongatis subplanis margine coralloideo-subfimbriatis. *Parmelia detonsa*, Fr. Pl. Homon. p. 284; Tuckerm. Synops. Lich. N. E. p. 32, & Lich. Exs. n. 18. Trees and rocks. Pennsylvania (*P. aquila*), Muhl. Catal. New England to Virginia, common in woods. Ohio, *Mr. Lea*. North Carolina, *Rev. Dr. Curtis*. South Carolina and Georgia, *Mr. Ravenel*. Alabama, *Mr. Beaumont*. Mississippi, *Dr. Veitch*. Louisiana, *Dr. Hale*. Much as extreme forms of our Lichen differ from common European states of the species, it is difficult to separate it, even as a variety. I find no difference in the spores. Mr. Wright collected the same plant in Japan. (U. S. N. Pacif. Expl. Exp.) The species appears to be in intimate relations with *P. ciliaris*, and is also near to narrow states of the next species, with which Dr. Nylander (Prodr. Gall. p. 63) compares the American Lichen.

8. *P. PULVERULENTA* (Schreb.), Nyl. *Parmelia* (*Physcia*) *pulverulenta*, Fr. Lichenogr. p. 79, a, thalli laciniis appressis margine nudis, Fr. l. c. *P. pulverulenta*, a, Tuckerm. Synops. p. 32. *Parm. pulverulenta*, *venusta*, & *muscigena*, Ach. On trunks and rocks, and on the earth, upon mosses. Pennsylvania, *Muhlenberg*. Arctic America (*P. muscigena*), *Richardson*. New England, common on trunks of Elm, and other trees. New York, passing into narrow states resembling the last, *Dr. Sartwell*. Nebraska, on the earth, a fragment, *Dr. Hayden*.



Var.  $\beta$ . PITYREA, Fr., thalli (magis cinereo-virentis) laciniis adscendentibus subtus fibrillosis margine pulverulentis. Fr. l. c. & Lich. Suec. n. 105. *Lichen*, dein *Parmelia pityrea*, Ach.; Moug. & Nestl. Cr. Vog. n. 352. *P. pulverulenta*, v. *grisea*, Schær. Spicil. p. 446, & Lich. Helv. n. 487. *Lichen leucoleiptes*, Muhl. in Herb. Willd. *P. pulverulenta*, v. *leucoleiptes*, Tuckerm. Synops. Lich. N. E. p. 32, & Lich. Exs. n. 107. On rocks and trees. Pennsylvania, *Muhlenberg*. New England to Virginia, common. Texas, *Mr. Wright*. Mountains of New Mexico, *Mr. Fendler*. Lobes often wider than those of  $\alpha$ , and rock-specimens of the present contrast strongly with tree-specimens of the former. The present is analogous to, and often much resembles *P. speciosa*  $\beta$ . (*Parm. granulifera*, Ach., in the state with the margins of the lobes raised and powdery), but the two Lichens are distinguishable, and appear to represent different types; this presenting the strongly black-fibrillose underside of *P. pulverulenta*.

9. *P. SPECIOSA* (Wulf., Fr.): thallo cartilagineo-membranaceo vire-scenti-glaucos subtus molliusculo e lacteo fuscescente; laciniis obtusis multifidis subciliatis; apotheciis subpodicellatis disco rufo-fusco nigricante margine thallino incurvo mox crenato-fimbriato. Sporæ octonæ, majusculæ, fuscescentes, ellipsoideæ, uniseptatæ, diam. 2–3-plo longioris.

Var.  $\alpha$ . STELLATA: laciniis appressis subelongatis inciso-ramosis pinatifidis margine adscendentibus epruinosis subtus nisi apice epulverulentis; apotheciis subsessilibus mox nudis. *Lichen speciosus*, Wulf. in Jacq. Coll. III. p. 119, t. 7. *Parmelia*, Ach. Lichenogr. p. 480; Syn. p. 211; Fr. Lichenogr. p. 80,  $\alpha$ ; Moug. & Nestl. Cr. Vog. n. 635; Schær. Spicil. p. 447, & Lich. Helv. n. 357; Tuckerm. Synops. Lich. N. E. p. 33, & Lich. Exs. n. 81; Nyl. Prodr. Gall. l. c. p. 61. On trunks and mossy rocks in woods. Pennsylvania, *Muhlenberg*, 1796 (Hoffm. D. Fl. II. 153). New England to Virginia, common in the mountains, but somewhat rarely fertile; the ascendent margins of the lobes often powdery, or passing, on rocks, at the centre, into a thick powdery crust. Lake Superior, *Prof. Agassiz*. Wisconsin, *Mr. Lapham*. North Carolina, infertile, *Rev. Dr. Curtis*. South Carolina, in the upper country, infertile, *Mr. Ravenel*. Alabama, infertile, *Mr. Beaumont*. Louisiana, *Dr. Hale*.

Var.  $\beta$ . GRANULIFERA: stellata, appressa; laciniis subplanis irregulariter laciniatis dentato-crenatis (subpruinosis) granulis globosis niveis aspersis margine demum adscendentibus subtus glabris e fusco nigri-



cantibus ; apotheciis subsessilibus disco subnudo margine thallino crenulato mox pulverulento. Sporæ speciei. *Parmelia granulifera*, Ach. Syn. p. 212. On trunks and rocks. Pennsylvania, fertile, *Muhlenberg*. Frederick County, Maryland, infertile. South Carolina, in the low country, abundantly fertile, *Mr. Ravenel*. Louisiana, fertile, *Dr. Hale*. Texas, fertile, *Mr. Wright*. I have specimens compared by me with one from Muhlenberg (from whom Acharius had the Lichen) in Herb. Willd. It is a Southern form, and occurs, covered with apothecia, on the low islands of the coast of South Carolina, while the typical form prefers the mountains, southward, and is rarely fertile. The original plant of Acharius is distinguished by its flatter, less divided lobules, the margins of which are not raised, powdery, or ciliate. A state of this evidently recedes towards *P. stellaris*, with which species it also agrees in its nearly entire, glaucous-pruinose apothecia. But the Lichen varies into a form (exactly *P. granulifera*, Meissn., from Brazil, in Herb. Kunz.) well represented by the Carolina Lichen, which only differs from the type in its shorter, wider, less discrete, and less divided lobes, with margins somewhat minutely notched and powdery ; and in its entirely smooth, and at length nigrescent underside. A similar Lichen, also blackish beneath, occurs in Venezuela (*Mr. Fendler*), in which the raised margins of the lobes and the whole centre of the specimen is densely *isidioid*-efflorescent. And Mr. Wright found specimens, growing with *P. appplanata*, on maritime rocks in Japan (U. S. N. Pacif. Expl. Exp.), which are colored similarly to the last, and appear fully to belong here, but are besprinkled with regular and rounded soredia.

Var.  $\gamma$ . HYPOLEUCA, Ach. : stellata, glabra, nuda, appressa ; laciniis planis multifidis subtus mollibus subpulverulentis ; apotheciis subsessilibus maximis nudis, margine crenato-folioloso. Sporæ speciei. *Parmelia speciosa*, v. *hypoleuca*, Ach. Syn. p. 211. *P. hypoleuca*, Muhl. Catal. p. 105 ; Tuckerm. Synops. p. 33, & Lich. exs. n. 108. Montag. & V. d. Bosch. Lich. Jav. p. 21. On trunks. Pennsylvania, *Muhlenberg*. New England to Virginia, not common, and abundantly fertile. New York, *Dr. Sartwell*. Ohio (a state with erect lobules), *Dr. Hayden*. Texas, both the state above described, which is only sparsely fibrillose beneath at the margins ; and another, inseparable, which is without pulverulence and rather thickly fuscous-fibrillose on the under side ; *Mr. Wright*. The largest and handsomest state of the species



with us, and always distinguishable by its entirely smooth, scarcely notched, often subconnate lobules, which are more or less powdery-tomentose beneath. The Lichen also recedes towards *P. stellaris*, but approaches it less nearly than a similar state of the last variety. The Java Lichen, for which I am indebted to Dr. Van den Bosch, does not appear to differ from ours.

Var.  $\delta$ . *PODOCARPA*: stellata, glabra; laciniis plano-convexis multifidis lobulis simpliciusculis subadscendentibus subtus pulverulento-tomentosis margine villosa-fibrillosis; apotheciis elevato-podicellatis pruinosis margine crenato-lobulato. Sporæ speciei. *Parmelia podocarpa*, Bel. Voy. Ind. Or. II. pag. 122, cit. Montag. & V. d. Bosch. Lich. Jav. p. 21. *P. leucomela*, v. *podocarpa*, Nyl. Enum. Gen. l. c. p. 106. On branches of trees in thick woods, Cuba, *Mr. Wright*. But the Lichen is only an intermediate state between the appressed conditions of the present species, and the immediately following erectish state, into both of which it distinctly passes, both in Cuba and in Louisiana (*Dr. Hale*).

Var.  $\epsilon$ . *GALACTOPHYLLA*, Tuckerm.: adscendens, glabra; lobis abbreviatis superne dilatatis repandis subtus pulverulento-tomentosis margine villosa-fibrillosis; apotheciis oblique subpodicellatis pruinosis margine crenulato-sublobatis. Sporæ speciei. *Parmelia involucrata*, Mey. in Spreng. Syst. Veg. Cur. Post. p. 328, e descr. *P. comosa*, Eschw. Bras. p. 199; Nyl. Enum. Gen. l. c. p. 106. *P. echinata*, Tayl. in Hook. Journ. Bot. 6, p. 166, e Nyl. Lich. Exot. *P. ciliaris*, var. *galactophylla*, Tuckerm. Synops. p. 32. *P. speciosa*, var. *galactophylla*, Ejusd. Lich. Exs. n. 82. *Parmelia galactophylla*, Willd. Herb. On trees, very rare northward, and less fibrillose, when it does not appear to differ from the widest states of *P. leucomela*, var. *latifolia*, Flot. & Mey. (Herb. Kunze. Herb. Berol.), and is sometimes (*P. erinacea*, Hamp. in Herb. Kunze, from Peru) almost undistinguishable from European states of *P. ciliaris*; — but southward becoming common and densely fibrillose, the fibres at length covering every part of the surface, as in the state described by Eschweiler. Maine, infertile, *Mr. Oakes*. Cambridge, Massachusetts, on Red Cedar, infertile, very rare. Hingham, on Red Cedar, infertile, *Mr. Russell*. Pennsylvania, *Muhlenberg*, fertile, 1796 (Hoffm. D. Fl. II. p. 144, where it is cited under *P. ciliaris*, under which species Floerke also placed the Lichen, with a mark of doubt, in his herbarium, Herb. Berol.). Ohio, on Red Cedars, fertile, *Mr. Lea*. Mountains of Virginia, *B. D. Greene, Esq.* North



Carolina, *Rev. Dr. Curtis*. South Carolina, *Mr. Ravenel*. Alabama, *Mr. Peters*. Mississippi, *Dr. Veitch*. Louisiana, *Dr. Hale*. Texas, *Mr. Wright*. At first sub-stellate, and scarcely dilated, when the fertile specimens only differ from the last variety so far as the apothecia are less strikingly pedicellate; and the infertile ones from substellate less canaliculate specimens of the next, in nothing but the elongation which is so characteristic a tendency in the latter:—but the short, dilated, erectish lobes of the fully developed and fertile Lichen, and its peculiarly conspicuous, milk-white under-side (which furnishes a more constant distinction than that indicated by the name adopted by Eschweiler), are sufficiently striking. Cuban specimens of the present variety are often more or less suffused, especially at the tips of the lobes, and the margins of the apothecia, with a (sometimes intense) brick-red color; this occurs equally in the preceding variety, and according to Montagne and Van den Bosch (*Lich. Jav.* p. 22), who consider it adventitious, was regarded as characteristic of his *P. podocarpa* by Belanger. I observe the same in Cuban specimens of the typical form.

Var. ζ. *LEUCOMELA*, Eschw.: adscendens, glabra, e substellata mox diffusa, elongata; laciniis attenuatis ciliato-fibrillosis subtus pulverulentotomentosis; apotheciis subpodicellatis pruinosis margine demum radiatolobatis. Sporæ speciei. *Lichen leucomelas*, L., Sw. Obs. Bot. tab. 11, f. 3. *Physcia*, Michx. Fl. Bor. Am. 2, p. 326; Dub. Bot. Gall. 2, p. 612; Nyl. Enum. Gen. l. c. p. 106. *Parmelia*, Ach. Meth. p. 256; Fr. Lichenogr. p. 76; Montag. Crypt. Canar. l. c. p. 111. *Borrera*, Ach. Lichenogr. p. 499; & Syn. p. 222. *Parmelia speciosa*, b. Fr. Lichenogr. p. 80; Moug. & Nestl. Crypt. Vog. n. 941. *P. speciosa*, var. *leucomelas*, Eschw. Bras. l. c. p. 198. *Lichen comosus*, Bory, Voy. cit. Ach. On trees, and probably also, as in Cuba, on rocks. Trees, Grandfather Mountain, North Carolina, the specimen belonging to the wider states, *Michaux*. On Red Cedars, infertile, Ohio, *Mr. Lea*. On trees in the mountains of Virginia, *Rev. Dr. Curtis*; and of Carolina, *Mr. Ravenel*. Florida, Herb. *Russell*. Texas, *Dr. Parry*. The Ohio specimens were found growing with those of the last variety, which looks like the fertile state of the same lichen; nor is it possible to distinguish narrow-lobed specimens of that from others of the present variety except by the difference of size, and especially of elongation. Excluding from this the short, wide-lobed South American forms (*P. leucomela*, var. *latifolia*, Mey. & Flot. pr. p.), which, as already re-



marked, are inseparable from states of the last, we appear to have in the Lichen now under consideration — which passes, without any break in the connection, from the substellate and nearly horizontal form of the middle of Europe (Moug. & Nestl. Cr. Vog. n. 941, with which the Ohio, and most of the other North American specimens accord) to the much elongated, almost filamentous, loosely decumbent states of the tropics (*P. leucomela*, var. *angustifolia*, Mey. & Flot.) — the extremest atypical development of our species in a centrifugal direction, as, in the nearly erect variety *galactophylla*, in a centripetal. Professor Fries first observed that this species passed into several varieties (“vario modo mutatur,” Lichenogr. l. c.) in America; and did not hesitate also to refer here the *P. leucomela* of Middle and Western Europe, though he retained, as specifically distinct, the narrower, subtropical form. And I owe to him the suggestion that *P. comosa*, Eschw., should be placed here, rather than under *P. ciliaris*. But this last-named species appears itself almost too near to states of *P. speciosa* already cited; — differing, however, to a degree in color, and receding rather towards *P. aquila*.

10. *P. LEANA*, Tuckerm. in litt. *Parmelia* (*Physcia*) *Leana*, Tuck. in Lea, Catal. Pl. Cincinn. p. 45. On trees. Ohio, Mr. Lea. Thallus thin and brittle, naked and smooth on both sides; the somewhat ascendent, loosely imbricated lobes multifid, much as in common states of the last species, with flat, nearly entire lobules, which are glaucous-fuscescent above (reminding in this respect of pale states of *P. obscura*) and pale beneath, where occur a few scattered fibres at the margins of the same color. The apothecia are smallish (compared with those of the last species), subsessile, and entire. The spores are smaller, narrower, and more acute. The Lichen appears to partake at once of the characters of *P. speciosa* and *P. obscura*, but I cannot refer it to either. Rocks and trees, Burlington, Vermont, with marginate soredia, Mr. Russell; who compares the Lichen with *P. speciosa*; to which Professor Fries considered the Ohio Lichen as approaching nearest. Rocks in the White Mountains, Mr. Oakes; similar to the last. Trees, Texas, Mr. Wright, a smaller-lobed state, like the last two, growing with *P. obscura*; which is distinguishable at once, by its black and densely black-fibrillose under-side. These latter states, which generally agree with the described plant, appear to approach *P. obscura*, much as that does *P. speciosa*.



11. *P. STELLARIS* (L.) : thallo subcartilagineo glaucescente epruinoso subtus glabro e pallido nigricante fibrilloso ; laciniis multifidis ; apotheciis sessilibus, margine tumidulo subintegro, disco fusco-atro subpruinoso. Fr. Lichenogr. p. 82, paucis mutatis. Sporæ octonæ, ellipsoideæ, fuscæ, uniseptatæ.

Var. *a.* *AIPOLIA*, Schær. : stellata, nuda, glabra ; laciniis convexiusculis subtus pallidis. *Lichen stellaris*, L. pro parte. *Parmelia*, Ach. ; Fr. Lichenogr. l. c., *a* ; Moug. & Nestl. Cr. Vog. n. 163 ; Schær. Spicil. p. 438, & Lich. Helv. n. 350, 351 ; Tuckerm. Synops. Lich. N. E. p. 33, & Lich. exs. n. 83 ; Nyl. Prodr. Gall. p. 61. On trees, dead wood, and rocks. Pennsylvania, *Muhlenberg*. New York, *Torrey*. Arctic America, *Richardson*. New England, exceedingly common, in forms with the lobes subconnate (*P. aipolia*, Ach.), and more distinct (*P. aipolia*, v. *anthelina*, Ach.), and a slender rock-form diverging yet farther (*P. phæa*, Tuckerm. in Darlingt. Fl. Cestr. p. 440) and continuing common southward to Virginia. North Carolina, *Rev. Dr. Curtis*. South Carolina, *Mr. Ravenel*. Alabama, *Mr. Peters*. Louisiana, *Dr. Hale*. Texas, *Mr. Wright*. New Mexico, *Mr. Fendler*. All the specimens from Carolina southward show a tendency to pass into smaller, narrower states, which appear to be inseparable, specifically, from the next.

Var. *β.* *ASTROIDEA* : stellata, nuda, glabra, microphylla ; laciniis planis mox sorediatis subtus e pallido demum nigris. *P. astroidea*, Clem. Ens. Add. p. 302, cit. Ach. ; Fr. Lichenogr. p. 81 ; Tuckerm. Enum. Lich. N. Amer. p. 50 ; Nyl. Prodr. Gall. p. 62. *P. Caricæ*, Clem. l. c. *Lecanora*, Ach. Syn. p. 188. *P. Clementiana*, Ach. Lichenogr. p. 483 ; Syn. p. 201 ; Moug. & Nestl. Cr. Vog. n. 737. *P. Clementi*, Turn. in Linn. Trans. IX. p. 140, tab. 13, fig. 1. *P. sideralis*, Ach. Syn. p. 207. *P. obsessa*, Ach. Syn. p. 213 ; Montag. Cuba, p. 227. *P. astroidea*, var. *obsessa*, Nyl. Lich. Exot. l. c. p. 255. On trees, New England to Virginia, becoming more common southward. Pennsylvania (*Parm. obsessa*), *Muhlenberg*. North Carolina, *Rev. Dr. Curtis*. South Carolina, *Mr. Ravenel*. Alabama, *Mr. Peters*. Louisiana, *Dr. Hale*. Texas, *Mr. Wright* ; who has also collected the same plant in the Loo Choo Islands (U. S. N. Pacif. Expl. Exp.) and in Japan ; the latter only differing from the type in its rounded soredia ; also in Cuba and Nicaragua. The North American Lichen referred here occurs in forms which I cannot distinguish from normal Portuguese specimens



of *P. astroidea*, and in others which pass imperceptibly into *P. stellaris*. These conclusions are results of much, oft-repeated study of large collections of specimens, in numerous states of development and degeneration. The smooth, normal Lichen, as it occurs in Texas and Cuba, may be referred, with equal right, to *P. astroidea* or *P. stellaris*. And the more northern, sorediate form (*P. obsessa*, Ach.) only differs from sorediate European states in the greater size and regularity both of the thallus and the soredia. But in tropical America, our plant departs much farther from its type, acquiring not merely a greater smoothness and elegance, but becoming entirely black beneath (*P. obsessa*, Montag. Cuba, l. c.), a condition which now resembles, in general habit, the present variety; is now larger, on rocks, with the aspect of *P. stellaris*; and finally, occurs on trees, with all the characters, except the color of the under side, of *P. Domingensis*, Montag. Acharius describes his *P. obsessa* as black beneath, while I have always found the northern form, here referred to his species, pale on the under side; but there is no reliance to be placed upon this character in the specimens from Cuba and Nicaragua, which occur, entirely similar above, but now black and now pale-fuscous beneath, and varying in the same manner in the color of the little ring of fibres which often surrounds the base of the thalline exciple.

Var.  $\gamma$ . DOMINGENSIS: stellata, nuda, platyphylla; laciniis planis margine sæpius pulverulentis subtus pallidis. *Parmelia* (*Physcia*) *Domingensis*, Montag. Cuba, p. 225; Nyl. Enum. Gen. l. c. p. 106. On trees. Seaboard of South Carolina, Mr. Ravenel. Key West, Florida, Dr. Blodgett. Louisiana, Dr. Hale. Bottoms of the Blanco, Texas, Mr. Wright. Passes into the last variety, in Cuba; and an entirely smooth state, from the Bonin Islands, near Japan (U. S. N. Pacif. Expl. Exp. Mr. Wright), exhibits at once the larger and wider lobes of the present, and the smaller and more divided ones of var. *astroidea*. But the American Lichen is almost always and elegantly characterized by its powdery margins. The plant also approaches *P. speciosa*, var. *granulifera* (*P. granulifera*, Ach. Syn.), especially that state with powdery margins (*P. granulifera*, Meissn. in Hb. Kunz.), but is always, so far as my specimens go, distinguishable from that, by a certain divergence of habit, resulting in part from a different lobation; the wider and always flat divisions of *P. Domingensis*, Montag., with their regular palmate summits and slightly notched lobules, contrasting with



the more irregular laciniation, and the rather convex and strongly toothed lobes, of *P. granulifera*; which, in the state here referred to, may be *P. Domingensis*, Ach.; a distinct Lichen, according to Dr. Nylander (l. c.) from that so named by Montagne.

Var.  $\delta$ . (TRIBACIA) Fr.: subadscendens, microphylla; laciniis planis margine eroso-granulosis in crustam dein granulosis conglobatis. *Parmelia stellaris*, c., Fr. Lichenogr. p. 83; Tuckerm. Synops. Lich. N. E. p. 34, & Lich. exs. n. 85. *Lecanora tribacia*, Ach. Syn. p. 191, pr. p. On trees, very common, from New England to Virginia. South Carolina, Mr. Ravenel. Louisiana, Dr. Hale.

Var.  $\epsilon$ . HISPIDA, Fr.: adscendens; laciniis subabbreviatis hispidofibrillosis apice tubuloso-inflatis. *Lichen hispidus*, Auct. e Fr. *Lobaria*, Hoffm. D. Fl. 2, p. 151. *Parmelia stellaris*, b. *hispidus*, Fr. Lichenogr. p. 82; Tuckerm. Synops. Lich. N. E. p. 34, & Lich. Exs. n. 84. *Lichen tenellus*, Scop. Carn. p. 1406. *Parmelia*, dein *Borrera*, Ach. Syn. p. 221; Moug. & Nestl. Cr. Vog. n. 450. *Physcia*, DC. Fl. Fr. 2, p. 396. *Parm. stellaris*, v. *tenella*, Schær. Spicil. p. 439, & Lich. Helv. n. 352, 562. Trees and rocks. Arctic America, Richardson (Hook. in Frankl. Narr. App. p. 761). New England, not uncommon. Analogous to *P. speciosa*,  $\epsilon$ . *galactophylla* (*P. comosa*, Eschw.).

12. *P. CÆSIA* (Hoffm.), Nyl. Prodr. Gall. p. 62. *Parmelia*, Ach. Lichenogr. p. 479; Syn. p. 216; Fr. Lichenogr. p. 83. *P. pulchella*, Schær. Spicil. p. 437.

Var.  $\alpha$ . (STELLATA) Fr., Tuckerm. Lich. Amer. Exs. n. 86. On stones and dead wood. Pennsylvania, Muhlenberg. New York, Halsey. New England, not very uncommon.

Var.  $\beta$ . TRIBACIA, Fr.: subadscendens, microphylla; laciniis convexiusculis margine demum eroso-granulosis conglobatis. *Parmelia cæsia*, c, Fr. Lichenogr. p. 84. *Lecanora tribacia*, Ach. Syn. p. 191, pro *Parmelia*, Sommerf. Lapp. p. 109. On rocks, New England; very like *P. stellaris*,  $\delta$ , but differing in the convexity of its somewhat pinatifid, ash-colored lobules.

Var.  $\gamma$ . TENELLA, Fr.: adscendens; laciniis hispidofibrillosis. *P. cæsia*, b. *tenella*, Fr. Lichenogr. p. 84. *Parmelia leptalea*, Ach. Meth. p. 198. *Physcia*, DC. Fl. Fr. 2, p. 395. *Borrera tenella*,  $\beta$ . *leptalea*, Ach. Lichenogr. p. 498; Syn. p. 221. On rocks and dead wood. New England? Differs but little from *P. stellaris*,  $\epsilon$ , but the same form has indubitably been traced back (Fr. l. c.) to both species. *P. cæsia* is a



northern Lichen, near to the last species, but occurring here in the same distinctness as in Europe; nor have I observed any intermediate states. It is, however, by no means as common with us as the last. There are some respects in which one might consider it as bearing possibly the same relation to *P. stellaris* that *P. ciliaris* bears to *P. speciosa sensu latiori*.

13. *P. APPLANATA* (Fée), Nyl. Enum. Gen. l. c. p. 107. *Parmelia applanata*, Fée Ess. p. 126, tab. 32, fig. 2, & Suppl. p. 123, tab. 42, n. 18; Montag. Cuba, p. 223, tab. 8, fig. 1. *P. plumosa*, Tayl. in Hook. Lond. Journ. Bot. 6, p. 173, e descr. On trees. Seaboard of South Carolina, *Mr. Ravenel*; of Florida, Herb. Gray; and of Alabama, Herb. Sartwell. Louisiana, *Dr. Hale*. Texas, in the valleys of the Blanco, and the Rio Grande, *Mr. Wright*. Thallus thickish, softish, stuppeous-membranaceous, closely agglutinate-appressed, from greenish at length white-glaucous; beneath scarcely fibrillose, becoming black; lobes confluent, crustaceous-concrete at the centre, radiant and somewhat pinnate-plicate at the circumference; besprinkled at length with rounded soredia; apothecia scattered, a thin, entire thalline margin bordering an at length convex, violet, naked disk, which becomes black, and rests on a black hypothecium. Spores narrow-ellipsoid, scarcely a little curved, fuscous, the length about thrice exceeding the width. I possess the same Lichen, a strongly marked and distinct type, but connected with Northern types through the next, from many parts of the warmer regions of the earth, and also from Japan (U. S. N. Pacif. Expl. Exp.), *Mr. Wright*.

14. *P. OBSCURA* (Ehrh.), Nyl. *Lichen obscurus*, Ehrh. Pl. Cr. dec. 18, n. 177, cit. Ach. *Parmelia (Physcia)*, Fr. Lichenogr. p. 84; Schær. Spicil. p. 441, & Lich. Helv. n. 353-4-5. *Physcia*, Nyl. Prodr. Gall. p. 63, & Lich. Par. n. 34. *Parm. cycloselis, chloantha, & ulothrix*, Ach. Syn.

Var. *a. CILIATA*: adpressa, substellata, livido-fuscescens; lobis planis linearibus subdigitato-multifidis subciliatis subtus nigrescentibus nigro-fibrillosis (pannosis); apotheciis subtus fibrillosis. *Lichen obscurus*, Ehrh. l. c. *L. ciliatus*, Hoffm. Enum. Lich. p. 69, tab. 14, fig. 1. *Lobarina*, Hoffm. D. Fl. 2, p. 155. *Lichen ulothrix*, Ach. Prodr. p. 113. *Parmelia*, Ach. Meth. p. 200; Lichenogr. p. 481; Syn. p. 217. *P. obscura*,  $\beta$ . *ulothrix*, Fr. Lichenogr. p. 85. Tuckerm. Synops. p. 34, & Lich. Exs. n. 87. *P. obscura*, var. *ciliata*, Schær. Spicil. p. 442. On



trees, dead wood, and rocks. Pennsylvania, *Muhlenberg*. Arctic America (*P. cycloselis*), *Richardson* (Hook. in Frankl. Narr. p. 761). New York, *Halsey*. New England to Virginia, common. Ohio, *Mr. Lea*. Wisconsin, *Mr. Lapham*. North Carolina, *Rev. Dr. Curtis*. South Carolina, *Mr. Ravenel*. Mississippi, *Dr. Veitch*. Louisiana, *Dr. Hale*. Texas, *Mr. Wright*. Very variable. *P. ulothrix*, Ach. is perhaps the most perfect condition of the Lichen, which hardly occurs here without more or less ciliate apothecia, while the ciliation of the lobes appears to be unreliable as a distinction. The present variety includes all our most perfect states of the species, and I have equally fine specimens of the same variety, from Sweden (*Mr. Torssell*), and the finest possible, in all respects, from Japan (U. S. N. Pacif. Expl. Exp.), *Mr. Wright*: but in the South of Europe the Lichen appears to degenerate, and Schærer distinguishes (Spicil. l. c.) the present from *P. cycloselis*, Ach., "omnium partium minutie." I have collected in New England and New York a large, glaucescent state of this (as I confidently consider it), with proportionately wider lobes, densely pannose-fibrillose beneath, and the black, tomentose hairs showing also at the margins, — which may well be *Parmelia setosa*, Ach. Syn. p. 203. There is also, in our mountains, a greenish-glaucous state, with largish, bright-chestnut apothecia (commonly ciliate at the base) which might be passed by for *Parmelia tiliacea*. The following varieties are still more remarkable.

Var.  $\beta$ . ERYTHROCARDIA: strato medullari aurantiaco-rubro. *Parmelia stuppea*, Tayl. in Hook. Lond. Journ. Bot. 6, p. 175. *P. endococcina*, Koerb. Parerg. Lich. 1, p. 36, e descr. On trees. California, *Beechey*, Herb. Hook. (Taylor, l. c.). New England, common, and with the lobes and apothecia of the type. Mountains of Georgia, *Mr. Ravenel*; less ciliate, and the apothecia scarcely so. Does not appear to differ from the type, except in the internal color. Dr. Koerber's Lichen, from the Tyrol, can scarcely differ from ours.

Var.  $\gamma$ . ADGLUTINATA, Schær.: arcte adnata, membranacea, glaucofuscenscens; lobis demum confluentibus margine plicatis apicibus nigrescentibus subtus pallidis. *Parmelia adglutinata*, Floerk. D. L. 4, p. 7; Moug. & Nestl. Cr. Vog. n. 543. *P. obscura*, v. *adglutinata*, Schær. Spicil. p. 442; Nyl. (sub *Physcia*) Prodr. Gall. p. 63; Lich. Par. n. 33. On trees (Hickory, Red Cedar, &c.), Massachusetts. Pennsylvania, *Dr. Michener*. North Carolina, *Rev. Dr. Curtis*. South Carolina, *Mr. Ravenel*. Louisiana, *Dr. Hale*. Texas, *Mr. Wright*.



Appears to be inseparable from the species, and equally so from the European variety (the Louisiana specimens being quite as depauperate as most of my foreign ones), but generally a finer plant than the latter, and when perfect, scarcely differing from states of *P. applanata*, except in color, and in the colorless hypothecium. *Parmelia viridis*, Montag. Crypt. Guyan., & Syll. p. 329, (*Parm. picta*, Montag. Cuba, p. 221, tab. 9, fig. 3, non Ach.), appears to be scarcely separable from the North American Lichen; and these varying conditions are perhaps comparable with the American forms of the European *P. astroidea*.

PYXINE MEISSNERI, Tuckerm. in litt.: thallo orbiculari cartilagineo radiatim laciniato glabro glaucescente intus sulphureo; laciniis subplanis appressis pinnatifidis imbricatis subtus nigris ambitu fibrillosis; apotheciis primitus thallo concoloribus excipulo thallino subintegro tumidulo discum planum nigrum cingente mox superne nigricantibus margine demum tenuescente nitido disco convexo subexcluso. Sporæ suboctonæ, oblongo-ellipsoideæ, uni-septatæ, mox fuscæ, diam. plusquam 3-plo longiores. On trees in Cuba, and also in Nicaragua, Mr. Wright. And I possess a fine Brazilian specimen, referred to *Physcia* by Dr. Meissner of Halle, from my kind friend, the late Professor Kunze of Leipzig. Thallus differing from that of the next species in its entire smoothness, and its light-yellow medullary layer. The apothecia are at first exceedingly like those of *Physcia applanata*, but the exciple soon blackens above, and presents finally a convex disk enclosed by a shining margin of the same color, thinner than the original thalline border, and often looking, but not really, distinct from it. Professor Fries, in establishing this genus (Pl. Homon. p. 266), indicated its relations to *Umbilicaria*, but did not regard either as Parmeliaceous. In venturing, some years since, to take this view with respect to *Pyxine* (Synops. Lich. N. E. p. 24, and 35) the writer had before him only the more northern Lichen (*Pyxine soorediata*, Fr.), the "at first closed, palish" apothecia of which, "becoming patellæform, and, with the altered thalline margin, black," he considered as indicating "a modification of *Parmelia*, near to" the section "*Amphiloma*, Fr."; a conclusion which the foliaceous thallus, with its compact, crust-like centre, and often dense hypothallus, served to strengthen. But the present species is as clearly inseparable from *Parmelia*, in the sense of Fries, as it is from *Pyxine*; and its position as respects the new tribe *Parmeliei*, as acutely limited,



in the light of our present knowledge of the spores and spermogones, by Dr. Nylander, may still perhaps be regarded as between *Physcia* (*Parmelia* § *Physcia*, Fr.) and *Pannaria* (*Parmelia* § *Amphiloma* and *Psoroma*, Fr.): and Eschweiler, it is observable, places his *Lecidea albo-virens* (Lich. Bras. in Mart. Fl. Bras. 1, p. 256), which is clearly *Pyxine sorediata*, as first observed by Montagne (Pl. Cell. Cub. in Sagra's Hist. Cub. p. 188), in the near neighborhood of his *Lecidea* (now *Pannaria*) *microphylla*, in which, moreover, he only followed Acharius. There are several points in Dr. Montagne's description and illustration of his *P. sorediata* (Cuba, l. c. p. 188), and especially his figure *b*, seemingly indicating our present species, which is finally very like smoothish states of the next, and may well occur without any trace of its originally Physciaceous fructification; in which case it should hardly be separable from *P. Coccoes* (*P. sorediata*, Fr.), unless by the color of its medullary layer, to be considered farther on. And thus the remarkable development of the apothecia of *P. Meissneri* might be taken as of value rather as enabling us to determine the true structure and natural position of the genus, than as a specific distinction; but, however the final state of the new species may approach the old, I have examined many hundreds of specimens of the latter, in its best condition (*P. Coccoes* β. *sorediata*), without finding the least trace or indication of the originally Lecanorine fructification of the former. Spores of *P. Meissneri*, linear-oblong, and more than thrice as long as wide, at first colorless and simple, an elongated sporoblast occupying the centre, but soon becoming fuscous, and the sporoblast separating into two roundish ones, which are connected by a narrow isthmus, remaining at least until the central dissepiment appears: these sporoblasts finally increasing in size till they meet the walls of the spore, when the well-marked limit of each, and the empty ends of the spore beyond it look like other dissepiments and sporoblasts, and the spore might be called 3-septate (comp. Montag. Cuba, l. c., but the description, as I understand it, is not illustrated by the figure given; and also Eschweiler, l. c., p. 246), which I think it is not.

PYXINE COCOES (Sw.), Nyl. Enum. Gen. l. c. p. 108. *Lichen Coccoes*, Sw. in Ach. Prodr. p. 106. *Lecidea*, Ach. Meth. p. 84; Lichenogr. p. 216; Syn. p. 54. On Cocoa Palms in Jamaica, Swartz (ex Ach.); and in Cuba, Mr. Wright. Also in Nicaragua, Mr. Wright (U. S. N. Pacif. Expl. Exp.). Acharius distinguished this from his



*Lecidea sorediata*, mainly by the lighter color and thinner texture of its smoother lobes, and their smoothish under-side; and Mr. Wright's Cuban collections appear fully to confirm Dr. Nylander's opinion (Lich. Exot. in Ann. Sci. 4, 11, p. 239), that neither of these differences, nor that of size, which extends even to the spores, is sufficient to separate specifically the tropical form from the more northern one. The present, so far as my specimens go, appears to be a smaller and less imbricated Lichen than *P. Meissneri*, from which it also differs in its white medullary layer, and especially in its apothecia, which are exactly those of the genus, as described by Fries, and, more at large, by Eschweiler. There is also in *P. Coccoes* a tendency to sorediate efflorescence, which becomes marked and characteristical in the northern Lichen, which, I cannot but think, deserves still a separate, if a subordinate place.

Var.  $\beta$ . SOREDIATA: thallo cartilagineo glauco-cinerascente intus fusco-sulphureo (palescente), laciniis rugoso-plicatis; sorediis rotundatis cæsiis marginalibus exasperatis subtus subspongioso-fibrillosis; apotheciis cæsiopruinosus (nudis). *Lecidea sorediata*, Ach. Syn. p. 54. *Pyxine*, Fr. Pl. Homon. p. 267. *Lecidea* (§ *Pyxine*), Eschw. Bras. l. c. p. 245. *Parmelia* (§ *Pyxine*), Tuckerm. Synops. Lich. N. E. p. 35, & Lich. Exs. n. 19. *Lecidea albo-virens*, Eschw. Bras. l. c. p. 256. On trees and rocks, Pennsylvania, *Muhlenberg* (Ach. Syn. l. c. 1814). New England to Virginia, not rare, especially on mountains. Westward to the Rocky Mountains, Herb. Hook. North Carolina, *Rev. Dr. Curtis*. South Carolina and Georgia, *Mr. Ravenel*. Alabama, *Mr. Peters*. Mississippi, *Dr. Veitch*. Louisiana, *Dr. Hale*. Texas, where occur also small forms like  $\alpha$ , *Mr. Wright*. The same unwearied botanist has collected the Lichen also in Cuba, and in Japan. And I am indebted to Dr. Hooker for an infertile, but otherwise undistinguishable specimen from the Himalaya, and to Dr. Van den Bosch for satisfactory ones from Java. It was upon this Lichen, first observed by Muhlenberg, that Fries constituted his genus. The plant differs from the earlier *P. Coccoes* (Sw.), Nyl., in being every way larger; in its darker, finally ashy color; its regular soredia; and densely spongy-fibrillose under-side: but approaches *P. Meissneri* (to which *P. sorediata*, Montag., Cuba, l. c., should perhaps be referred, in part at least) in its dark-yellow (sometimes fuscous, and often palescent) medullary layer; which is observable (as indicated by Eschweiler in his *Lecidea albo-virens*), if nowhere else, immediately beneath



the hypothecium. *P. sorediata*, var. *endochrysa*, M. & V. d. Bosch, in Montag. Syll. p. 345, "thalli strato medullari fulvescente (chamois)," described from specimens of Junghuhn, is an indication of the last-mentioned feature, which appears to me to show itself (though doubtless finally disappearing, and unknown in *a*) with more or less distinctness, in most of my specimens. In *P. coccinea*, M. & V. d. Bosch, Lich. Jav. p. 40, the same layer is described as blood-red. As already remarked under our first species, the present differs from that in possessing the pseudo-Lecideine apothecia of the genus, as defined by its illustrious author, and others; only varying from their descriptions in the fructification, being at first pale (as indicated by the present writer, l. c.) and also, in the variety now before us, bespread at length with a gray bloom (comp. Eschweiler's "apothecia . . vix canescentia" in his *Lecidea albo-virens*, l. c.), which is very often wanting. The spores of the present form do not differ appreciably from those of other species, unless in proportional dimensions. They are often ellipsoid, slightly constricted at the middle, once-septate, and fuscous; about two and a half times longer than wide: but occur perhaps more commonly in a rather elongated, oblong, less colored and less simple state, in which the protoplasm develops at first (as in many spores) into a square, or oblong sporoblast, which then divides into two, which are connected by a narrow isthmus (like the neck of an hour-glass, or, more often, of dumb-bells) through the middle of which passes the dissepiment of the spore; which reaches, in this state, to nearly the length of the spores of *P. Meissneri*. The ends of the sporoblasts towards the (empty) tips of the spore are so well defined that it is difficult not to describe these sporoblasts as becoming at length larger, oval, and once-septate, and the spore as thus thrice-septate (and this view has been taken by eminent writers), but I venture to propose the above as perhaps the true one; and to regard the genus as possessing spores typically once-septate; and as approaching, therefore, species of *Physcia* as closely in this respect, as it does also, according to Dr. Nylander (in his observations on *P. Meissneri*, in Lich. Exot. l. c., p. 255) in its spermatogones.

PYXINE RETIRUGELLA, Nyl. Lich. Exot. l. c., p. 240, is the only remaining species known, not above noticed. In this, which was collected in Nukahwà, growing on stones and rocks, by Mr. Jardin, the thallus is described as reticulate-rugulose, like that of *Parmelia saxatilis*; and the apothecia as resembling those of the last species. Very



elegant specimens, collected by Mr. Wright, from stems of *Pandanus*, in the Bonin Islands (Herb. U. S. N. Pacif. Expl. Exp.), with linear, elongated, *discrete* lobes, which are brought into relief by the black hypothallus, have just the marking above described, and the regular soredia, and whole aspect of *Pyxine*; but are without fructification.

PANNARIA LEUCOSTICTA, Tuckerm. in litt.: thallo e squamulis cartilagineo-membranaceis glauco-fuscescentibus ambitu expansis subelongatis pinnato-incisis centro adscendentibus imbricatis dissectis dentato-crenatis, crenis albo-pulverulentis, hypothallo cæruleo-nigro marginante; apotheciis appressis convexis rufis margine thallino persistente subincurvo crenulato mox pulverulento. Sporæ ovoideæ, simplices, incolores, diam.  $1\frac{1}{2}$ –2-plo longiores. — *Parmelia* (*Psoroma*) *leucosticta*, Tuckerm. in Darl. Fl. Cest. p. 441. On trees and rocks. New England to Virginia, not uncommon. Pennsylvania, *Dr. Michener*. North Carolina, *Rev. Dr. Curtis*. South Carolina and Georgia, *Mr. Ravenel*. Alabama, *Mr. Beaumont*. Louisiana, *Dr. Hale*. Approaching *P. microphylla*, from which it differs in the colors, in its larger, dissected thallus, and also in the apothecia and spores. And it also approaches (but is always, so far as I have observed, distinguishable from) subsquamulose states of *P. rubiginosa*. *P. craspedia*, Koerb. Parerg. 1, p. 45 (1859) from Istria, appears to have some (possibly unessential) features of agreement with our Lichen. But it is interesting, in this connection, that one or two other Lichens, first observed in North America, as *Cetraria Oakesiana* (*C. Bavarica*, Krempelh., and now published also, though I know not from what locality, in Massalongo's Italian Herbarium Exsicc.), and possibly *Physcia obscura*, var. *erythrocardia* (*Parm. stuppea*, Tayl., which can hardly be distinct from *P. endoccina*, Koerb. l. c. p. 36, from Tyrol), are, with more or less certainty, inhabitants of the South of Europe.

PANNARIA CROSSOPHYLLA, sp. nov.: thallo minusculo membranaceo glauco-cinerascente e squamulis subelongatis expansis plumoso-multifidis, lobulis linearibus teretiusculis subtus subconcoloribus; hypothallo nigro obsolescente; apotheciis appressis convexis rufo-fuscis biatorinis vel excipulo thallino (spurio) tenui crenato demum subcinctis. Sporæ ellipsoideæ, limbatae, subincolores, diam. mox 4-plo longiores. — On slaty rocks, Brattleborough, Vermont, *Mr. Russell*. This Lichen, of which I have also received fine specimens from Mr. Frost, appears to differ from all described species in the narrow, teretish divisions of its



elegantly branch-lobed thallus, the longer portions of which closely resemble a delicate feather, or (as implied in the Latin terms *plumarius* and *plumatilis*) fine embroidered work, or *lace*. Of the species nearest related, which are all flat-lobed, *P. tryptophylla* differs in the colors, in the lobation of its very flat and thin divisions, and in its apothecia; *P. microphylla* in its closely imbricated crust of small, notched (but "never laciniate-dissected," Fr.) true squamules, and its smaller, oblong-ellipsoid spores; and *P. Saubinetii* (Montag.), Nyl., a tree-lichen, of which I have been kindly favored with a specimen by the generous author, in the colors, the distinct configuration of the scarcely lobate, larger, and flatter scales, and, like the last, to which it is much nearer than is the present, in its oblong spores. Beneath, our plant is much of the same color as above, but traces of a blackish hypothallus are more or less discernible at the centre. Apothecia somewhat immersed, bright brownish-red, convex, and the thin, biatorine exciple (which has sometimes an apparent, more or less perfect, crenate, but spurious thalline border) scarcely discernible. Spores ellipsoid, rather sharp at the tips, which are often somewhat elongated; more or less tinged with a hue like that of the gonimous granules; limbate, and the protoplasm commonly separating into irregular, more or less rounded sporoblasts, which are often in polar opposition; from twice to four times longer than wide.

*LECIDEA MICROPS* (Fr. Herb. sub *Parmelia*), sp. nov.: thallo minuscule granuloso-subsquamaceo imbricato glaucescente; apotheciis minimis biatorinis rufescentibus concavis vel excipulo thallino tenui integro receptis. Sporæ octonæ, ovoideæ, incolores, simplices, diam.  $2 - 2\frac{1}{2}$ -plo longiores. *Lecidea pezizoidea*, Schwein. Herb., non Ach. *Parmelia microps*, Fr. Herb. On the earth, Salem, North Carolina, Schweinitz. I possess only a fragment, given to me by Professor Fries, who had it from Schweinitz. The Lichen has points of resemblance to *Lecanora amniocola*, but differs in the spores. It may also be compared with *Lecidea coarctata*, but appears certainly distinct from it. The whole is so small, that an ordinary lens is hardly sufficient to examine its characters; and I offer it here only for further investigation.

*LECIDEA OIDALEA*, sp. nov.: thallo crustaceo tenui subcartilagineo demum contiguo lævigato rimoso verrucoso-areolato flavo-viridi-glaucescente; hypothallo nigro sublimitato; apotheciis (mediocribus) cupu-



laribus sessilibus nigris disco nudo opaco subscabrido intus albo hypothecio fusco-nigro imposito mox convexo-protuberante marginemque tenuem subobscurum excludente. Sporæ majusculæ, oblongæ, atrofuscescentes, murali-divisæ, diam. 3-plo longiores. On trunks of Oaks, Alcatraz, California, *Mr. Wright* (U. S. N. Pacif. Expl. Exp.). And I possess a fragment of the same Lichen, from trees on the banks of the Columbia, in Oregon Territory, *Dr. Newberry*. Crust with much of the habit of states of *L. disciformis*, from similar habitats, but greenish; and the margins of the protuberant apothecia perhaps more obscure than in that species. The spores are quite different. These are always without dissepiment, showing at first a grumous protoplasm, which, as the spore attains to its maturity and very dark color, assumes a cellular configuration resembling mason-work, as in *L. atro-alba*, and other species of the same group (*Rhizocarpon*, Koerb.).

LECIDEA AFRICANA, sp. nov.: thallo crustaceo adnato radio-lobato mox squamuloso-areolato, areolis applanatis crenulato-lobatis ambitu rimoso-multifidis lævigatis luteis subtus nigris; apotheciis areolis innato-sessilibus cupularibus nigris, margine tenui crenulato-rugosulo flexuoso, disco opaco nudo intus albo demum convexiusculo subexcluso. Sporæ ellipsoideæ, apicibus acutæ, 1 – 3-septatæ, atrofuscescentes, diam.  $1\frac{1}{2}$  –  $2\frac{1}{2}$ -plo longiores. On rocks (friable sandstone) on hills near Simons-town, Cape of Good Hope, *Mr. Wright*. Thallus in young plants crustaceous-foliaceous, radiate-lobate; but the centre passing into mostly flattish, areolate, crenulate squamules, which are somewhat palmate-multifid at the circumference, and black beneath; bright-yellow, becoming whitish in some specimens. Apothecia always black; the slightly tumid or obtusish, wrinkled-crenulate margin at length almost excluded by the convex, naked disk, which is white within and rests upon a black hypothecium. Spores smallish, ellipsoid, with rather acute tips, the at first simple protoplasm dividing into two round sporoblasts, and crossed by a central dissepiment; the sporoblasts then divided, and the spore appearing twice or thrice septate, according as the central dissepiment is more or less apparent; finally blackish-brown, and the dissepiments more or less obscure. The Lichen has, at first sight, a good deal of resemblance to *L. geographica*, (as Moug. & Nestl. Cr. Vog. n. 640,  $\alpha$  &  $\beta$ .) but differs in its at first lobulate, at length squamulose and effigurate thallus, and scarcely less in its apothecia and spores, which last are never many-septate. Specimens with





Tuckerman, Edward. 1860. "Observations on North American and other lichens. 1." *Proceedings of the American Academy of Arts and Sciences* 4, 383–407.

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