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The Lichens of Bermuda

LINCOLN W. RIDDLE

Our knowledge of the lichens of Bermuda up to the present time has been confined to the Reports of the Challenger Expedition, based on the collections made by H. N. Moseley, who secured in Bermuda only twenty-five species and varieties of lichens. Three successive reports on the lichens of the Challenger Expedition were published. The first was that of Stirton in the Journal of the Linnaean Society for 1875 (14: 369-372). Two years later Crombie, with the assistance of Nylander, went over the collection, revised many of Stirton's determinations, and published a report in the journal cited (16: 214-217). This report included several "new species and varieties" named by Nylander, but, with one exception noted below, these differed from well-known species in chemical tests only or in such trivial characters that they cannot be considered valid. Finally, in 1885, in the official Report on the Scientific Results of the Voyage of H. M. S. Challenger, Botany, vol. 1, No. 2, Part 1, Hemsley published the list again, his list being practically a reprint of that of Crombie.

Meanwhile, in 1880 and in 1881, Professor W. G. Farlow, of Harvard University, had visited Bermuda and made a small but important collection of lichens. This was turned over to Tuckerman, who named twenty-one species, of which six were new. Tuckerman was then busy with his Synopsis of the North American Lichens and was approaching the end of his life, so that he was unable to publish descriptions of the new species that he named. Duplicates of some of these specimens were sent to the Royal Herbarium at Kew, England, and Hemsley gave a list of thirteen of these in a footnote on page 99 of his report. Descriptions of two of the new species, *Gyalecta Farlowi* and *Verrucaria bermudana*, were published by Nylander in 1890 and 1891, respectively, but the other new species from Professor Farlow's collection have remained undescribed. He has very kindly allowed me to incorporate the results of a study of his specimens in the present paper.

Between 1905 and 1914 a more complete exploration of the flora of Bermuda has been carried on by Dr. and Mrs. N. L. Britton, Dr. F. J. Seaver, and Messrs. Stewardson Brown and Paul Bisset, resulting in the finding of sixty-five species and varieties, of which fifty, including three new species, had not been previously reported.

As a result of these several collections, we now have a total of thirty-six genera, with eighty-six species and varieties of lichens, known to occur in Bermuda. Ten of these species are endemic.

The collection made by the members of the staff of the New York Botanical Garden, in coöperation with the Academy of Natural Sciences of Philadelphia, has formed the chief basis of the following enumeration. All numbers cited refer to these specimens. Since Mrs. Elizabeth G. Britton has collected more numbers than anyone else, the initials only are cited. The names of other collectors are given in full. References are also given to the species collected by Professor Farlow, and to the records of the Challenger Expedition.

1. *VERRUCARIA RUPESTRIS* Schrad.

On rocks, without definite station, *W. G. Farlow*.

2. *VERRUCARIA RUPESTRIS* var. *RUDERUM* DC.

Verrucaria ruderella Nyl.; Crombie, Jour. Linn. Soc. Bot. 16: 217. 1877.

On rocks, without definite station, *Challenger Expedition*.

3. *Thelidium bermudanum* (Tuck.) Riddle, comb. nov.

Verrucaria bermudana Tuck.; Nylander, Sert. Lich. trop. Labuan et Singapore 43. 1891.

As the original description is not readily accessible, it is given here: "Thallus vix ullus; apothecia pyrenio dimidiato-nigro (latit. circ. 0.25 mm.) convexa; sporae 8nae breviter fusiformes 1-septatae, long. 0.011-12, cr. 0.0035-45 mm., in thecis angustis; paraphyses graciles. Super saxa calcarea in Ins. Bermudis. Affinis *V. albido-atrae* Nyl." South shore; type collected by Professor W. G. Farlow. This species and the next are strictly maritime, growing just at tide-limit.

4. **Thelidium Farlowi** Riddle, sp. nov.

Thallus epilithicus, crustaceus tenuis vel tenuissimus continuus laevigatus plumbeus, in margine linea obscuriore cinctus. Gonidia cystococcoidea. Perithecia partim confluentia, circa 0.5 mm. diam., nigra depresso-hemisphaerica semiimmersa, strato tenuissimo thallose fere ad instar pruinae velata, apice sat late denudato; amphithecio subgloboso completo, basi tenuiore, fusconigro. Paraphyses gelatinam percurrentes. Asci 8-spori. Sporae incolores, oblongae vel ovae, biloculares, $18-20 \times 7-9 \mu$.

On calcareous rocks, south shore, collected by Professor W. G. Farlow, 1881.

Type in the Cryptogamic Herbarium of Harvard University.

This species appears to be related to *Th. pyrenophorum* (Ach.) Koerb., but is distinct in the lead-colored thallus and the confluent perithecia, with the thin thalline covering giving a pruinose effect.

5. **PORINA NUCULA** Ach.

On bark of orange, Paynter's Vale, *E. G. B.* 363.

6. **PORINA PHAEA** (Ach.) Muell. Arg.

On *Juniperus*, Harrington House, *Stewardson Brown* 560.

7. **PORINA TETRACERAE** (Ach.) Muell. Arg.

On coffee trees, Walsingham, *E. G. B.* 293.

8. **PYRENULA AURANTIACA** Fée.

On *Rhizophora*, Fairy Land, *E. G. B.* 193; also *W. G. Farlow*, who states that it is generally common on *Rhizophora*, but very difficult to cut off.

9. **PYRENULA BRACHYSERMA** Muell. Arg.

On *Eugenia*, Hall's Island, *Brown & Britton* 885.

This species was originally published in Mueller-Argau's *Revisio Lichenum Eschweillerianum*, *Flora* 67: 670. 1884. The type came from Brazil. It is exceptional among *Pyrenulas* in having two-celled spores. Although there has been no material available for comparison, the Bermuda specimen agrees so well with the description that there can be no doubt of its identity.

10. *PYRENULA LEUCOPLACA* (Wallr.) Koerb.

On decorticated *Juniperus*, north of Hamilton, *E. G. B.* 69, on *Nerium*, Devonshire Marsh, *E. G. B.* 165; on *Rhizophora*, Fairy Land, *E. G. B.* 194; on *Eugenia*, Tucker's Town, *E. G. B.* 315; on *Ficus*, Wreck Hill, *Brown & Britton*, 1108; without definite station, *Brown, Britton & Seaver*, 1225.

11. *PYRENULA MAMILLANA* (Ach.) Trev.

On *Elaeodendron*, without definite station, *Brown, Britton & Seaver*, 1578, 1587.

12. *PYRENULA NITIDA* var. *NITIDELLA* (Flke.) Schaer.

On *Melia*, hillside near Flatts, *E. G. B.* 50, 53; on *Nerium*, Devonshire Marsh, *E. G. B.* 164; on trees, Church Cove, *E. G. B.* 1081. The material shows considerable variability, but on account of the small size of the perithecia appears to belong here.

13. *Anthracothecium tetraspermum* Riddle, sp. nov.

Thallus epiphloeodes crustaceus indeterminatus, sat crassus, continuus sat laevigatus aut subleprosus, olivaceus opacus. Gonidia chroolepoidea. Perithecia dispersa, 0.4 mm. diam., nigra, primum immersa et thallo obducta apice anguste denudato, demum emergentia; amphithecio globoso completo. Paraphyses simplices. Asci constanter 4-spori. Sporae fuscae oblongae murali-divisae, 4-loculares, 2-locellati, 15-20 × 8-10 μ .

On bark of palmetto, Devonshire Marsh, collected by Mrs. E. G. Britton, No. 169 in part.

Distinct from all other species of the genus in the spore-characters.

14. *MELANOTHECA AGGREGATA* (Fée) Muell. Arg.

On *Elaeodendron*, without definite station, *Brown, Britton & Seaver*, 1583.

15. *MELANOTHECA CRUENTA* (Mont.) Muell. Arg.

Without definite station, *Challenger Expedition*.

16. *PYRGILLUS CUBANUS* Nyl.

On bark of palmetto, Devonshire Marsh, *E. G. B.* 169 in part.

An interesting species known previously only from the original collection made by Charles Wright in the island of Cuba.

17. ARTHONIA CONFERTA (Fée) Nyl.

On tamarisk, Biological Station, *E. G. B.* 35; on *Melia*, hillside near Flatts, *E. G. B.* 52; on *Melia*, Tucker's Town, *E. G. B.* 866; also, on *Melia*, Harrington Sound, *Brown & Britton*, 836; and without definite station, *W. G. Farlow*.

As was pointed out by Willey (Synopsis of the Genus *Arthonia* 12), this is the *Arthonia atrata* of the list in Hemsley's Report, but not of Fée.

18. ARTHONIA POLYMORPHA Ach.

On bark, without definite station, *Challenger Expedition*, under the name *Arthonia polymorphoides* Nyl. apud Crombie (*opus citi*), but the characters are certainly not of specific value, as they were based entirely on the chemical reactions of the hymenium.

19. ARTHONIA RUBELLA (Fée) Nyl.

On bark, Abbot's Cliff, *E. G. B.* 924; Church Cave, *E. G. B.* 1082; without definite station, *Challenger Expedition*, under the name "var. *inferiuscula* Nyl.," but the varietal characters given are not of sufficient importance.

20. ARTHOTHELIUM SPECTABILE (Flot.) Mass.

On *Elaeodendron*, without definite station, *Brown, Britton & Seaver* 1585.

21. OPEGRAPHA ATRA Pers.

On *Cocolobis*, Hungry Bay, *E. G. B.* 203 in part, a small form; on *Conocarpus*, without definite station, *Brown, Britton & Seaver*, 1211.

22. OPEGRAPHA BONPLANDI Fée.

On decorticated *Juniperus*, north of Hamilton, *E. G. B.* 69 in part; on *Randia*, sand hills near Paget, *E. G. B.* 122; Church Cave, *Brown & Britton*, 1085; on dead *Juniperus*, St. David's Island, *Brown, Britton & Bisset*, 2080, and on *Elaeodendron*, Abbotsford, *Brown, Britton & Bisset*, 2110; on *Juniperus*, without definite station, *Brown, Britton & Seaver*, 1210, 1285.

This species is as variable as it is common. No. 1085, with olive-brown thallus and short apothecia, is the nearest to Fée's

original figure (Essai sur les Cryptogames *pl. 5, f. 4.* 1824). In Nos. 2110, 1210, 1285, the thallus is glaucescent instead of olivaceous. In some of the specimens the spores are somewhat wider than the figures given by Mueller-Argau, but there is nothing else to distinguish these from the typical form.

23. *OPEGRAPHA CHEVALIERI* var. **incarnata** Riddle, var. nov.

Thallus rimuloso-areolatus, roseo-suffusus vel tandem pallescens et argillaceus.

On calcareous rocks, without definite station, collected by Professor W. G. Farlow, 1880.

Type-specimen in the Cryptogamic Herbarium of Harvard University.

24. *Opegrapha ophites* Tuck. in herb., sp. nov.

Thallus epilithicus crustaceus indeterminatus tenuissimus, atro-griseus et fuligineo tinctus, aut demum evanescens. Lirellae sat graciles elongatae, 1.0–2.5 mm. long, 0.15 mm. latit., sat flexuosae nigrae nitidiusculae simplices aut rariore furcatae laevigatae aut parce transversim diffractae, disco rimiformi. Sporae incolores, 6–8-loculares, circa $22 \times 7 \mu$.

On calcareous rocks, without definite station, collected by Professor W. G. Farlow, 1880.

Type-specimen in the Cryptogamic Herbarium of Harvard University.

25. *OPEGRAPHA VULGATA* Ach.

On *Eugenia*, without definite station, *Brown, Britton & Seaver*, 1288.

26. *GRAPHIS AFZELII* Ach.

Without definite station, *Challenger Expedition*.

27. *GRAPHIS LINEOLA* Ach.

On *Melia*, hillsides near Flatts, *E. G. B.* 51.

28. *GRAPHIS PAVONIANA* Fée.

On *Ilex*, Devonshire Marsh, *E. G. B.* 377a.

29. GRAPHIS SCRIPTA (L.) Ach.

On *Ilex*, Devonshire Marsh, *E. G. B.* 377; without definite station, *Challenger Expedition*.

30. GRAPHIS SCRIPTA var. SERPENTINA (Ach.) Nyl.

On *Celtis*, Caves, Walsingham, *E. G. B.* 291.

31. GRAPHIS STRIATULA (Ach.) Nyl.

On *Laurocerasus*, Paget Marsh, *E. G. B.* 230.

32. PHAEOGRAPHIS LOBATA (Eschw.) Muell. Arg.

Without definite station, *Challenger Expedition*.

33. GLYPHIS CICATRICOSA Ach.

On *Celtis*, Caves, Walsingham, *E. G. B.* 292, and Church Cave, *E. G. B.* 1084; on *Elaeodendron*, Walsingham, *Brown & Britton* 862; on lemon, Jayces' Dock, *Brown, Britton & Bisset* 2104; also, without definite station, *W. G. Farlow*. Recorded in Hemsley's Report under the synonym *Gl. Achariana* Tuck.

34. CHIODECTON MONTAGNEI Tuck.?

It seems best to place here specimens of sterile thallus collected by Mrs. E. G. Britton, on *Juniperus*, Paynter's Vale, 366; on *Elaeodendron*, Abbot's Cliff, 941; and on rocks at Abbot's Cliff, 950. In the absence of fruit the disposition of these specimens must remain doubtful.

35. SCLEROPHYTON ELEGANS Eschw.

On *Elaeodendron*, without definite station, *Brown, Britton & Seaver* 1580.

36. GYOSTOMUM SCYPHULIFERUM (Ach.) Fr.

On *Celtis*, Walsingham, *E. G. B.* 289.

37. **Leptotrema trypaneoides** (Nyl.) Riddle, comb. nov.

Thelotrema trypaneoides Nyl. Ann. Sci. Nat. IV. 19: 335. 1863.
Type from Cuba.

On *Elaeodendron*, without definite station, *Brown, Britton & Seaver* 1581, 1588.

38. *MICROPHIALE LUTEA* (Dicks.) Steiner.

On *Melia*, Tucker's Town, *E. G. B.*, a few apothecia mixed with No. 867.

39. *GYALECTA FARLOWI* Tuck.; Nylander, Lich. Japon. 106. 1890.

The original description reads: "Species concinna affinis *G. hyalinae* Hepp; macula thallina alba vel carnealba, apotheciis innatis dilute carneoluteis (latit. circ. 0.25 mm.) thelotremoideis; sporae ellipsoidea murales 18-23 × 9.11 μ."

On calcareous rocks, without definite station, *W. G. Farlow*.

LECIDEA.

In the Journal of the Linnaean Society (14: 371. 1875), Stirton described three new species of *Lecidea*: *L. euporiza*, *L. semiusta*, and *L. revertens*. These were based on the collections of the Challenger Expedition, and are said by Crombie to be rock-specimens too fragmentary for determination. Indeed, Stirton himself says that one of these was based on a single apothecium!

40. *Biatora fusciorubescens* (Nyl.) Riddle, comb. nov.

Lecidea fusciorubescens Nyl. Bull. Soc. Linn. Norm. II. 7: 169. 1874.

Without definite station, *Challenger Expedition*.

Said to be related to *Biatora vernalis* (L.) Fr.

41. *Bilimbia Brittoniana* Riddle, sp. nov.

Thallus epiphloeodes crustaceus indeterminatus inaequaliter crassus, omnino granuloso-leprosus, sulphureus. Gonidia cystococcoidea. Apothecia sparsa et dispersa, sat thallo occulta minuta, 0.2-0.4 mm. diam., plus minusve gyalectiformia, disco primum concavo demum plano pallide carneo, margine crasso integro persistente concolore; intus omnino incolores. Asci 8-spori. Sporae incolores fusiformes, utrinque apices obtusae, 4-loculares, 15-18 × 3 μ.

On exfoliating bark of *Juniperus*, north shore, collected by Mrs. E. G. Britton, August 31-September 20, 1905, no. 77.

This very distinct species has been named in honor of Dr. and Mrs. Britton. It is related to *Bilimbia floridana* (Tuck.) Riddle,

comb. nov., but differing in the thallus being entirely made up of sulphury granules, which under the microscope are seen to be glomerules of gonidia with a loose mixture of hyphae. The regular, marginate apothecia, resembling those of *Microphiale lutea*, also distinguish this species from *B. floridana*.

42. **Bilimbia sphaeroides** var. **vacillans** (Nyl.) Riddle, comb. nov.

Lecidea sphaeroides var. *vacillans* Nyl. Lich. Scand. 204. 1861.
Without definite station, *Brown, Britton & Seaver, 1279*.

43. **BACIDIA FUSCORUBELLA** (Hoffm.) Th. Fr.

On *Rhizophora*, Fairy Land, *E. G. B. 194* in part; without definite station, *W. G. Farlow*.

Agrees well with Wright's Lich. Cub. No. 220, in the Tuckerman Herbarium under the synonym *Biatora rubella* var. *spadicea* (Ach.) Tuck.

44. **CLADONIA FIMBRIATA** var. **BORBONICA** (Del.) Wainio.

On a roadside banking, Harrington House, *Brown & Britton 852*. Tropical material of the *fimbriata-pityrea* group offers an almost hopeless problem, but this specimen agrees well with Wright's Lich. Cub. No. 31, which is cited by Wainio under his account of this variety.

45. **CLADONIA FIMBRIATA** var. **NEMOXYNA** (Ach.) Coem.

According to Wainio, the specimen called "*Cl. fibula* Hoffm." in Crombie's Report belongs here. The specimen listed in the same report as "*Cl. acuminata* var. *hebescens* Nyl." is said by Wainio to be related to *Cl. fimbriata*, but not in condition for determination.

46. **CLADONIA FIMBRIATA** var. **SIMPLEX** (Weis.) Flot.

On a stone-wall near St. Mark's Church, *Brown & Britton 496; E. G. B. 1861*.

The squamules of the primary thallus are more compact than in northern material, but there seems to be nothing else to distinguish this.

47. CLADONIA MITRULA Tuck.

On the ground, Hall's Island, *E. G. B.* 887 (typical); Paynter's Vale, *Brown & Britton*, 980 (reduced); Paget Marsh, *E. G. B.* 1862; without definite station, *Brown, Britton & Seaver* 1333; also *Challenger Expedition*.

48. CLADONIA PITYREA (Flke.) Fr.

On the ground, growing mixed with *Cl. mitrula*, *Brown, Britton & Seaver*, 1333 in part.

49. CLADONIA RANGIFORMIS var. PUNGENS (Ach.) Wainio.

Without definite station, *Challenger Expedition*.

50. **Psorotichia bermudana** Riddle, sp. nov.

Thallus crustaceus effusus indeterminatus crassus (0.3–0.5 mm.) diffracto-areolatus, areolis angulosis 1–2 mm. latis subdispersis, nitidus fusco-niger (madefactus atro-olivaceus), minute crebreque verruculosus vel coralloideo-granulosus; pro maxima parte hyphis tenuibus laxisque constitutis, strato exteriori tenui parenchymatico cellulis 4–10 × 4–6 μ . Gonidia gloeocapsoidea cellulis 4–6 μ diam., in glomerulosas circa 10–15 μ consociatis, tegumento gelatino fuscoluteo. Apothecia primum subimmersa demum superficialia et lecanorina, ad 0.6 mm. diam., disco inaequali fusco-nigro, margine thalino tenui granulato; intus omnino incolores. Sporae incolores simplices ellipsoideae, 14–16 × 8 μ . Spermagonia ovoidea verruculis thalpinis immersa. Spermata oblonga recta, 2–4 × 1 μ .

On calcareous rocks, without definite station, collected by Messrs. Brown, Britton & Seaver, November 29–December 14, 1912, No. 1415.

In habit this species resembles *Psorotichia diffracta* Forssell, as represented in Claudel & Harmand, *Lich. Gall. Exsic.* 301.

51. OMPHALARIA CUBANA Tuck.

On calcareous rocks, Castle Harbor, *Stewardson Brown* 628.

52. OMPHALARIA LINGULATA Tuck.

On calcareous rocks, Walsingham, *W. G. Farlow*, 1881; in the same region, *Brown, Britton & Seaver* 2245.

Known elsewhere from Cuba and Mona Island.

53. **Collema bermudanum** Tuck. in herb., sp. nov.

Thallus foliaceus laxe adherentis irregulariter crebre laciniatus, siccus rigidus madefactus gelatinosus, lacinulis inciso-crenatis, ad 1 mm. latis, crassiusculis planis scrabiusculis apicibus turgidis adscendentibus imbricatis, in pulvinulos constipatis 5–10 mm. diam., isidiis granulisque destitutus, superne atro-olivaceus subtus nigrescens; strato corticali destitutus. Gonidia nostocacea. Apothecia dispersa primum immersa demum subsuperficialia, ad 0.6 mm. diam., disco badio plano, margine thallino crasso integro persistente. Sporae incolores oblongae 4-loculares, 20–30 × 10–12 μ .

On calcareous rocks, Walsingham, collected by Professor W. G. Farlow, 1880.

Type-specimen in the Cryptogamic Herbarium of Harvard University.

In a letter to Professor Farlow, under date of August 25, 1881, Tuckerman wrote of this species: "*Collema* cum *C. furvo* forsan comparabile sed distincta."

54. **COLLEMA FLACCIDUM** Ach.

Without definite station, *Brown, Britton & Seaver 1348*.

55. **COLLEMA NIGRESCENS** (Huds.) Ach.

On *Avicennia*, Walsingham, *W. G. Farlow*.

56. **Collema thamnodes** Tuck. in herb., sp. nov.

Thallus fruticulosus irregulariter ramosus in pulvinulos constipatis 5–10 mm. diam., ramis erectis compressis, circa 3–5 mm. altit., 1.2 mm. latit., 0.5 mm. crassis, partim crebris isidiis, viridi-fuscus vel fusco-niger; strato corticali destitutus. Gonidia nostocacea. Apothecia ignota.

On calcareous rocks, Walsingham, collected by Professor W. G. Farlow, 1880.

Type-specimen in the Cryptogamic Herbarium of Harvard University.

57. **LEPTOGIUM MARGINELLUM** (Sw.) Mont.

On *Jasminium*, Paynter's Vale, *E. G. B. 368*; on *Juniperus*, without definite station, *Brown, Britton & Seaver, 1410, 1586* (beautiful specimens!).

58. LEPTOGIUM TENUISSIMUM (Dicks.) Koerb.

On the ground, Paynter's Vale, *Brown & Britton 979*.

One would scarcely expect this northern species in Bermuda, and the material being sterile the determination is not certain, but the thalline characters agree with this species.

59. LEPTOGIUM TREMELLOIDES (L. f.) S. F. Gray.

Including *L. diaphanum* (Sw.) Ach. of Crombie's Report.

There are two recognizable phases of the species in Bermuda, although these are not distinct enough to receive names. The following specimens have abundant apothecia and few lobules: on *Juniperus*, Devonshire Marsh, *E. G. B. 39*; on *Elaeodendron*, 847, and on *Conocarpus*, Castle Harbor, *Brown & Britton 849*. The remaining specimens are sparingly fruited and have the lobes more or less densely fringed with lobules: on various trees, Walsingham, *M. A. Howe*; Castle Harbor, 846, 848; Hall's Island, 886, and Paynter's Vale, *Brown & Britton 992*; St. David's Island, *Brown, Britton & Bisset, 2079*. Also collected by the Challenger Expedition.

60. PERTUSARIA LEIOPLACA (Ach.) Schaer.

P. papillata (Ach.) Nyl. of Crombie's Report.

On orange, Paynter's Vale, *E. G. B. 364*; without definite station, *W. G. Farlow*; also *Challenger Expedition*.

61. PERTUSARIA LUTESCENS (Eschw.) Krempelh. Lichenen-Flora der Südsee-Inseln, Jour. Mus. Godeffroy 1: 104. Hamburg. 1873.

Pertusaria communis var. *lutescens* Eschw.; Martius, Flor. Bras. 1: 118. 1833.

A complete description of the species based on several specimens, including the type, was given in Mueller-Argau's *Revisio Lichenum Eschweillerianum*, Flora 67: 672. 1884.

On tamarisk, Biological Station, *E. G. B. 36* in part; and on *Melia*, hillside near Flatts, *E. G. B. 55*.

There has been no authentic specimen of this species for comparison but the material agrees well with Mueller-Argau's description cited above. The species is recorded from Rio Janeiro

and Bahia, Brazil, and from Cuba. In the Cryptogamic Herbarium of Harvard University there are specimens from the southern United States, which Tuckerman had labelled under this name with a query.

62. *PERTUSARIA MULTIPUNCTA* (Turn.) Nyl.

On orange, Walsingham, *E. G. B. 1*; on *Elaeodendron*, Walsingham, *Brown & Britton 863*, and Abbot's Cliff, *Brown & Britton 943*.

63. *PERTUSARIA PUSTULATA* (Ach.) Nyl.

On bark, Mangrove Creek, *W. G. Farlow*; without definite station, *Challenger Expedition*.

64. *PERTUSARIA TUBERCULIFERA* Nyl.

On *Celtis*, Walsingham, *E. G. B. 290*.

65. *LECANORA BERMUDENSIS* Nyl.; Crombie, Jour. Linn. Soc. Bot. **16**: 215. 1877.

Without definite station, *Challenger Expedition*.

Said to be related to *L. Hageni* Ach. I know nothing further of it.

66. *LECANORA CINEREOCARNEA* (Eschw.) Wainio.

Including *L. chlaronella* Nyl. of Crombie's Report.

Occurring in three well-marked forms:

Forma *TYPICA*, thallo crassitudine mediocre verruculoso vel verrucoso. On tamarisk, Biological Station, *37b*; on *Melia*, hillside near Flatts, *54*; on decorticated *Juniperus*, north of Hamilton, *68*; on *Rhizophora*, Fairy Land, *192* in part; on cedar posts, Paynter's Vale, *988*; all collected by Mrs. E. G. Britton.

Forma *athallina* Riddle, f. nov., thallo evanescente. On pine fence, Paynter's Vale, *E. G. B. 989, 991a*.

Forma *rugosa* Riddle, f. nov., thallo crasso rugoso. On *Melia*, west end of Causeway, *Brown & Britton, 996*.

67. *LECANORA PALLIDA* var. *CANCRIFORMIS* Tuck.

Including *L. glaucmodes* var. *conflectens* Nyl. of Crombie's Report. On *Diospyros*, Warwick Marsh, *E. G. B. 306*; without definite station, *W. G. Farlow*; also *Challenger Expedition*.

68. LECANORA SUBFUSCA (L.) Ach.

On tamarisk, Biological Station, *E. G. B.* 37a; on *Melia*, Tucker's Town, *E. G. B.* 867 in part. These specimens appear to belong to the variety *allophana* Ach. In Crombie's Report, there is recorded a var. *sylvestris* Nyl. (*Bull. Soc. Bot. France* 15: 188. 1868), but this is a *nomen nudum*.

69. LECANORA VARIA (Hoffm.) Ach.

On *Celtis*, Walsingham, *E. G. B.* 288.

70. LECANORA VARIA var. SYMMICTA Ach.

On *Conocarpus*, without definite station, *Brown, Britton & Seaver*, 1211 in part.

71. HAEMATOMMA PUNICEUM (Ach.) Wainio.

On *Diospyros*, Warwick Marsh, *E. G. B.* 307; on *Melia*, Tucker's Town, *E. G. B.* 864; on palmetto, "the commonest habitat," without definite station, *W. G. Farlow*.

72. PARMELIA LATISSIMA var. CRISTIFERA (Tayl.) Hue.

On palmetto, North Shore Road, *E. G. B.* 15.

73. PARMELIA PERLATA (L.) Ach.

Paynter's Vale, *W. G. Farlow*; without definite station, *Challenger Expedition*.

74. PARMELIA TINCTORUM Despr.

On palmetto, Devonshire Marsh, *E. G. B.* 167; without definite station, *Challenger Expedition*.

75. RAMALINA COMPLANATA (Sw.) Ach.

On various trees and shrubs, Abbot's Cliff, 889, 934, Fairy Land, 191, Walsingham, 295, Serpentine Marsh, 104, all collected by Mrs. E. G. Britton; also, Tucker's Town, 818, and Mangrove Pond, 1035, *Brown & Britton*.

76. BUELLIA CANESCENS (Dicks.) DeNot.

On roadside wall, Devonshire, *E. G. B.* 155.

No fruit has been found so the determination cannot be

regarded as certain, but the thalline characters agree exactly with those of the species cited. As this species is entirely unknown in America, the interesting possibility suggests itself of its having been introduced into Bermuda from England, where it is common in just such habitats as the one given.

77. *BUELLIA MYRIOCARPA* (DC.) Mudd.

On bark of *Melia*, Tucker's Town, *E. G. B.* 867 in part; without definite station, *W. G. Farlow*.

78. *BUELLIA PARASEMA* (Ach.) Th. Fr.

On pine-rail fence, Paynter's Vale, *Brown & Britton 991*; on *Juniiperus*, St. David's Island, *Brown, Britton & Bisset 2078*.

The Bermuda material of this species varies considerably from the species as known in the northeastern United States. The thallus is either more distinctly areolate, or, in other specimens, almost absent, the disk of the apothecia is very flat, and the spores of the minimum size for the species. Yet it scarcely seems worth while giving a varietal name in the case of such a polymorphic species.

79. *RINODINA INSPERATA* (Nyl.) Zahlbr.; Engler & Prantl, *Nat. Pflanzenfam.* 1^{1*}: 232. 1907.

Without definite station, *Challenger Expedition*.

This was published originally as *Lecanora insperata* Nyl. *Act. Soc. Sci. Fenn.* 7: 443. 1863. Then it was changed to *Lecidea* Nyl.; Crombie, *Jour. Linn. Soc. Bot.* 16: 215. 1877. Hue, in his *Lichenes Exotici* (*Nouv. Arch. Mus. d'Hist. Nat. Paris III.* 3: 139. 1891), places it under "Stirps *Lecideae* (*Buelliae myriocarphae*." An examination of an apothecium from an original specimen in Lindig's *Lich. Nov. Gran. No. 2616* shows beyond doubt that Zahlbruckner's disposition of the species is correct, in spite of the thalline exciple having disappeared.

80. *BLASTENIA FLORIDANA* (Tuck.) Zahlbr.

On tamarisk, Biological Station, *E. G. B.* 36, and on *Coccolobis*, north of Hamilton, *E. G. B.* 66.

81. *PHYSCIA PICTA* (Sw.) Nyl.

On a cliff, Paynter's Vale, 362; on *Juniperus*, Paynter's Vale, 367; on stone wall, Harrington House, 853; on *Melia*, Tucker's Town, 867; on palmetto, Devonshire Marsh, 169 in part; all collected by Mrs. E. G. Britton.

82. *PHYSCIA ALBA* (Fée) Muell. Arg.

A small form on *Rhizophora*, Fairy Land, *E. G. B.* 192.

83. *PHYSCIA CRISPA* (Pers.) Nyl.

On *Avicennia*, Serpentine Marsh, 105; on rocks, Abbot's Cliff, 937, 945, 946, sterile, and 938, fruiting; on *Celtis*, Abbot's Cliff, 947, fruiting; all collected by Mrs. E. G. Britton; on *Juniperus*, Abbot's Cliff, 935; on rocks, Abbot's Cliff, 939, 940; on *Avicennia*, west end of Causeway, 995; all collected by Brown and Britton.

84. *PHYSCIA INTEGRATA* var. *SOREDIOSA* Wainio.

Ph. obsessa (Mont.) Nyl. of Crombie's Report.

On *Celtis*, Abbot's Cliff, *E. G. B.* 923, and on bark, Church Cave, 1080 in part, *E. G. B.*

85. *PHYSCIA LEANA* Tuck.

Without definite station, *Challenger Expedition*.

I give this record on the basis of Crombie's Report, not having seen the specimens, but it seems to me doubtful if the determination is correct.

86. *PHYSCIA STELLARIS* (L.) Nyl.

On various trees and shrubs, Biological Station, 34; Serpentine Marsh, 106; Tucker's Town, 865; Abbot's Cliff, 922; Bassett's Caves, 1040; all collected by Mrs. E. G. Britton; also, Smith's Island, *Brown, Britton & Bisset* 2102, and without definite station, *W. G. Farlow*.

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