

TASMANIAN LICHENS.

BY REV. F. R. M. WILSON.

PART I.

There is no class of plants which ordinary people know or notice so little as lichens. Yet this does not arise from their rarity or the sparseness of their distribution, for they grow almost everywhere on the globe, especially in the temperate and polar zones; and some species are very numerous. For example, the "reindeer moss," as it is called, while it is found in all cool climates, grows in the Arctic regions so profusely that the individual specimens of it are said to greatly outnumber those of any other species of plant throughout the world. The range of altitude and position also is very extensive. Some species are found on Alpine heights where no other vegetation exists; and some grow on the seaside, between high and low water. Some thrive on hard rocks exposed to the noonday sun; and some delight in the shade of caves and forests. The substrata on which they grow are various. Sandy earth, clay and loam, sandstone, granitic, basaltic, and calcareous rocks, dead wood, the bark and leaves of trees, mosses, etc., even dried bones, leather, iron, and glass afford them foothold. But they seem to absorb very little nutriment from any of these substrata; and most of them indeed live wholly on air and moisture. The two great enemies of lichen growth are lengthened droughts and frequent bush fires. From the effects of the latter agency many parts of Tasmania, especially in the eastern half of the island, have been much denuded. It is possible that in the wilder and moister west there may be fuller scope for the adventurous lichenologist. There may be species found there which do not grow in the eastern parts; and the converse will doubtless be found true.

1. THE COLLECTION OF LICHENS is very simple. They are removed by a sharp knife from the bark of trees, or with the bark and a piece of the wood, or by a small cold chisel from dead wood and rocks; and they need merely to be wrapped in soft paper—old newspapers will do—and carried home with just sufficient care to prevent their being bruised or rubbed. Their preservation is also simple. Few of them need any preparation if they are collected in a proper state, neither wet nor too dry. They can be glued down, as they are, on to a slip of paper, on which the date and place of collection should be noted, with the name of the collector.

2. THE EXAMINATION OF LICHENS is a somewhat more difficult matter. Although their anatomical parts are few, and their various organs comparatively simple, these are often so minute as to require the use of a microscope with a good quarter-inch objective. The *apothecium* or fruit is of various forms, but invariably contains *thecæ* or bags which hold the spores. The usual number of spores in each theca is eight. When large they are reduced even to one, and sometimes they are very minute and numerous. The *spermagones* are small nuclei form organs, containing and ejecting the *spermatia*, which are very minute, and are supposed to fructify the apothecia. The *thallus*, or vegetative part of the plant, is either crustaceous or foliaceous. The latter is the typical form, and is generally composed of three strata—cortical, *gonidial*, and medullary—of which the gonidial is specially characteristic.

3. HOW TO KNOW A LICHEN.—If it is desired to know whether a plant is a lichen or not, cut off a minute portion of the thallus and lay it on a glass slip. Moisten it with a drop or two of water, and then bruise it down gently with a pen-knife till it seems all melted down; put on a small glass cover and submit it to the microscope, as above. If it be a lichen, there will be found small greenish or yellowish cells, with transparent walls, called *gonidia*, or bluish cells without walls, called *gonimic granules*. The latter are sometimes conglomerated in sacs of various sizes and shapes, or concatenated like a necklace, or scattered more or less widely through the substance of the plant. It will be well to try several portions in case the first examination shows none of these cells. Some lichens, however, are nothing but apothecia, and grow on the thallus of other lichens. The class to which these apothecia belong is determined by their general likeness to the apothecia of other lichens.

4. CLASSIFICATION.—This class of plants finds its place between the algæ and the fungi; many obscure plants of the lower forms being with difficulty distinguished from algæ, and many species having so strong an affinity to fungi that it has often been a question whether they do not belong to that class.

The family which bears the closest affinity to the algæ is that of the COLLEMACEÆ, so called from their gelatinous appearance (Greek *colle*, glue) when moistened. Some of these, indeed, which grow on maritime rocks and are washed daily by the tide are very readily mistaken for algæ.

Closely connected with this family are the remarkable MYRIANGIACEÆ (Greek *myrios*, many, *angion*, vessel) of which there are only two or three species known.

The family of LICHENACÆ, or lichens properly so called, includes all the other species, and is divided into six series.

The EPICONIODEI, or dusty fruited series (Greek *epi*, upon, *conia*, dust) are readily distinguished from all the other families by the pulverulent spores on the surface of the apothecium.

The CLADODEI, or shoot-like series (Greek *clados*, a shoot) have peculiarly fungoid apothecia growing mostly on the summit of *podetia*, or stems rising from a foliaceous thallus.

The RAMALODEI, or branch-like series (Latin *ramale*, a branch) have apothecia with a thalline margin, which grow on a generally pendulous thallus.

The PHYLLODEI, or leaf-like series (Greek *phyllon*, a leaf) have their thallus depressed to the substratum, and lobed.

The PLACODEI, or plate-like series (Greek *plax*, a plate) have a crustaceous thallus,

The PYRENODEI, or nut-like series (Greek *pyren*, a nut) are marked by the fructification being in closed receptacles.

5. TASMANIAN LICHENOLOGY.—The lichens of Tasmania have had more attention paid to them than those of Australia. As far back as 1802, Mr. Robert Brown, who accompanied Flinders on his voyage round Australia, collected and named a number of lichens, which have been examined in the light of more modern knowledge and re-named by Rev. Mr. Crombie in a paper given to the Linnæan Society of London (Journ. Linn. Soc., vol. 17 pp. 390-401). Of these 50 are from Tasmania.

In 1839-1843, Mr. Joseph D. Hooker accompanied Sir James Clark Ross in a voyage of discovery to the Antarctic regions, in Her Majesty's ships the *Erebus* and *Terror*. Mr. Hooker was assistant surgeon of the *Erebus* and naturalist of the expedition. Among other places visited was Tasmania. There they found several zealous botanists, who had been inspired by a Mr. Robert Lawrence, and who assisted Hooker in making a botanical collection in the island. On returning to England, Hooker drew up and published in 1847, under authority of the Lord Commissioners of the Admiralty, an account of the botany of the voyage. The third and fourth volumes contain the Flora Tasmaniae, in which Rev. J. C. Babington and Mr. Mitten describe the lichens, Mr. Mitten undertaking the crustaceous kinds. They enumerate 92 in all, two of them being described as new. The names of the collectors are given: Hooker, Lawrence, Ronald C. Gunn, Charles Stuart, employed by Mr. Gunn, William Archer, of Cheshunt, Dr. Milligan, of Hobarton, Dr. Scott, and A. Oldfield. After Hooker's return to England the lichens sent to him were submitted to Mr. Thomas Taylor, and his determinations were published in the London Journal of Botany, 1844-1847.

A number of specimens were collected subsequently by Charles Stuart for Dr. Ferdinand Müller, of Melbourne, now Baron Von Müller, and were transmitted by him to Dr. Hampe, of Germany, in 1850, who published the names and descriptions of 34 in Schleehtendal's *Linnæa* for 1852, p. 709, etc., under the title of *Plantæ Muellerianæ*. Another small collection was forwarded long after by Dr. Müller to Dr. Krempelhuber, of Germany, who published his determinations of 37 species in *Den Verhandlungen des Kaiserlich-Königlichen Zoologisch-botanischen Gessellschaft in Wien*, 1880, p. 329, etc. These last have been revised by Prof. Jean Müller, of Geneva, in the *Ratisbon Flora*, 1887, No. 8.

The lichens determined by Hampe and Krempelhuber are enumerated in the supplements to the 11th volume of the *Fragmenta Phytographiæ Australiensis*.

Dr. William Nylander, in his synopsis *Methodica Lichenum*, 1858-1860, describes several Tasmanian lichens not mentioned by others.

Twenty-two species, determined by Prof. J. Müller, are enumerated by Baron Von Müller in the *Victorian Naturalist*, October, 1887, p. 89.

6. HERBARIA OF TASMANIAN LICHENS are not deposited, so far as I am aware, in any public institution in the colony to which students could refer. I believe that Brown's collection is in the British Museum, Hooker's in the Kew Museum, in England, Nylander's in the Paris Museum, Hampe's among his *Lichenes Exsiccati*, and Krempelhuber's in his herbarium at Blankenberg. A few Tasmanian specimens will be found also in the Botanical Museum in Melbourne.

There are several collections in private hands. Mr. Augustus Simson, of Launceston, and Mr. W. A. Weymouth, of Hobart, to both of whom I was kindly introduced by Mr. A. Morton, Sec. R.S., T., have made collections of Tasmanian lichens, and generously allowed me to select any specimens from their herbaria. Mr. R. A. Bastow, formerly of Hobart, now of Melbourne, made a considerable collection with the intention of following up his able descriptions of the Mosses and Hepaticas of Tasmania in the *Proceedings of the Royal Society of Tasmania*, by describing the lichens of the island. It is to be regretted that he is unable to continue his valuable work. In a most generous manner he handed over to me his whole collection, that I might make such use of it as I thought fit. And having myself made a large collection during a late visit to Tasmania, I possess a somewhat extensive herbarium of Tasmanian lichens. I have consulted the lichen herbarium in the Botanical Museum in Melbourne as well as my own in the drawing up of this paper, and also the literature specified

above. For the naming of Messrs. Simson's, Bastow's, and Weymouth's specimens I alone am responsible.

7. GEOGRAPHICAL DISTRIBUTION.—In Rev. Mr. Crombie's paper are recorded many of the places where Brown collected his various specimens. These places are scattered over the colonies of Tasmania, Victoria, South Australia, New South Wales, and Queensland. But these divisions were not known to Brown, and are not noted by Crombie. There has been some difficulty in determining the spots. For example, Table Mountain was found to be the name of what is now Mount Wellington in Tasmania, and is not to be confused with Table Mount near Lake Sorell. Derwent River and Risdon Cove were of course readily recognised. Anna Maria River was with some difficulty decided to be a small stream running down to D'Entrecasteaux Channel in Tasmania. On the other hand, Grose River was found in Flinders chart of New South Wales as a tributary of the Hawkesbury. Crombie seems, however, to have considered it a Tasmanian stream, for one of the lichens found by Brown at Grose River is named by Crombie *Ephebe Tasmanica*. Kingstown has not been included in Tasmania, though there is a place on the Derwent called Kingston, because the lichen said to have been found there, *Physcia picta*, is a tropical plant, not found, I believe, either in Tasmania or in Victoria. The Kingstown mentioned by Brown may probably be an island off the coast of Western Australia, 32deg. S., 115.30deg. E.

Hooker, in his *Flora Tasmania*, mentions as habitats of lichens "The Springs" on Mount Wellington, Cheshunt, Esk, at Launceston, Macquarie Plains, Richmond, Back River, and Southport. The other publications do not specify the habitats. Mr. Simson collected on the Blue Tier, Mr. Weymouth and friends, and Mr. Bastow and friends collected in Maria Island and Tasman Peninsula, on Mount Wellington and about Hobart, at the Gordon River, and in the neighbourhood of Southport; and myself about Launceston, Mount Arthur, Hobart, Mount Wellington, St. Mary's Pass, the Huon River, and Ulverstone.

CLASS OF LICHENS.

Thallus containing gonidia or granula gonima variously disposed, and also very often crystals of oxalate of lime in the crutaceous species. Fructification consisting of apothecia, containing spores in thecæ. Spermatia in nucleated conceptacles—spermagones—distinct from the apothecia.

The families and their principal divisions are founded on the diversities of the thallus, and sometimes on those of the apothecia, and even of the spermagones.

FAMILY 1. COLLEMACEÆ.

Thallus usually dark in colour, black, brown, or olive, sometimes ashly or bluish, various in form, gelatinous in substance, enclosing granula gonima, which are variously arranged—moniliform, or enclosed in sacs, or dispersed. Apothecia usually rufescent or pale, seldom black, generally lecanorine or biatorine, rarely endocarpoid.

GENUS 1. EPHEBE. Fr. Born, Nyl.

Thallus minute, filiform, branched. Granula gonima large, sub-transversely arranged in heaps, 2, 4, or more together. Apothecia endocarpoid in thickened portions of the thallus, spores 8, colourless.

Species 1, E. pubescens, Fr., blackish-brown, slender, cæspitose, entangled, branched, slightly rugulose. Spores linear-oblong or subfusiform, 1 septate.

Habitat on sub-alpine rocks. Mount Wellington.

2. LICHINA. Ag.

Granula gonima cærulescent. Apothecia terminal in globose thalline receptacles, lecanorine, sub-pyreoid. Spores ellipsoid, simple.

1. *L. confinis*, Ach., fuscous black, densely cæspitose, small, cylindrical, not compressed.

Hab. on maritime rocks between high and low water. Brown's River, Ulverstone.

3. SYNALISSA, D.R. Nyl.

Thallus small, of various forms—encrusting, sub-membranaceous, granulose or fruticulose. Granula gonima in globular cells. Apothecia innate, with thalline margin, or rarely imbedded in the thallus.

1. *S. cancellata*, Wilson, black, or dark olive, sub-membranaceous, cancellate, minutely atro-granulose, effuse, and encrusting at circumference. Granula gonima light green; enclosed in gelatinous sacs (inky with I.), 1 to 5 in each, also moniliform among fine elementary filaments. Apothecia minute (about .25 mm. broad), prominent in the thalline granules, one in each, at first endocarpoid, at length rufescent, elevated; disk concave or plane, with thalline margin withdrawn. Spores colourless, ellipsoid or ovoid, simple, with narrow epispore, .01 to .012 × .004 to .006 mm. Paraphyses slender. Thecæ cylindrical. Gel. hym. I. vinous, then yellow.

Hab. on rocks and moss, S. Esk at Launceston.

4. PYRENOPSIS. Nyl.

Thallus crustaceous granuloso areolate, internally rubricose, laxly cellulose. Granula gonima agglomerated in globular sacs. Apothecia concolorous, minute, urceolate, innate in a prominent marginal receptacle; margin somewhat swollen and connivent. Spores simple.

1 *P. Tasmanica*, Nyl., fuscous black, thin, effuse, subtilely rugulose above, diffracto glomerulose, glomerules equal. Apothecia many in each glomerule, somewhat impressed, often crowded. Spores ellipsoid or sub-globose, $\cdot 004$ to $\cdot 005 \times \cdot 0025$ to $\cdot 003$ mm. No distinct paraphyses. Gel. hym. I. cærulescent.

Hab. on granite rocks, St. Patrick's River. Hook. L.J., Bot : Nyl.

5. COLLEMA. Ach. Nyl.

Thallus various, no distinct cortical layer. Granula gonima moniliform. Apothecia rufescent, with thalline margin, Spores simple or variously septate.

Sub-genus Collema.

Spores more or less ellipsoid.

1. *C. flaccidum*, Ach., dark green, opaque, membranaceous, lobate, lobes large, expanded, flexnose. Apothecia plane, rufescent. Spores ovoid or broadly fusiformi oblong, $\cdot 023$ to $\cdot 028 \times \cdot 007$ to $\cdot 01$ mm.

Habitat on woodland rocks. Hook. L.J. Bot.; on bark, Cheshunt, Archer, Hook. Fl. Tas.

2. *C. implicatum*, Nyl. Not enumerated in Nyl. Syn. Meth. Hab. by Derwent River, Brown, Cr.

3. *C. læve*, Tayl., olivaceous, under surface paler or cinerascens, smooth, rotundo lobate, undulate. Apothecia rufous or fusco rufous, plane, at length convex, with a thin entire thalline margin. Spores fusiformi ellipsoid, $\cdot 013 \times 004$ mm., 3 to 5 septate, and also longitudinally divided. Granula gonima moniliform. Gel. hym. I. blue.

Hab. among mosses on rocks. S. Esk, Launceston; Mount Wellington, Weymouth.

4. *C* —. In Hooker's Fl. Tasm. Babington says:—"Mr. Archer has found at Cheshunt a species of Collema different from any of those described above, but has unluckily preserved only one specimen. It is unknown to us and may be new. The dull green thallus grows among mosses, has membranous rounded lobes, in a young state resembling *C. crispum*, Schær. (*C. cheilum*, according to Nylander), but after-

wards expanding into a larger frond, which is much sinuated and tomentose beneath, with rather shaggy down, as in *Leptogium saturninum* (to which, however, this cannot belong, not being a *Leptogium*), and then resembling a young frond of *Stictina fuliginosa*. Apothecia plano concave, dull red, fringed with the minute, crenated thallocal at margin, then convex, emarginate."

Sub-genus Synechoblastus.

Spores narrow or fusiform.

5. *C. nigrescens*, Huds., nigro virescent, thin, membranaceous, sub-monophyllous, orbicular, depressed, rotundo lobate, radiato rugoso plicatulate, naked or granulate, ascending in the centre, depresso adnate at the circumference. Apothecia dark rufous, plane, small, crowded, thalline margin entire. Spores fusiformi cylindrical, pluri-septate, $\cdot 034$ to $\cdot 042 \times \cdot 005$ mm.

Hab. on old trees by Derwent River, *Brown*, Cr.

6. *C. leucocarpum*, Tayl. *C. nigrescens* var. *leucocarpum* of Babington, olivaceous, foliaceo membranaceous, 1 to 3 inches diam., smooth, lobate, lobes rotundate, undulate and plicate, margin flexuous. Apothecia often crowded, albo carneous, convex, pruinose, margin entire, at length withdrawn. Spores elongato fusiform, often acuminate at apices, 3 to 5 septate, $\cdot 03$ to $\cdot 05 \times 006$ to $\cdot 01$ mm.

Hab. on trees, Derwent River, *Brown*, Cr.; Hook. L. J. Bot.; Circular Head, *Gunn*, Hook. Fl. Tasm.; Krppl.; *Stuart* in herbar. Bot. Mus., Melb.; Mount Wellington, (and *Weymouth*) *Brown's* River, *St. Mary's* Pass; *Macrobie's* Gully, and *New Town Falls (Bastow)*. Mr. *Crombie* says = *C. glaucophthalmum*, Nyl., which is a mistake. Though somewhat alike, they are quite distinct. *C. glaucophthalmum* is frequent in Victoria, but has not yet been found in Tasmania. It is likely, however, to occur associated with *C. nigrescens*.

7. *C. aggregatum*, Ach., var. *thysanæum*, Moug. *C. thysanæum*, of Babington, nigrescent, membranaceous, lobate, plicate, diffused, lobes sometimes crenate, margins often granuloso crispate. Apothecia dark rufous or rufous, moderate, crowded, with thin thalline margin. Spores 8 or 6, fusiformi cylindrical, pluri septate, not rarely somewhat curved, $\cdot 033$ to $\cdot 065 \times \cdot 004$ to 005 mm.

Hab. on bark, Cheshunt, *Archer*. Hook. Fl. Tasm.

8. *C. quadriloculare*, Wilson, var. *Tasmaniae*, Wilson, fusco olivaceous or nigricant, membranaceous, adhering, lobate, thicker at circumference, crisped. Apothecia moderate, crowded, black or rufous black, plane, or somewhat concave, with entire thalline margin. Spores cylindrical, rounded at each apex, somewhat curved, 8 locular, $\cdot 04$ to $\cdot 05 \times \cdot 003$ to

·004 mm. Paraphyses slender, not articulate. Granula gonima moniliform or sometimes conglomerated in fours in gelatinous sac.

Hab. on mosses on sub-alpine rocks, summit of Mount Wellington. Type, with 4 locules in the spore, occurs at summit of Mount Macedon, Victoria.

6. LEPTOGIUM, Ach.

Thallus very various, thin. Granula gonima moniliform. Cortical layer angulari-cellulose, distinct. Apothecia lecanorine or sub-biatorine. Spores 8, colourless, ellipsoid, variously divided.

1. *L. tremelloides*, L., plumbeo glaucescent or plumbeo olivaceous, thin, membranaceous, smooth, lobate, imbricated and crisped. Apothecia rufous or rufescent, elevated, concave or plane, with margin thick, entire, elevated, lead coloured. Spores ellipsoid, acuminate at apices, $\cdot 016 \times \cdot 006$ mm., 3 to 5 septate and longitudinally divided.

Hab. on trees and rocks in shady places, Cheshunt, *Archer*. Hook. Fl. Tasm.; Krphl.; Mount Wellington (and *Weymouth*), Mount Arthur, St. Mary's Pass.

2. *L. tasmanicum*, Wilson, small, plumbeous or fusco rufous, very thin, membranaceous, smooth, rotundo lobate, lobes imbricate, crowded, sub-ascending in centre, sinuate, undulate and crenate, often dentato fimbriate, or sometimes revolute downwards. Apothecia large compared with the thallus (1 to 2 mm. or more broad), rufous, thalline margin, often dentato crenulate. Spores fusiformi ellipsoid, 3 septate, with longitudinal divisions, $\cdot 02 \times \cdot 01$ mm.

Hab. on mossy earth. Brown's River.

3. *L. Victorianum*, Wilson, obscurely plumbeous, beneath sub-cinerascent, large, rotundo lobate, lobes undulate, firm, thickish, confusedly rugulose, Apothecia moderate, rufous, thalline margin thickish or plicate or granulate or laciniolate. Spores ovoideo fusiform, acuminate at apices, 3 septate, with central locules longitudinally divided, $\cdot 013$ to $\cdot 017 \times \cdot 005$ to $\cdot 006$ mm.

Hab. among mosses on trees, Mount Wellington, *Weymouth*.

FAMILY 2. MYRIANGIACEÆ.

Thallus black, noduloso pulvinate, cellulose, unstratified. Apothecia sub-lecanorine, sphæroideo cellulose. Spores 8, colourless, oblong, irregularly septate, or almost murali divided.

GENUS 1. MYRIANGIUM. Mnt. and Berk.

Characters above, as there is only one genus in the family.

1. *M. Duricæ*, M. and B., black, opaque, small, tuberculato glomerate or noduloso confluent, often depresso pulvinate. Apothecia small, black, slightly impressed. Spores oblong or oblongo ovoid, variously septate, $\cdot 02$ to $\cdot 036 \times \cdot 009$ to $\cdot 016$ mm. Gel. hym. I. vinous.

Hab. on bark of trees, especially on *Acacia decurrens*, S. Esk at Launceston, St. Mary's, Hobart, Mount Wellington (and *Weymouth*), Huon River.

FAMILY 3. LICHENACEÆ.

Thallus various in colour—white, whitish, cinerascens, flavicant, rufous or fuscous, rarely nigrescent, various in form—filamentous, foliaceous, squamose, crustaceous, pulverulent, or evanescent. Apothecia various—stipitate, lecanorine, peltate, patellulate, lirellate or pyrenoid.

SERIES I. EPICONIODEI.

Apothecia with the spores naked, collected into a sporal mass on the surface, Spores 8 in theca.

GENUS 1. CALICIUM. Ach. Nyl.

Thallus filmy, granulose, powdery, squamose, or evanescent. Apothecia minute, black, stipitate or sessile, capitula globose, or turbinate, or cupular. Spores fuscous or nigricant.

1. *C. phæocephalum*, Bor., var. *albidum*, Wilson, whitish, thin, smooth. Apothecia with slender, black, or fuscous stipe 1.5 mm. high, $\cdot 05$ mm. thick; capitula obconical, $\cdot 2$ mm. broad, with citrine powder on margin and beneath, sporal mass umber; spores spherical, diameter $\cdot 002$ to $\cdot 003$ mm., dilutely fuscous, containing a central locule.

Hab. on decorticated decaying eucalyptus, and on stringy bark of growing eucalyptus. Mount Wellington.

2. *C. Victoriæ*, C. Kn., white or whitish or cinerascens, more or less marked, effuse. Apothecia black, $\cdot 5$ to 1 mm. high, stipe $\cdot 1$ mm. thick, incrassate towards the base; capitula turbinate lenticular, or hemispherico lenticular, $\cdot 25$ to $\cdot 5$ mm. broad. Spores simple, fuscous, or fuscous, nucleus darker, fusiformi ellipsoid, compressed, $\cdot 005$ to $\cdot 008 \times \cdot 002$ to $\cdot 003$ mm., and when viewed from the side $\cdot 0015$ wide; paries thick, defined by a dark line on the outside.

Hab. on decorticated decaying eucalyptus. Mount Wellington (and *Weymouth*), Mount Arthur.

Var. gracile, Wilson, apothecia somewhat longer and slenderer than type; capitula turbinate and much smaller. Spores smaller and narrower, fusco nigrescent.

Hab. on decorticated decaying eucalyptus, Mount Wellington, S. Esk at Launceston.

3. *C. roseo-albidum*, Wilson, rosy whitish, thick, minutely cancellate, chrysogonimic. Apothecia black, minute, .7 mm. high; stipe .06 mm. thick; capitula lenticular, .2 mm. broad. Spores nigrescent, oblong or oblongo ellipsoid, apices rotundate, uniseptate, .005 or more \times .002 to .003 mm.

Hab. on decorticated decaying eucalyptus, Ulverstone.

The thallus often covers a large part of the tree, and when bruised it becomes a deep yellow. It has a faint primrose scent.

4. *C. piperatum*, Wilson, whitish or cinerascens. Apothecia black, sub-sessile, .2 mm. high; stipe, .1 mm. thick; capitula lenticular, disk plane .25 mm. broad. Spores fusco nigricant, oblong, .004 to .008 \times .0025 to .005 mm., uniseptate, generally much constricted at the middle, each cell containing a globular locule.

Hab. on decorticated decaying eucalyptus, Mount Wellington; South Esk at Launceston.

5. *C. quercinum*, Pers. *var. microcarpum*, Wilson; pallid or pallido cinerascens, thin, effuse. Apothecia black, .5 mm. high; stipe .13 mm. thick; capitula turbinate, .2 mm. broad, with a thin whitish margin. Sporal mass black, protruded upwards. Spores fuscous, with reddish epispore and nigrescent nuclei, uniseptate, .008 \times .003 mm.

Hab. on cortex of growing eucalyptus, Mount Wellington.

6. *C. curtum*, Borr., whitish, thin or evanescent. Apothecia variable in size, to 1.8 mm. high, but often much less, stipe to .2 mm. thick; capitula turbinate to .6 mm. broad, albo suffused beneath. Sporal mass black, protruded upwards. Spores nigricant, ellipsoid, uniseptate, .005 to .01 \times .002 to .003 mm.

Hab. on decorticated decaying eucalyptus, Launceston, at foot of Mount Arthur, St. Mary's, Mount Wellington.

7. *C. roscidulum*, Nyl., white, thick. Apothecia .9 mm. high; stipe .1 mm. thick; capitula turbinate lenticular, .4 mm. broad, margin and upper part of stipe golden green. Spores fuscescent, ellipsoid, constricted at middle, uniseptate, .003 to .006 \times .002 to .003 mm.

Hab. on decorticated decaying eucalyptus, Launceston.

8. *C. tricolor*, Wilson, sulphureous, leproso granulose. Apothecia black, to .75 mm. high; stipe, .1 mm. thick; capitula

turbinato globose, .2 to .5 mm. broad, margin white. Spores fuscous, fusiformi ellipsoid, sub-acuminate at each apex, somewhat constricted in the middle, uniseptate, with a fusco nigrescent locule in each cell, .008 to .012 \times .003 to .005.

Hab. on decorticated decaying eucalyptus at foot of Mount Arthur.

2. TRACHYLIA, Fr., pp. Nyl.

Thallus thin, granulose or sub-leprose or smooth or foreign. Apothecia black, sessile, cupuliform, open; sporal mass black. Spores nigricant or fuscous black, ellipsoid or oblong, uniseptate, rarely pluriseptate.

1. *T. emergens*, Wilson, white or whitish, thin, smooth, somewhat shining. Apothecia seeming to emerge from among the fibres of the wood, and at length barely standing out above the thallus, breadth to .5 mm. Spores fusco nigricant, adhering closely together, ellipsoid, about .005 \times .003 mm. but very variable in size; uniseptate, with a locule in each cell.

Hab. on eucalyptus rails in mountainous regions, Mount Wellington (and *Weymouth*), St. Mary's.

3. SPHÆROPHORON.

Thallus cæspitoso fruticulose, ramose and ramulose, smooth, polished, fragile, fertile apices sub-globoso incrassate, enclosing the apothecia, which are nucleiform, enclosed, ultimately exposed by the irregular dehiscence of the thalline covering. Spores nigricant or violaceo nigricant, spherical or sub-globose.

1. *S. compressum*, Ach., pallido albicant or lurid, ramose, plano compressed. Apothecia obliquely innate on the apices, receptacle wrinkled, at length lacero deliscent or discoid and open. Spores nigricant, spherical, .007 to .011 mm.

Hab. on trees in mountains, Krplh.; on *fagus*, *Gunn*, Hook. Fl. Tasm. Blue Tier, *Simson*; Tasman Peninsula, Mount Bischoff and Mount Faulkner, *Weymouth*; Gordon River, *Allport*; Maria Island, *Bastow*; Mount Arthur, Mount Wellington.

2. *S. Australe*, Laur.; glauco pallid, sometimes lurid, under surface albicant, rugose, to two inches long, branches explanate, often distichously ramulose. Receptacle 6 to 12 mm. broad, lenticulari compressed, external margin at apex cristato crenate and sometimes proliferous. Spores .011 to .015 mm.

Hab. on trees in mountains, *Brown*, Cr.; Cheshunt, *Archer*, on *fagus*, *Gunn*, Hook. Fl. Tasm. Mount Wellington, (and *Weymouth*); Mount Arthur, *Ulverstone*.

3. *S. coralloides*, Pers., pallid or whitish, sometimes lurid, ramulose, terete. Apothecia in globose receptacles irregularly debiscent above, 2 mm. or more in diameter. Spores $\cdot 009$ to $\cdot 015$ mm.

Hab. in mountainous regions on stones and trunks of trees, *Brown*, Cr.; Cheshunt, *Archer*, Hook. Fl. Tasm.; Nyl.; Krplh.; Mount Wellington (and *Weymouth*), Mount Arthur.

4. *S. tenerum*, Laur., pallid or white, terete, much branched, slender, 2 to 3 inches high, with filiform intricate branches. Apothecia 1 to 2 mm. diam., on primary branches or axes, soon denuded of thalline receptacle, which is persistent at margin of base. Spores nigricant, $\cdot 007$ to $\cdot 008$. mm.

Hab. on trees and earth on mountains, Cheshunt, *Archer*, on *Fagus*, St. Patrick River, *Gunn*, Hook. Fl. Tasm.; Krplh.; Tasman Peninsula, *Weymouth*, Mount Arthur, Mount Wellington.

SERIES II. CLADODEI.

Thallus generally erect. Apothecia terminal on podetia, rarely sessile on thallus, biatorine, rarely lecanorine. Spores 8, colourless, usually oblong and simple, sometimes elongate and septate.

GENUS I. GOMPHILLUS, Nyl., Wilson.

Thallus very thin, consisting of gonidia and filaments irregularly conglutinated. Apothecia small, stipitate by constriction of the hypothecium, of a most tenacious, horny texture. Spores 8, filiform, very long, multiseptate, in cylindrical thecæ. Paraphyse, not discrete.

1. *G. bæomyceoides*, Wilson = *Patellaria Wilsoni*, Müll., Arg., Lich., Beit. 1435, cinereous or virescent, effuse, very thin and somewhat shining, or thicker and eroso isidioso granulate. Gonidia various in form and size, conglomerated into gelatinous sacs. Apothecia of tenacious, horny texture, biatorine, sometimes margined by the white hypothecium, scattered or conglomerated, depresso globose, to 1.15 mm. diam., smooth, rufè fulvescent, pale when young and dark in age, sub-sessile or stipitate, stipe to $\cdot 5$ mm. high and $\cdot 5$ mm. thick, with sometimes 2 or 3 capitula on one stipe. Spores 8 in cylindrical thecæ, aciculari filiform, about $\cdot 14$ mm. long, pluriseptate.

Hab. on roots and trunks of trees, on mosses and bark, on *jungermannia* and lichens, also on dead leaves, etc., on the earth, Mount Arthur.

2. BÆOMYCES, Pers.

Thallus crustaceous, powdery, granulose, or squamulose. Apothecia biatorine, sessile or stipitate.

1. *B. roseus*, Pers., var. *fungoides*, Ach., whitish, granulose, margin of granules spreading, thin, continuous (K. faint yellow). Apothecia roseo carneous or albo carneous, subglobose or globoso clavate or deformi clavate, 2 to 4 mm. broad (K. orange). Stipe 4 to 8 mm. long, whiter, subterete. Spores oblong or fusiform, simple, $\cdot 011$ to $\cdot 023 \times \cdot 0035$ mm. Paraphyses slender.

Hab. on earth (chiefly clay) in mountainous regions. Hook. Fl. Tasm.; Mount Wellington (and *Bastow* and *Weymouth*).

2. *B. heteromorphus*, Nyl., pallido glaucescent or pallido cinerascens, verrucoso unequal, forming large patches. Apothecia pale carneous or carneo fuscenscent, $\cdot 5$ to 1 mm. high, variously compressed or plicate, often 2 to 6 or more conglomerated on one stipe. Spores very transparent, ellipsoid, simple, $\cdot 01 \times \cdot 006$ mm. (Thal. and Ap. K. + C.—).

Hab. on clay, mosses, dead leaves, etc., in mountainous regions, *Oldfield*, *Gunn*, *Cheshunt*, *Archer*, Hook. Fl. Tasm.; Nyl.; Tasman Peninsula and St. Crispin's (and *Weymouth*), Mount Wellington (and *Bastow*); Ulverstone.

3. *B. squamarioides*, Nyl. = *Parmelia splachnirima*, Tayl. = *Placodium splachnirimum*, Tayl. = *Baeomyces splachnirimus*, Mitten = *Knightiella leucocarpum*, Müll. Arg. = *Knightiella squamarioides*, Müll. Arg., albo or albido glaucescent, subopaque, squamose, squamæ difformed, about $\cdot 5$ mm. broad, affixed, forming small patches about 1 inch wide, lobate or lobato incised, plane or somewhat depressed in the centre, concolourous beneath or whiter. Apothecia lurid or pale lurid or lurido carneous, $\cdot 2$ to $\cdot 3$ mm. broad, biatorine, plane, margin thickish, evanescent. Spores oblong or ellipsoid or fusiform, uniseptate or simple.

Hab. on earth among lesser jungermanniæ, *Gunn*, *Stuart*, Hook. L.J. Bot.; Hook. Fl. Tasm.; Nyl.

3. CLADONIA.

Thallus foliaceus, laciniiform, with podetia generally dilated at apex into scyphi, and generally foliolose or squamulose at the base, or thallus sometimes granuloso crustaceous. Apothecia variously coloured, seldom nigricant. Spores small, oblong.

Subgenus Cladonia.

Thallus foliaceus or squamose.

I. Apothecia fuscous or fuscenscent.

A. Scyphophorus.

1. *C. alcicornis*, Flk., macrophylline, spreading, bluish grey or yellowish green above, white or whitish beneath, laciniæ

narrow, palmato multifid, inciso crenulate at apex, margins with black fibres. Podetia springing from upper surface of laciniaë, margins of scyphi cristate. Apothecia rufescent.

Hab. on dry heathy ground, *Stuart*, Hampe. Doubtful.

2. *C. ceratophylla*, Sw., pale glaucescent or flavido pallescent, laciniöse, laciniaë profoundly divided, margin undulate or crenato incised, albid beneath. Podetia attenuate, often subulate and sterile, decorticate, white or whitish, springing from the laciniaë, scyphi narrow or scarcely any. Apothecia pallescent or sub-fuscous. Spores not seen. This plant is smaller than *C. alcicornis* and is like a large-leaved *C. fimbriata*.

Hab. B.v. m. Vic. Nat. Oct., 1887.

3. *C. pyxidata*, Fr., squamulose, ashy green. Podetia cartilaginous, corticate, verrucose, or coarsely granulato pulveraceous or scaly downwards. Scyphi cyathiform, more or less proliferous.

Hab. on earth, *Gunn*, *Oldfield*, Hook. Fl. Tasm.; *Stuart*, Hampe; *Simson*; New Town Falls and Huon-road and Launceston, *Bastow*; Mount Arthur, Mount Wellington, Brown's River; Port Arthur, *Weymouth*.

Var. 1. *pityrea*, Ach., podetia pulverulento granuloso furfuraceous, ashy white, smooth and decorticate and often ribbed or laciniöse in the upper part.

Hab. Brown's River, Mount Wellington, Lilydale, Mount Arthur; Launceston, and New Town Falls, *Bastow*; Port Arthur, *Weymouth*.

Var. 2, *chlorophæa*, Flk., podetia pulverulent, granules coarser at the base, sulphury yellow.

Hab. Mount Wellington.

Var. 3, *fimbriata*, Hffm., thallus white, squamulose, podetia membranaceo corticate, deliquescing into a fine impalpable white powder, sometimes scaly from the base upwards.

Hab. Asbestos Hills, *Gunn*, Mount Wellington, *Oldfield*, Southport, *Stuart*, Hook. Fl. Tasm.; Krphb.; Mount Wellington and New Town Falls and Launceston and Huon-road, *Bastow*.

This variety occurs in Tasmania under the following forms:—

F. radiata, Schreb., podetia irregularly scyphophorous and radiato fimbriate, with divided margin, or podetia simple, cornute.

F. antilopæa, Duby, podetia extended, slender, tapering upwards, and arcuate, with minute scyphi.

F. costata, Flk., podetia granuloso pulverulent, at length denuded, and discovering their costate substance; *Wilson* and *Bastow*.

F. longipes, Mount Wellington, *Oldfield*, Hook. Fl. Tasm.

F. coniocræa, Duby, Southport, *Stuart*, Hook. Fl. Tasm.

3. *C. cariosa*, Ach., thallus pale ashy green, scales minute, more or less investing the base of the podetia. Podetia whitish, half to one inch high, dilated upwards, carious, cancellato or eroso lacunose, granulato verrucose, scyphi digitato partite, fastigiate.

Hab. on earth, Nyl., Mount Wellington.

4. *C. gracilis*, Hffm. = *Cenomyce gracilis* of Taylor; thallus pale ashy green or livid brown, leaflets at the base often evanescent. Podetia elongate, filiform, subulate, or scyphophorous and proliferous, corticate, glabrous. Apothecia pedicellate or sessile, fuscous.

Hab. on earth. Hook. L. J. Bot. (Mount Wellington and *Bastow*).

5. *C. verticellata*, Flk. = *Cenomyce allotropa*, var. *verticellata* of Taylor; thallus foliaceo squamulose, leaflets laciniaeform, crenate incised. Podetia ashy grey, corticate, glabrous or sub-verrucose, scyphophorous, scyphi denticulate at the margins, two to four times verticellato proliferous and scyphophorous from centre of scyphi. Apothecia fuscous.

Hab. on earth and among rocks, Hook., L. J. Bot.; Mount Wellington (and *Hooker*, Hook. Fl. Tasm.; and *Bastow*); Port Arthur, *Weymouth*.

6. *C. degenerans*, Flk., thallus squamulose. Podetia whitish or brown, cartilaginous, glabrous, nigrescent and albo guttate at base, scyphophorous, scyphi proliferous, cristato ramose.

Hab. on earth and among rocks, Cheshunt, *Archer*, Hook. Fl. Tasm.; Mount Wellington, Ulverstone.

7. *C. cervicornis*, Schær., thallus macrophylline, caespitose, sub-erect, narrowly laciniato multifid, crenate, cartilaginous, glaucous green above, white beneath, purplish black at base. Podetia from disk of laciniaë, short, slender, smooth, or sub-verrucose, scyphi simple and leafless, or irregularly proliferous, and more or less squamose.

Var. stipata, Nyl., basal squamæ elongate, sub-linear, crenato incised, erect, stipate, rarely fertile.

Hab. on hills and rocks, *Stuart*, Hampe; Krphl.; Mount Wellington, Huon-road.

8. *C. decorticata* (?) Fr., thallus squamose or squamulose, glaucous above, white beneath, or sometimes nigricant, lobate and crenate. Podetia one or two inches long, cylindrical,

nearly all rough, with squamules ascyphous, or with narrow scyphi. Apothecia fuscous, often confluent.

Hab. among mosses in rocky places, Mount Wellington, *Oldfield*, Hook. Fl. Tasm.; *Coates*. Marked doubtful as above in Fl. Tasm.

9. *C. cornuta*, L. = *C. fimbriata*, var. *cornuta* of Babington, thallus pale ashy green, or livid brown at the base, sparsely foliolose, folioles lobate, crenate, or none. Podetia 2 to 4 inches long, upwards to beyond the middle glabrous, at the apex pulverulent, generally cornute, a few scyphophorous, scyphi narrow, often irregular, and sometimes sub-radiate. Apothecia fuscous.

Hab. on earth, Mount Wellington and Southport, *Stuart*, Hook. Fl. Tasm.

10. *C. ochrochlora*, Flk., similar to *cornuta*, but often more foliolose. Podetia glabrous, the upper half white or ochrey-white, pulverulent, apex obtuse or narrowly scyphophorous, dentato radiate at the margin, scyphi often glabrous in the cavity and at the base of the teeth, margin green.

Hab. on turfy earth and rotten trunks of trees, Mount Wellington (and *Weymouth*), Mount Arthur, Ulverstone.

B. *Ascyphous*.

11. *C. furcata*, Hffm., = *Cenomyce ecmocyna*, var. *subulata* of Taylor; thallus squamulose, evanescent, podetia elongate, pale whitish or brownish green, fruticose, glabrous, branched, branches attenuato subulate, divergenti furcate; apothecia small, fuscous.

Hab. on earth, chiefly on mountains, Launceston, *Gunn*, Mount Wellington, *Oldfield*, Hook. Fl. Tasm.; *Krphl.*; Mount Wellington, Knocklofty, Mount Arthur; Blue Tier, *Simson*; New Town Falls and Launceston, *Bastow*. Tasmania possesses many forms of this species, some slender, and others inflated. The most marked varieties are as follow:—

Var. 1, adspersa, Flk., podetia elongate, squamoso furfuraceous, sparingly branched, branches sub-simple.

Hab. Mount Wellington (and *Brown*, Cr.).

Var. 2, squamulosa, Mull. Arg., podetia leafy or scaly.

Hab. Mount Wellington, Mount Arthur, Tasman Peninsula (*Weymouth*).

Var. 3, polyphylla, Flk., podetia more or less covered with tolerably large leaflets.

Hab. Mount Wellington.

Var. 4, attenuata, Hffm., = *C. acuminata*, Ach. of Crombie, podetia broader, subulato rumose, branches furcate, podetia often partly decorticate.

Hab. Mount Wellington, *Brown*, Cr.

12. *C. coniodendroides*, Wilson; thallus of small pale squamules investing the base of the podetia. Podetia elongated dichotomously, divergenti furcate, with branches and ramules generally at right angles to each other, sometimes irregularly clavate or contorted and swollen, or simple and subulate, wholly covered with whitish or cinereo virescent powder. Apothecia rare, pale fuscous.

Hab. on earth. Mount Wellington, Ulverstone; Kermantie Valley, *Bastow*. Possibly a variety of *C. furcata*. There is almost complete atrophy of the cortical layer of the podetia, leaving only a few scattered squamules, and often atrophy also of the gonidial layer, leaving only the chondroid medulla, clothed more or less with whitish powder.

13. *C. cenotea*, Ach. = *C. brachiata*, Fr. of Hampe; thallus almost leafless, or with a few lobato crenate squamules at the base of the podetia, which are cylindrical, whitish, or cinerascens, pulverulent, axils and apices dilated, scyphoid, perforated, the margins of the apertures denticulate, and generally proliferous, the podetia then ramose, repeatedly proliferous, the apertures generally fuscous within, apothecia pallescent or fuscous.

Hab. on trunks of trees, among mosses, *Stuart*, Hampe.

14. *C. squamosa*, Hffm., = *Cenomyce sparassa*, Ach. of Taylor and Hampe; thallus squamulose, podetia cæspitose, whitish green, cylindrical, two inches high, erect, repeatedly branched, proliferously denticulate, or subulate from margins of the minute irregular scyphi, apices rigid, sub-corymbose, radiato cristate, glabrous, longitudinally sub-lacunose, cortex entire, clothed with minute leaflets or scales, apothecia clustered, fuscous.

Hab. Cheshunt, &c., *Gunn*, *Hooker*, *Oldfield*, *Lyall*, *Hook. L.J.*, *Bot.*; *Hook. Fl. Tasm.*; *Stuart*, Hampe; *Krphb.*; Mount Wellington, *Brown*, Cr.

15. *C. delicata*, Flk., var. *subsquamasa*, Nyl. Thallus squamulose, white or cinereous; podetia whitish, slender, 1 to 2 inches high, partially glabrous, cartilaginous, longitudinally ribbed or fissured, clothed at intervals at the base with spreading, incised, and crenate scales, granulate in the upper part, branched, radiato cristate, subcorymbose; K + C —.

Hab. on decaying logs and trunks of trees. Mount Wellington; New Town Falls, *Bastow*.

16. *C. capitellata*, = *Cenomyce capillata*, Tayl., = *C. amaurocrea*, var. *capitellata* of Nyl., thallus sparingly foliolose at the base of the podetia, and occasionally throughout; podetia straw-coloured or pallid, slender, smooth, rigid, dichotomously branched, dilated here and there as if with scyphi, which are

open and subradiately proliferous, ultimate ramuli infuscate at apices, with one to four fuscous points. Apothecia shortly stipitate, brown, margin reflexed.

Hab. on rocks and earth, St. Patrick's, Hook. Fl. Tasm.; Mount Wellington, Knocklofty, Mount Arthur; S. Esk at Launceston, and Maria Island, *Bastow*.

II. *Apothecia red.*

17. *C. cornucopioides*, L., albido flavescens or cinereo virescent, squamose or squamulose, squamæ lobiform, crenate or crenato incised; podetia glabrous, often granuloso unequal or squamuloso exasperate, $\frac{1}{2}$ in. to lin. high, scyphophorous, scyphi regular, sometimes proliferous. Apothecia bright scarlet, sessile or podicellate on margin of scyphi, often confluent.

Hab. *Laurence*, Asbestos Hills, *Gunn*, Mount Wellington, *Oldfield*, Hook. Fl. Tasm.; Krplh. revis., Mull., Arg.; Mount Wellington (and *Bastow*).

Var. Tasmanica, Wilson, = *C. deformis*, var. *Tasmanica*, Krplhb. = *C. cornucopioides* Mull., Arg. Flora, 1887, No. 8; thallus foliaceous or evanescent, folioles sometimes large, lobate and crenate or laciniate, variously divided, podetia cyathiform or ascyphous, extended, sometimes proliferous or branched, lower half verucoso corticate, generally squamulose, upper half covered with depressed granules; the podetia, folioles and squamules at first light green, gradually growing fusco flavid upwards, especially at the base of the podetia and the under-surface of the folioles, the upper part of the podetium becoming a deep yellow. Apothecia conglomerate on margin of scyphus or apex of podetium.

Hab. on earth, fern trees, and decaying logs. Krplhb. in hb. Melb. Bot. Mus. (with name and description in his writing); Mount Wellington (and *Bastow*).

F. arrosa, Wilson, podetia truncated, the margin of the scyphi thickened so as to reduce the mouth almost to a point. Apothecia minute.

Hab. on decayed logs, Mount Wellington.

F. sub-macilentata, Wilson, differs from *C. macilentata* in the base of the podetia and the folioles being flavid.

Hab. on decaying logs, Mount Wellington, Ulverstone. Similar to Nylander's *C. angustata*, which, however, has virescent squamæ and sulphureous podetia.

18. *C. intermedia*, Krplhb. *Dr. Story* in hb., Melb. Bot. Mus.

19. *C. deformis*, Hffm., podetia sulphureous, pulverulent, folioles at base pallide virescent, incised, crenate, beneath

whitish or pallescent, scyphi simple, regular, or deformed. Apothecia bright red, discrete, or conglomerate.

Hab. *Oldfield*, Hook. Fl. Tasm.; Nyl.; Krplhb.; Mount Wellington, *Brown*, Cr.

It may be questioned whether the Tasmanian specimens thus named are not *C. cornucopioides*, var. *Tasmanica*, which is a very polymorphous variety as found in Victoria.

20. *C. Flærkeana*, Fr., squamules at the base of the podetia crenato incised or crenate, few or evanescent; podetia white, 1 to 1½ inch high, corticate, smooth, obtuse at apex, often obsoletely scyphoporous or incrassate, or briefly divided. Apothecia often conglomerate.

Hab. Falls of the Meander, Western Mountains, *Archer*, Hook. Fl. Tasm.; Krplhb.

21. *C. digitata*, Hffm., thallus of folioles, pallide virescent, crenato incised, or lobate and crenate, underneath white or albid, and there generally pulverulent podetia albedo; pulverulent, without folioles, cylindrical, 1 to 2 inches high, simple or rarely divided at the apex, scyphoporous, scyphi with margin either denticulate, or sub-inflexed, or variously divided, and digitato proliferous. Apothecia bright scarlet, small, or confluent.

Hab. Cheshunt, *Archer*, Hook. Fl. Tasm.

Var. macilenta, Hffm. = *C. macilenta* of Babington, thallus smaller or squamulose, podetia ½ to 1 inch or a little more, slender, simple, or shortly divided at the apex, ascyphous, obtuse, rarely with narrow, irregular scyphi. Apothecia confluent.

Hab. Cheshunt, *Archer*, Hook. Fl. Tasm.; Krplhb.

F. seductrix, Del., folioles more evolved, virescent, multifid, crenate; podetia narrow, cylindrical, simple. Apothecia minute.

Hab. on earth. Brown's River, *Oldfield*, Hook. Fl. Tasm.; Nyl.

Sub-genus Cladina, Nyl.

Thallus leafless, podetia without scyphi, repeatedly branched, more or less smooth. Apothecia terminal.

22. *C. rangiferina*, Hffm., cinerascens, 2 to 6 inches high, verruculoso, scabrous, sub-tomentose, terminal branches sub-corymbose, fastigiate, apices sub-secund, nodding, K + C —.

Hab. on earth. Hook. L. J. Bot.; *Cunningham*, *Gunn*, etc., Hook. Fl. Tasm.

Var. Sylvatica, Hffm., pale or straw coloured, glabrous, terminal branches radiato cymose, fastigiate, apices sub-secund, nodding, K f y C +.

Hab. on earth, Asbestos Hills, *Gunn*, Hook. Fl. Tasm.; Mount Wellington (and *Brown*, Cr.); George Town and Macrobie's Gully, and Leven River, and Oyster Cove, and Tasman Peninsula, and Maria Island, and Macquarie Harbour, *Bastow*; Port Arthur, *Weymouth*.

F. alpestris, L., white or pale straw coloured, verrucose, intertwining, and divaricately branched, densely thyrsoïd at apex, more stipitate below.

Hab. on earth. Cascades and Port Arthur, *Oldfield*, Hook. Fl. Tasm.; Mount Wellington.

F. pycnoclada, Pers., white or yellow, opaque, not glabrous, cæspitose, densely ramose, byssino context.

Hab. Mount Wellington, Ulverstone.

23. *C. uncialis*, Hffm. = *Cenomyce uncialis*, Tayl., greenish straw coloured, glabrous, cylindrical, fistulose, dichotomous, branches short, apices subulate, denticulate or digitate, K — C +.

Hab. on mossy earth, Hook. L. J. Bot.; *Stuart*, Hmpe.

Possibly the specimens have been juvenile forms of *C. capitellata*.

Sub-genus Clathrina, Wainio.

Thallus efoliolose; podetia terebrate or hiascent. Apothecia usually nigricant.

24. *C. aggregata*, Eschw. = *Dufourea collodes*, Tayl., = *Cornicularia terebrata*, Hmpe., pale cinerascens or cervine, pallid or pale, chestnut-red or darker, at base fuscescent, glabrous, somewhat shining, more or less terebrate, sterile branches usually slender and alternato ramulose, with furcate apices, fertile branches thick with shorter turgescens ramules. Apothecia fuscous black or fuscescent, aggregated.

Hab. on earth, rocks, logs, and trees, abundant; all collectors, Hook. Fl. Tasm.; *Stuart*, Hmpe.; Krph.; Mount Wellington, Mount Arthur, Ulverstone, Brown's River; Knocklofty, and Macrobie's Gully, and Cascades and New Town Falls, *Bastow*.

Var. inflata, Wilson, branches and ramules much inflated, to 3 mm., diam, cylindrical, but broader at furcations sterile.

Hab. on earth and rocks, South Esk at Launceston; and Maria Island, *Bastow*.

Var. 2, tenera, Wilson, sterile branches and ramules pale, filiform, intricate, procumbent, K + C —, fertile branches glaucous green, thicker, more terebrate, erect, short, and discrete. K + C +.

Hab. on logs and trunks of trees, common. Mount Wellington, etc.; Tasman Peninsula, *Weymouth*.

25. *C. retipora*, Labil., = *Cenomyce retipora*, Tayl., whitish or bluish white, cæspitose, glabrous, reticulato terebrate or lace-like, thick, branches dichotomous, short, turgid, apices obtuse. Apothecia fusco rufous, or pallescent, or nigricant.

Hab. on earth, Hook. L. J. Bot.; abundant, all collectors, Hook. Fl. Tasm.; *Stuart*, Hmpe.; Nyl.; Krplh.; Ulverstone; George Town, and Southport, and Macquarie Harbour, and Knocklofty, *Bastow*; Tasman Peninsula and Huon, *Weymouth*.

26. *C. schizopora*, Nyl., thallus of whitish or cinerascens or fuscous squamulæ, which are often much divided or isidioso dissected or furfuraceous; podetia small, 5 to 10 mm., high, pale or fusco rufescent, glabrous, lacunose, and hiascent; much thicker upwards, and usually divided into short branches, which are all truncate and fertile. Apothecia nigricant, minute, aggregate, margined, concave when young, plane when older.

- Hab. on rotten logs and trees, Nyl., ex. hb. Hook.; Ulverstone; Tasman Peninsula, *Weymouth*.

4. STEREOCAULON.

Thallus of podetia covered more or less with fragile granules of various forms. Apothecia terminal or lateral, lecideine, fuscous or fusco pallescent, internally solid. Cephalodia of various forms and colours.

1. *S. ramulosum*, Ach., thallus more or less erect, cæspitose, 3 to 5 inches high, strong, elongato ramose, the axis more or less arachnoïde tomentose, branches with whitish fibrillose granules simple or divided and divaricato ramulose. Cephalodia sub-podicellate, scrobiculato unequal, somewhat discoloured, with a gonimic stratum formed of nodules containing gonimic granules. Apothecia fuscous or pallescent, terminal, biatorine, 1 to 2 mm., broad. Spores cylindraceo fusiform, 3 to 7 septate, $\cdot 035$ to $\cdot 06 \times \cdot 004$ to $\cdot 006$ mm.

Hab. on rocks, stones, and earth, Hook. L. J. Bot.; *Gunn and other collectors*, Hook. Fl. Tasm.; *Stuart*, Hmpe.; Krplh.; Mount Wellington, *Brown*, Cr. Prof. Mueller says *Krempehueber's* specimens belong to the next species. It is probable that the others do so too.

2. *S. proximum*, Nyl., similar to *S. ramulosum*, differing in the cephalodia, in which the gonimic stratum is sirosiphoid. Spores 3 to 5 septate, $\cdot 028$ to $\cdot 06 \times \cdot 004$ to $\cdot 005$ mm.

Hab. on rocks and earth in mountainous regions, Krplh. revis., Mull. Arg.; Mount Wellington (*Weymouth and Bastow*), Mount Arthur, S. Esk (*Launceston*), Ulverstone.

3. *S. macrocarpoides*, Nyl., podetia erect, ramulose, $1\frac{1}{2}$ to 3 inches, glabrous, or for most part corticate, granules papillar,

scattered or evanescent, ramules fibrilloso divided. Cephalodia with sirosiphoid gonimic stratum. Apothecia large, 2 to 4 mm. broad, spores 3 to 7 septate, $\cdot 036$ to $\cdot 058 \times \cdot 004$ to $\cdot 006$ mm.

Hab. on stones. Nyl. ex hb. Hook.

4. *S. coralloides*, Fr., = *S. Corallinum* of Babington, caespitose, ramose, glabrous, granules cinerascens, sub-fibrillose, or digitato divided. Apothecia terminal and lateral. Spores cylindraceo fusiform, 3 septate, $\cdot 02$ to $\cdot 04 \times \cdot 0025$ to $\cdot 005$ mm. Cephalodia cinerascens, verrucose, minutely granulate, sessile.

Hab. on rocks, St. Patrick's River, Gunn, Hook. Fl. Tasm.

5. *S. denudatum*, Flk., podetia slender, simple or branched, attenuate at apex, glabrous, granules whitish or albo cinerascens, sub-peltate, medio depressed, the centre virescent, margin white, crenulate. Apothecia fuscous, small, plane or convex, terminal or lateral, spores elongato fusiform, 3 rarely to 5 and 7 septate, $\cdot 02$ to $\cdot 046 \times \cdot 002$ to $\cdot 004$ mm. Cephalodia olivaceo fuscenscent, verrucoso glomerulose.

Hab. on rocks and stones, Cheshunt, Archer, Hook. Fl. Tasm.

6. *S. leptaleum*, Nyl., thallus small, 5 to 10 mm. high, erect or ascending stipate, sparingly ramose, slender, axis nude, glabrous above or granulose at apices of branches, granules few, white or whitish, sub-globose, small, or pulveraceous. Apothecia not seen. Cephalodia olivaceous, opaque, or olivaceo cinerascens, verrucoso glomerulose, or botyroides glomerate, gonimic granules disposed in oblong or elongated nodules.

Hab. on granite stones, Nyl.; Mt. Wellington.

7. *S. gracilescens*, Nyl., white or albo cinerascens, of soft habit, with podetia nearly an inch high, caespitose congested and intricate, branched in the upper part, sparsely glomerulose, granulose, axis slender, filiform, somewhat glabrous, granules verruculose or nearly pulverulent. Apothecia and cephalodia not seen.

Hab. on granite rocks. St. Patrick's River, Gunn, Hook. Fl. Tasm.

SERIES III.—RAMALODEI.

Thallus fruticulose or filamentose, erect or pendulous, terete or variously compressed or angulose, without any folioles or granules or basal crust, internally tubulose with hollow medulla, or solid. Apothecia generally lecanorine.

GENUS I.—SIPHULA, Fr.

Thallus of terete or compressed stipes, erect, firm, simple or often dichotomously divided or ramose, apices obtuse or

sub-obtuse, whitish, opaque or sub-opaque, rarely dilated or lobate, medulla white, dense, composed of elementary filaments closely arranged longitudinally. Apothecia unknown.

1. *S. torulosa*, Thunb., white, compressed, smooth, ramose, branches ascending, ramulose, torulose, often thrust down at the obtuse apices and rugose, aggregated into a bushy cushion about an inch high.

Hab. among mosses, Mount Wellington (and *Brown*, Cr.); Ben Lomond, *Bastow*.

2. *S. pteruloides*, Nyl., cæspitose, 1 to 2 inches high, whitish, opaque, upwards compressed and attenuate towards apex, often slightly canaliculate or plicatule longitudinally on both sides, dichotomous or dichotomously ramose, one branch generally the longer.

Hab. among mosses, Mount Wellington.

2. THAMNOLIA. Ach.

Thallus consisting of podetia, which are cylindrical or sub-compressed, cornute, imperforate, simple or branched, apices acute, internally fistulose. Apothecia unknown.

1. *T. vermicularis*, Sw., chalk white or whitish, 2 to 4 inches long, prostrate or ascending or erect, simple or rarely bifurcate, smooth or longitudinally rugulose, nearly dispersed, or densely stipate.

Hab. on mossy earth or among *Cladonias*, especially *C. capitellata*, in alpine places, Mount Wellington (and *Brown*, Cr.).

3. USNEA, Dill. Ach.

Thallus fruticulose, filamentose, erect or pendulous, fibrilloso ramulose, medullary axis solid. Apothecia concolorous, orbicular or peltate, terminal or lateral. Spores small, ellipsoid, colourless, simple.

1. *U. barbata*, L. Fr., albido glaucescent or pale cinereo virescent, terete, variously branched, erect or pendulous. Apothecia concolorous, rather large, fibrilloso radiate.

Hab. on trees, logs, and old rails nearly everywhere; Hook. L. J. Bot. and Fl. Tasm.; Krphl.; Wilson; *Bastow*.

F. 1. florida, L. Fr., erect, scabrid, divergenti ramose. Apothecia large, plane, pallido carneous, pruinose, with long ciliæ on the margin.

Hab. on trees and rails, common. Hab. Hook. L. J. Bot.; *Stuart*, Hmpe; Wilson.

F. 2, scabrida, Tayl. (Müll. Arg.) = *U. scabrida* of Taylor, short, branches few but covered with long fibrils. Apothecia large, disk glaucous or sub-cæsioid, receptacle more or

less ciliate. Spores broadly ellipsoid, .01 to .012 mm. long.

Hab. Hook. Fl. Tasm.

F. 3, hirta, L. Fr., erect, minutely and abundantly fibrillose, much branched, often only verrucoso soresiate.

Hab. on trees and rails; common.

F. 4, dasygoga, Ach. Fr., elongato pendulous, clothed with numerous short spreading fibrils.

Hab. on trees; common. St. Mary's Pass, Mount Arthur, etc.

F. 5, dasygoides, Mull., Arg., pendulous, shorter and more bushy than *dasygoga*.

Hab. on trees; common. Tasman Peninsula, *Weymouth*; Wilson.

F. 6, articulata, Hudson, pendulous, elongato ramose, smooth, articulato constricted, more or less inflated.

Hab. on trees; frequent. Mount Wellington, etc.

2. *U. straminea*, Mull. Arg., B. v. M. Vic. Nat., 1887, Oct., p. 89.

3. *U. trichodea*, Ach., albido flavescens or white, glabrous, ramoso intricate, branches sparsely fibrillose, fibrils sometimes sub-secund. Apothecia concolorous, margin nude.

Hab. on trees. Springs and St. Crispin's Well, Mount Wellington, Mount Arthur. Tuckerman says:—*U. trichodea* and *U. longissima* are distinguished from the filamentous forms of *U. barbata* by their always epapillate thallus.

4. *U. longissima*, Ach., flavescens or albido cinerascens, slender, elongato pendulous or very long, terete or compressed, sub-pulveraceous on surface, with few long branches covered with long glabrous fibrils. Apothecia nearly concolorous or pallid, or very thinly glaucescenti suffused, terminal on ramules, margin fibrilloso ciliate.

Hab. on trees, Krphl. Perhaps the specimens found belong to the next species.

5. *U. angulata*, Ach., albido cinerascens, or albido flavescens or pallescent or glaucescent, pendulous, very long, elongato ramose, costato-angular, closely fibrillose, fibrils divaricate, here and there papilloso-scabrous. Apothecia albid or albido glaucescent, rather small, 2 to 3 mm. broad, margin ciliate, with slender fibrils.

Hab. on trees. *Gunn, Hooker, Lawrence*, Hook. Fl. Tasm.; *Stuart, Hmpe*; St. Mary's Pass.

4. NEUROPOGON. Nees. and Flot.

Thallus erect, surface unequal, ramose, terete, with solid axis of horny texture, or hollow. Apothecia nigricant or occasionally pallid, terminal or sub-terminal.

1. *N. melaxanthus*, Ach., pallescent or flavescens or orange, often spotted or ringed with black at the base and elsewhere, especially at the apices, dichotomously ramose, apical ramules attenuate, scrobiculosos rugose or somewhat smooth, rarely papillato scabrous. Apothecia black or pallescent, large, 4 to 12 mm. broad, margin nude.

Hab. on rocks, Arthur Lakes, *Gunn*, Springs on Mount Wellington, *Hooker*, *Mossman*, Hook. Fl. Tasm.; Summit of Mount Wellington, (and *Brown*, Cr.; *Bastow*.)

5. EVERNEA. Ach. Nyl.

Thallus flacid, erect, or ascending, or prostrate, or pendulous, applanate or subterete, laciniöse or much branched, destitute of rhizinæ, internally stuppeous. Apothecia lateral, lecanorine. Spores small, ellipsoid, colourless, simple.

1. *E. furfuracea* (?), Mann., cinerascens, dichotomously multi laciniate, upper surface isidioso furfuraceous or fibrillose, under surface canaliculate, black or cæsius nigricans. Apothecia sub-marginal, badio rufous, receptacle smooth.

Hab. on trees. Cheshunt, *Archer*, Hook. Fl. Tasm., where it is marked doubtful, as above, and a note is added that there was only one specimen, and that an aged and unsatisfactory one. It is not improbable that it was *Parmelia physodes*.

6. Ramalina, Ach. Fr.

Thallus whitish or pale, compressed, somewhat shining, rigescent, erect or prostrate, laciniate, alike on both sides. Apothecia scattered or marginal, concolorous. Spores colourless, oblong, 1 septate.

1. *R. calicaris*, Hffm., pale glaucous grey, or albido flavescens, rigescent, erect, dichotomously branched, laciniæ linear, compressed, elongated, attenuate at the apices, longitudinally lacunoso canaliculate, cortical layer filamentose. Medulla K —. Apothecia almost terminal, with deflexed and elongated extremities of the laciniæ, like a spur, behind them. Receptacle rugose beneath. Spores straight.

Hab. on trees. S. Esk (Launceston), *Gunn*, Hook. Fl. Tasm.

2. *R. fraxinea*, L., pale yellowish or glaucescent, pendulous, straggling, subrigescent, laciniæ compressed more or less broadly, applanato dilated, lacunose, longitudinally rugose or nervose, elongated and attenuate at the apices, cortical layer filamentose. Med. K —. Apothecia large, marginal, and superficial, brownish yellow or glaucescent, receptacle rugose or plicato rugose. Spores curved.

Hab. on trees. *Stuart*, *Hmpe*.

3. *R. Eckloni*, Spreng., *var. 1, membranacea*, Laur., pallido glaucous or pallid, membranaceous, compressed, laciniate, laciniae attenuato linear, glabrous, striated, apices acuminate, inciso divided. Apothecia small, marginal or scattered, pallido carneous. Spores ovate or arcuate, 1 septate, $\cdot 012 \times \cdot 005$ mm.

Hab. on trees. St. George's Bay, *Simson*.

Var. 2, ovalis, Tayl. = *R. ovclis*, Tayl., straw coloured or pallid, membranaceous, glabrous, minutely lacunose, obovate, simple, or sometimes broadly lobato divided. Apothecia small, scattered all over the upper surface.

Hab. on trees. *Gunn*, Hook. Fl. Tasm.

4. *R. brevis*, Wilson, *var. brevissima*, Wilson, glaucous or pallid, very short (3 to 10 mm. long), broadly appanate, more or less divided at the circumference. Apothecia large, scattered, elevated, disk concave, carneous, or albid, margin often inflexed. Spores oblong, slightly curved or reniform, 1 septate, $\cdot 08$ to $\cdot 09 \times \cdot 004$ mm.

Hab. on small branches of trees and bushes. Ulverstone; Antill Ponds, *Weymouth*.

5. *R. fastigiata*, Pers., pallid straw coloured, small, densely caespitose, laciniae sub-compressed, dilated and inflated upwards, smooth, lacunoso impressed, and nervoso rugose. Apothecia terminal, peltate, sessile, sub-fastigate, on very short divergent extremities of the laciniae, receptacle plicato rugose. Spores ellipsoideo oblong, straight or curved, 1 septate, $\cdot 012$ to $\cdot 017 \times \cdot 006$ to $\cdot 007$ mm.

Hab. on trees. Hook. L. J. Bot.

6. *R. geniculata*, Tayl. = *R. inflata*, Bab. = *R. pusilla*, Le Prev., pallid or straw coloured, caespitose, sub-fastigate, ramose, sub-terete or sub-compressed, smooth or obsoletely sub-nervose, often perforated with minute round holes, internally fistulose, branches attenuate. Apothecia pallido testaceous or glauco albid, terminal or sub-terminal, receptacle smooth or rugulose, sessile on a turgid branch or appendiculate. Spores oblong or fusiformi oblong, straight or obsoletely curved, $\cdot 009$ to $\cdot 015 \times \cdot 004$ to $\cdot 007$ mm.

Hab. on living and decaying twigs and branches of trees and bushes, Macquarie Plains, *Oldfield*, Cheshunt, *Archer*, Recherche Bay, Lake St. Clair, and St. Patrick's River, *Gunn*, Hook. Fl. Tasm.; Krplh.; Hobart, Brown's River, Lauceston; and B. v. M. Vic. Nat., 1887, and *Weymouth*.

SERIES IV. PHYLLODEL.

Thallus foliaceous, depressed, lobate, or variously laciniate or stellate, very rarely caespitoso intricate; medulla stuppeous. Apothecia peltiform, or lecanorine, or lecideine, or gyrose.

GENUS I. NEPHROMA, Ach. p. parte.

Thallus with cortical layer continued on under surface, and there without nerves; colour above ochroleucous or pallescent, underneath paler or whitish or nigricant. Gonidial stratum containing true gonidia. Apothecia rufous or fuscuscent.

1. *N. australe*, Rich., albidō pallescent or stramineo pallescent, passim pallidi rufescent, 3 to 4 inches broad, smooth, lobatolaciniate, margin sinuate, underneath whitish or whitish-straw colour, glabrous, smooth. Apothecia rufo-fuscuscent or fuscous, rotundate or somewhat broader, 4 mm. broad. Spores fuscuscent, fusiformi, oblong, $\cdot 015$ to $\cdot 021 \times \cdot 006$ to $\cdot 008$ mm.

Hab. Cheshunt, *Archer*, Mount Wellington, *Hooker*, Hook. Fl. Tasm. Probably these specimens belong to the following species.

2. *N. antarcticum*, Jacquin, stramineous or glaucescenti stramineous, large or smaller, lobato laciniate, margin undulate or crenate, above lacunoso or foveolato impressed, underneath bullate, smooth, albid. Apothecia rufo-fuscous or rufous, reniform, broad, back of thalline receptacle rugose. Spores fuscous, oblong, $\cdot 02$ to $\cdot 024 \times \cdot 006$ to $\cdot 008$ mm.

Hab. on bark of trees, Mount Wellington; Circular Head, *Weymouth*. Distinguished as a species by the upper surface foveolato impressed, and the lower bullate and whitish.

2. NEPHROMIUM, Nyl.

Like the preceding, but more fragile; colour lurid, glaucescent or fuscuscent or rarely pallid. Gonimic stratum of granula gonima generally moniliformi concatenated.

1. *N. lævigatum*, Ach. var. *papyraceum*, Hffm., lurido fuscuscent or glaucescent, thin, not large, orbicular, rotundato lobate, margin sinuato crenate, opaque, scarcely shining, beneath pale, glabrous and slightly rugulose. Apothecia fusco-rufous, margin of receptacle crenulato unequal, back of receptacle minutely depresso granulate. Spores fuscuscent, fusiformi, oblong, 3 septate.

Hab. on branches of trees. St. Mary's Pass.

2. *N. cellulorum*, Ach., livido castaneous or castaneo fuscuscent, diam. 4 inches, reticulato foveolate or lacunose lobate, below white or whitish pallescent, bullato unequal, glabrous. Apothecia rufous, to more than $\frac{1}{2}$ inch broad, receptacular margin scarcely exceeding disk, and entire. Spores fuscuscent, 3 septate, $\cdot 016$ to $\cdot 019 \times \cdot 006$ to $\cdot 007$ mm.

Hab. on trees, Johnny's Creek, *Oldfield*, Cheshunt, *Archer*, Mount Wellington, Hook. Fl. Tasm.; Nyl.; Mount Wellington, and *Weymouth*.

3. PELTIGERA, Ach.

Thallus membranaceous, lobate, fragile, cortical layer not continuous on the under surface, and there generally nerved and rhizinose. Apothecia marginal on upper surface of thallus. Spores 8, colourless or slightly fuscous, fusiform, 3 to 5 to 7 septate. Stratum gonidiale of granula gonima.

1. *P. canina*, L., cinerascens or cinereopallescent, opaque, more or less longitudinally lacunoso impressed, adpresso tomentellose, rotundato lobate, under surface longitudinally adpresso albo tomentose, with prominent pale anastomosing villosa tomentose nerves extending to the very margin, and clothed with tufts of pale rhizinæ. Apothecia fuscous or fusco rufous, adnate, margin nearly entire, back of receptacle uniformly tomentose, almost sub-furfuraceous. Spores 3 to 5 septate, $\cdot 066$ to $\cdot 07 \times \cdot 0045$ mm.

Hab. on mossy earth. *Stuart*, Hmpe.

Var. membranacea, Ach., thallus thinner, more glabrous.

Hab. Mount Wellington, *Brown*, Cr.

2. *P. spuria*, Ach. = *P. canina*, var. *pusilla*, Fr. of Hooker, cinereo virescent, small, digitato lobate, lobes ascending, smooth, glabrous in lower part, adpresso tomentellose upwards towards the apothecia, under surface whitish, with thick coarse spongioso tomentose nerves, and interstitial longitudinal whitish lacunæ. Apothecia fuscous or rufo fuscous, roundish, margin irregularly crenulate or denticulate, back of receptacle densely irregularly spongioso tomentose. Spores aciculari fusiform, 3 to 7 septate, $\cdot 056$ to $\cdot 075 \times \cdot 0035$ to $\cdot 0045$ mm.

Hab. on earth. Southport, *Stuart*, Hook. Fl. Tasm.; Nyl.

3. *P. polydactyla*, Hffm., glauco pallescent or pallido fuscous, digitato lobate, lobes ascending, glabrous and shining, smooth or obsolete impressed, underneath with thick coarse spongioso tomentose fusco nigricant anastomosing more or less flattened nerves, and interstitial whitish lacunæ. Apothecia fuscous or fusco rufescent, longitudinal revolute margin irregularly crenulate, back of receptacle sub-verrucoso tomentose. Spores attenuato fusiform, 3 to 7 septate.

Hab. on mossy earth. *Archer*, *Laurence*, *Stuart*, *Hooker*, Hook. Fl. Tasm.; *Ulverstone*, *St. Mary's Pass*, *Mount Wellington* (and *Weymouth*); and *Launceston*, and *Crag Creek*, and *New Town Falls*, *Bastow*.

4. *P. horizontalis*, L., pale or pallido fuscous or glauco pallescent, rotundato lobate, glabrous, smooth or slightly impressed, shining, margin sinuato crenate and slightly undulate, underneath with pale brown and fuscous black coarse flattened anastomosing or confluent nerves, and interstitial white lacunæ. Apothecia fuscous or fuscous black, rotundate or elliptical, plane, horizontal, margin irregularly crenulate,

often inflexed, back of receptacle verrucoso tomentose. Spores 6 to 8, colourless or pale fuscous, fusiform, 3 septate, $\cdot 03$ to $\cdot 042 \times \cdot 006$ to $\cdot 007$ mm.

Hab. on mossy rocks and trees, Cheshunt, *Archer*; Hook. Fl. Tasm.

4. HETERODEA, Nyl.

Thallus laciniate, sub-corneous and fragile when dry, the under surface tomentose, with cyphelloid spaces. Apothecia marginal, biatorine. Spores 8, simple, ellipsoid.

6. *H. Müelleri*, Hmpe. (Nyl.) = *Sticta Müelleri*, Hmp. = *S. cetrarioides*, Bab. = *Platysma Müelleri*, Nyl., flavido glaucescent, passim rufo-fuscous, vivid green when fresh and moist, orbicular, 2 inches wide, smooth, sublacunose, rigescent, lineari laciniate, laciniæ sinuato multifid, the margin curved downwards, the apices broader, crenato incised, sub-ascending, underneath fuscous, sub-spongiose, with black marginal fibrils, and here and there cyphelloid whitish bare spaces. Apothecia carneo rufous, sub-pruinose, strictly marginal, 2 to $2\frac{1}{2}$ inches wide, biatorine or cephaloid. Spores simple, fusiformi ellipsoid, $\cdot 009$ to $\cdot 01 \times \cdot 0025$ to $\cdot 003$ mm.

Hab. on earth, Hook. Fl. Tasm.; Hmpe.; Nyl. The upper surface of the thallus, which when fresh and moist looks like a hepatica lying loose on the earth, shrinks when dry, so that the whole plant curls up, showing only the fuscous tomentose under surface, and bears some resemblance to dried sheep dung.

5. STICTINA, Nyl.

Thallus membranaceo lobate or lobato laciniate, the under surface rhizinose, and with cyphellæ, either true and urceolate or pseudo and pulverulent. Apothecia lecanorine. Spores fusiform, 1 to 3 rarely pluri-septate. Gonidial stratum of dark blue granula gonima.

A. Pseudo cyphellæ yellow.

1. *S. crocata*, L., lurido fuscous, shining, broadly rotundato lobate, crenate, reticulato lacunose, reticulations and margins usually bearing citrine scordia, under-surface fusco nigricant, tomentose. Apothecia scattered, blackish; margins crenate, at length excluded. Spores 6 to 8, fuscous, oblongo fusiform, 1 septate, $\cdot 02$ to $\cdot 032 \times \cdot 009$ to $\cdot 01$ mm.

Hab. on earth, rocks, and trees. *Brown*, Cr.; Hook. L. J. Bot.; everywhere, *all collectors*, Hook. Fl. Tasm.; *Stuart*, Hmpe.; Krphl.; Mount Wellington, etc.; and *Bastow*, *Weymouth*.

2. *S. carpoloma*, Del., glaucescenti pallescent or flavido cinereo pallid, 3 to 5 inches wide, somewhat rigid, almost

shining, wholly linear-lacinate, laciniæ linear-lobate, lobes short, retuse at margin, upper surface scrobiculato-unequal, underneath somewhat bullato-unequal, pallid, or fuscous; tomentum thin or evanescent, pseudo-cyphellæ small, citrine. Apothecia black, marginal, $1\frac{1}{2}$ to 2 mm. broad, thalline margin smooth. Spores fuscous, fusiform-oblong, bilocular, $\cdot 023$ to $\cdot 027 \times \cdot 009$ to $\cdot 01$ mm.

Hab. on trees. *Brown, Cr.*; Nyl.; Mount Wellington.

3. *S. gilva*, Thunb., dirty lurid-pallescens, or lurid-fuscous, paler at circumference, 3 to 5 inches broad, rigescent, somewhat shining, laciniato-lobate, laciniæ briefly lobate, often almost imbricate, above scrobiculato-unequal, within medullary stratum white, underneath nigricant or dark fuscous, margin pallescens, tomentum moderate. Apothecia fuscous or black, opaque, 2 to 3 mm. wide, thalline receptacle rugoso-scabrous, pallid, margin crenate, concolorous or pale brick-red. Spores as in *S. crocata*.

Hab. on stones and trees, Nyl.; Launceston.

4. *S. granulata*, Bab., sordidly cinereo-pallid or cinereo-fuscous, especially at circumference, dilated, rigid, thicker than *S. carpoloma*, nearly opaque, laciniato-lobate or deeply lacinate, laciniæ crenate or lobato-crenate, scrobiculate or scrobiculato-unequal, margin and sometimes rugæ granuloso-albido-sorediate, underneath pallid, tomentum moderate, pseudo-cyphellæ white or yellow, often large. Apothecia not seen.

Hab. on trees. Cheshunt, *Archer*, fertile, *Hooker* and *Gunn*, barren, Hook. Fl. Tasm.; Nyl.

B. Pseudo cyphellæ white.

5. *S. cinamomea*, Rich. = *S. fragillima*, Bab., glauco-pallid or pale yellow, passim rufescent-fuscous, thinly membranaceous, rigescent, fragile, smooth, or here and there obsoletely scrobiculato-unequal, linear-lacinate, laciniæ pinnatifid, margin here and there minutely laciniato-dissect, apex dichotomous, underneath fusco-ochraceous or ochraceo-pallid, especially towards margin, tomentum rhizino-se, short, deficient at margin. Laciniæ underneath costate or sub-costate in the middle and especially towards centre of plant, above canaliculato-impressed. Apothecia fuscous or rufescent, $1\frac{1}{2}$ to 3 mm. broad, scattered or sub-marginal, thalline margin irregularly denticulato-lacerate or sub-crenulate, and at length nearly evanescent. Spores fuscous or fuscous, oblongo-fusiform, 1 to 3 septate, $\cdot 024$ to $\cdot 03 \times \cdot 009$ to $\cdot 011$ mm.

Hab. on rocks, earth, logs, and trees in shady places, Nyl.; Mount Wellington, Mount Arthur, St. Mary's Pass; Tasman Peninsula and Mount Bischoff, *Weymouth*, and Mount

Wellington, and Knocklofty, and Maria Island, and Circular Head, *Bastow*; B. v. M. Vic. Nat., Oct., 1887.

C. Cyphellæ urceolate or thelotremoid.

6. *S. fuliginosa*, Dicks., cervine or cinereo fuscescent, 2 to 4 inches broad, rigescent, either somewhat smooth or unequal, or here and there scrobiculato rugose, rather shining or nearly opaque, monophyllous, variously lobed, lobes rotundate, above frequently sprinkled with fuscous or nigricant coralloid isidia, underneath pallid, tomentum moderate, cyphellæ white or pale. Apothecia fusco rufescent, 1 mm. broad, scattered, often albido piloso ciliate at margin. Spores colourless, fusiform, 1 to 3 septate, $\cdot 027$ to $\cdot 04 \times \cdot 007$ to $\cdot 008$ mm.

Hab. on trees and mossy rocks. Cheshunt, *Archer*, Hook. Fl. Tasm.

7. *S. sylvatica*, Huds., cervine or cinereo fuscescent, 4 to 6 inches or more, rather rigescent, nearly shining or sub-opaque, lightly scrobiculato unequal, laciniato lobate, lobes variously divided, divisions obtuse at apex, upper surface here and there lightly furfuraceous, beneath tomentose, fuscous or fuscescent, generally near margin pallescent. Apothecia as in *S. fuliginosa*, but rather larger and margin nude.

Hab. on mossy rocks and trunks of trees, *Stuart*, Hmpe.

8. *S. limbata*, Sm., glauco lurid or pale cervino fuscescent, 2 to 4 inches, scarcely rigescent, smooth or very lightly scrobiculate, unequal, scarcely shining, monophyllous, variously lobate, lobes rotundate, margin usually covered with cinerous or sordid bluish grey soredia, often with round patches of the same on the upper surface of the thallus chiefly towards the margin, underneath pallid, tomentum moderate or evanescent, cyphellæ white or whitish, moderate. Apothecia not seen.

Hab. on trunks of trees and mossy rocks, Mount Wellington; Tasman Peninsula, *Bastow*. The last three species are similar and may be easily confounded.

9. *S. quercizans*, Ach., lurid, cervino pallescent or cervino fuscescent, 4 to 10 inches, thinly membranaceous, scarcely rigescent or shining, smooth, laciniato lobate, lobes variously crenato divided, margin chiefly granulato isidiose and then somewhat reflexed, undulate, underneath tomentose, fuscescent, but at margin pallid or ochraceo pallid, cyphellæ urceolate. Apothecia generally sub-marginal, fusco rufescent, 2 to 3 mm. broad, thalline margin thin, nude. Spores colourless, fusiform, 3 septate, $\cdot 03$ to $\cdot 032 \times \cdot 003$ to $\cdot 009$ mm.

Hab. on trees and mossy rocks. Nyl.

10. *S. filicina*, Ach., pallido flavescens, or pallido cinereo flavicant, small or moderate, rigescent, or thinly membranaceous and scarcely rigescent, somewhat shining or sub-opaque, smooth, stipitate, or sub-stipitate, lobato incised, lobes beneath at least towards the base costate, margin variously sinuate, underneath ochraceo pallid, tomentum thin, or sometimes none. Apothecia rufous or badio rufous, scattered, 2 to 3 mm. broad, thalline margin pallido testaceo, entire, or sometimes very slightly crenulate. Spores colourless, fusiform, 1 to 3 septate, $\cdot 03$ to $\cdot 04 \times \cdot 003$ to $\cdot 009$ mm.

Hab. Johnny's Creek, and Back River Gully, *Oldfield*, Cheshunt, *Archer*, Hook. Fl. Tasm.; Krphl.

Var. latifrons, Rich., larger and broader, 4 to 7 inches or more.

Hab. on trunks of trees, *Hooker*, near caves Back River, *Oldfield*, Hook. Fl. Tasm.; Krphl.

6. STICTA, Ach. pro parte.

Thallus variously lobed, or laciniato lobate. Rhizinæ simple. Gonidial stratum of yellowish green gonidia.

A. Pseudo cyphella yellow.

1. *S. aurata*, Ach., glaucous or testaceo rubricose, or rosy rubricose, widely expanded (to one foot), somewhat firm, opaque or scarcely shining, lobato divided, lobes sinuato incised, margins crenato undulate, generally citrino pulverulent, medullary stratum citrine, underneath fusco nigricant or fusciscent, margin beneath pale, briefly tomentose. Apothecia spadiceous black or black, largish or large, 5 to 8 mm., receptacle sub-podiceolate in young apothecia, thalline margin thin, often inflexed, marginal or sub-marginal. Spores fusciscent, 3 septate, $\cdot 024$ to $\cdot 028 \times \cdot 007$ to $\cdot 003$ mm.

Hab. on trunks of trees and mossy rocks. Cheshunt, *Archer*, St. Patrick's River, *Gunn*, Mount Wellington, *Hooker*, Hook. Fl. Tasm.; Krphl.; Wilson.

Var. rubella, Tayl. = *S. rubella* of Hooker, dull, lurid or pallido rubricose, widely lobate, 3 to 6 inches, firm, opaque, covered with thin white down, somewhat smooth, or obsoletely foveolato scrobiculoso unequal, here and there with punctiform citrine soredia.

Hab. Hook. L. J., Bot.; Mount Wellington, St. Mary's Pass.

2. *S. orygmæa*, Ach., flavido pallescent, or livido glauco pallescent, broadly lobate, 3 inches or more, thinly membranaceous but rigescent, slightly shining, closely scrobiculato unequal, or sometimes reticulato costate, lobes rotundate, margin broadly and unequally crenate, yellow within, underneath ochraceo pallescent, very thinly tomentose, here and

there often nearly nude. Apothecia fuscous black or black, $1\frac{1}{2}$ to 2 mm. broad, thalline receptacle smooth, margin crenulate at length almost obliterated. Spores fusiform, $\cdot 022$ to $\cdot 036 \times \cdot 008$ to $\cdot 01$ mm.

Hab. on trees. Southport, *Stuart*, Hook. Fl. Tasm.; Hook. L. J. Bot.; Nyl.; Mount Arthur; Blue Tier, *Simson*, Tasman Peninsula, *Weymouth*.

3. *S. Urvillei*, Del., coriaceo flavescent or ochraceo pallid, widely expanded, 4 inches or more, soft, opaque, or here and there somewhat shining, smooth or passim lightly scrobiculato unequal, laciniato divided, laciniæ lobate, crenate, or variously divided, citrine within, underneath thinly tomentose, pallid, or in the centre fuscous. Apothecia fuscous black or black, scattered, at length 3 to 5 mm. broad, thalline margin rugose. Spores fusiform, 3 to 5 septate, $\cdot 038$ to $\cdot 048 \times \cdot 006$ to $\cdot 007$ mm.

Hab. on bushes and among mosses. B. v. M. Vic. Nat., 1887, Oct.

Var. Colensoi, Bab., firmer and scrobiculate, margins with granulose or lobulose isidia. Apothecia sometimes 7 mm. broad. Spores 1 to 3 septate, $\cdot 034$ to $\cdot 04 \times \cdot 008$ to $\cdot 011$ mm.

Hab. in forests on bark of fagus, very abundant, *Gunn*, *Hooker*, Hook. Fl. Tasm.; Nyl.; Krphl.

B. Pseudo cyphellæ white.

4. *S. dissimulata*, Nyl., *var. multifida*, Laur., lurido glaucescent or pallido cervine or pallido lurid, of moderate size, somewhat flaccid, thin, rather shining, scrobiculato unequal, lineari laciniato, laciniæ narrow, sinuato multifid, margin often fringed with minute lobules or laciniolæ, apical lobes linear, obtuse or retuse, underneath pallid or at the centre fusco pallescent, tomentum rhizinose, fuscous or pale whitish, of moderate length, towards the margin evanescent. Apothecia fuscous, receptacle granulato rugulose, margin scarcely prominent, at length nearly excluded. Spores fuscous, oblongo fusiform, 1 or 3 septate, $\cdot 023$ to $\cdot 032 \times \cdot 006$ to $\cdot 008$ mm.

Hab. on trunks of trees, Anna Maria River, *Brown*, Cr.

5. *S. Freycinetii*, Del., = *S. glabra*, Tayl., ochroleucous or pallid, rarely pallido rufescent, 5 to 10 inches, scarcely rigescent, slightly shining, smooth or obsolete unequal, laciniato lobate, lobes sinuato divided, crenate, margins often partly albo sorediate, underneath slightly tomentose, fuscous or fusco cinereous, at margin pallescent or pallid. Apothecia rufous or rufo fuscous, 2 to 4 mm. broad, receptacular margin in young state inflexed, then as if thinly lacero fimbriate or sub-crenulate, marginal or scattered. Spores colourless, oblong or oblongo fusiform, 3 septate, $\cdot 022$ to $\cdot 03 \times \cdot 007$ to $\cdot 009$ mm.

Hab. on trees, common, Mount Wellington (and *Brown, Cr.*); everywhere, by all collectors, Hook. Fl. Tasm.; Nyl.; Krph.; *Simson, Bastow, Weymouth.*

F. 1. rugosa, Nyl., thallus rugose, Nyl. Syn. Meth.

F. 2. angusta, Wilson, small, narrow, linear.

Hab. Mount Wellington, Blue Tier, *Simson.*

Var. 1. fulvo cinerea, Mont., more widely lobate, margin crenate or crenato incised, underneath ochraceo fuscous, margin lighter, or all ochraceo pallid. Apothecia dark rufous, often larger, 3 to 5 mm. broad.

Hab. Mount Wellington.

Var. 2. prolifera, Mull., Arg. = *S. glabra*, Tayl., Hook. L. J. Bot.

6. *S. fossulata*, Duf. = *S. linearis*, Tayl. = *S. foveolata* of Babington = *S. Billardierii*, Del. of Mull., Arg., pallid or pale lurido glaucescent or glaucescenti pallid, small or moderate or large to a foot or more, scrobiculato foveolate, and transversely costate between the pits, lineari laciniate, laciniæ subpinnatifid, intricate, apices retuse, underneath pallid or fuscous, rhizinoæ tomentum moderate or scanty, or obsolete, pseudocyphellæ white or occasionally whitish-yellow, sometimes rather rare. Apothecia rufous or fusco rufous or nigricant, 2 to 3 mm. broad, marginal, plane, thalline margin at length excluded. Spores fuscous or fuscous, oblongo fusiform, 1 to 3 septate, $\cdot 02$ to $\cdot 032 \times \cdot 008$ to $\cdot 011$ mm.

Hab. on trees, common, Derwent River, *Brown, Cr.*; Springs on Mount Wellington, *Oldfield, Hooker*, Hook. Fl. Tasm.; Hook. L.J. Bot.; Nyl.; Krph.; Mount Wellington; and Mount Dromedary, etc, *Bastow*; Blue Tier, *Simson*; Tasman Peninsula, *Weymouth*; Mount Wellington and elsewhere.

Var. 1. cellulifera, Tayl., thallus thick, rigid, more broadly laciniato divided and scarcely to the centre, lobes sub-palmate, profoundly reticulato scrobiculate, underneath pallid, or towards the centre dark and more reticulato rugose and thinly rhizineo tomentose.

Hab. Mount Wellington.

Var. 2. Richardi, Bab., glaucescent, a foot wide.

Hab. *Gunn*, Hook. Fl. Tasm.

C. cyphellæ thelotremoid.

7. *S. stipitata*, C. Kn., glauco pallid, when moist a bright green, here and there rufescent, sub-erect, 2 to 3 inches high and sometimes 4 inches broad, thin, somewhat rigid, scarcely shining, obsoletely scrobiculate, laciniato lobate, laciniæ subpinnatifid, margins sinuate and undulate, sinuses round and somewhat large, apices often broadly dilated and crenate,

sometimes deeply divided or even laciniatule, underneath pale fulvous, tomentose, tomentum short, sordid, denser towards the base, which often ends in a stout woody tomentose stipe. Apothecia fusco rufous, 1 to $3\frac{1}{2}$ mm. broad, scattered, thalline margin entire, often at length obliterated. Spores colourless, fusiform, 5 septate, $.035 \times .007$ mm.

Hab. on trunks of trees and fern trees and logs. Mount Wellington; Gordon River, *Allport*. The plants generally grow closely crowded together and imbricated, often covering many feet of tree or log with sub-ascending fronds. The juvenile state of this lichen is very remarkable, and, so far as I am aware, it is unique among lichens. It is about 1 inch high, fruticulose, ramose, the branches spreading out in one plane secundo incurved, the stem and lower side of the branches terete, fulvous, tomentose, the upper side plane, smooth, plumbeous, the higher branches slightly dilated, the last divisions extremely minute. The diameter of the stem is about 1 mm. The plumbeous colour is owing to the presence of numerous blue-green granula gonima disposed in a moniliform manner immediately under the upper cortex. It is notable that in the juvenile state the gonimic stratum is composed of granula gonima, while that of the adult plant is of gonidia. The adult form of the plant is developed from the apex in the shape of a minute, broad, green frond, containing true gonidia. The stem then grows thicker and more tomentose, and at length loses the plumbeous branches. Many plants wither away without developing the frond.

4. *S. damacornis*, Ach., var. *macrophylla*, Del. = *S. macrophylla* of Hampe, pale rufescent or hepatico fuscescent, usually widely expanded, 4 to 6 inches or even a foot or more, rather rigescent and shining, smooth laciniato, lobate, laciniae pinnatifid, apices dichotomous obtuse, underneath fusco nigricant, margin pallescent or cinereo fuscescent or ochraceo pallescent, tomentum moderate, thin, or none. Apothecia fusco rufous or fusco nigricant, $1\frac{1}{2}$ to 3 mm. broad, marginal or scattered, thalline margin obsoletely crenulate or nearly entire. Spores colourless, or lightly fuscescent fusiform, 1 to 3 septate, $.026$ to $.036 \times .008$ to $.011$ mm.

Hab. Hook. L. J. Bot.; *Stuart*, Hmpe.

Var. *sub-caperata*, Nyl. = *Sticta sub-caperata*, Nyl. of Cr., pale lurid, size moderate, thinner than *macrophylla* and more imbricato lobate. Spores $.026$ to $.046 \times .009$ to $.011$ mm.

Hab. Mount Wellington, *Brown*, Cr.

5. *S. sub-variabilis*, Nyl., sub-stipitate, glaucous grey, smooth, shining, laciniato lobate, often dichotomous, terminal laciniae linear, narrow, furcate, with rounded apices, lateral laciniae smaller, crowded, sub-erect, beneath pale flesh pink,

tomentum short, snuff brown, margin nude. Apothecia not seen.

Hab. Mount Wellington, Mount Arthur; Gordon River, *Allport*.

6. *S. cinereo glauca*, Tayl., glaucescent or cinerascens, usually cervine at circumference, about 3 inches broad, rigescent, scarcely shining, lobate, lobes crowded, sinuate, somewhat crenate or spreading at the margin, smooth or obsoletely unequal, beneath pallid or slightly ochraceo pallid, tomentum short, concolourous, or whitish. Apothecia badio rufous, 1 to $1\frac{1}{2}$ mm. broad, thalline margin slightly crenulate. Spores colourless, fusiform, 1 septate, $\cdot 036$ to $\cdot 05 \times \cdot 007$ mm.; attenuate at each end.

Hab. Hook. L.J. Bot.; Hmpe.; Rev. Mr. Babington compares it with *Stictina limbata*.

7. *S. prolificans*, Nyl., B. v. M. Vic. Nat., 1887, Oct.

7. LOBARIA, Hffm. pro. p.

Thallus variously lobed or laciniato lobate. Rhizinæ simple. Ecyphellate, underneath bullate, reticulate tomentose. Gonidial stratum in some species formed of green gonidia, in others of dark blue granula gonima.

1. *L. scrobiculata*, Scop., glauco flavescens, reticulato scrobulate, sorediate, underneath albido bullate, tomentum fuscenscent. Apothecia scattered, margin thick, entire, inflexed. Spores colourless, fusiform, 3 to 7 septate, $\cdot 05$ to $\cdot 08 \times \cdot 006$ to $\cdot 007$ mm.

Hab. Risdon Cove, *Brown*, Cr.; Hmpe.; Hook. L.J. Bot.; *Miss Lilley*.

8. RICASOLIA, D. N.

Thallus lobate or laciniate, affixed by fasciculate rhizinæ. Cyphellæ, none usually. Gonidial stratum of small green gonidia. Spermagones in mastoid prominences. Spores fusiform and septate.

1. *R. herbacea* (?), Huds., pallid or pale lurid, or here and there glauco pallescent, widely expanded, 6 inches to a foot and more, thinly membranaceous, scarcely rigescent, somewhat shining, here smooth and there rugulose, lobate, lobes crowded, rotundato crenate and undulate at margin, underneath pallid, rhizinæ concolorous or whitish. Apothecia rufous, 4 to 8 mm. broad, thalline margin entire or obsoletely and thinly crenulate, opaque, obsoletely granulato rugulose. Spores colourless, and at length often fuscenscent, fusiform, often broadly fusiform, 1 septate, $\cdot 026$ to $\cdot 046 \times \cdot 009$ to $\cdot 012$ mm.

Hab. on rocks and trunks of trees, *Gunn*, Hook. Fl. Tasm., where it is marked doubtful as above, and a note is added that there was but a single specimen, and that in bad condition.

9. PARMELIA, Ach. Nyl.

Thallus lobate or laciniate, expanded, sometimes shining, medulla stipiteous. Apothecia scattered. Spores 8, ellipsoid, simple, small. Spermata acicular, fusiformi incrassulate at the acute apices.

1. *P. perlata*, L., albo glaucescent or whitish, dilated, lobed, lobes rotundate, sub-imbricate, often albo sorediate on the margins, under surface fuscous black or black, and pale towards margin. Medulla K yellow C —. Apothecia badio rufous, margin entire. Spores $\cdot 011$ to $\cdot 017 \times \cdot 007$ to $\cdot 01$ mm.

Hab. (various collectors) Hook. Fl. Tasm.; Hook. L. J. Bot.; Hmpe.; Krphl.; Tasman Peninsula, *Weymouth*. Often confounded with the following species, which is much more common, and is readily distinguishable by the rimulose upper surface, seen with a lens, and by the perforated apothecia, and especially by the chemical reaction.

2. *P. perforata*, Wulf., whitish or glaucous white, lobate or lobato sinuate or sinuato divided, smooth, minutely reticulato rimulose, margin often albo sorediate, under surface fuscous black or black. Medulla K yellow, then red. Apothecia badio rufescent, or fusco rufous, often medio perforate, margin entire.

Hab. Brown's River, St. Mary's Pass, Launceston, Mount Arthur; Knocklofty, *Bastow*; Circular Head, *Weymouth*.

3. *P. tenuirima*, Tayl., = *P. sulcata* of Taylor = *P. saxatilis* of Babington and Hampe, glauco cinereous or glauco pallescent or whitish, usually glaucous or virescent in growth, rigescent, somewhat shining, laciniate, laciniae sub-pinnatifid, sinuate, concave, apices crenate and crenato divided, upper surface here and there scrobiculato impressed, and—especially towards the apices—marked with white, small rugulosities, underneath black, fibrillose. Medulla K yellow, then red. Apothecia elevated, at length appressed, incurved, rufo castaneous, or rufescent, or fusco rufous, sometimes 1 inch broad, at length splitting into lobes. Receptacle reticulato scrobiculate.

Hab. on trees and rocks, Derwent River, *Brown*, Cr.; Launceston, *Gunn*, *Hooker*, Hook. Fl. Tasm.; Hook. L. J. Bot.; Hmpe.; Nyl.; Brown's River, Mount Wellington, St. Mary's Pass, Launceston, Mount Arthur; Tasman Peninsula, *Weymouth*; Knocklofty, *Bastow*.

Var. 1, corallina, Mull. Arg., the white markings on the upper surface more numerous and reticulate, centre crowded with bulbous isidia.

Hab. on rocks, Launceston.

Var. 2, multifida, Wilson, pallid or glaucescenti pallid, laciniate, laciniae narrow, sinuate, multifid, very laxly affixed, under surface densely hirsute. Apothecia large, over an inch wide, lacerato lobate, surface undulate, receptacle corrugate with elevated reticulations.

Hab. on Mount Arthur.

4. *P. saxatilis*, L., *var. omphalodes*, L., = *P. tenuissima*, Hmpe., fuscous or nigricant, shining, somewhat smooth, reticulato rugulose, laciniöse, laciniae sinuato multifid or sinuato incised or lobate, apices retuse, black and fibrillose beneath. Medulla K yellow, then red. Apothecia spadiceo badius or fuscous, margin entire or crenulate.

Hab. on alpine rocks, Hmpe. Query, *P. tenuirima*?

5. *P. conspersa*, Ehrh., pale ochroleucous, orbicular, laciniato divided, laciniae appressed, contiguous or imbricate, margins sinuato incised or crenate, undulate, under surface fuscous black or fuscous, nigro fibrillose. Medulla K yellow, then red. Apothecia spadiceous or fuscous, margin thin, inflexed. Spores $\cdot 008$ to $\cdot 012 \times \cdot 005$ to $\cdot 008$ mm.

Hab. Gunn, Hooker, Archer, Oldfield, Hook. Fl. Tasm.; Hook. L. J. Bot.; Hmpe.; Nyl.; Krph; Hobart, Mount Wellington, St. Mary's Pass, Launceston; and Bellerive, and Knocklofty, Bastow.

Var. 1, laxa, Mull. Arg., = *P. tasmanica*, Tayl., = *P. incisa*, Tayl., fide Mull. Arg., not appressed, imbricate, laciniae narrow, multifid, underneath fuscous, or fuscous, or pale, nude.

Hab. Hook. L. J. Bot.

Var. 2, isidiata, Anzi., centre of thallus densely isidiöse.

Hab. Mount Wellington.

Var. 3, stenophylla, Ach., laciniae of thallus narrower, much more divided, and imbricate.

Hab. Launceston, Miss Lilley.

6. *P. australiensis*, Cr., albido flavescent, opaque, beneath nigricant, nude, laciniae long, convolute. Medulla K—C pale red. Apothecia not seen. Similar in appearance to *P. vagans*, Nyl.

Hab. on rocks, Mount Wellington, Brown, Cr.

7. *P. caperata*, L., flavescent or sub-stramineous, dilated, lobato incised, rugose, under surface black, margin paler, nigro

rhizinose. Thal. K f yellow C + Medulla K — C —. Apothecia[‡] badio rufescent, margin crenulate, pulverulent. Spores $\cdot 017$ to $\cdot 02 \times \cdot 007$ to $\cdot 01$ mm.

Hab., various collectors, Hook. Fl. Tasm.; *Stuart*, Hmpe.; Krp^h; Brown's River, Hu n River, Hobart, St. Mary's Pass, Falmouth, Launceston, Ulverstone; Jordan, and Antill Ponds, and Tasman Peninsula, *Weymouth*.

8. *P. sub-caperatula*, Nyl. in lit., like a smaller *P. caperata*, thallus diminished, adnate, lobes crenato incised, beneath black even at the extreme margin. Thal. K—C—. Apothecia pallido testaceous or testaceo rufous, 1 to 3 mm. broad, concave with receptacular margin thin, nearly entire or obsoletely crenulate. Spores 014 to $\cdot 017 \times \cdot 007$ to $\cdot 008$ mm.

Hab. on bark of trees, Derwent River, *Brown*, Cr.

9. *P. rutidota*, Tayl., = *P. ochroleuca*, Mull. Arg., fid. ejus, flavicant, orbicular, 3 to 4 inches wide, closely adhering, smooth, longitudinally plicate, centre minutely corrugate and tawny. Apothecia central, crowded, concave, disk rufescent, margin thin at length crenulate. Much smaller than *caperata* and lighter in colour.

Hab. Hook. L.J. Bot.

10. *P. tiliacea*, Ach., glaucescent, sub-orbicular, laciniato lobate, laciniae rotundate, smooth, margin sinuato crenate. Medulla C red. Apothecia badio rufescent, chiefly in the centre of the thallus, receptacle smooth, margin nearly entire.

Hab. Cheshunt, *Archer*, Hook. Fl. Tasm.; Mount *Stuart*, *Weymouth*; Brown's River, Bellerive, Hobart, St. Mary's, Launceston (and *Bastow*).

Var. 1 scortea, Ach., orbicular, sinuato lobate, lobes short, rotund, undulate, margin inciso crenate, centre of thallus isidiiferous and pulverulent; Med. C red.

Hab. on dead wood and trees, Launceston.

Var. 2, Hookeri, Tayl., = *sub-levigata*, Nyl., fide Mull., Arg., pinnatifido divaricate, laciniae appressed, linear, narrow, distinct, sinuato incised, apices truncato furcate, beneath very atro rhizinose; Med. C red.

Hab. on small branches of trees and bushes, Launceston; Tasman Peninsula, *Weymouth*.

11. *P. ulophylla*, Ach., orbicular, pallido virescent or cinereo virescent or pallid, glabrous, lobato laciniato, laciniae rarely sub-rugose, apices rotundato lacerato crenate, margins elevated, crisp, and albo pulverulent, beneath sordid white, ruguloso fibrillose; Med. C red. Apothecia scattered, small fuscous, margin thin, at length rugoso crenate or pulverulent.

Hab. Brown's River, Hobart, St. Mary's Pass, Ulverstone, Mount Arthur, Launceston (and *Bastow*).

12. *P. laceratula*, Nyl., = *P. subflava* Tayl., fide Mull. Arg., whitish or albo glaucescent, thinly membranaceous, 1 to 3 inches wide, rugulose or passim smooth, lobato laciniate, margin crenate or crenato incised, or oftener for the most part lacero dissect or nearly isidioso dentate, beneath white, and with concolorous fibrils few and longish. Apothecia badio testaceous or pale badius, $2\frac{1}{2}$. to $3\frac{1}{2}$ mm. broad, receptacle subpodicellate, margin thin, entire, or sub-entire. Spores $\cdot 012$ to $\cdot 013 \times \cdot 007$ to $\cdot 01$ mm.

Hab. Hook. L. J. Bot.

13. *P. adpressa*, Krphl.; B. v. M., Vic., Nat., 1887, Oct.

14. *P. albata*, Wilson, white or bluish-white, opaque, with here and there soresiate patches, lobate or laciniato lobate, undulate, lobes rotund, crenato incised, beneath white or whitish, sometimes reddish-white, with scattered longish fibrils, concolorous, or cærulescent, or cæruleo nigricant; Med. K yellow C—. Apothecia not seen.

Hab. on rocks, Launceston.

15. *P. olivacea*, L., olivaceo fuscous, orbicular or sub-orbicular, smooth or minutely corrugated or sometimes varnished, laciniato lobate, lobes appressed, plane crenate, sub-opaque, under surface concolorous; Med. K—C—. Apothecia badius or badio rufescent, margin entire. Spores $\cdot 01$ to $\cdot 019 \times \cdot 007$ to $\cdot 01$ mm.

Hab. on earth, rocks, and stones. Richmond, *Oldfield*, *Hooker*, Hook. Fl. Tasm.; Hobart, Launceston; Knocklofty, *Bastow*.

Var. *prolixa*, Ach. dark olivaceous, sub-orbicular or effuse, laciniate, laciniæ narrow, variously divided, multifid, plane, crenate, incised, under surface nigricant, fibrillose. Spores $\cdot 009$ to $\cdot 012 \times \cdot 005$ to $\cdot 006$ mm.

Hab. Nyl. Probably subprolixa, a variety of *P. imitatrix*, Tayl.

16. *P. lanata*, L., nigricant or fusco nigricant, terete, slender, decumbent, stragglingly ramose, entangled, nearly shining. Apothecia lateral, concolorous, receptacular margin sub-entire or nearly granular, unequal. Spores $\cdot 009$ to $\cdot 012 \times \cdot 007$ to $\cdot 008$ mm.

Hab. Mount Wellington, *Brown*, Cr. A filamentous form of *Umblicaria cylindrica*, which is found on the mountain, is very apt to be taken for this species.

17. *P. alpicola*, Th. Fr., nigro olivaceous, crustaceo cartilaginous, orbicular or expanded, sub-opaque, laciniæ convex, rugoso plicate, imbricate and complicate, narrow, toruloso intricate, apices incurved, under surface very black, sparsely fibrillose; Med. K—C—. Apothecia nigricant, concave, margin entire. Spores $\cdot 007$ to $\cdot 012 \times \cdot 005$ to $\cdot 009$ mm.

Hab. Mount Wellington.

18. *P. physodes*, L., whitish, sub-stellate, laciniae multifid, plane, glabrous, smooth imbricate, under surface naked, rugose, fuscous black, apices inflated and badio pallescent, Thal. K yellow, C +, Med. K — C —. Apothecia spadiceous or badio rufescent, margin entire. Spores 006 to 008 × 005 to 006 mm.

Hab. Hook. L. J. Bot.; Hmpe.; Krplh.; Mount Wellington, Mount Arthur; Blue Tier, *Simson*; Tasman Peninsula, *Weymouth*; Knocklofty and Cascades, *Bastow*.

Var. 1. vittata, Ach., laciniae narrow and linear, denigrate at the margin.

Hab. Brown's River, Mount Arthur.

F. lugubris, Pers., = *P. enteromorpha*, Tayl., = *P. physodes*, *var. enteromorpha* of Babington, generally rugulose, with narrow laciniae spread out to a span or more.

Hab. *Brown*, Cr.; *Gunn*, *Archer*, Hook. Fl. Tasm.; Hook. L. J. Bot.; Mount Wellington.

Var. 2. encausta, Sw., albedo cinerascens, nearly fuscous, narrowly laciniate, unequal, laciniae multifid, convex or terete, imbricato decumbent or depressed, under surface nigrescent, opaque. Apothecia badio rufous, margin crenulate. Spores 007 to 01 × 005 to 008 mm.

Hab. Mount Wellington.

19. *P. placorhodioides*, Nyl., = *P. conferta*, Tayl., similar to *physodes*, but with thallus growing together as though monophyllo orbicular, thinly membranaceous, margin crenate or laciniato incised, beneath nigricant, but paler at edge or wholly albid. Apothecia much elevated, liver coloured or liver reddish, 4 to 8 mm. wide, crowded at centre of thallus. Spores 008 to 01 × 005 to 006 mm. Polymorphus, sometimes rugulose, etc., etc.

Hab., very common on trees and logs. *Oldfield*, Hook. Fl. Tasm.; Hook. L. J. Bot.; Nyl.; Huon, Brown's River, Mount Wellington, St. Mary's Pass, Launceston, Mount Arthur, Ulverstone; Tasman Peninsula, and Hobart, *Weymouth*.

20. *P. mundata*, Nyl., whitish or white, narrowly laciniate, laciniae dichotomous, linear, 1½ to 2½ mm. broad, closely ruguloso unequal, sub-opaque, under surface black, somewhat shining, plicato corrugate, and towards apices badius or even dealbate. Apothecia pallido badius, 4 to 9 mm. broad, receptacle rugulose, elevated, base sub-podocellate, margin entire. Spores 008 to 009 × 006 to 007 mm.

Hab. on bark of trees. *Verreaux*, Nyl.; Derwent River, *Brown*, Cr.; Krplh.; Brown's River, Mount Wellington.

F. pulverata, Nyl., laciniae somewhat broader, densely and minutely greyish-white pulverulent. Sterile.

Hab. on trees—dendrosma—in shady woods at base of Mount Wellington, *Brown*, Cr.

21. *P. pertusa*, Schrank, = *P. diatrypa*, Tayl., whitish, orbicular, plano appressed, glabrous, laciniae narrow, multifid, sinuate, convex, somewhat shining, minutely perforated, apices dilated, crenato incised, sometimes soredate, under surface black and rugose. Medulla K yellow C-. Apothecia rufo fuscescent, margin entire, inflexed. Spores 2 to 4, large, $\cdot045$ to $\cdot06 \times \cdot022$ to $\cdot028$ mm.

Hab. *Brown*, Cr.; *Gunn*, Cheshunt, *Archer*, Hook. Fl. Tasm.; *Brown's River*, Mount Wellington, *St. Mary's*, *St. Mary's Pass*, *Launceston*, Mount Arthur; *Blue Tier*, *Simson*; *Tasman Peninsula*, *Weymouth* and *Bastow*.

Var. 1. coskinodes, Wilson, much smaller, glaucous, riddled with perforations, sometimes merely reticulate.

Hab. Mount Arthur; *Tasman Peninsula*, *Weymouth*.

Var. 2. montana, Wilson, dwarfed, generally fusco rufous or fuscous or black, laciniae congested, convoluto undulate, perforations where usually apothecia appear, but few. Apothecia small, badio rufous or rufo fuscous, elevated, concave, margin thin, entire, back of receptacle rugose. Spores $\cdot04 \times \cdot025$ mm.; epispore thick, like that of a pertusaria.

Hab. on twigs of shrubs at summit of Mount Wellington.

22. *P. reticulata*, Tayl., Hook. L. J. Bot. Description in Tayl. Flor. Hiber.

23. *P. angustata*, Pers., = *P. inequalis*, Tayl., = *P. moniliformis*, Bab., yellowish, sub-opaque, or rather shining, sub-orbicular, lineari laciniate, laciniae 1 mm. wide or less, multifid, plane or convex, imbricate or sub-imbricate, often moniliformly constricted, apices attenuate, under surface either continuously or interruptedly spongy, fuliginous or fusco badious, upper surface sprinkled with minute white glandulose papillae, visible with lens. Apothecia spadiceous, or badio fuscescent, moderate or largish, elevated and spongy at the sides, margin at length lobato unequal. Spores somewhat spherical, $\cdot005$ to $\cdot007 \times \cdot004$ to $\cdot005$ mm.

Hab. *Grass Tree Hill*, *Hooker*, Cheshunt, *Archer*, Hook. Fl. Tasm.; *Mount Wellington*, *Mount Arthur*, *St. Mary's Pass*.

24. *P. colpodetes*, Ach., whitish, sub-stellate, 1 to 2 inches wide, laciniae 1 mm. broad, lineari multifid, rather plane, apices often 2 to 3 crenate, under surface fuligineo pannose. Apothecia spadiceo rufescent, 2 to 5 mm. wide, margin nude, entire or slightly rugulose. Spores oblong, $\cdot0025 \times \cdot001$ mm.

Hab. *Mount Wellington*, *Mount Arthur*; *Tasman Peninsula*, *Weymouth*.

10. THELOSCHISTES.

Thallus laciniate, generally stellato orbicular. Apothecia orange or yellow. Spores colourless, polari bilocular.

1. *T. flavicans*, Sw., yellow or orange-yellow, cæspitose, subterete, slender, entangled, much branched, branches attenuate, furcellate at apices. Apothecia orange or rufous orange, margin thin, sub-entire. Spores elliptico oblong, $\cdot 012$ to $\cdot 018 \times \cdot 007$ to $\cdot 011$ mm.

Hab. B. v. M., Vic. Nat., 1887, Oct.

Var. subexilis, Nyl., = *Physcia subexilis* of Crombie, smaller, cæspitose, orange-yellow throughout. Apothecia saffron orange, 1 to 2 mm. wide, thalline margin at length excluded. Spores $\cdot 011$ to $\cdot 015 \times \cdot 006$ to $\cdot 008$ mm.

Hab. on rocks, Kent Island, *Brown Cr.*; B. v. M., Vic. Nat., 1887, Oct.

2. *T. chrysophthalmus*, L., yellow or flavo albicant, or flavo cinerascent, rigescent narrowly laciniate, laciniae ascending, divaricato multifid, apices filbriloso ramulose or spinose, whitish beneath. Apothecia orange, margin filbriloso ciliate, sometimes naked. Spores elliptico oblong, $\cdot 011$ to $\cdot 017 \times \cdot 006$ to $\cdot 01$ mm.

Var. Sieberi, Mull. Arg., = *Parmelia spinosa* of Taylor.

Hab. on basaltic rocks, George Town, *Gunn*, Hook, Fl., Tasm.; Hook. L. J. Bot.; Krphl.; Launceston.

3. *T. velifer*, Wilson, yellow, or in the sun orange, $\frac{1}{2}$ inch or less broad, sociable, laciniolate, laciniae somewhat convex, beneath albid, sub-canaliculate, with concolorous ciliae, the apices ascending, elongate, appanate, inflated, with their lower cortex and the medulla usually wanting, and often exposing copious green or yellow gonidia. Apothecia orange rufous, 1 to 2 mm. broad, at length sub-cephaloid, much elevated, 1 to 2 mm. high, arising from the base of the thalline apical lobes. Spores $\cdot 01 \times \cdot 008$ mm. bilocular, the locules united by medial tube.

Hab. on bark of trees and bushes, sterile. Launceston.

4. *T. parietinus*, L., yellow, sub-orbicular, membranaceous, rotundato lobate, incised, lobes sub-imbricate, appressed, plane or sub-concave, smooth, margin crenate, thickened and up-turned, under surface paler or whitish. Apothecia concolorous or waxy orange, margin entire. Spores $\cdot 01$ to $\cdot 016 \times \cdot 007$ to $\cdot 009$ mm.

Hab. on trees and rocks. *Gunn*, St. Patrick's, *Oldfield*, Cheshunt, *Archer*, Hook. Fl. Tasm.; Hmpe.; Krphl.; Brown's River, Hobart, Falmouth, Launceston, Mount Wellington; and Cornelian Bay and Bellerive, *Bastow*; Derwent River, *Weymouth*.

Var. lychnea, Ach., orange coloured, pulvinate, crowded rotundo squamulose, adscendenti imbricate, margins granuloso pulverulent or lacero dissect. Apothecia margin entire, pulverulent.

Hab. Domain, Hobart.

11. PHYSCIA, Nyl.

Thallus laciniate, usually stellato orbicular. Apothecia lecanorine, nigricant. Spores fuscous, 1 septate.

1. *P. speciosa*, Wulf., white or albo cinerascens, stellato laciniate, laciniae narrow, multifid, plane, sub-imbricate, somewhat ascending at the apices, under surface plane, albo flocculose, rhizinae and marginal ciliae whitish. Medulla Ky Cy. Apothecia fuscous, margin sub-entire or crenulate, incurved. Spores $\cdot 025$ to $\cdot 036 \times \cdot 012$ to $\cdot 017$ mm.

Hab. Hmpe.; Krplh.; Mount Wellington.

F. sorediata.

Hab. Brown's River.

2. *P. comosa*, Nyl, white or albo cinerascens or albo glaucescent, laciniato divided, laciniae rather short, ascending, ciliae scattered and on margin, under surface pure white. Apothecia caesio pruinose, 3 to even 13 mm. wide, elevated, receptacle podicellate, sprinkled with ciliae, margin thin and broad. Spores $\cdot 024$ to $\cdot 03 \times \cdot 012$ to $\cdot 017$ mm.

Hab. B. v. M., Vic. Nat., 1887, Oct.

3. *P. stellaris*, L., white or albo glaucescent, orbicular, stellari appressed, laciniae multifid, contiguous, sub-cortically albo maculate, under surface whitish, with concolorous or fuscous or nigricant fibrillae. Med. K yellow C —. Apothecia fuscous black or black, naked or caesio pruinose, margin entire or obsolete crenulate. Spores oblong, cells nucleated, $\cdot 016$ to $\cdot 024 \times \cdot 008$ to $\cdot 011$ mm.

Hab. on trees, St. Mary's, Launceston.

4. *P. astroidea*, Clem., greyish white, orbicular, thin, closely appressed, almost entirely granulose or leprose, laciniato effigurate at the circumference. Med. Ky Cy. Apothecia fuscous black, naked or pruinose. Spores elliptico oblong, cells nucleated, $\cdot 017$ to $\cdot 026 \times \cdot 008$ to $\cdot 011$ mm.

Hab. on trees, St. Mary's Pass.

5. *Physcia picta*, Sw., white or whitish, appressed, orbicular, laciniae plane, sub-imbricate, contiguous or sub-confluent, narrow, variously crenate, under surface black, nude, opaque, but at extreme edge whitish. Apothecia black, plane, small,

1½ mm. wide, black within, receptacle rather elevated and margin crenulate. Spores .011 to .02 × .007 to .009 mm.

Hab. B. v. M., Vic. Nat., 1887, Oct. Very doubtful. *P. picta* is a strictly tropical and sub-tropical lichen. It has not been found in Victoria.

12. UMBLICARIA.

Thallus membranaceous, monophyllous, umblically affixed. Apothecia lecideine, complicato compound or gyrose. Paraphyses distinct. Spermata slender, shortly cylindrical, obtuse at both apices.

1. *U. cylindrica*, L., cinerascens or dull greenish brown, thickish, unequally lobed, margins nigro fibrilloso ciliate, upper surface rugulose, under surface pallescent, more or less fibrillose. Med. K — C —. Apothecia concentrico gyrose, podicellate. Spores 8, colourless, ellipsoid, simple, .01 to .016 × .006 to .008 mm.

Hab. on sub-alpine rocks, summit Mount Wellington (and *Brown*, Cr.).

F. jubata, Wilson, black, filiform, cæspitose, elongate. entangled.

Hab. with type, Mount Wellington.

2. *U. atro-pruinosa*, Schær, var. *cinerascens*, Ach., fusco-nigricant somewhat cinerascens, smooth, or at the centre very thinly rimuloso areolate, under surface fuligineo nigricant, or, especially towards the margin, cinereous and shining. Apothecia somewhat prominent, simply lecideine, moderate. Spores simple, ellipsoid, often bean-shaped, .011 to .016 × .006 to .009 mm.

Hab. on rocks at summit of Mount Wellington. Associated with *U. cylindrica*, but on more exposed parts of the rocks.

3. *U. proboscidea*, L., cinereo nigrescent, thin, crenate, slightly lobed, pale pruinose, grey in the centre, where it is marked with elevated reticulated veins, the other portions rugose, under surface smooth, cinereo pallescent, Med. K — C red. Apothecia gyroso plicate. Spores 8, colourless, ellipsoid, simple.

Hab. Mount Wellington, *Brown*, Cr.