

THE LICHENS OF QUEENSLAND.

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INTRODUCTION.

The Lichens of Australia have not received much attention from botanists, either in Europe or here. New Zealand has had its Lichen flora examined by many of the most experienced specialists. Tasmania also has had nearly the same advantages. In Australia no special essay has ever been devoted to the subject. A complete Lichen flora for the whole continent is what we would not expect. It would be unreasonable even to look for this for one of the colonies; but it is a matter of surprise that no one as yet has tried to determine and catalogue the ordinary species. What Robert Brown did was to catalogue those he found on the coast, and those obtained in the few hurried journeys into the interior, which were made by himself and others in his time. What he obtained caused him to conclude that two-thirds of the Lichens of Australia were identical with European species. No other essay appears to have been written on the subject until it was approached by Dr. Woolls, who, in 1867, published a little work on the Flora of Australia. This contained a series of essays on the botany of our continent, written in a popular style, and with a view to convey only popular information on the subject. Amongst the essays there is one on Lichens. In this there is the determination of a few species belonging to 13 genera, all growing in the neighbourhood of Parramatta. In the Annual Report of the Botanical Garden of Melbourne for 1868, there is a list of species collected by Baron von Mueller up to that period. I learn also from Dr. Woolls' essay that in the *Journal of Botany*, published at Halle in 1856, as a part of the *Plantæ Muellerianæ*, or plants collected in Victoria by Baron v. Mueller, that eleven more species had been added to the Australian flora, principally belonging to the genera *Cladonia*, *Parmelia*, and *Sticta*.

From these small materials it would be impossible to conclude anything with regard to the specialities of our flora. It is true that any very special features we might not expect. Lichens are too cosmopolitan, or widespread, to admit of any country having features in this department peculiarly its own. We cannot anticipate that the marked insular characters of our Australian *phænogams* will be continued amongst the Lichens; yet some Australian characteristics we might look for. What has resulted from the examination

of the New Zealand Lichens would lead us to this opinion. Those islands have proved to be peculiar in their Lichens in a remarkable degree. It is the province of *Stictas*. This is a very large temperate and tropical genus, which is not found in arctic or alpine regions, but is most abundant in New Zealand, either on the ground or on trees. The same genus is well represented in Australia, but, as far as we know, not to the same extent as in New Zealand. We do not know as yet what is our commonest form of Lichen, or if we have any which predominates, but the results so far are of great interest, and stimulate enquiry.

The study of Lichens, however replete with interest, is still a very difficult one—so difficult that the most eminent lichenologists are far from being in accord with one another. I do not allude now to the discussion which is taking place as to the nature of the plants, but as to the classification. Then there are many arrangements of the various families, but botanists seem a little divided between the merits of two systems, namely, that of Fée and that of Nylander. The latter has been followed by Hooker in his New Zealand and Tasmanian Flora, and I believe is the system most generally approved of. It has also this advantage, that Dr. Nylander has himself arranged many Australian, Tasmanian, and New Zealand species; but, whatever system be adopted, determination can only be made with the greatest caution. Dr. Hooker says, in the handbook to the New Zealand Flora (p. 553), “For myself, I frankly confess that I find it impossible to determine even the foliaceous Lichens satisfactorily, except by comparison of specimens, whilst the species of the crustaceous and corticolous genera are so difficult to examine, and impossible to describe in definite language, that I doubt any two independent workers coming to a tolerably close agreement regarding their limits and nomenclature, even if they worked upon the same specimens.”

I will take the liberty of inserting in this place a few remarks on the organs of Lichens, taken from Dr. J. Hooker. I do this for the sake of those students into whose hands this essay may come, and who may not have any easy access to the authorities, or manuals which treat of the subject. It is very desirable to excite an interest on lichenology in Tasmania, where so much has still to be learned, and so much that may be of importance to the colony may be discovered in this department of botany. Lichens contain dye principles of great value, as I shall show presently. Their study, in the most important fields, will be in portions of the Island now well known, but which were not accessible to Dr. Hooker when he made his census. These are exactly the

places where books are not accessible, and yet where this little essay may easily find its way. No other apology, therefore, will be needed for reprinting Dr. Hooker's remarks.

Lichens are a very large natural order, found in all climates and latitudes. Upwards of 1,300 species are described, very many of which have most extensive ranges of distribution, from the Arctic Circle to the Equator, in both hemispheres. Like most of the Cryptogamic orders, they chiefly affect damp temperate climates. They are composed of a thallus, which usually spreads horizontally over dead wood, bark of trees, or rocks. In many genera the thallus is erect or pendulous, and sometimes it grows from the earth like moss. The thallus may be (1) *effuse*, that is without determinate shape; or (2) *effigurate*, determinate in shape; (3) *scaly*, formed of small coriaceous scales; (4) *crustaceous*, of a thick crusty substance; (5) *powdery*, or *leporous*, when formed of minute membranous scales; (6) *granular*, composed of minute granules; (7) *foliaceous*, forming leaves like branches. The attachment of the thallus may be by the whole under surface, or by fibrils or bundles of short filaments, and may be by one point or many. When the thallus is erect it is often called a podetium, a name given to the erect cylindrical portion of a horizontal thallus.

Four kinds of reproductive organs have been noticed in Lichens, viz.:—1. *Apothecia*, circular or variously shaped shields, cups, or prominently formed of closely packed jointed filaments and closed tubes (*asci*), which contain simple or septate spores. 2. *Spermagones*, minute open cavities in the thallus, containing filaments (*sterigmata*), upon which are extremely minute colorless bodies called *spermatia*. 3. *Pycnidia*, or *superficial spermagones*. 4. *Gonidia*, or *granules*, often scattered like powder over the thallus; they are analogous to buds, and reproduce the species.

The internal substance of the thallus consists usually of three layers:—1. The corticle, which is tough and leather-like, formed of densely packed minute cells, with thick walls. 2. A green gonidia layer, formed of loose bright green or yellow globular cells, which either have a proper cellular coat, and are called gonidia, or have none, and are called gonina. These cells are almost peculiar to Lichens. They often burst through the upper layer in masses called soredia, or are scattered like powder over the cortical layer, or fringe the lobes of the thallus. In the genus *Stictia* they burst through the under surface of the thallus, and occupy small circular depressions or cups called cyphellæ. Many Lichens are extensively propagated by gonidia, which may be seen forming green or yellow powdery strata on bark, stones, etc.

These strata were formerly supposed to be independent Lichens, and constituted the genus *Lepraria*. Sometimes the gonidia invade the apothecium of Lichens, which gave rise to another false genus, *Variolaria*. 3. A medullary, spongy, filamentous, or cottony layer, composed of a network of jointed delicate threads; these are sometimes developed downwards, forming rootlets or fibrils on the under surface of many horizontal thalli. The hypothallus is a rudimentary horizontal stratum, from which the thallus grows, and is only distinguishable in the youngest state of the more highly organised Lichens, and lies beneath the crustaceous or granular thallus of the more lowly.

The apothecia are usually discoid, dark-colored bodies, occupying various portions of the thallus, rarely, however, the under surface. In *Nephroma* they occupy the lower recurved margin. They may be orbicular, linear (lirellate), sessile or stalked, superficial or sunk in the thallus, convex, concave, or sub-globose, and of all colors. The apothecia consists of the exciple or receptacle and thalamium.

The receptacle is the enveloping portion of the apothecium, and is formed of the substance of the thallus. When the apothecium is adnate to the thallus, the receptacle only borders it, and when the apothecium is peltate or stalked, the receptacle forms its under surface also. When the bordering portion is of the same color as the thallus, it is called a thalline, or thallocal border; when of a different color, or that of the thalamium, it is called a proper border. The receptacle may be altogether absent, or almost enclose the thalamium, or form a globular capsule called a perithecium. The thalamium is usually solitary in each receptacle, but sometimes there are several, which are separate or confluent. It consists of a series of vertical, elongate, microscopic bodies, rising from a layer of minute cells, called the hypothecium, and they are usually held together by a transparent gelatine. The vertical bodies are two in number, paraphyses and thecæ or asci. The paraphyses are the most numerous; they are linear, subclavate, transparent jointed bodies, whose terminal cells are thick walled, are often crustaceous, warted, colored, and adhering together from the hard substance of the thalamium. The asci are shorter vertical bodies, linear, clavate or ellipsoid, tapering downwards, and consist of simple, thick-walled transparent sacs containing one or more, usually eight very minute spores. At maturity the ascus breaks at the top, discharges the spores and shrivels up, when fresh asci are developed from the hypothecium, and this process goes on as long as the apothecium, which is perennial, exists. The spores are

usually ellipsoid, but may be of any shape, and are simple, or divided into sporidia by one or more transverse partitions; they are then called septate.

The spermagones are microscopic, simple, or compound cavities in the thallus, opening by pores, whose orifice is usually dark. They are full of gelatine, and contain sterigmata, which are simple or branched, articulate or inarticulate filaments, short, straight: articulate sterigmata are called arthrosterigmata. Upon the sides or tips of the sterigmata are the spermatia, which are most minute, ovoid, ellipsoid, linear or acicular, straight or curved colorless bodies. The spermatia accumulate in the cavities of the spermagone, and escape by its pore. They appear to be analogous to the antherozoids of *Algae*, etc., but have no cilia, and are not developed into antheridia. They are found in maturity usually in spring or summer, long before the spores of the apothecium are mature, and the relations between these two kinds of organs are still disputed.

Pycnidea are longer, thicker walled, sometimes superficial spermagones, of which the sterigmata are simple, inarticulate, tubular, tapering pedicels, called stylospores, that bear at their tops bodies analogous to spermatia, but longer, curved, oblong, and full of granular contents.

In germination, the sporidia of a Lichen give off one or more branching filaments, whose branches interlace, and form a network, upon the hypothallus, which again develops into the medullary stratum. A layer of colorless cells next spreads over the hypothallus, and amongst these the gonidia appear. In many Lichens, including most of those growing on bark, there is no further development of thallus, the apothecia growing from this, and in some few the hypothallus is alone formed. In the higher forms, however, a cortical layer is added. The hypothallus though often evanescent, is present as the fibrils of *Sticta*, the black fringe of *Lecidea geographica*, and in other forms or colors in many other corticolous and rupicolous species. The food of Lichens is not confined to the gaseous elements, for they take up mineral matter in abundance, especially carbonate and oxalate of lime, besides compounds of alumina, silica, iron, potash, soda, magnesia, and even of metals as manganese and iron. Some species attain a great age, and some appear to burrow into the rock they inhabit. This burrowing has been attributed to the corroding power in the vegetable, but Dr. Hooker thinks it more probably due to the moisture they retain around them. With reference to the age, the Rev. Mr. Berkeley thinks that the growth is very rapid at first,

and subsequently the increase in the size of the thallus does not alter much for years.

The interest attaching to these humble organisms would be much greater if it were known what an important place they occupy in human economy. Thus the Laplander entirely depends upon the crop of Lichens to feed his reindeer, and to supply many other wants. *Cladonia rangiferina* forms the only food of the reindeer during the winter months. The surface of the soil is carpeted with it in Lapland, just as in the table lands of many parts of South Tasmania. I have seen the ground covered with a thick growth of *Cladonia retipora* several inches in height. Another beard-like Lichen, *Usnea florida*, is gathered largely in N. America, to be stored as winter fodder for the cattle. The well-known Iceland moss, *Cetraria Islandica*, is a Lichen. It is still extensively used as a restorative in exhaustive diseases. Without it the Icelanders could not live. It is to them what wheat and oats are to the European. Several other species of Lichen are esculent, and there are few which might not be used to stave off starvation in the bush.

In medicine, Lichens have been most extensively employed, though not so much in repute now as formerly. The bitter principle made them esteemed as febrifuges, and their astringent qualities recommended them as styptics and tonics. It is, however, to be borne in mind that most of their medicinal qualities are more to be attributed to the tree on which they grow than to themselves, because the Lichen, which has certain qualities when growing on a tree, does not possess them when growing on a rock or other different surface.

There are many other medicinal and domestic uses for Lichens, but I pass on to that which constitutes their greatest value, and that is the possession of colors which make them of use to the dyer. It is not generally known that the original colors of the Highland tartan were derived from dyes produced by the Lichen. The colors were prepared by boiling the thallus in water along with other ingredients, such as heather, twigs, birch-leaves, the roots of the nettle, and other common plants. The twist was soaked in the liquor, and by this means dyes of brilliant and lasting tints of red, yellow, green, blue, or black, in varying shades, were obtained. By a combination of the threads in weaving, the well-known tartan was produced. The best and most useful of the native dye Lichens is the cudbear, so called after Mr. Cuthbert, who first brought it into use. The species is known as *Lecanora tartarea*. I am not aware that the species is found in Australia, though we have a few of the genus. The dye is quite equal to any orchin, and is capable of being

modified into any tint of purple or crimson. A beautiful and valuable crimson pigment is obtained from a dark-brown shrubby British Lichen named *Cornicularia aculeata*. The common stone Lichen of Scotland, which forms grey rosettes on every rock, is much used by the Scotch peasantry to dye woollen stuffs a dirty purple or reddish-brown color. For much valuable information on this subject, the matter is referred to Dr. MacMillan's "First Forms of Vegetation," or Lindsay's "British Lichens." Dr. MacMillan states that in the low rocks on the summits of all the loftiest Highland hills there is a curious leafy Lichen, *Parmelia fahlunensis*, found abundantly, and with the appearance as if it had been scorched by the sun into a black cinder. Of all Lichens he says this species, judging from its outward color and appearance, would seem to be the last capable of yielding coloring matter; and yet, when treated in the ordinary way, it yields a brilliant pink-cherry or claret color, which in France has been applied to so many useful purposes that the Lichen is known as "*Herpette de Tenturiers*," or dyers' Lichen. But the most valuable of all Lichens is the *Roccella tinctoria*, or *Orchil*, which is so extensively used in dyeing, and is still largely imported from the tropics. It is found as far north as the Channel Islands, but is not in any quantity. It used to form a valuable article of export from the Canary Islands. At present the kinds of *orchil* most sought after are imported from the coast of Africa.

The coloring matter of all these species separates itself quite easily when rubbed under water. The water becomes milky from erythric acid, which settles in the water as a fine powder. The addition of hypochlorite of lime instantly brings out its red color. The same effect will be produced by touching the lichen with the same salt moistened. In fact, hypochlorite of lime becomes a test for any coloring matter in Lichens. In some Lichens, such as *Orchil*, the coloring matter lies on the surface, in others it is necessary to cut into the thallus to discover it; but a most certain test for all will be to bruise or boil the Lichen in water, and then add hypochlorite of lime to the infusion. This form of investigation into the habits of Lichens ought to be of the greatest interest and value, especially if we refer to Queensland. It has been long ago ascertained that Lichens from tropical or subtropical regions possess medicinal and coloring qualities to a much larger extent than those from other regions. Those which grow near the sea are also more valuable than those growing inland.

Australia would not be looked upon as a likely field for new Lichens, when we reflect upon the large proportion of

dry and desert country it possesses; but, just as our coast line is very rich in species of ferns and fungi, so it is in Lichens. Our *Cryptogamic* flora generally may be regarded as best represented on the coast from Tasmania northwards, becoming richer in proportion as the climate becomes warmer. Amongst the Queensland Lichens, as in New Zealand and Tasmania, we find a good many species which are found all over the world, but not so many as R. Brown supposes. It must not surprise us to see them so widely diffused when we remember how excessively fine the spores are, and how easily borne along by the very lightest breath of air. As far as it has been examined, the Queensland Lichen flora possesses many novelties, but it is not sufficiently known to make any general conclusions. The species here described belong to 34 genera, distributed in the following way:—*Obryzum*, 1; *Collema*, 1; *Leptogium*, 3; *Myriangium*, 1; *Bæomyces*, 1; *Cladonia*, 8; *Usnea*, 5; *Ramalina*, 4; *Platysma*, 1; *Nephromium*, 1; *Sticta*, 4; *Stictina*, 6; *Parmosticta*, 1; *Parmelia*, 24; *Pyxine*, 3; *Pannaria*, 2; *Coccocarpia*, 1; *Lecanora*, 8, with 4 varieties; *Pertusaria*, 3; *Thelotrema*, 2; *Ascidium*, 2; *Cænogonium*, 3; *Lecidea*, 20; *Graphis*, 9; *Opegrapha*, 1; *Glyphis*, 3; *Arthonia*, 1; *Chiodecton*, 2; *Trypethelium*, 3; *Endocarpon*, 1; *Plagiothelium*, 1; *Verrucaria*, 12; *Strigula*, 3; *Physcia*, 1.

This makes in all 145 species, and four varieties. The Lichen flora of Queensland must be, of course, much larger than this. In New Zealand, which is the best known of the Australasian islands in this respect, there are 44 genera, and about 250 species, that is including Dr. Lindsay's enumerations. A good many of the New Zealand species are found in Australia, but probably not all. In general there is a strong resemblance between those of New Zealand and all the Pacific Islands. Some relations also exist with South America. Both these features appear in Australian Lichens, but not in so marked a manner. In New Zealand the Highland dye Lichen, *Lecanora tartarea*, occurs, but not *Roccella tinctoria*. *Parmelia saxatilis* is another dye Lichen which is common in New Zealand, and is most probably in Australia as well, because it is of world-wide distribution.

As a guide to those who may be in search of these organisms, it must be remarked that collections from various places are what are most needed. It must not be imagined that because many species have a wide distribution that some are not very local. Again, external resemblances are no guide in establishing the identity of species—a minute examination and comparison will be necessary. So that beginners need not fear, in collecting everything, that they are not making useful

additions to the knowledge of our flora. *Collema* and *Lep-
togium* are generally seen as a brownish-green sort of skin on
the bark of many scrub trees; on these *Obryzum* has been
found as a parasite at Ipswich, in Queensland; on the ground
will be found *Bæomyces*, and sometimes *Cladonia*, though the
latter will be more common on logs and rocks; *C. Flærkiana*
and *C. marcelenta* are easily recognised by their numerous
red caps, and *C. retipora* by its net-like appearance; all the
beard mosses, or *Usnea*, will need no description; they hang
from the branches of trees, or on dead wood, fences, etc.,
in a conspicuous manner.

Mr. Bailey states that *Usnea longissima* is extensively used
in Queensland, entwined round the hat as a protection
against the sun. The common *Usnea* on our fences is
generally *U. barbata*, var. *cornuta*, very common on the Blue
Mountains, New South Wales. With this is found *Ramalina
complanata* around Brisbane, but it is most abundant on the
main range. The *Stictinas* are all of large foliaceous habit,
but the close damp gullies of the ranges are the places for
them on rocks, logs, and trunks of trees. With these also
will be found the genus *Sticta*. The *Pyxine* of the accom-
panying list, I am informed by Mr. Bailey, was taken from a
tree on the coast, near Cairns, Trinity Bay. The *Physcias*
are abundant on the fences, scrubs, trees, and rocks, with the
exception of *P. chrysophthalma*, which prefers slender twigs.
“To see a dead branch covered with this delicate and
beautiful species is worth a trip to the scrub at any time.”—
Bailey. I am indebted to the same gentleman for most of
the following facts:—*Parmelia* is pretty common every-
where. *P. tinctorum* covers the rails of fences; *P. perforata*
loves to grow on charcoal, and thus the burnt stumps of trees
are frequently covered with it. *Pannaria pannosa* is a pretty
dark-bordered Lichen, found on the bark of trees. On rocks
everywhere will be noticed several species of *Lecanora*, the
most attractive of which is *L. cinnaberina*; it is a handsome
red Lichen, adhering closely to the porphyry rocks; the
thallus is bright green, and the apothecia orange-colored.
Pertusaria papillata is found on the bark of trees with
Lecidea Domingensis. All the Lichens belonging to the genus
Lecidea are more or less attractive, because of the contrast
between the thallus and the apothecia. This is particularly
the case in *L. triphragma*. *Graphis* is a genus which owes
its name to the resemblance between its apothecia and
written or angular characters and letters. It occurs in
Queensland sometimes in very large patches on the bark
of trees.

It may be necessary to state that all the specimens here

determined have been submitted to Dr. Stirton, of Glasgow, who has described the new species, and that a good many have also been named by the Rev. Mr. Leighton, of Shrewsbury, England.

In conclusion, it will be observed that I have not made any direct reference to the Tasmanian Lichens in comparing them with those described here. The reason of this is that the Tasmanian Lichen Flora is so very imperfectly known. Forty-four genera and about 100 species are described in Dr. Hooker's Flora. This is even less than the present contribution to the Lichenology of Queensland. Amongst those described we find about one third of them in the present list. *Sticta* is also abundant in Tasmania as in New Zealand, and there is generally a close resemblance in the genera and species occurring in both. Dr. Hooker says that all the European species are represented in Tasmania, but this I think must be received with hesitation until a better census of the island is made. It is certain that a complete list of Tasmanian Lichens is one of the most interesting botanical desiderata.

A FEW QUEENSLAND LICHENS.

Dr. Nylander's Arrangement.

FAMILY I.—COLLEMACEI.

Thallus black-brown or olive-green, often sub-gelatinous; gonidia without a cellular membrane, usually traversing the thallus in moniliform lines; apothecia often red, white, or pale inside.

Tribe *Lichinei*.—Thallus shrubby. *Obryzum scabrosum*, Stirton; parasitic on *Collema*; on trees, Ipswich.

Tribe *Collemei*.—Thallus usually horizontal, foliaceous, lobed. *Collema byrsinum*, Ach.; on trees in damp scrubs.

Leptogium diaphanum, Mont.

L. phyllocarpum, var. *isidiosum*.

L. tremelloides, Fr. var. *cæruleum*, all abundant on trees and rocks in damp scrubs.

Myriangium Duræi, Mont., a dark spot-like species on twigs of trees, found in dense scrubs.

FAMILY II.—LICHENACEI.

Thallus variously coloured, not soft or gelatinous; gonidia with a cellular membrane.

Series *Cladodiei*.—Thallus usually erect; apothecia terminal on erect podetia, usually without a border; spores, often 8 in an ascus, oblong, rarely elongate and septate.

Tribe *Bæomycei*.—Thallus horizontal, crustaceous; apothecia pale-red or brown; spores simple, or 1-3-septate.

Bæomyces rosens, Persoon. On damp hill-sides. Thallus white; apothecia rosy.

Tribe *Cladoniei*.—Thallus foliaceous or scaly, or of branched shrubby podetia; apothecia convex, without a border; spores simple.

Cladonia Flærkiana, Fr.; on wood.

C. schizopora, Nyl.; amongst moss.

C. gracilis, Hoffm., var. *aspera*; on wood.

C. retipora, Flærk.; amongst moss.

C. marcilenta, Hoffm., var. *seductrix*, Del.; on wood.

C. aggregata, Eschn.; amongst moss.

C. cervicornis, Ach.; on wood.

C. pyridata, Fries.; on wood, Stradbrook Island.

Series *Ramalodei*.—Thallus shrubby, or filamentous, erect, or pendulous; terete compressed or angular, without any basal crust or scales, tubular or solid; apothecia usually with a thalline border.

Tribe *Usneei*.—Thallus white or yellowish, branched, with a firm filiform axis; apothecia peltate, with a thalline border, which is often ciliate.

Usnea cornuata; on trees, Brisbane River.

U. longissima, Ach., pendulous; from trees, Brisbane River.

U. articulata; on trees, Main Range.

U. rubiginea, Ach.; on fences, Brisbane.

U. elegans, Stirton; on shrubs, Main Range.

Tribe *Ramalinei*.—Thallus terete or compressed, erect or pendulous, with lax pith or hollow internally; apothecia with a thalline border.

Ramalina complanata, Ach.; on trees.

R. Scopulorum, Ach., var. *cuspidata*; found on shrubs near the coast.

R. perpusilla, Stirton; on shrubs.

R. exiguella, Stirton; on shrubs.

Tribe *Cetrariei*.—Thallus compressed, shrubby, or foliaceous, lobed, shining, with a central pith. Apothecia marginal, with a thalline border; spores small, simple.

Platysma glaucum; on trees, etc.

Series *Phyllodei*.—Thallus foliaceous, depressed, lobed, or laciniate, with a fibrous pith; apothecia peltate or discoid, with or without a thalline border.

Tribe *Peltigerei*.—Thallus dilated, under-surface naked; apothecia usually marginal.

Nephromium levigatum, Nyl.; on fences, etc.

Tribe *Parmeliei*.—Thallus dilated, rarely subterete or

shrubby; apothecia with a thalline border; Spermagonia with arthrosterigmata.

Sticta aurata, Ach.; *Cyphellæ punctiform*, orange-yellow.

S. pulmonacea, Ach.; on trees. Ranges.

S. retigera, Stirton; on trees. Ranges.

S. Felix; on trees. Ranges.

Stictina gilva, Thun.; on rocks and trees.

S. quercizans, Ach.; on rocks and trees.

S. lutescens, Tayl.; on rocks and trees.

S. marginifera, Tayl.; on rocks and trees.

S. tomentella; on rocks and trees.

S. fragillima, Alf. *Cyphellæ* minute, white; on rocks and trees.

Parmosticta rubrina, Stirton; on trees.

Parmelia conspersa, Ach.; on rocks and trees.

P. sinuosa, Sin.; on rocks and trees.

P. Brisbaneensis, Stirton; on trees, Brisbane.

P. perlata, Ach.; on trees, margin of lobes often with black hairs.

P. reparata, Stirton; on trees, etc.

P. caperatula, Nyl.; on trees, etc.

P. molliuscula, Ach.; on rocks, Glasshouse Mount.

P. revoluta, Flk.; on trees, etc.

P. limbata, Sonr.; on trees, etc.

P. perforata, Ach.; on trees, etc.

P. tinctorum; on fences, etc.

P. umplerula, Stirton; on trees, etc.

P. olivetorum, Ach.; on trees, etc.

P. anstra-africana, Stirton; on trees, etc.

P. permutata, Stirton; on trees, etc.

P. platycarpa, Stirton; on trees, etc.

P. cyathina, Stirton; on trees, etc.

P. euplecta, Stirton; on trees, etc.

P. nitescens, Stirton; on trees, etc.

P. erubescens, Stirton; on trees, etc.

Physcia confluens, Mont.; on trees, etc.

P. hypoglauca, var. *chrysophthalma*; on trees, etc.

P. picta, Nyl.; on fences, etc.

P. speciosa, Fr.; on fences, etc.

P. barbifera, Nyl.; amongst moss, Brisbane River.

P. obsessa cæcio-crocata; on trees, Main Range.

P. sublurida, Stirton; on trees, Rosewood.

Pyxine Meissnerii, Tuck.; on trees.

P. cocoes var. *sorediata*; on trees.

P. obscurior, Stirton; on trees.

Series *Placodiei*.—Thallus crustaceous, scaly, granular, powdery, or evanescent; apothecia with or without a thalline border, sometimes linear.

Tribe *Lecanorei*.—Thallus various; apothecia with a thal-
line border, rarely without.

Pannaria pannosa, Sw.; on trees.

P. triptophylla, Nyl.; on trees.

Coccocarpia plumbea, Leighton; thallus lead colored,
bordered by the black hairs showing from beneath.

Lecanora cinnabarina, Ach.; on rocks.

L. subfusca, var. *chlarona*, Ach.; on trees.

L. parella, var. *pallescens*; on trees.

L. p., var. *phæolenta*; on trees.

L. Domingensis, Ach.; on trees.

L. D., var. *gyrosa*; on trees.

L. sprucei, Bab.; on foliage.

L. punicea, Ach.; on trees.

L. pinguis, Tuck.; on trees.

L. tartarea, Linn.; on trees.

Pertusaria porinella, Nyl.; on trees.

P. leioplaca, Ach.; on trees.

P. leioplacella, Nyl.; on trees.

Thelotrema phæosporum, Nyl.; on trees.

T. terebratulum, Nyl.; on trees.

Ascidium depressum, Nyl.; on trees.

A. profundum, Stirton; on trees.

Tribe *Lecidiei*.—Thallus various; apothecia without a
thalline border.

Cænogonium Linkii, Ehrenb.; on tree trunks, Maroochie.

C. interpositum, Nyl.; on tree trunks, Brisbane scrubs.

C. confervoides, Nyl.; on trees, Maroochie.

Lecidea parvifolia, Pers.; on bark.

L. chlorites; on bark.

L. taitensis, Mont.; on bark.

L. myriocarpa, Dl.; on bark.

L. Raffii, Stirton; on bark.

L. triphragmia; on bark.

L. foliata, Stirton; on bark.

L. russula; on rock.

L. subnubila, Stirton; on rock.

L. coniochlora; on bark.

L. saxatilis; on rocks.

L. vulpina, Tuck.; on bark.

L. subdisciformis; on bark.

L. phyllocharis, Mont.; on foliage.

L. obovata, Stirton; on bark.

L. contigua, Irics.; on rock.

L. superula, Nyl.; on bark.

L. inallescens, Stirton; on bark.

L. demutans; on bark, Taylor's Range.

L. aberrata, Stirton; on boughs of ironbark trees.

Tribe *Graphidei*.—Thallus very thin, often invisible or beneath the bark; apothecia like cracks, flat or plicate, with or without a border.

Graphis eludens, Stirton; on rocks, Moggil.

G. malacodes, Nyl.; on bark.

G. circumfusa, Stirton; on bark.

G. Afzelii; on bark.

G. mucronata, Stirton; on bark.

G. fisso-furcata, Leighton; on bark.

G. persulcata, Stirton; on bark.

G. (Medusula) pertenella, Stirton; on bark.

G. repleta, Stirton; on bark.

Opegrapha intrusa, Stirton; on bark.

Glyphis labyrinthica, Ach.; on bark.

G. confluens, Mont.; on bark.

G. medusulina, Nyl.; on bark.

Arthonia cinnabrina; on bark.

Chiodecton farenaceum, Fée; on bark.

C. sphaerale, Ach.; on bark.

Series *Pyrenodei*.—Thallus various, peltate, scaly, areolate, continuous, or none; apothecia opening by a punctiform pore.

Tribe *Pyrenocarpei*.

Trypethelium sprengelii, Ach.; on bark.

T. papillosum, Ach.; on bark.

T. cruentum; on bark.

Endocarpon Baileyi, Stirton; a very curious thick species found on trees, rosewood scrub.

Plagiothelium Australiense, Stirton; this is a new genus, founded by Dr. Stirton on a Queensland Lichen.

Verrucaria catervaria, Fée; on bark.

V. circumrubens, Nyl.; on bark.

V. obovata, Stirton; on bark.

V. mæstroides, Ach.; on bark.

V. ceratina, Fée; on bark.

V. libricola, Fée; on bark.

V. aurantiaca, Fée; on bark.

V. nana, Fée; on bark.

V. nitidiuscula, Nyl.; on bark.

V. sinapisperma, Nyl.; on bark.

V. tropica, Ach.; on bark.

V. flaventior, Stirton; on bark.

Strigula complanata, Fée; on foliage.

S. nemathora, Mont.; on foliage.

S. elatior, Stirton; on foliage.