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OBSERVATIONS

ON

NEW LICHENS AND FUNGI

COLLECTED IN

OTAGO, NEW ZEALAND.

BY

W. LAUDER LINDSAY, M.D., F.L.S.,

HONORARY FELLOW OF THE PHILOSOPHICAL INSTITUTE OF CANTERBURY, NEW ZEALAND.

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XXX.—*Observations on New Lichens and Fungi collected in Otago, New Zealand.*

By W. Lauder Lindsay, M.D., F.L.S., Honorary Fellow of the Philosophical Institute of Canterbury, New Zealand. (Plates XXIX., XXX.)

(Read 2d January 1866.)

INTRODUCTION.

In 1861, in a part of the province of Otago, New Zealand, not previously botanically explored, I made, among other botanical collections,* one of Lichens and Fungi. The number of *new species* and varieties proved to be considerable, amounting to about 20 per cent. of the whole *lichens*, and 40 per cent. of the whole *fungi*, collected. Since my return home, I have submitted (with a view specially to the study of *the minute anatomy of the reproductive organs and their contents*) the new species (and varieties) in question—some of them repeatedly—to microscopical examination: the results whereof are contained in the notes which follow.

I hold that he only is fully competent to determine and describe species from *new countries*, who, in addition to the requisite analytical and descriptive power, has, on the one hand, constant access to, and an intimate knowledge of, the now overwhelming and ever-increasing mass of Botanical Literature in all the principal European languages; and, on the other, equally habitual access to Herbaria which contain the largest collections of specimens from all parts of the world, such, for instance, as those of Kew or Paris. By no other means does it appear possible now-a-days accurately to ascertain or *distinguish what is new from what is already known in the plant-world*. This virtually restricts systematic and descriptive botany to the Naturalists of London or Paris, or of similar centres of botanical knowledge; and as virtually excludes Provincial Botanists, who are isolated from the sources of the necessary fundamental information. It were easy for a collector or observer in a new field to name and describe, what to himself, according to his limited opportunities for judging, appears to be new. But if he do so, however otherwise qualified, without that knowledge, which can, generally speaking, only be acquired in the Botanical Libraries, and from the Herbaria, of the largest European cities, he cannot fail to add to the confusion of synonyms, and impede the true progress of botanical discovery and science, by

* *Vide* "Contributions to the Flora of Otago, New Zealand:" Transactions of Botanical Society of Edinburgh, vol. viii. p. 250: and "List of Lichens collected in Otago, New Zealand," *ibid.* p. 349.

publishing as new, and under new names, species, which a wider experience speedily proves to be identical with, or mere forms of, other plants already known as natives of other parts of the world. Collectors are, as a body and as a rule, naturally desirous of naming and describing their own collections; and, *in certain respects*, no other Botanists *can* be so well qualified to do so. Nor is it always possible to secure the co-operation of those overworked, eminent authorities, who have the largest knowledge of the special departments of botanical science which they respectively cultivate and adorn.

Holding such views, and in the absence, on my own part, of the necessary qualifications, advantages, or opportunities, I have gladly availed myself, *in the determination of species* (and to a certain extent also, in their description), of the valued assistance of my friends Dr NYLANDER of Paris (for Lichens), and FRED. CURREY, F.R.S., of London (for Fungi),—the one, the most eminent living authority in systematic and descriptive Lichenology; the other, one of our most accomplished British Fungologists.*

In reference to the following enumeration of Otago *Lichens*,—with one or two exceptions,—the *names* assigned are those of Dr NYLANDER,† who writes as follows regarding the Lichen collection:—

"Les votres sont d'un grande valeur pour la Flore Antarctique, surtout à cause des saxicoles et espèces d'un ordre inférieur qu'elle renferment et qui avant étaient trop imparfaitement représentés parmi les matériaux rapportés de ce bout du monde.‡ . . . Certainement les espèces . . . et les variétés sont *toutes nouvelles pour la Science*. La Flore de la Nouvelle Zélande a par vos découvertes fait des acquisitions importants dans le domaine lichénographique."§

In regard to the *Fungi*, in several cases I am indebted to Mr CURREY, not only for names, but also for specific diagnoses and notes on structure or affinities. In a few other cases (of fungi or fungo-lichenes), where complete materials do not exist in my collection for full description, the plants not being in a perfect state as to fruit or otherwise, I have assigned names with much diffidence, but not without due deliberation, in the belief that the subsequent researches (to which the names and notes now given may perhaps lead) of Local Botanists, who

* I use the term *Fungology* in preference to *Mycology* (referring to that department of botanical science which treats of *Fungi*), because, though less euphonious or elegant, it is also less open to misunderstanding; the term *Mycology* being equally applicable and applied to that department of *anatomical* science which treats of the *muscular* system in man and animals. I am borne out, in the preference of the term *Fungology*, by the recent and high authority of BERKELEY ("Outlines of British Fungology," 1860, p. 2).

† Since my "Observations" were committed to the printer, a paper by Dr NYLANDER, entitled "Lichenes Novæ Zelandiæ, quos ibi legit anno 1861 Dr LAUDER LINDSAY," has been published in the Journal of the Linnean Society: Botany, vol. ix. p. 244, which contains the specific diagnoses of the majority of the Lichens referred to in the following and aforesaid "Observations." Fortunately the paper has been issued in time to enable me to insert references thereto at their proper places in the present text.

‡ Letter, dated August 3, 1864. § Letter, dated August 22, 1865.

may have at command, for investigation, ample series of *living specimens*, in all their forms or conditions of growth, will prove the plants in question—what I here presume them to be—in reality new species.

I. LICHENES.—(PLATE XXIX.)

1. *Abrothallus Curreyi*, nov. sp. (figs. 1 to 5.)

Parasitic on the thallus of *Parmelia perforata*, Ach., (which is copiously covered with apothecia and spermogones): on the trunks and branches of dead trees,* Greenisland Bush.

In characters, this species is intermediate between *A. Smithii*, Tul., and *A. oxysporus*, Tul.† These species, when they occur (as they most frequently do) on the thallus of *Parmelia saxatilis*, Ach., are almost invariably found occupying special growths from, or anamorphoses of, its thallus. But *A. Curreyi* occurs directly on the ordinary thallus of *P. perforata* (fig. 1, *a b*), towards its periphery, in the position usually occupied by the spermogones of the *Parmelia* (*c*). In this respect it resembles other species of *Abrothallus*, which are parasitic on the thallus of other species of *Parmelia*, and on species of *Platysma* and *Stictina*.

The apothecia of *A. Curreyi* are less prominent and tuberculiform, and smaller than those of *A. Smithii*; more convex and protuberant than the discoid, flattened, sub-immersed ones of *A. oxysporus*. In *A. Curreyi*, the apothecia are typically minute, black, convex, and immarginate; partly immersed in the thallus, in whose superficial tissues they have been originally developed (figs. 1 *b*, 2 *a*). They vary, however, considerably in form and size, having a tendency on the one hand to become tuberculiform, and on the other, discoid. In the young and old states they are apt to be confounded with the *spermogones* of *P. perforata*, which are generally more or less abundant on adjoining lobes of the thallus. In the young state, the apothecia of *A. Curreyi* appear as very minute papillæ; in the old, when the tuberculiform hymenium has fallen away, it frequently leaves a black, stellate-fissured scar, resembling that characteristic of old emptied spermogones of the *Parmelia*. I have elsewhere‡ described the characters of these *spermogones* of the *Parmelia*, which are easily distinguishable from the apothecia of the *Abrothallus* on microscopical examination, though sometimes not otherwise. In my Otago specimens of *P. perforata*, I find its spermogones (figs. 1 *c*, 3) though generally sub-marginal, punctiform, and immersed, occasionally occupying also central positions on the

* Especially "Goai" (*Sophora tetraptera*, Aiton). *P. perforata* is equally abundant sometimes also on *living* trees in Saddlehill Bush, and other remnants of the primitive forest.

† "Monograph of the genus *Abrothallus*;" with two coloured plates.—*Quart. Journal of Microscopical Science*. January 1857.

‡ "Memoir on the Spermogones and Pycnides of the Higher Lichens."—*Trans. Royal Society Edinburgh*, vol. xxii. p. 211 (Plate II. figs. 4, 5).

thallus; large, prominent, and sub-papillate; seated on, or immersed in, minute thalline wartlets or elevations. They become, moreover, with age occasionally confluent and difform, frequently irregularly stellate or radiate (fig. 3 *b*). Generally speaking, corticolous forms of *P. perforata* are abundantly, while saxicolous ones in Otago are sparingly, spermogoniferous. In the former, spermogones sometimes abound to such an extent as to give the thallus, to the naked eye, a black-punctate character.

The constituents of the hymenium of *A. Curreyi* (fig. 4 *a d*), are somewhat indistinct, from their state of close aggregation. The tips of the paraphyses are dark-brown (*b*), very granular, and agglutinated; and they are covered by a colourless epithecial membrane (*a*). The hypothecial tissue is also very granular and dark (*d*). The *thecæ* (*c*) are of the typical form, ·0012″ long, and ·0006″ broad,* containing eight spores arranged in one or two rows. In the young state, and while crowded in the thecæ, these spores are generally sub-angular or otherwise difform from mutual pressure (*c*). The thecal lichenine gives a beautiful blue reaction with iodine; in this respect resembling *A. oxysporus*. The *spores* (fig. 5) are simple, colourless, sometimes showing a double contour, ·0003″ long, and ·00025″ broad; broadly ellipsoid or sub-oblong; sometimes slightly curved like those of the genus *Ramalina;* and also, like them, sometimes exhibiting a tendency to central division into two loculi (*a*), with occasionally a slight constriction opposite the septum. The spores thus resemble those of *A. oxysporus*, rather than those of *A. Smithii*, which are brown, solæform, and 1-septate. The tendency, however, to division and constriction is an approach to the characters of the latter. They are always much smaller, broader, more rounded at the ends, or more oblong, than those of *A. oxysporus*. With this species I have associated the name of my friend, the eminent Fungologist, FRED. CURREY, F.R.S.

2. *A. oxysporus*, Tul. (fig. 6),

also occurs in Otago, apparently identical in its characters with its Scotch prototype.† I found it parasitic on the larger-lobed forms of *Parmelia conspersa*, Ach., which grow plentifully on basalt, in the gullies or glens of the Greenisland hills (*e.g.*, near Greenisland church). The apothecia are typically flattish or discoid; in the young state, however, they are frequently tuberculiform or sub-papillæform; and under moisture, in the mature condition, they swell so as to become sub-convex, and to assume somewhat the characters of those of *A. Smithii* and *A. Curreyi*. In the old state, generally from the falling away of the hymenium, they leave a black urceola, which may become irregular in its outline, or stellate-

* The microscopical analyses were made with a Nachet's microscope: objective ¼″, ocular, No. 3—magnifying 425 diam.-linear; and the measurements here given are in decimal fractions of the English inch.

† "Monograph of Abrothallus," p. 80; "Memoir on Spermogones," p. 232–3.

fissured. As in *A. Curreyi*, the constituents of the hymenium are indistinct and closely united. The *paraphyses* contain much brown colouring matter about their tips, which are intimately agglutinated. The hymenial lichenine gives a blue reaction with iodine. The *spores* (fig. 6) are narrowly ellipsoid, almost fusiform; simple; sometimes with a double contour (*b*); colourless; ·00075″ long, and ·00025″ broad.

The genus *Abrothallus* (which is properly to be considered only a group of lower, parasitic, athalline *Lecideæ*), and the two species above recorded, are new to the New Zealand Flora.

From their minute size and inconspicuous character, the plants composing the genus in question are apt to be overlooked by all but the practised Lichenologist. From what I have myself seen, I have no reason to suppose them rarer in New Zealand than in Britain; and I have therefore to recommend their being carefully looked for by local Botanists on the thallus of the higher or foliaceous Lichens, especially in the genera *Parmelia* and *Stictina*.

3. *Melanospora Otagensis*, nov. sp.

(Lindsay "On a New *Melanospora* from Otago, N.Z.," Trans. Bot. Soc. Edin., vol. viii. p. 426, Plate V. figs. 7–12.)

Thallus sub-determinate, tartareous, thick, of cretaceous texture and chalk-white colour, sub-farinose, smoothish, sub-areolate. *Apothecia* vary in form from lirellæform (Opegraphoid) to angulose-patellæform (Lecidine): most usually they are short, sub-oblong, broadish pseudo-lirellæ, generally straight, black, simple, solitary and scattered, sub-sessile, base only sub-immersed. *Epithecium* rimæform or exposed, flat or concave; margin distinct, thickish, generally entire, sometimes more or less involute on the disk. *Spores* abundant and distinct, brown, 1-septate; about ·0006″ long, and ·0003″ broad; oval-oblong, constricted or not at the septum, sometimes figure-8 shaped or solæform.

Habitat on columnar basalt, Greenisland Bluff; associated with a sterile condition of *Pertusaria velata*, Turn. This species (which has been described from an imperfect specimen—the only one in my herbarium) appears closely allied to the British *M. cerebrina*, DC. (Mudd, "Manual," 226, E. Bot., Pl. 2632, fig. 1), so far as I can judge from figures and descriptions only. The family or tribe to which the genus *Melanospora* (Mudd) belongs, viz., the *Xylographidei*, Nyl., as well as the genus itself, and *M. Otagensis*, are alike *new to the New Zealand Flora*.*

4. *Lecidea Otagensis*, Nyl., Lich. N.Z., 255 (figs. 7, 8).

On stockyard fences of "Goai" timber; in the Bush, ravines of the Chain Hills, Greenisland: associated with *Arthonia excedens*, Nyl.

* *Vide* "List of Otago Lichens," pp. 366–8.

The apothecia somewhat resemble externally those of *L. grossa*, Pers., and *L. pulverea*, Borr. They are sometimes angular, or sub-lirellæform; sometimes sub-pedicellate. The hymenial gelatine and the thecæ become beautifully blue under iodine (fig. 7 *c*). Both hymenium and thecæ also contain large quantities of oil globules (*b*). The *thecæ* (*c*) are somewhat small; ·0015″ long, and ·00045″ broad; 8-spored, and of the ordinary form. The *paraphyses* are indistinct, and the dark-brown clavate heads are closely agglutinated (*a*). The *spores* (fig. 8) are ·0012″ long, and ·00001″ broad; acicular or very narrowly fusiform; colourless; generally slightly curved; poly-septate (frequently 3 to 5 septa); like the majority of lichen-spores, granular in the old and young states (*a*), with no distinction of loculi or septa.

5. *L. flavido-atra*, Nyl., Lich. N.Z., 257 (fig. 9).

On stockyard palings of "Goai," Martin's Bush, Chain Hills.

Externally it differs from *L. grossa*, Pers., *L. margini-flexa*, Tayl., and other *Lecideæ*, only by the colour of its thallus—a lemon yellow.

The *paraphyses* are indistinctly seen, but are sub-discrete, delicate, filiform, sub-hyaline, colourless even at their tips, which are not knobbed or clavate. The *thecæ* are large and distinct; 8-spored; ·0036″ long, and ·0015″ broad; giving a beautiful blue with iodine. The *spores* (fig. 9) are broadly ellipsoid; 1-septate; colourless; ·0009″ to ·0012″ long, and ·0006″ broad. In the young state (*a*) they are polari-bilocular, and save as to colour resemble those of *Physcia pulverulenta*, Fr. In the young state (*a*) also, the septum is generally wanting, and the loculi have a pale lemon-yellow tint.

6. *L. melanotropa*, Nyl., Lich. N.Z., 255 (fig. 10).

On trees and shrubs, Stoneyhill Bush; and on the bark of dead trees, Saddle-hill Bush; associated with *Arthonia excedens*, Nyl., and *Collema leucocarpum*, Tayl.

The apothecia in the young state are sometimes waxy or corneous, of a glaucous or olive hue, becoming, however, with age pitch-black, and then resembling those of *L. grossa*, Pers.

The constituents of the hymenium are most indistinct, and the spores (fig. 10) are with difficulty seen. The latter are globose or sub-globose; 1-septate, colourless, about ·0003″ in diameter. The hymenium and thecæ give a blue reaction with iodine.

7. *L. amphitropa*, Nyl., Lich. N.Z., 256 (fig. 11).

On rocks and the ground, Woodburn Ravine, Saddlehill.

The plant consists of a patch of white thallus, with a very few straggling black apothecia, resembling in general aspect our *L. epigæa*, Schær., or *L. Hookeri*, Schær.

The constituents of the hymenium are indistinct and closely aggregated. The