NOTES ON A REMARKABLE LICHEN GROWTH IN CONNECTION WITH A NEW SPECIES OF STICTA; WITH DESCRIPTIONS OF BOTH.

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In April, 1886, I found in a fern-tree gully, on Mount Macedon, Victoria, a Sticta, which I sent to Dr. Charles Knight, of New Zealand, and which he pronounced a new species. He named it *Sticta stipitata*.

In the same gully, and at the same time, I found a few specimens of a remarkable plant, somewhat like a minute lead-coloured ostrich feather. Microscopical examination revealed, under the upper cortex, a stratum of gominic granules; which put it beyond doubt that the plant was a lichen. But to what tribe of lichen it belonged I could not decide.

Among the specimens collected were found one or two which were tipped by a minute broad green frond, having in its under surface white urceolate cyphellæ, and containing true yellowish-green gonidia. In fact, it seemed to be a minute Sticta, with some resemblance to the plant *Sticta stipitata*. But the presence of a Sticta or anything like a Sticta on the apex of so diverse a plant was a puzzle which I put aside till I should get more materials for examination.

In February, 1887, I found in another fern-tree gully on the same mountain a few more specimens of these lead-coloured plumules, and among them some which were tipped by larger fronds, bearing a still closer resemblance to a Sticta and to the species *stipitata*. The idea then grew stronger that this strange plume-like plant might be the juvenile form of *Sticta stipitata*.

It reminded me somewhat of the difference between the first and subsequent leaves (phyllodes) of certain acacias. I have been informed also that ferns in their infantile state simulate the liver-worts. But I knew of no parallel case among lichens. Still I could not account for the phenomena observed on any other hypothesis.

In November, 1887, being again on Mount Macedon, I explored the gullies for further specimens, and any doubts I had were set at rest by finding on a fallen and decaying tree numerous specimens of *Sticta stipitata* in all states of transformation :—Simple lead-coloured plumules, plumules tipped with small fronds, plumules with fronds as large as themselves, still larger fronds with remains of the plumules at their base, fronds without the plumules, but with their tomentose stipes more or less enlarged, and, lastly, fully developed and fruited plants with much thickened but well marked tomentose stipes.

In June, 1889, being on Mount Macedon, I resolved to examine the matter from a different point of view : I searched for juvenile forms of *Sticta stipitata*, and I found that in every case the very early stage of the plant was plumose.

I conclude that the plumule is a juvenile state of *Sticta stipitata*. I acknowledge that I have not found, either from my own observation or from reading or from correspondence, any case like this. The only analogies I can think of among lichens are the *cephalodia* which are found upon some lichens, and the *hypothallus* upon which many lichens grow.

Of the cephalodia which are found on some species of *Stictei*, Nylander says : " Cephalodia in thallo interdum observantur peculiaria (systemate gominico e granulis gominis formato), aut (1) sparsa glomerulos leptogiodeos referentia, aut (2) semel (in Sticta dichotomoide) *marginialia* simpliciora, aut demum (3) in pagina infera sit a faciei pyrenodeæ " (Syn., p. 333). The plumules in question have their gonimic system formed, like these cephalodia, of granula gonima, although the adult plants have true gonidia. But there is this important

difference, that cephalodia are growths upon and out of the adult plant, while in the case of the plumules the more mature plant grows upon and out of them.

In this latter respect they seem to serve much the same purpose as the hypothallus of some plants. I refer again to Nylander: "La couche hypothalline est la plus inférieure du thalle, celle sur laquelle se stratifient les autres, mais ille n'est pas toujours visible et manque dans beaucoup d'espéces. Elle precède dans la genèse des lichens la formation des autres couches thallines, mais son développement s'arrête souvent de bonne heure, et elle est alors peu distincte ou disparaît entièrement. Son tissu est filamenteux ou cellulare, et sa couleur est le plus souvent foncée ou noirâtre, d'autres fois pâle, mais rarement blanche," (Syn., p. 11). The plumule is probably a homologue of the hypothallus; but, while the tissue of the hypothallus is either filamentose or cellular, the plumule has also a gominic stratum and a cellular cortex besides.

In short, this is a new form of lichen growth, so far as my observation or reading serves me. If any lichenologist has observed any growth of the same or analogous nature, I should be glad to compare notes and exchange specimens, in order that the matter may be thoroughly investigated.

Descriptions of Sticta Stipitata and its Juvenile Form.

Sticta stipitata, C.K., spec. nov. Thallus glauceous pallid (when moist a bright green), here and there rufescent, moderate in size (2-3 inches high, and attaining sometimes 4 inches in breadth), thin, somewhat rigid, scarcely shining, obsoletely scrobiculate laciniato—lobate, laciniæ sub-pinnatifid, margins sinuate and undulate, sinuses largish and round, apices often broadly dilated and crenate, sometimes, deeply divided or even laciniatule; under surface pale fulvous, tomentose, tomentum short, sordid, denser towards the base, which often ends in a stout woody tomentose stipe, cyphellæ thelotremoid.

Apothecia fusco-rufous small (1-3·5 m. m. broad) scattered, margins thalline, entire, often at length obliterated. Spores colourless, fusiform, 5 septate, 035 x 007 m. m.

Habitat on trunks of trees and fern trees and on logs, in thickets on Mount Macedon, Victoria. It has not yet been discovered elsewhere. The plants generally grow closely crowded together and imbricated, often covering many feet of tree or log with subascending fronds.

Allied to *Sticta variabilis*, the juvenile state of this lichen is 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. Its height is about one inch, and the diameter of the stem about one millimeter. The plumbeous colour is owing to the presence of numerous bluish-green granula gomina disposed in a moniliform manner immediately under the upper cortex.