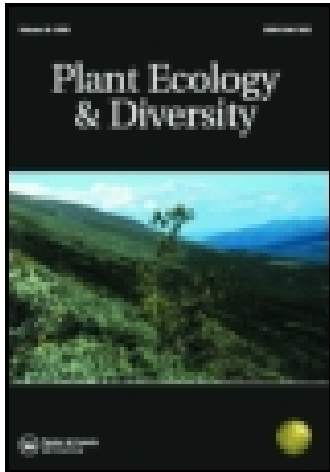


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### II. New and Rare Mosses from Ben Lawers

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I. *Notes on the Ipecacuanha Plant.* By Dr GUNNING, Rio Janeiro. Communicated by Professor BALFOUR.

Dr Gunning states that the Ipecacuanha plant is exceedingly scarce in the province of Rio Janeiro from having been pulled up, and no attention paid to its cultivation. It is exported from Sao Paulo, the province south of Rio, but chiefly from Matto Grosso, a thousand miles up the river Plate. Dr G. sent a number of cuttings to the Botanic Garden for transmission to India, where it is proposed to cultivate the plant extensively.

II. *New and Rare Mosses from Ben Lawers.* By Dr J. STIRTON, Glasgow. Communicated by Mr SADLER.

It is proposed, in the following communication, to review the progress of discovery on Ben Lawers, within the last ten years, in this section of botany; to indicate in general terms the habitats of the rarer species, as well as their tendencies towards increased luxuriance or gradual decay and extinction.

There will also be noticed from time to time the affinities between the Cryptogamic Flora of the mountain and that of Scandinavia, more especially of the Dovrefjeld.

To any one conversant with both floras, this is remarkable in a two-fold sense: 1st, the identity of the species; 2d, and more especially, the close resemblance of the forms and even of the aspect of the plants from both regions.

I had proposed, besides, to frame a theory which might, in accordance with known facts, account for these close analogies; but, beyond the soft and friable nature of the Schistose rocks, on which the plants, for the most part, grow, in both instances, along with, of course, other geological features in common, I had nothing which could bear out strict investigation and comparison. The height of the mountain, along with its relative situation as part of the Breadalbane range, will not account for the exceeding richness of the flora, as almost all the varieties are found at elevations somewhat below 3000 feet;\* and none of the rest

\* [The climate, however, is influenced by the mountain being about 4000 feet in height. Ed.]

of the summits of the same range are lower than this. I may, however, recur to this subject on some future occasion.

With my own I have associated the name of Mr Alexander M'Kinlay of Glasgow, whose untimely end all true lovers of botanical pursuits must deeply deplore. I have the less scruple in doing so, as it had often been discussed between us, that a conjoined paper, on the subject of the bryology of Ben Lawers, might not prove unacceptable in its present detached state; besides, we have added considerably to what was known at the publication, in 1855, of the "Bryologia Britannica" of Wilson.

*Sphagnum Girgensohni* and *Sphagnum teres*, on the southern aspect of the mountain at a low level. On the whole, this peculiar group of mosses is not well represented; indeed, one is struck with their comparative scarcity, more especially one who is accustomed to climb our mountains nearer the west coast, where these mosses grow in great luxuriance and variety, and nowhere more so than on Ben Wyvis in Ross-shire, where Mr M'Kinlay, if I mistake not, discovered all the European Sphagna except *S. insulosum*.

*Dicranum arcticum*, in two or three marshy spots, at a considerable elevation, and bearing a remarkable resemblance to one set of specimens from the Dovrefjeld.

*Dicranum longifolium*, on large blocks of stone, in a ravine on the western slopes of the mountain, in great luxuriance, but barren. First detected in July 1865, and identified by Professor Schimper of Strasbourg with this species. Here again the resemblance between specimens from rocks of a corresponding formation on the Dovrefjeld and those from this locality is striking, as shown in the colour, texture of leaves, and manner of tufting.

*Dicranum palustre* var. *juniperifolium*, on the opposite side of the same ravine, in considerable abundance, and exactly resembling specimens from Sweden. Detected by Mr M'Kinlay in 1865.

It may be mentioned, as bearing out in a more extraordinary degree this analogy, that there is found, here and there on the mountain, a variety of *D. scoparium*, whose leaves are strongly and sharply serrated down nearly to the

base, and otherwise bearing characters which would, *primâ facie*, lead one to refer it to *D. robustum*, a Scandinavian species.

*Campylopus compactus*, in great luxuriance on the grassy slopes on the same ravine; barren. The mode of propagation of the plant is well seen in the buds or lateral shoots from the axils of the older leaves, and which are pushed up by lateral pressure to the surface, owing to the density of the tufts, and scattered by the winds.

*Radicular fibres*, pretty constantly seen, serve to establish these buds in a suitable nidus.

It is remarkable that, with the exception of the above and perhaps *C. torfuceus*, sparingly, near the base of the mountain, I cannot call to recollection having seen another species of this genus on the mountain; quite a contrast, in this respect, to others nearer the west coast, as Ben Voirlich and neighbouring mountains by Loch Lomond, whose sides are lined with huge patches of *C. Schwarzii*, *C. alpinus*, *C. longipilus*, *C. fragilis*, as well as *C. compactus*, although much more sparingly, and in detached tufts.

*Stylostegium caespiticium* is now very rare, and, so far as I know, confined to one spot at the head of this ravine, and in a situation very difficult of access. During my earlier visits, I detected it in several localities, where, however, I have looked in vain during my later visits. This rare moss is evidently on the decline, and threatens to become extinct. In the summer of 1865 I detected it in considerable tufts near the summit of Ben Lomond. In doubt as to whether this might not be a small barren state of *Blindia acuta* I submitted it to Professor Schimper of Strasbourg, who corroborated my former opinion.

*Dicranum virens*, the normal form, is seen nowhere in greater profusion, or fruiting so freely, as on the northern slopes of the mountain looking towards Glen Lyon.

On the grassy slopes, bordering the rills that trickle down the sides of the mountain on its northern aspect, were found, in July 1866, huge tufts of a moss, densely and almost inextricably matted together by purple radicles. Examination showed its affinity to *Trichostomum flexicaule*, inasmuch as the nerve bears the same relative pro-

portion to the pagina, &c. ; but the denser areolation, the shorter stouter leaf, and almost entire absence of denticulation at the apex, as well as the peculiar habitat, render the matter of specific difference probable.

The barren condition, in this instance, as well as the invariable barrenness in these islands of *Trichostomum flexicaule* (which by the way is got pretty plentifully in the neighbourhood of the moss in question), have hitherto deterred me from pronouncing upon the matter definitely. Provisionally I am inclined to name it *Trichostomum compactum*, to distinguish and yet show its affinity to the variety *densum* of *T. flexicaule*.

A form of *Racomitrium sudeticum* is pretty commonly seen of a nearly black colour, and otherwise characterised by the muticous condition of the leaves being the rule rather than the exception in any single specimen. The capsule is normal in appearance, form, and texture.

*Zygodon Mougeotii* was detected in 1863 on Craig na Gour, a neighbouring mountain, in a fertile state, when nearly twenty capsules were secured.

If we except the solitary capsule picked out by Mr Wilson from the herbarium of the late Professor Walker Arnott, this is the first recorded instance of this moss having been found in a fertile state in Great Britain or Ireland.\*

The fruit has since been detected in specimens from the Campsie range of hills, where I secured forty capsules. This station was, however, destroyed by the precipitation of the rock, on which the moss grew, into the stream beneath. The Craig na Gour station has not been visited since the discovery.

*Polytrichum secangulare* is found in great plenty at the head of the ravine, so often spoken of, in a barren state ; and in another spot above marshy ground at a much lower level, and looking towards the inn at the foot of the mountain.

*Timmia Norvegica* was detected in 1863, on grassy slopes near the summit, having a western exposure ; and during subsequent visits in other localities at a lower level, but always imbedded amongst grass. I am enabled to identify

\* [It was collected in fruit in 1860 in Moffatdale, by Mr Bell, and in Glen Lochay in 1864, by Mr Sadler. Ed.]

this moss from having received authentic specimens from Professor Zetterstedt, of Jöhnköping, the original discoverer of the moss in Norway.

In some Continental lists, this moss is inserted as *Timmia Megapolitana* var. *Norvegica*, but it is undoubtedly a good species. The specimens show a wonderful resemblance to those from Norway, so much so, indeed, that the eye cannot detect any difference, except the greater prevalence of glittering particles of mica amongst the radicles of those from Ben Lawers.

*Timmia austriaca* was picked up by Mr Wilson on another part of the mountain, having the long sheathing bases of the leaves so characteristic of this species. In July 1869 were secured two small tufts of this moss in the Ordnance ravine, but on no other occasion have I detected it.

*Tortula fragilis*, first detected by Mr M'Kinlay in 1865, is found in great luxuriance in several places considerably below the summit, especially those having a western and south-western aspect, but, owing to its close resemblance in a dry state, to *Tortula tortuosa*, is apt to be overlooked. It is generally of a more lively green colour than the other, while the glossy appearance of the back of the nerve, as well as the fragile state of the leaves, serve to discriminate it in the field.

*Encalypta commutata* is also very common in similar situations to the above, but difficult of detection, as it is generally closely surrounded by other forms of vegetation, while, as is well known, *Encalypta rhabdocarpa* is only got within a radius of 100 yards of the summit.

On the perpendicular face of a huge detached rock was found, in July 1867, a moss, which at first sight I could not recognise; but the structure of the leaf, as revealed by the microscope, bearing a considerable resemblance to that of *Grimmia Hartmannii*, I was induced to identify it with this moss, and in this opinion I was seconded by Mr Wilson, author of the *Bryologia Britannica*. Since then I have carefully compared it with genuine specimens from Norway, and feel inclined to separate the two. The stems average three inches in length. The areolation of the leaves is denser, while their pellucid tips are in many

instances scarcely discernible by the naked eye, and under the microscope are revealed, as clusters of three or four cells. The absence of fructification, as well as inflorescence, has hitherto deterred me from elevating it into the rank of a species.

Mr John Shaw discovered in July 1865, and Mr W. B. Boyd, of Ormiston, in 1869, a moss near the summit, which by Mr Wilson, although somewhat doubtfully, has been referred to *Grimmia atrata*. I have always felt considerable hesitation in the matter of the identity, but I mean to investigate the subject further should I be fortunate enough to alight upon the moss, in a fertile condition, during my next visit.

*Bryum cirrhatum* was found in 1866 for the first time, on the banks of the more westerly of the two most considerable streams that empty themselves into Loch Tay. The inflorescence is almost invariably synoicous, while in numerous instances male inflorescence may be detected at the apices of lateral shoots. A similar condition I have found to prevail in specimens from the Continent. It is remarkable also, that the specimens gathered at a low level rivalled in size *Bryum pseudo-triquetrum*, while they diminished in proportion to the increase of altitude; until near the sources of the stream they scarcely reached the size of *Bryum cespiticium*.

In this respect also is fully borne out what has been written concerning the moss by Continental botanists.

In connection with the above, I have considered it advisable to record here a slight description of a so-called variety of *Bryum pseudo-triquetrum*, which has puzzled others to whom I have referred it as well as myself. The stems are closely tufted, comparatively free of radicles, and scarcely at all branched. The leaves are deeply concave, obovate, abruptly pointed, with the nerve recurved at the apex; the margins reflexed but not thickened, being composed of two series of cells narrower than those of the rest of the pagina, while the latter are larger, laxer, than in the normal form. It certainly is not *Bryum Neodamense* (Itzig.), and so far as the description extends in the *Bryologia Europæa*, not the variety *compactum* of *B. pseudo-triquetrum*.



It will have been noticed already, that I have given descriptions of several puzzling varieties of other mosses. I might extend the list considerably, as there is no other mountain in Scotland I have climbed that presents such curious and perplexing anomalies in its cryptogamic vegetation.

Almost at every step, in the more favoured spots, the botanist meets forms which seem to mock his powers of discrimination, and, above all, to warn him, that nature is not to be cramped and confined by any classification of man's devising.

In the remaining portion of this paper, I shall merely, with one exception, record under their respective species, the fact of certain varieties having been found on the mountain.

III. *Notice of Grimmias, collected on Arthur's Seat, near Edinburgh.* By Mr WILLIAM BELL and Mr SADLER.

Arthur's Seat has long been a favourite place with Edinburgh botanists engaged in the study of mosses. It is not now our intention to give a complete list of *all* the mosses found on it, but only to notice briefly the different species of *Grimmia* which we know to be growing there at the present time. In point of number, as well as the rarity of some of the species found there, Arthur's Seat is perhaps richer than any similar area in Britain. But why it should thus be favoured above many other places which seem to have all the physical conditions requisite for the perfect development of cryptogamic life, is only one of the many questions of the kind to which Muscologists can give no answer. As yet too little is known regarding the nature of those laws which favour the extension in one direction and limit in another the existence and development of vegetable life. Still, although rich in point of number—with the exception of *Grimmia pulvinata*, *G. leucophaea*, and *G. subsquarrosa*—they are by no means generally distributed over the whole of the hill. Some are confined to very limited spots; for example, *G. anodon*, *G. Edinensis*, Ferg. MSS., *G. orbicularis* and *orbicularis* var. *oblonga*, *G. commutata*, *G. Doniana*. A little more widely distributed are *G. (Schistidium) conferta*, *G. (Schistidium)*