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III. *Gleanings among the Irish Cryptogams*. No. II. By BENJAMIN CARRINGTON, M.D., F.L.S., &c.

I have already noted the abundance of cellular plants in the south-west of Ireland, tracing it to the prevailing humidity of the climate.

These plants, which occur everywhere, from the sea-level to the mountain top, impart a surprising freshness and greenness to many districts, and justify the name of the *Emerald Isle*. But as it is natural to associate the ideas of verdure and plenty, strangers are apt to form an erroneous estimate of the richness of the soil. The cryptogams are mostly epiphytic in habit; they ask little more than a surface to grow upon, and abundant moisture. However interesting to the botanist, it must be confessed they represent a low type of development, and form an unprofitable, if not unwholesome, kind of vegetation. Meantime, in these days of drainage, the student will appreciate as it deserves such a field of research as Killarney. We cannot always trace the true relations and uses of objects, and are too ready to consider everything worthless, and unworthy attention, that does not administer directly to our well being. That the Creator has bestowed such care upon the structure and preservation of these plants, should teach us they were not made in vain. How many secrets of life and development their translucent tissues have revealed! And what a multitudinous series of forms they assume; what adaptability to extremes of climate, and wonderful powers of reproduction! Even in an æsthetic point of view they claim no mean place. The ferns are universal favourites; but few reflect how much of the beauty of rock or ruin,—of gnarled trunk or wave-worn cliff,—is due to cryptogamic plants. Artists have not studied as they might have done, those touches of colour, white and red—golden and purple—the wrinkles, and “time stains” of the ages gone by. Strip the ruin of these, and you efface all that told of the past and made it venerable.

Of modern writers, Wordsworth, and Ruskin alone seem alive to these influences.

“The gentler work begun
By nature, softening and concealing,
And busy with a hand of healing,—
The altar, whence the cross was rent,
Now rich with mossy ornament.”

The Cryptogamia attain their culmination in Ireland for the Northern, as they seem to do in New Zealand, for the Southern hemisphere, where, from the insular character of the land, and the moist atmosphere of the southern ocean, similar conditions prevail. A comparison between the two floras presents us with one of those examples of representative distribution so interesting to the naturalist.

	Ireland.	New Zealand.
Lichens, . . .	295	150
Mosses, . . .	230	250
Hepaticæ, . . .	88	190
	<hr/> 613	<hr/> 590

This table is not very recent, but will be found relatively correct. It will be observed how closely the numbers correspond. Many are common to both countries, and the majority belong to the same genera. The abundance of Hepaticæ in New Zealand is compensated by the number and beauty of Irish lichens.

Of the eleven weeks of my stay in Ireland, nearly six (May 11th to June 18th), were spent at Killarney. The four succeeding weeks were

devoted to sea-bathing at Ross Bay; and the last week we visited Glassnevin, and Dublin.

Ross Bay is a primitive bathing hamlet at the head of Dingle Bay. I was induced to prefer it rather than Bantry, because the district was unexplored. But upon examination I found there was little to discover. The hills are composed of a loose Old Red conglomerate, with uniform rounded contours, and destitute of trees, which add so much to the charm of Killarney. Still, the bay was very fine, and a narrow isthmus of sand dunes, which extends nearly to the northern shore, formed a capital strand, and perpetual barrier to the Atlantic swell.

Algæ were very abundant, many of great rarity; and such gigantic Laminariæ, and great tufts of Rhodospiræ, I never saw before. After a storm the beach was literally piled with them, and scores of people were employed carting them away. They form the only manure used in this district, and, indeed, the only riches the natives derive from this rich bay. The staple, of course, is the potato, which flourishes wonderfully under this treatment. There are no kitchen or flower gardens about Irish cottages. If we wanted a salad, fruit of any kind, or the commonest pot herb, we had to send to Killarney, more than twenty miles; and even there, they could only be obtained from the gardens of the gentry. How the people exist without these, to us, indispensable necessities, I cannot tell. But they seem too apathetic and indolent to cultivate anything but what will barely keep body and soul together. Who can wonder there should be chronic famine in the west of Ireland? Until they learn to develop the resources of sea and land, and are taught the benefits of horticulture and husbandry, no legislation can aid them. Once create the desire for other diet than potatoes, and one of the greatest difficulties would be overcome.

In lieu of better employment, we spent much time in boating, and shooting inoffensive penguins and gulls. The white breast of the gull was in great request for ladies' plumes, and it was my task to preserve them. I met here again that curious amphibian the natter-jack, (*Bufo calamita*); it is a pretty harmless creature, and its bell-like chorus at eventide could be heard at a great distance. I had previously observed it among the sand-flats of Southport, a very similar habitat.

By far the larger portion of my collections were made at Killarney. Two or three times a week I made excursions, seldom beyond six miles from Mucross, into the woods. The best spots were the Tore Mountain, Cromaglan, and the Eagle's Nest; and weeks might be devoted to any one of these without exhausting it.

The stillness of these woods is almost oppressive, only broken by the alarm note of some startled bird, or the continuous hum of clouds of gnats, which I found almost as tormenting as the mosquitoes of South America. On one occasion, near the summit of Tore, I met with a rather unpleasant adventure. Depending from twigs of broom, I saw what appeared a tissue-paper balloon, and wondering how it reached such a place, I unthinkingly tore it open, but in a moment an angry buzz warned me that I had invaded a wasp's nest. Fortunately the density of the shrubs which made the ascent so laborious, now proved my salvation; for leaping and rolling down the steep sides of the mountain, I soon outstripped pursuit.

There is one spot I think of with peculiar pleasure—the Tore or Turk Cascade, made classical by the researches of Mackay, Taylor, Wilson, and many others. It was only about half a mile from the hotel, and almost every evening we strolled there. Ascending a short ravine covered by trees, we reach a sunken amphitheatre of rocks, down which the tumultuous water flows. Here, on spray-moistened boulders, and the steep sides of dripping rocks, we behold the perfection of cryptogamic life.

Noble ferns droop from the fissures, mosses of many kinds fringe the rocks, or cover them with a glossy, many-coloured pile. The colours of some species are very rich and characteristic; thus, *Hypnum eugyrium*, (which here replaces *H. palustre*), occurs in wide patches with a coppery lustre. The fronds of *Hypnum demissum*, and *H. flagellare* are golden, and those of *Hookeria lucens*, pale and silvery. But the Hepaticæ claim precedence for the number and beauty of their species. Depending from the dripping ledges are large tufts of *Frullania Hutchinsiae*, and *Anema pinnatifida*. *Plagiochila punctata*, *P. tridenticulata*, and *Lepidozia tumidula*, grow on trees and rocks. Parasitic on other species, we find *Lejeunia ovata*, *L. hamatifolia*, and *L. microscopica*; whilst *Radula voluta*, *Phragmicoma Mackaii*, *Frullania fragilifolia*, and a host of others, will repay careful research. But the pride of Torc Cascade, and perhaps one of the finest species in the world, is *Dumortiera irrigua*, (*Marchantia*, Tayl.). It grows on the steep faces of rocks, in patches of several yards in diameter, and nothing can surpass the gracefully scalloped outlines, and dark velvety greenness of the fronds. The effect is heightened by the beads of spray which cover the surface with a translucent film, like so many pearls. Unfortunately it shrinks in drying, and the expressive form and colour are lost.

It will be observed that the list of Hepaticæ is relatively more perfect than the other orders. The fact is, my chief object in visiting Ireland, after the renovation of health, was the collection and study of that group. The eye sees what it is trained to see, and this will account for my overlooking some rare lichens, and mosses; whereas, with the exception of *Gymnanthe Wilsoni*, *Syn. Hep.*, I got all the rarer Hepaticæ. Descriptions of several species will be found in the following catalogue, not hitherto recorded as British.*

List of Lichens collected at Killarney, from May 11th to June 18th, 1861.

This collection represents very inadequately the Lichenological riches of Killarney. It comprises only the more conspicuous species; those growing on rocks were purposely omitted, from their bulk and weight. I am indebted to Mr W. Mudd for the determination of these plants, and the nomenclature is that of his work on British Lichens (1861). Whatever may be the difference of opinion as to the value of the genera adopted, there can be none as to the great labour and research, and practical acquaintance with species, exhibited in this work. The genera are founded on the form of the spores, a system advocated by Körber, Nylander, Hepp, and others. I do not feel myself competent to decide how far it is likely to stand the test of experience.

The following remarks of the Rev. C. Babington seem to me very judicious:—"It is perhaps presumptuous to offer an opinion on a subject with which I am not so familiar as the above mentioned authors are; but it appears clear that the employment of microscopic characters must be very cautiously introduced. It is certain that the forms of these organs (the spores) vary considerably in the same species, even in the same specimen, as any one may convince himself by a little experience."—*Fl. New Zealand*. Part II. p. 268.

COLLEMACEÆ, *Nyl.*

Ephebe pubescens, *Fries.*

On damp rocks, Loch Leane,

and below Cromaglan; fruit rare.

Ephebe byssoides, *nov. sp.*†

Collema furvum, *Ach.*

* Some of the rarer species are published in Rabenhorst's *Hepaticæ Europ. Excis. Decas* xxi.-xxii.; and *Bryotheca Europæa*, fasc. xi. Dresden, 1862.

† Described at the end of the list.

Collema pulposum, Bernh.
Synechoblastus flaccidus, Kbr.
 (*Collema flaccidum*, Ach.)
S. aggregatus, (Ach.) Mudd.
 (*Col. fasciculare* var. *aggregatum*, Ach.)
Leptogium lacerum, Kbr.
L. Schraderi, Nyl.

LICHENACEÆ, Nyl.

I. *Gymnocarpi*.

Cladonia aleicornis, Fries.
C. gracilis α. *cervicornis*, Mudd.
 (*C. cervicornis*, Schær.)
C. squamosa, Hoff., et
 ε. *cæspititia*, Mudd. (*Lichen cæspititius*, Eng. Bot. t. 1796.)
C. furcata, Huds.
 β. *racemosa*, α. *erecta*, Mudd.
C. rangiferina, β. *sylvatica*, L.
C. coccifera.
 γ. *Flörkeana*, Fries.
Beamycetes roseus, Pers.
Stereocaulon paschale, L.
 β. *corallinum*, Laur.
Ramalina pollinaria, Ach.
Nephroma lævigatum, Ach.
 (*N. resupinata*, Hook.)
Sticta pulmonacea, Ach.
 scrobiculata, Scop.
 fuliginosa, Dicks.
 limbata, Sm.
 elegans, Deak.
 herbacea, Huds.
Parmelia perlata, L.
 saxatilis, β. *leucochroa*,
 Wallr.
 sinuosa, Sm.
 encausta, Sm. ?
 caperata, Dil.
Borreria cæsia, Hoff.
 aquila, (Ach.) Mudd.
Physcia candelaria, Nyl.
Pannaria plumbea (Lightf.), Massol.
 (*Parmelia plumbea*, Fries.)
 This fine species, and the following, are very abundant on trees about Mucross.
Pannaria rubiginosa, Thunb.
 brunnea, Sw.
 (*Lecanora pezizoides*, Bor.).
 Found on Cromaglan and the loftier mountains.

Lecanora atra, Huds.
 pallescens, β. *tumidula*
 Pers.
Gyalecta cupularis, Ehrh.
Lecidea scapanaria, nov. sp.*
Biatorina grossa, Pers.
 (*Lecidea leucoplaca*, Leight. Ex. 125).
Bacidea luteola, Ach.
 muscorum (Sw.), Mudd.
 Sandhills, Malahide. The only species not collected about Killarney.
Bacidea atro-grisea, Delise.
Opegrapha rupestris, Pers.
 varia ε. *tigrina*, Ach.
 atra, Pers.
 α. *denigrata*, Ach., et
 c. *nigrita*, Light.
 vulgata, Ach.
Stenographa anguina α *divaricata*,
 Mudd.
 (*Graphis scripta* Leight. Ex. 19.)
Graphis serpentina var. *flexuosa*,
 Leight.
Aulacographa elegans (Sm.), Leight.
Stigmatidium crassum, Dub.
 (*Sagedia aggregata*, Fries.)
Arthonia ilicina, Tayl.

II. *Angiocarpi*.

Sphærophoron coralloides, Pers.
Endocarpon miniatum, L.
 β. *complicatum*, Sw.
Normandina jungermanniæ, Del.
 This species is very common on patches of *Frullania tamarisci*, &c., about Killarney, but only few apothecia were found.
Pertusaria communis, DC.
 fallax, Pers.
Verrucaria chlorotica, Ach.
 rupestris, Schrad.
 calciseda, DC.
Thelidium immersum, Mudd.
 gemmatum, Mudd.
Pyrenula nitida, Ach.
Arthopyrenia nitescens (Salw.),
 Mudd.
 epidermidis (Ach.),
 β. *analepta*.
 ε. *punctiformis*,
 Mudd.

* Described at the end of the list.

MOSESSES.

SCHISTOCARPI, *Brid.*

Andreaea petrophila, *Hed.* (*A. rupestris*, *Hed.*). Rocks below Cromaglan; Mangerton.

A. Rothii, *Web. & M.* Dingle Bay.

SYNCLADEI, *Berk.*

Sphagnum squarrosum, *Pers.* Frequent.

S. cymbifolium, *Ehrh.* Very abundant.

S. compactum, *Brid.* Near Loch Guitane; Bog Old Weir Bridge; Looscanough Lake.

S. contortum, *Schultz.* Frequent by mountain springs; Mangerton; Torc; and Glena, &c.

S. auriculatum (*Mitt.*), *Sch.* Escalougha; Cromaglan; pendant from the borders of rills and wet rocks, Kenmare Road, &c.

This plant has a different aspect from *S. contortum*. The stems are longer, 12 to 18 inches or more, the branches less cuspidate and contorted; leaves longer, more distant, clasping and falcate. It has a softer habit, and the colour is pale rusty-white, not fawn-coloured or vinous. But the microscopic characters are identical in both. The utricles of the leaves vermiform and flexuose, containing a spiral of 12 to 20 annulations, each bordered by a minute foramen. The chlorophyllose cells are very narrow, and covered on both surfaces by the utricles. Branches slender, surrounded by one row of translucent utricles.

S. auriculatum seems to bear the same relation to *S. contortum* that the plumose variety of *S. cuspidatum* does to the ordinary form, and its peculiarities are traceable to similar causes.

Obs. The spiral utricles are not the equivalents of the cells of other mosses. The true chlorophyllose cells or ducts are very narrow, and interposed. On a transverse section of the leaf, their position is seen to differ in different species; e.g., they are angular, and occupy the convex surface of the leaf in *S. cuspidatum*,—the concave surface in *S. acutifolium*, and *S. rubellum*. They are central, exposed on both surfaces in *S. squarrosum*; while in *S. cymbifolium*, *S. compactum*, and *S. contortum*, we find them completely surrounded by the angular utricles. These utricles are special organs, like the bladders of *Utricularia*, and serve a double purpose, as reservoirs of moisture, and as floats, to enable the plant to keep the unstable level of mountain bogs.

Sphagnum molluscum, *Bruch.* Ascent of Mangerton; Escalougha; Gap of Dunloe; Cloghereen.

S. acutifolium, *Ehrh.* Very common; there was a dark red variety, with the fascicles more densely arranged.

S. rubellum, *Wilson.* Near Loch Guitane; Cloghereen Bog; Dingle Bay.

S. cuspidatum (*Dill.*), *Ehrh.* Not unfrequent.

The pure white of this species is very characteristic; indeed, as Mr Wilson observes, most of the sphagni may be recognized by colour alone.

ACROCARPI.

Blindia acuta (*Hed.*), *B. & S.* On stones, Crinnagh River; Cromaglan; Eagle's Nest; Torc Cascade.

Dicranum cerviculatum, *Hed.* Banks, Kenmare Road, beyond Torc; Loch Guitane.

D. heteromallum, *Hed.*

D. Scottianum, *Turn.* Frequent in mountain woods, near Lady Kenmare's Cottage, growing with *Lepidozia tumidula*; Glena; Mangerton.

D. fuscescens, *Turn.* Torc Mountain.

D. majus, *Turn.* Tomie's Mountain; Mucross.

D. palustre, *Brid.* Bog at Cloghereen; Cara Lake.

Leucobryum glaucum (*Dill.*), *Hampe.* Common.

Ceratodon purpureus (*Hed.*), *Brid.*

Dicranodontium longirostre, *W. & M.* Rare. Rocks, Devil's Bit; Torc; Ravine near the hunting-tower. Cromaglan, with *Hyp. micans*; Eagle's Nest.

The habit of this species is that of *Lepidotrichum*.

Campylopus fragilis (*Dicks.*), *B. & S.* (*Raben. Bryoth.* 504). Frequent on banks, Ross Bay.

C. torfaceus, *B. & S.* (*Rabenk. Bry.* 506.) Banks on the Kenmare Road, beyond Torc; near Loch Guitane.

Campylopus flexuosus (Dill.), Bird.
Frequent. Very fine near Loch
Guitane.

There was one slender form with linear fasciculate fertile spikes, the archegonial leaves obtuse, and cucullate; stem leaves setaceous, rigid, which should probably be referred to *C. setifolius*, Wils.

Campylopus brevipilus, B. & S.
Bog near Dinish Island; and
Loch Guitane, growing with
Sphagnoecetis communis, Nees.

The different habitat, interrupted stems, slightly convex, short, scarcely piliferous leaves, and narrow nerve (about one-fourth the breadth of the leaf), will distinguish this from *C. polytrichoides*. The areolæ are large, oblong, and obliquely arranged.

Obs. Only the inner perichaetial leaves have reflexed margins; in the rest they are plane. Unless this is remembered, the figure in Bry. Brit. is likely to mislead.

C. longipilus, Bry. Brit. (C. atrovirens, Schimp.) (Rabenh. Bryoth., 505!) Very abundant, and fine, in sub-alpine districts.

Both ♂ and ♀ plants were met with, but no fruit. Upon the synonymy, Mr Wilson observes, in a letter:—"Doubtless *Campylopus polytrichoides* is the moss given as *C. longipilus*, in Bryol. Europ.; but that name is inexpressive, and originates in the confusion of the two species by Bridel. Schimper's *C. atrovirens* is the original *Dicran. flexuosum* γ *piliferum*, on which Bridel evidently intended to found his *Campyl. longipilus*, Bryol. Univ. t. 477."

C. polytrichoides, De Not. (C. longipilus, Bry. Eur.), Rabenh. Bryoth., 507! On exposed rocks near the Hunting Tower, Cromaglan.

This species was first recognised as British from specimens sent to me from Jersey, by Mrs Mackenzie, a lady new to the study of Bryology. It has since been recorded from Penzance, and other stations, and is perhaps far from rare.

Stems densely caespitose, 1 to 2 inches high, rigid, from pale green to ochraceous brown, simple or fasciculately branched, narrowed and radiculose below, suddenly enlarged towards the top, with the leaves longer, and closely imbricated. *Leaves* ovate-lanceolate, terminating abruptly in a short, white, rough mucro. *Nerve* predominant, striated, convex, more than twice the breadth of the involute laminae, which are narrowed upwards, forming a

hooded process at their junction with the piliferous apex.

A transverse section of the leaf above the middle is nearly circular. The *nerve* is composed of two series of cells, the inner large and oblong, the outer narrow and compact, arranged in longitudinal lamellæ.

Laminar areolæ small, quadrate, or lozenge-shaped, translucent near the base, which is often clothed with brown radi-cles.

The *clavate, rigid* stems, like those of *Polytrichum piliferum*, very convex, shortly piliferous leaves, and broad nerve (viewed from the back the leaf seems almost all nerve), will distinguish this moss from *C. brevipilus*.

C. longipilus has more elongate and setaceous leaves, the piliferous portion longer; larger, oblong, flexuose areolæ, and the plant has always a blackish-green tinge. Its leaves are at least eight or ten times as long as broad, while those of *C. polytrichoides* are as four to one.

Trichostomum tophaceum, Brid.
Ross Bay; near Dublin (*D. Moore!*).

T. flavovirens, Bruch. Sand hills, Malahide; and Ross Bay.

T. cylindricum, C. Müller. Torc Cascade; Eagle's Nest; Minister's Fall, Glenna.

T. mutabile, Bruch. Rocks; not unfrequent near the Upper Lake; Dingle Bay.

T. crispulum, Bruch. Rocks, Cromaglan; Coomashana Lake, and walls near Ross Bay.

Leptotrichum flexicaule, C. Muller.
Frequent in limestone districts.

L. homomallum, Hed. Mucross; Torc Cascade; Howth (*D. Moore!*).

Tortula unguiculata, Hed. Common.

T. fallax, Hed. Ross Bay, &c.

T. tortuosa, W. & Mohr. Frequent on walls and rocks, old capsules near Mucross.

T. convoluta, Hed. In fine fruit at Mucross, and Ross Bay.

T. revoluta, Schwaeg. Not uncommon, Killarney; Bridge near Coomashana Lake.

T. oblongifolia, Hook. & Wils. Walls near Dublin (*D. Moore!*).

T. cuneifolia, Dicks. Howth, near Dublin (*D. Moore!*).

T. aloides, B. & S. Walls, Mucross; near Dublin (*D. Moore!*).

Anacalypta Starkeana.

β brachyodus, Wils. Fallows,
near Dublin (*D. Moore*!).

This is the form with short peristome, intermediate between the var. *α*, and *Pottia minutula*, B. & S. Surely the system which refers these forms to separate genera is an imperfect one.

Pottia crinita, Wils. Walls, &c.,
Ross Bay; Malahide.

Desmatodon nervosus, B. & S. Near
Dublin (*D. Moore*!).

Schistidium apocarpum, Hed. Fre-
quent.

Grimmia torta, Horns. Rocks near
Coomashana Lake; Dingle Bay.

G. tricophylla, Grev. Mangerton;
walls, Ross Bay.

G. Schultzii, Brid., Fairhead, Co.
Antrim (*D. Moore*!).

G. leucophæa, Grev. On basaltic
rocks, Fairhead (*D. Moore*!).

G. patens, Schwaeg. Torc Cascade.

Obs. The curious double nerve of this
species at once enables us to recognise it,
even in a barren state, from its allies.

Racomitrium ellipticum, B. & S.
Slemish Mountain, Co. Antrim
(*D. Moore*!).

R. sudeticum, B. & S. Rocks, Cara
Lake, near Dingle Bay.

R. heterostichum, Brid.
γ gracilescens, Wils. Rocks,
Police Barrack, Killarney.

R. lanuginosum, Brid. Not un-
frequent.

Glypnomitrium Daviesii, Schwaeg.
Basaltic rocks, Fairhead; rare
(*D. Moore*!).

Orthotrichum neglectum, Schimp.? *O. anomalum*, Bry. Brit. Lime-
stone rocks, Killarney.

Not having seen the recent monograph
of Professor Schimper, I am far from
clear to which of the six segregates of
O. anomalum, he refers our common form.

Dr Wood deserves the credit of having
drawn attention to this proliferous sub-
ject. In the "Phytologist" (Dec. 1860),
that accomplished bryologist proves that
our plant is not identical with *O. anom-
alum*, B. & S., which is defined "with the
capsule on a long pedicel, twisted to the
left when dry, ovate-oblong, shortly
apophysate, with sixteen ribs, alternately
long and short; and sixteen geminate
teeth, ultimately free, and equidistant." Dr Wood describes a moss from Aber-
dour, which he believes identical with
the *Bry. Eur.* plant. But in a letter at-

tached to his paper, Schimper declares
the Aberdour moss a new species, "evi-
dently distinct from that of *Bry. Eur.*,"
which is most widely distributed in
Europe. So that here are two forms
nearly intermediate between *O. anom-
alum*, Auct., and *O. cupulatum*.

Before we accept all these forms as new
species, the following facts should be kept
in mind:—

In *O. cupulatum*, we find the length of
the pedicel, and form of the capsule, far
from constant. Plants collected in Craven
have a narrow capsule with only 8 striæ,
while luxuriant specimens from the border
of a neighbouring lake, possess large ur-
ceolate capsules, 16 striæ, and a perfectly
developed inner peristome.

Mr Wilson describes a plant from Con-
way Castle, that "would be called *O.
anomalum*, only that the peristome (a
grand point in this case) insists on its
being exactly like that of *O. cupulatum*!"
Again, Dr Wood admits having examined
plants with 8 teeth, and the habit of *O.
anomalum*, and yet "bearing indications
of intermediate striæ."

Schimper always finds an inner peri-
stome of 8 cilia in our *O. anomalum*, while
the continental form is said invariably to
want it. (*Vide* Phytol., p. 367. 1860.)

Weighing this evidence, I think a Dar-
winian would try to reconcile the difficulty
by considering *O. anomalum*, and *O. cu-
pulatum*, modified forms of one species,
rather than claim specific honours for each
variety.

O. Sturmii, Hoppe.

Barren specimens from old red sand-
stone rocks, Dingle Bay, probably belong
to this species. Mr D. Moore first dis-
covered it at Luggielaw, Co. Wicklow,
and subsequently at Seven Churches, and
Fairhead. It is closely allied to *O. ru-
pestre*, but the capsule is shorter and
rounder, peristome simple, and calyptra
less hairy.

O. rupestre, Schreb. Rocks near
Cromaglan, &c.

O. tenellum, Br. On ash trees,
Mucross Green; Seven Churches
(*D. Moore*!).

O. stramineum, Horns. Mucross;
Ross Bay.

(*O. pumilum* is said to have been found
in Ireland by Dr Taylor. The moss was
most likely *O. stramineum*, or *O. tenel-
lum*. I have never seen British specimens
of the true *O. pumilum*, Bry. Eur. Mr
Wilson's moss (t. xlv., f. 2) is the *O. ful-
tax*, B. & S.)

O. affine, Schrad. Common.

O. rivulare, Turn. Torc Cascade;
Cara Lake.

O. diaphanum, Schrad. Common.

Orthotrichum leiocarpon, B. & S.
Macromitrium Ludwigii, Schrad.

Rare; young oaks, Torc Wood;
 Glena Wood.

M. Drummondii, Brid. Very frequent.

Ulota phyllantha, Brid. Common.

U. pulchella, Sm. Trees, Mucross demesne.

U. Bruchii, Brid. Trees, Killarney woods.

U. crispa (Hed.), Brid. With ripe capsules, June 18th, 1861.

The season was remarkably dry; and several species were in fruit earlier than usual. From the starved condition of the specimens, I at first thought this species the *U. crispa*, B. & S.; but although some tufts had the capsules very short, I could find none that exactly agreed with Mr Wilson's *Ambleside* specimens. Mr D. Moore has been more fortunate, and collected some fine tufts from the Torc Woods.

U. calvescens, Wils. Mss. (*Rabenh. Bryoth.*, 520!). Growing in the forks of young oaks, Killarney woods, not unfrequent in Kerry. Fruit mature, June 10–20.

Habit of *O. Bruchii*, but with narrower leaves, less dilated at the base; inner perichaetial leaves short, obtusate, areolae minute; capsule oblong-clavate, broadly striate, tapering into a long slender pedicel, not contracted below the mouth when old; vaginula smooth; calyptra glossy, straw-coloured, the apex purple, glabrous, or slightly hairy. Fruit—June, July.

This species adds another to the contributions of my friend, Mr D. Moore, to Irish bryology. He first met with it in 1857; but the specimens were immature, and Mr Wilson referred it to *O. crispum*, whilst Prof. Schimper considered it a glabrous form of *O. Bruchii*.

From the commencement of my visit I made the plant an object of careful study, and as they were barking and felling a great number of oaks, I was fortunate enough to obtain some hundreds of specimens. Almost every branch bore tufts of this, and the allied species, so that the comparison was easy.

The pale glossy calyptra, and long pedicels of our plant made it a conspicuous object, whereas the capsules of *O. Bruchii* were unformed, and the dark-brown hairy calyptra, just separating from the pilose vaginula. The eight or ten weeks difference of maturity, where the conditions of growth are equal, seems to me conclusive as to its specific claims.

Tufts small, preferring the ultimate

branches of young oaks. Leaves lanceolate-acuminate from a slightly dilated base, minutely papillose, nerve strong, concolorous, margins reflexed; inner-perichaetial leaves shorter, sheathing, ovate obtusate. Capsule elliptic oblong, (resembling that of *U. Drummondii*), ribs as broad as the intermediate portion, apophysis narrow, gradually passing into the pale slender seta, which is about thrice as long as the capsule. Lid large, conic-convex, with a short beak. Vaginula smooth. Archegonia short, oblong, and like the antheridia almost destitute of paraphyses.

Peristome conspicuous, pale yellow, outer of 8 lanceolate-bigeminate teeth; inner of 8 filiform cilia, composed of two series of cells, marked by a faint median line. Calyptra mitriform, glossy, pale green, or stramineous, slightly hairy. Spores small, brown, granulose.

Areolae punctiform (as large as in *U. crispa*), arranged in parallel uniform rows, basal cells oblong.

Obs. The form of areolation described as 'dotted' or 'guthulate,' does not represent the whole of the cell, but rather its nucleus, the cell walls being obscured by the structureless epidemic layer.

The true form is defined by treating the leaf with a drop of sulphuric acid, or what is better, boiling it in a little Liq. Potassæ, and afterwards adding a drop of Sol. Zincæ Binioididi. The cells are then seen to be quadrate or hexagonal, the walls very thick, and apparently forming a raised border around the well-defined darker nucleus, like the opal setting of a ring. On each surface of the leaf the walls are raised, bearing one or more papillae.

With a power of 350 diam. the whole surface of the cell appears delicately stippled, and marked with concentric striae, looking not unlike the cells of *Flustra foliacea*. The areolae of *U. Bruchii* are nearly twice as large, less regular in form and disposition; those of the lower third of the leaf longer and flexuose.

In *O. crispum* the walls are thicker, more tuberculose, and the nucleus and nerve darker coloured.

Ulota calvescens is in some of its characters intermediate between *U. Bruchii*, and *U. crispa*, having the habit of the former, with the acute leaves, strong narrow capsule, and large peristome of the latter; but I observed no disposition to merge into either. That glabrous forms of those species may occur, I do not deny; but of which can ours be considered a glabrous form? I am more inclined to suspect, with Mr Wilson, that all the British *Ulota* may be varieties of *U. crispa*.

One variety, growing on hawthorn, beneath dripping rocks, had a larger pyriform capsule, and darker calyptra; but *U. Bruchii* and the other species accom-

panying it, were quite as much altered by the moisture.

Zygodon Mougeotii, B. & S. (*Amphoridium*, B. & S.). Frequent on moist rocks; Torc Cascade; Cromaglan, &c.

This species should take its place with *Gymnost. rupestre*, rather than *Zygodon*.

Z. viridissimum, Dicks. (*Rabenh. Bryoth.*, 524!). Abundant fruit on ash trees, Mucross demesne.

Z. conoideus, Dicks. Less frequent, Mucross; Dina Cottage; Glena, &c.

Polytrichum gracile, Menz. Mangerton.

P. formosum, Hed. Cromaglan; Tomie's Mountain; Cahnicann wood.

P. juniperinum, L. Mountain bogs.

Pogonatum nanum, Hed. Ross Bay; Howth, near Dublin (*D. Moore*!).

Aulacomnium palustre, *Schwaeag.* Frequent.

Bryum bimum, Schreb. Cloghereen.

B. cernuum, Hed. Walls, Mucross; sand-flats, Ross Bay, and Malahide.

(As the places are so much alike, repeated search was made for *B. calophyllum* and the other Southport mosses, but unsuccessfully.)

B. torquescens, B. & S. Walls at Killarney; Abbott's Town, near Dublin (*D. Moore*!).

B. atropurpureum, W. & M. Ross Bay.

B. alpinum, L. Fairhead, county Antrim (*D. Moore*!).

B. nutans, Schreb. Killarney. The capsule was remarkably short and round.

Entosthodon ericetorum, C. Müller. Torc Mountain; Derryeunihy Cascade; Gap of Dunloe.

E. Templetoni, Hook. & T. Plentiful on shady rocks, Devil's Gap; Torc Mountain.

Philonotis calcarea, B. & S. Near Looscanough Lake; Glena.

P. fontana, Brid.

P. rigida, D'Not.

Only one small tuft was found on steep rocks below Tomie's Mountain. I could not find Dr Taylor's station, at Looscanough Lake.

Bartramia ithyphylla, Brid. Eagle's Nest.

Bartramia Halleriana, Hed. Gap of Dunloe; Fairhead (*D. Moore*!).

Breutelia arcuata (Dicks.), B. & S. Cromaglan; in fruit, Glena woods.

Splachnum sphaericum, Hed. Near Looscanough Lake.

PLEUROCARPI ET CLADOCARPI.

Cryphaea heteromalla (Dill.), Brid. Trees, Mucross.

Fissidens osmundoides, Hed. Wet rocks; remarkably fine, but no fruit.

F. taxifolius, Hed. Frequent.

F. adiantoides, Hed.

On the ledges of dripping rocks, Torc Mountain, I picked the finest specimens I ever saw: the tufts hung pendant for a foot, or 18 inches, and individual fronds were 9 or 10 inches long. I at first felt no doubt this was the *F. polyphyllus*, which Mr Wilson found at Glengarriff, but the latter is dioecious.

Hookeria lucens, Dill. Common.

H. late-virens, H. & P. O'Sullivan's Cascade; and ravine below Eagle's Nest.

I could not find it at Torc Cascade, although I searched for it repeatedly. Perhaps the dry season had retarded the growth, as in the case of *Trichomanes*.

Daltonia splachnoides, H. & T. Rocks; Torc Mountain; Cromaglan; Eagle's Nest.

Pterogonium gracile, Sw. Rocks near Coomashana Lake; Dingle Bay.

HYPNUM, Auct.

Isoetecium myurum (Dill.), Brid.

I. myosuroides, Dill.

Thamnium alopecurum (Dill.), Brid.

One of the most conspicuous adornments of the Killarney woods and waterfalls. In fine fruit on limestone rocks, near the Parsonage, Mucross; and at O'Sullivan's Cascade.

Climacium dendroides, W. & M.

Neckera complanata, L. Glena woods.

N. crispa, Hed. Not uncommon.

Pylaisea polyantha, B. & S. (*Leskea Hed.*). Trees; Mucross demesne.

Homalothecium sericeum, B. & S. (*Leskea, Hed.*)

Heterocladium heteropterum, Bruch.

Very frequent on rocks in shady woods.

Thuidium tamariscinum (Dill.) Brid.
T. abietinum, L. Sand dunes, Malahide.

Plagiothecium undulatum (L.), Bry. Eur.

P. sylvaticum, L.

P. denticulatum, Dill.

P. elegans, Hook. Shady rocks, Glens; Torc Cascade, &c.

Amblystegium serpens, Bry. Eur., var. *salinum*.

Growing in wide, brown, shallow patches, on the sand-flats at Malahide. This moss has somewhat the habit of *A. subtile*. The branches and leaves are shorter and more distant than usual in *A. serpens*; leaves ovate-acute, convex, from a dilated amplexicaul base, with a vitreous, rufous colour. Nerve reaching about half-way; areolæ large, rhomboid. No fruit has yet been observed. The same moss is found in Southport.

A. riparium, Hed. Ross Bay.

A. polygamum, B. & S. Sand hills, Malahide.

Brachythecium albicans, Neck. Sand hills, Ross Bay; Malahide.

B. lutescens, Huds. Frequent with the last.

B. velutinum, Dill.

B. plumosum, Swartz.

B. populeum, Hed.

B. rutabulum, Dill.

B. rivulare, Br. Borders of streams, Killarney.

Eurhynchium crassinervium, Tayl. Mucross.

E. prælongum, Dill.

E. Stokesii, Turn. Found by Dr Taylor, at Cromaglan.

E. Swartzii, Turn. Both ♂ and ♀ plants, at Torc Cascade; with *E. pumilum*. O'Sullivan's Cascade.

E. pumilum, Wils.

E. striatum, Hed.

E. striatulum, Spruce. Limestone rocks, Mucross, discovered by Mr Wilson.

E. circinatum, Brid. On limestone, Innisfallen, and other islands in Lochleane.

Rhyncostegium tenellum (Dicks.), Bry. Eur. Walls and limestone cliffs; frequent about Mucross.

Rhyncostegium confertum, Dicks.

R. megapolitanum, Bland. Sand hills, Malahide, and Dingle Bay.

R. rusciforme, Neck.

R. depressum, Bruch. Limestone rocks by Lochleane. Torc Cascade.

R. demissum, Wils. Not unfrequent.

R. micans, Wils. This beautiful moss is rarer than *R. demissum*. Devil's Gap; Torc; Eagle's Nest; Glens; ravine opposite the hunting tower, Cromaglan. No fruit has hitherto been found.

Hylacomium flagellare (Dicks.), Bry. Eur. Common in shady ravines and by waterfalls. Fruit at Cromaglan, and O'Sullivan's Cascade.

H. squarrosum, L.

H. brevirostre, Ehrh. Fruiting freely in Glens woods.

H. splendens, Hed.

Limnobia palustre (Dill.), Bry. Eur., v. *subspheerocarpon*. Mucross; Torc Cascade.

L. ochraceum, Turn. Rare. Killarney.

L. eugyrium, Bry. Eur.

Very abundant at Torc Cascade, Derrycahony Cascade, &c., forming broad, copper-coloured patches, on rocks; first discovered by Dr Mackay. The Irish variety has shorter, more spreading and falcate leaves, approaching the American form. Monocious, branches irregularly fasciculate, leaves subfalcate-second, broadly ovate, acute, concave, somewhat complicate and contorted, nerveless; areolæ very narrow, basal cells larger and fulvous; capsule short, roundish-oval, curved; annulus broad, distinct.

Hypnum cupressiforme, L.

H. resupinatum, Wils.

H. molluscum, Hed.

H. filicinum, L.

H. revolvens, Br. Bogs.

H. condensatum. New Police Barrack.

H. Kneiffi, Schimp. Cloghereen Bog.

H. stellatum, L.

H. chrysophyllum, Brid. Walls opposite Torc Lodge.

H. cordifolium, Hed.

H. sarmentosum, Wahl. Coomashana Lake, Kerry; Cromaglan.

Note.—The list of Hepaticæ will appear in a future Number. The descriptions of *Ephedra byssoides*, and of *Lecidea scapanaria*, are also deferred, as the illustrative figures are still in the hands of the engraver.