THE FLOWERING SEASON OF PLANTS.

IN consequence of the mild seasons, or spells of weather, that occur during the winter months, many plants blossom along the seaboard of Donegal at abnormal periods. The following notes may be of interest. No doubt they could be easily added to. No winter occurs that does not provide its quota.

In flower at Christmas, 1892:–

Ulex europæus.
U. nanus.
Corylus Avellana.
Bellis perennis.
Senecio Jacobæa.
S. aquatica.
Chrysanthemum segetum.

Third and fourth weeks of January, 1893:–

Cardamine pratensis.
Potentilla fragariastrum.
Tussilago Farfara.
Lamium purpureum.
Veronica arvensis.
Veronica peregrina.
Alnus glutinosa.

First week of February:–

Geranium Robertianum.
Primula vulgaris.

Middle of March, 1892:–

Ranunculus Ficaria.
Capsella Bursa-pastoris.
Cardamine hirsuta.
Viola sylvatica.
Cochlearia officinalis.
Potentilla fragariastrum.
Ulex europæus.
Oxalis Acetosella.
Prunus communis.
Bellis perennis.
Tussilago Farfara.
Chrysosplenium oppositifolium.
Euphorbia Peplus.
Poa annua.
Draba verna, etc.

In flower second and third weeks of November:–

Calluna vulgaris.
Erica Tetralix.
E. cinerea.
Geranium Robertianum.
Ulex europæus.
U. nanus.
Taraxacum Dens-Leonis.
Juncus bufonius.
Senecio Jacobæa.
Achillea Ptarmica.
Potentilla reptans.
Leontodon autumnale.
Ranunculus Flammula.
R. acris.
Sonchus oleraceus.
Rubus carpinifolius.
R. discolor.
Hieracium Pilosella.
Rumex nemorosus.
Holcus lanatus.
Achillea millefolium.
Sherardia arvensis.
Carduus lanceolatus.
Polygonum Hydropiper.
Bellis perennis.
Cardamine Bursa-pastoris.
Poa pratensis.
P. annua.
Senecio vulgaris.
Stellaria media.
Viola tricolor.
Veronica arvensis.
Cerastium glomeratum.
Brassica campestris.
Euphorbia Helioscopia.
E. Peplus.
Alchemilla arvensis.
Lapsana communis.
Myosotis arvensis.
Centaurea nigra.

Scirpus Savii.
Sarothamnus Scoparius.
Potentilla Tomentilla.
Lonicera Periclymenum.
Geranium molle.
Scabiosa succisa.
Ranunculus bulbosus.
Crepis biennis.
Juncus effuses.
Plantago lanceolate.
Holcus lanatus.

In flower the second week of December, 1894:–

Achillea millefolium.
Erica cinerea.
Erica Tetralix.
Heracleum Sphondylium.
Daucus Caroba.
And many others.

I made similar notes in other years in Fanet, but the above will suffice. All the above are from the shores of Lough Swilly.

GEOGRAPHICAL DISTRIBUTION.

ANALYSIS OF DONEGAL FLORA.

I PROPOSE here to offer a few remarks upon the geographical distribution of the species composing the flora. This subject may be dealt with from different points of view. We may regard the species as portion

(1) of the Irish Flora,

(2) of the Flora of Great Britain.

With regard to their distribution in Ireland, it will be of interest in the first place to call attention to the rarest of the Donegal plants. Very few are found only in Donegal:–

Trollius europæus.
Helianthemum vulgare.
Hieracia.
Carex Bœnninghauseniana (believed to be a hybrid).*

Other species which are very local or rare in Ireland are:–

Thalictrum alpinum.
Crambe maritima.
Cardamine amara.
Draba incana.
Silene acaulis.
Vicia lathyroides.
Dryas octopetala.
Saxifraga aizoides.
Ligusticum scoticum.
Carum verticillatum.
Hieracia.
Atropa Belladonna.
†Linaria repens.
Bartsia viscosa.
‡Calamintha Clinopodium.
Stachys Betonica.
†Nepeta Cataria.
Oxyria reniformis.
†Polygonum Bistorta.
P. viviparum.
Euphorbia hyberna.
†E. amygdaloides.
Ceratophyllum demersum?
Salix phylicifolia.

* Recently discovered in Kerry by Mr. Scully.

Neottia Nidus-avis.	Sesleria cœrulea.
Cephalanthera ensifolia.	Elymus arenarius.
Eriocaulon septangulare.	Trichomanes radicans.
Typha angustifolia.	Adiantum Capillus-Veneris.
Juncus obtusiflorus.	Cryptogramme crispa.
Potamogeton filiformis.	Polystichum Lonchitis.
Eriophorum latifolium.	Asplenium viride.
Carex aquatilis.	Ophioglossum polyphyllum.

We will now see how the flora is related to that of the rest of Ireland. For this purpose we have the *Cybele Hibernica* of More and Moore to consult.

Of the fifteen species there enumerated as characteristic of the west and south of Europe, which range, under an exceptional climate, to a higher northern latitude than on the Continent, four only reach as far north as Donegal, although at that time only one was believed to occur. These are:–

Saxifraga umbrosa.	Trichomanes radicans.
Euphorbia hyberna.	Adiantum Capillus-Veneris.

While of the four trans-Atlantic species a single one only occurs:–

Eriocaulon septangulare.

There are some peculiarities in the Donegal flora which may as well, at once, be referred to:–

Firstly.–The Alpine species descend to a lower level than elsewhere in Ireland.

Secondly.–The Genus *Hieracium* is, perhaps, better represented than in any other part of Ireland.

Thirdly.–The proportion of marsh and moisture-loving species (Ferns, Sedges, &c.) to the rest of the flora is probably higher than elsewhere in Ireland.

Fourthly.–The number of Alpines is large, and the Northern or Scottish type is well represented.

A comparison of the numbers of the larger natural order brings out one simple fact, that the loss is greater in Dicotyledons than in Monocotyledons. In the Monocotyledons there is a decrease of about one in seven, while in the Dicotyledons it amounts to more than one in five. If we take the whole Flora of Ireland, the figures stand at about

730	Irish Dicotyledons	146	of these not in Donegal
229	,, Monocotyledons	34	,, ,,

so that there is about one Dicotyledon lost in every five to one Monocotyledon in every seven.

This result may be explained by the consideration that the Monocotyledons include many aquatics, which have an extensive range, and are, of course, adapted for the damper climate. This, however, only affords a partial explanation. The real difference arises from the *loss* in such orders as *Cruciferæ*, *Leguminosæ*, *Umbelliferæ*, and *Compositæ*. In these four orders Donegal loses more than a quarter of their Irish total. In *Leguminosæ* we fare worst, losing a third. In *Orchideæ* very nearly the same failure occurs, and this group is always important. In compiling floras of small islands off the coast of Ireland, I have observed that the orchids diminish more than any other order, except upon the Galway Aran Islands, whose flora is altogether exceptional. It appears to be almost a rule that *Orchis maculata* alone of the family can put up with such banishment as Tory, Saltees, Blasquets, Inishbofin, North Aran, &c.

In a report of the flora of the Blasquets Islands, Mr Barrington drew out an interesting table of the occurrence

of the various species on Tory, North Aran, South Aran, and Blasquets. The proportion of Dicotyledons to Monocotyledons in these groups is close to 2¾ to 1 (364 to 131). The proportion in all Ireland is almost exactly 2½ to 1 (734 to 292). But this insular proportion is very much distorted by the wealthy flora of South Aran. If we removed its flora, we should remove 122 Dicotyledons and only 24 Monocotyledons. This would turn the proportion into nearer 2 to 1 (242 to 110). This is much more the usual proportion in these outer islands, with their reduced and impoverished floras, which is in accordance with my previous remark. A curious fact again in connection with Aran is that its exceptional character is well borne out by its *Orchidaceæe*. My Aran list has five in the family, and a couple more spring flowering ones have since been added. All the other islands have but one *Orchis* apiece. This fact points out the continental character of the Aran flora as regards the British Isles. In Mr Watson's *Cybele Britannica*, he shows (iv, 408) that this order is more highly represented in Great Britain as compared with the European flora than any other order. And, on a small scale, this high representation of Orchids is continued into Aran as compared with Ireland. The opposite view is more forcible, *i.e.,* the total reversal of this state of things in a more thoroughly depreciated flora like that of the other smaller islands.

In insular floras *Leguminosæ* diminish most after Orchids.

I have alluded above to another feature in the flora of Donegal as compared with the rest of Ireland, that is the increase in the number of questionable natives, or rather the increased suspicion attached to many species. There are several plants which it seems most unreasonable to

challenge, considering their great abundance. But, if we are to endeavour to realize a condition of things prior to the introduction of our food-crops, or prior to the introduction of cultivation of any sort, I see no reason why we should not consider, in this county at least, a large number of plants, not usually questioned elsewhere, as being followers or attendants upon the arrival or evolution of man. Illustrations occur among Poppies, Fumarias, *Barbarea*, *Sisymbrium*, *Capsella*, *Geranium Robertianum* and *G. dissectum*, *Trifolium repens* and *T. procumbens*, *Spergula arvensis*, *Sherardia*, *Galium Aparine*, *Sonchus arvensis* and *S. oleraceus*, *Anthemis*, *Chrysanthemum segetum*, *Senecio vulgaris*, *Arctiums*, *Carduus*, several Labiates, Veronicas, and many Grasses.

I have used the mark of suspicion with as much freedom as I dared. This question is nearly always so much a matter of opinion. On the other hand, it should be borne in mind that these divergences of opinion are often the result of dissimilar observation. To a resident in Dublin or Belfast it would seem unreasonable to attach suspicion to several of the above plants which, in Donegal, never occur except near habitations.

Mr. Watson's divisions of the surface of Great Britain into zones is generally accepted and understood. He imagines an observer to start from the summit of one of the loftiest hills and note the phanerogams as they appear in his descent. From a series of such observations on various hills, the ascents being similarly utilized, a certain order will be discovered in which many species usually occur. Also there will be found to be a number of species which never descend to the bases, and another number of species which

cease very early on their upward ascent. The former will be the typical Highland species. The latter belong to the plains and valleys.

But in addition to this set of observations another series will be found necessary. It will be found that a number of species which reach the lowlands in a northern latitude fail to do so as we travel southwards, and finally become confined to the summits or nearly so in their most southern stations. Another converse set will display themselves as ascending a certain distance upon southern hills, but as the observer goes northward the altitude or upper limit becomes lower and lower, until at length the species becomes altogether lowland or ceases to exist .

In order, therefore, to exhibit all these climatic ranges in one space, we would require a mountain in the extreme south of England, whose base would stand in that region where the most southerly species existed, but whose summit would reach to the height which would provide a climate equivalent to that of the summit of Ben Lawers, or whatever other Scotch mountain provides the most Arctic species. No such mountain exists. Snowdon comes nearest in both directions to containing all Mr. Watson's zones. But by keeping a double entry of latitude and altitude Mr. Watson obtains a series of zones which displays admirably the distribution within Great Britain of its flora with regard to climate.

The first subdivision he makes is the broad one of Agrarian and Arctic, the former including all the spaces lying below the limits of cultivation of the cereal crops, the latter all the spaces above these limits. *Pteris aquilina* is selected by Watson as a plant which marks out naturally the primary division. Its range corresponds in Great Britain to

that of adaptability for cultivation. Above its range oats will not exist. This height in England is about 1600 feet.

The Agrarian region is again subdivided into zones, as is also the Arctic region, and these zones are all defined by containing within their limits a certain set of species which will go no higher, and another set which will go no lower, these forming the upper and lower limits of the zone. Beginning at the summit zone on the highest Scotch mountain (6), there are enumerated several species, none of which occur in Ireland. These descend no lower, and are peculiar to these summits in Britain. But of course a number of species have come up from below also. There are to be found again a number of plants which cease on their approach upwards, at about the same limit as those peculiar ones cease to descend. Of these *Calluna vulgaris*, *Eriophorum vaginatum* and others may be regarded as defining the upper limits of zone 5, and so on downwards.

The zones may be calculated thus by their limits:–

Arctic region.

Zone 6: Super-Arctic zone. - *Calluna vulgaris* has ceased to exist from below up. (This zone is not in Ireland).

Zone 5: Mid-Arctic zone. - *Erica tetralix, E. cinerea* have ceased from below up. *Salix herbacea* from above down.

Zone 4: Infer-Arctic zone. - *Pteris aquilina* has ceased from below up. *Saussurea* has ceased from above down.

Zone 3: Super-Agrarian. - *Thalictrum alpinum*, *Oxyria reniformis*, *Alchemilla alpina* have ceased from above downwards. *Convolvulus sepium* and *Rhamnus catharticus* have ceased from below up.

Zone 2: Mid-Agrarian. *Rubia peregrina*, *Juncus acutus*, *Erica vagans* have ceased from below up. *Empetrum*, *Ligusticum*, etc, from above downwards.

Zone 1: Infer-Agrarian. *Meconopsis*, *Comarum*, *Parnassia* have ceased from above. (Scarcely in Ireland except the maritime species.)

I have applied Watson's zones, as far as possible, to the flora of Donegal. It will be found that of these six zones the super-Arctic at one extremity, and the infer-Agrarian at the other, have no existence in this limited space. It may be safely said that zone 6 exists only in Scotland in the British Isles.

To the table exhibiting the distribution of plants in their districts in Donegal, I have appended a column marking the zones. Watson's definition cannot be exactly adopted, as several species have a different mountain range in Ireland from that in Great Britain. But the distinctions are slight, and the body of the flora in my Donegal zones will correspond with his distribution.

The flora of all Ireland will range itself into five zones, the lowest being about half represented only in the south. The lowest Donegal zone, or zone 2 of Watson, is not all included in Donegal. My zone 2, though covered by it, is of scarcely as

wide an extent, and that in the south and south-west of the county. To the north and north-west it hardly extends. His lower limits for *Empetrum*, *Rhodiola*, *Selaginella* do not exist there. None of the upper limit plants for Watson's 1 occur in this county; and several of the upper limit plants of 2 are not found in the north-west, though occurring freely in the south. The following are the zones in Donegal:–

5. 2466 to 1800 feet. No *Erica tetralix*, or (as a rule) *E. cinerea*. *Digitalis*, *Prunella*, have ceased to exist. *Salix herbacea*, *Carex rigida* at a maximum.

4. 1800 to 1100 feet. No *Pteris*, *Myrica*, Fruticose *Rubi*. Most of the Alpines with lower limits confined, or nearly so, to this zone in Donegal.

3. 1100 to 400 feet. Seldom any cultivation higher than this in Donegal and its lower limit may be taken as the limit of cereals. Upper limit defined by 3.

2. 400 feet to sea-level. Region of cultivation.

Keeping these zones in our memory we shall see by comparison how they agree with those of Great Britain. At page 175, Vol. IV, of Watson's *Cybele Britannica* is given a most valuable summary of distribution of British plants. There are no doubt several corrections now to be made in this summary from an increasing knowledge of the distribution of some species, and the addition of a few others. But the main advance in British botany has been in the discrimination and elaboration of varieties which would probably have found no place in the *Cybele*, so that this summary may be probably accepted still as an accurate one.

According to the summary we have in Ireland no species confined to zone 6.

Confined to 5 and 6 there are in Ireland:–

(Saxifraga nivalis).	Carex rigida.
Salix herbacea.	(Aira alpina) if true?

Those included in brackets do not occur in Donegal.

Confined to 4, 5, and 6 (or 4 and 5):–

Silene acaulis.	Saussurea alpina.
Hieracium argenteum.	Juniperus nana.
(H. flocculosum).	(Poa alpina).

Saxifraga Sternbergii should probably come in here.

Confined to 3 with zones above zone 3:–

Draba incana.	Hieracium gothicum.
(Arabis petræa).	Arctostaphylos uva-ursi.
Dryas octopetala.	(Pyrola secunda).
(Rubus Chamæmorus).	(Gentiana verna).
(Alchemilla alpina).	(Ajuga pyramidalis).
(Epilobium alsinifolium).	Polygonum viviparum.
Saxifraga stellaris.	Oxyria reniformis.
S. oppositifolia.	Eriocaulon septangulare.
Hieracium anglicum.	Carex aquatilis.
H. iricum.	Polystichum Lonchitis.
H. pallidum.	Lycopodium alpinum.

The foregoing may be regarded as our most northern or Highland species. All except three (*Pyrola*, *Ajuga*, and *Gentiana*) are classed as "Highland" by Mr Watson. A small group of species, which descend to "2," are also held

by Mr. Watson to be Highland. These ascend to 6, except those otherwise marked:–

Sedum Rhodiola.
Saxifraga aizoides.
Galium boreale (to 5).
Vaccinium vitis-idæa.
Sesleria cœrulea (to 5).
Allosorus crispus.
Asplenium viride (to 5).
Lycopodium selaginoides.
Isoetes lacustris (to 4).

And it is interesting to observe that the whole of this mid-Agrarian-reaching group of Highland species, which occurs in Britain, occurs in Ireland and in Donegal. This somewhat anomalously assorted set completes the Highland flora of Ireland, and the above method of grouping them serves to bring out their peculiar requirements. To many people the tenants of our loftiest mountain tops are the most interesting portion of the flora, since it may be fairly assumed that they are the remnants of our earliest flora, and connect us, through the lapse of ages, with that period of geological history which gave our islands their present shape, and that they have a familiar history of higher antiquity than man himself upon these islands.

But it must not be forgotten that these species are not the only inhabitants of the loftiest summits. There is a considerable number of common plants which range up through all zones throughout the Kingdom.

The following are the highest ranging species in Britain not belonging to the Highland division, or already mentioned. All these occur in Donegal:–

Ranunculus acris.
Caltha palustris.
Cardamine pratensis.
Cochlearia officinalis.
Cardamime pratensis.
Viola palustris.
Silene maritima.
Sagina procumbens.

Stellaria uliginosa.
Cerastium triviale.
Oxalis acetosella.
Potentilla Tormentilla.
Alchemilla vulgaris.
Montia fontana.
Saxifraga hypnoides.
Chrysosplenium oppositifolium.
†(Adoxa moschatellina).
Galium saxatile.
Apargia autumnalis.
Hieracium vulgatum.
Taraxacum palustre.
Gnaphalium dioicum.
Solidago virgaurea.
Achillea millefolium.
Campanula rotundifolia.
Vaccinium Myrtillus.
Euphrasia officinalis.
Thymus Serpyllum.
Armeria maritima.
Rumex acetosa.
Narthecium ossifragum.
Juncus squarrosus.
Luzula sylvatica.
Eriophorum angustifolium.
Carex pilulifera.
Anthoxanthum odoratum.
Aira flexuosa.
Poa annua.
Festuca ovina.
Polypodium Phegopteris.
Lastræa dilatata.
Blechnum boreale.
Lycopodium Selago.

And one Scottish species, *Empetrum nigrum*, which does not descend to zone 1.

This list is full of interest, although the species are almost without exception our commonest ones. It comprises all the British species, except the highland ones, and those three others (*Gentiana*, *Ajuga*, *Pyrola*), which attain to the super-Arctic zone. These are the true *summit plants*, and hardiest mountaineers. It also comprises, without any exception, all the species which range from the lowest Agrarian to the highest Arctic zone. That is to say, these are our most predominant species which can adapt themselves to every climate the British Isles afford. And it is important to notice that all the British species with these characteristics occur in Ireland, and, with a single exception, in Donegal.

In this group of forty-six robust inhabitants there are, however, it must not be overlooked, two species of a somewhat anomalous nature. One is *Saxifraga hypnoides*. This is by no means an abundant species, in spite of its extreme adaptability. It is the only plant in the list that is not relegated to the "British" or commonest type by Watson, and it is rare in Ireland. The other is *Adoxa moschatellina*. It is the only plant in the list that does not grow in Donegal, and it is one of the very few "British" species which do not occur in Donegal. The "British" type species absent are few. Even in our weakest family (*Leguminosæ*) we escape. The absentees are *Erythræa littoralis*, *Atriplex littoralis*, *Mercurialis perennis*, *Carex paludosa*, and *Pilularia globulifera*, some of which are extremely rare, and there are a few others do not occur at all in Ireland. None of these rarer "British" species range through all zones.

We shall now see how we stand in Donegal, with regard to the species (not Highland) ranging up to zone 5 in Britain from the lowest levels.

The following are the species ranging from the lowest zone to the mid-arctic or zone 5.

Anemona nemorosa.	Sagina subulata, S.
Ranunculus Flammula.	(Arenaria verna).
R. repens.	Stellaria media.
Draba verna.	Linum catharticum.
Cardamine sylvatica.	(Geranium sylvaticum).
Arabis hirsuta.	Anthyllis vulneraria.
Viola sylvatica.	Trifolium repens.
Polygala vulgaris.	T. pratense.
(Viola lutea).	Lotus corniculatus.
Lychnis diurna.	Vicia Cracca.

Spiræa Ulmaria.
Geum-urbanum.
Pyrus Aucuparia.
Epilobiun angustifolium.
Sedum anglicum, A.
(Chrysosplenium alternifolium)
Angelica sylvestris.
Heracleum Sphondylium.
Scabiosa succisa.
Hieracium murorum.
Taraxacum officinale.
Carduus palustris.
Tussilago Farfara.
Bellis perennis.
Calluna vulgaris.
Vaccinium Oxycoccos.
Gentiana campestris.
Veronica Beccabunga.
V. officinalis.
V. Chamædrys.
Rhinanthus Crista-galli.
Melampyrum pratense.
Pinguicula vulgaris S.
Lysimachia nemorum.
Rumex acetosella.
Urtica dioica.
Betula alba.
Juniperus communis.
Orchis maculata.
Habenaria viridis.
Triglochin palustre.
Juncus lamprocarpus.
J. supinus.
Luzula campestris.
L. multiflora.
Eriophorum vaginatum.
Carex dioica.
C. pulicaris.
C. stellulata.
C. curta.
C. vulgaris.
C. flava.
C. œderi.
C. binervis.
C. panicea.
C. sylvatica.
C. præcox.
C. ampullacea.
Agrostis vulgaris.
Aira cæspitosa.
Avena pratensis?
Molinea cærulea.
Poa pratensis.
P. trivialis.
Festuca duriuscula.
(Polypodium Dryopteris).
Cystopteris fragilis.
Lastræa Oreopteris.
Botrychium Lunaria.
Equisetum sylvaticum.
E. palustre.

This group of second highest ranging lowland species is also almost entirely "British" in type; and all that occur in Great Britain, with a single exception (*Pyrola*), occur in Ireland, with five exceptions in Donegal.

It might have been expected, owing to our much lower altitudes in Donegal, and indeed in all Ireland, that a number of these second highest plants, or all of them, perhaps, would attain our Irish summits. But this is by no means the case. A reference to any list of summit plants in Ireland, such as those in Dickie's *Flora of Ulster;* in many papers by the author of the present work; in Messrs. Barrington and Vowells' Ben Bulben list, or in a recent paper on the Mourne Mountains, by Messrs. Stewart and Praeger, will show the interesting fact that these wiry individuals, as a rule, have the tops to themselves, whether the top is 3000 feet in Kerry, 4000 feet in Scotland, or 2400 feet in Donegal. There are of course discrepancies, but we may pick out a group that can be predicated to inhabit all the tops in the British Islands with considerable certainty. These plants would be *Potentilla Tormentilla*, *Galum saxatile*, *Canpanula rotundifolia*, *Vaccinum Myrtillus*, *Luzula sylvatica*, *Carex pilulifera*, *Anthoxanthum odoratum*, *Aira flexuosa*, *Festuca ovina* and *Lastræa dilatata*; and if we wish to add to their number, with lesser confidence, we may take *Cerastium triviale*, *Solidago virgaurea*, *Rumex Acetosa*, *R. Acetosella*, *Thymus Serpyllum*, *Euphrasia officinalis*, *Juncus squarrosus*, *Eriophorum vaginatum*, *Agrostis vulgaris*, *Blechnum boreale,* and *Lycopodium Selago*. They would be accompanied by alpines and northerns, but these follow no such law with, perhaps, a few exceptions. These are *Empetrum nigrum*, *Salix herbacea*, and *Carex rigida*.

Speaking of summits of 2000 feet and upwards, there are few without these last there also, even where no other alpines exist.

The cause of this general identity of summit plants is not so easily guessed at. But it is obvious that even the least descent on some side of any mountain will afford a shelter from whatever its most scourging prevailing wind may be. A little bit lower, and conditions of moisture as well as shelter, during the growing season, come in. Hence, the moment we descend, a wholly new set of influences varying with the various climates of the districts appear. Only to a few is it permitted to withstand the rigorous hardship of an actual summit, and these few have, as a rule, more or less undisturbed possession.

A few species range into zone 5 which are not Highland, and yet do not reach the infer-Agrarian zone. These are all "Scotch" in their range, with one exception (*Hymenophyllum*) whose lower limits are doubtful.

There are only two British species that do not occur in Ireland in this selection, and all occurring in Ireland occur in Donegal.

Trollius europæus, S.	(Salix nigricans), S?
Subularia aquatica, S.	S. phylicifolia, S.
Rubus saxatilis, S.	Listera cordata, S.
Galium boreale, S.	Hymenophyllum Wilsoni, A.H.

The remainder of the "Arctic" Flora of Britain that occurs in Ireland is a more complex and less common, and in that respect a more interesting class of plants. They will be those occurring in zone 4, infer-Arctic of Watson, going up from below and going no higher. Those not occurring in

Donegal are included in brackets. I have appended letters marking the types. I.–Intermediate (doubtful, sometimes Scottish in tendency, sometimes Atlantic or Highland).

Ranunculus hederaceus, B.
R. Ficaria, B.
Helianthemum vulgare.
(Meconopsis cambrica, A).
Drosera rotundifolia, B.
D. anglica, S.
Stellaria Holostea, B.
Hypericum pulchrum, B.
Geranium pratense, B.E.
Spartium scoparium, B.
Vicia sepium, B.
Orobus tuberosus, B.
(Potentilla fruticosa), I.
P. Fragariastrum, B.E.
Fragaria vesca, B.
Rubus Idæus, B.S.
Rosa spinosissima, B.
R. mollis, B.
Epilobium palustre, B.
E. montanum, B.
E. tetragonum, B.
Callitriche pedunculata, B.
Pimpinella Saxifraga, B.
Galium verum, B.
(G. sylvestre, I.H.).
Valeriana officinalis, B.
Hypochœris radicata, B.
Crepis paludosa, S.H.
Carduus lanceolatus, B.
Senecio Jacobæa, B.
Achillea Ptarmica, B.
Lobelia Dortmanna, S.H.
Erica Tetralix, B.
E. cinerea, B.
Pyrola media, S.
Gentiana Amarella, B.G.
Menyanthes trifoliata, B.
Veronica serpyllifolia, B.
V. scutellata, B.
Pedicularis palustris, B.
P. sylvatica, B.
Digitalis purpurea, B.
Ajuga reptans, B.
Prunella vulgaris, B.
Myosotis repens, B.
Plantago lanceolata, B.
P. maritima, B.
(Mercurialis perennis, B).
Salix aurita, caprea, repens, B.
Myrica Gale, B.
(Pinus sylvestris, S).
Gymnadenia conopsea, B.
Habernaria albida, S.
Potamogeton polygonifolius, B.

Juncus effusus, B.
Carex ovalis, pallescens, fulva, glauca, B.
Aira praecox, B.
Avena pubescens, B.
Holcus lanatus, B.
Triodia decumbens, B.
Glyceria fluitans, B.
Briza media, B.
Polypodium vulgare, B.
Lastræa Filix-mas, B, Filix-fœm, B.
Asplenium Trichomanes, B.
A. Adiantum nigrum, B.
Lycopodium clavatum, B.
Equisetum limosum, B.

There have now been enumerated in all 252 species of British plants which occur in Watson's Arctic zones, and are also found in Ireland. Of these 23 have not yet been found in Donegal, which are all more or less scarce in Ireland. Probably no other part of Ireland has as large a proportion of those species reaching Watson's Arctic zone as Donegal, which might have been anticipated from its geographical position.

The absentees are arranged according to zones.

5, 6.
Saxifraga nivalis.
Aira alpina.

4, 5, 6 (or 4, 5).
Hieracium flocculosum.
Poa alpina.

3 and above 3 with it.
Arabis petræa.
Rubus Chamæmorus.
Alchemilla alpina.
Epilobium alsinifolium.
Pyrola secunda.
Gentiana verna.
Ajuga pyramidalis.

All six zones.
Adoxa Moschatellina.

All zones except six.
Viola lutea.
Arenaria verna.
Geranium sylvaticum.
Chrysosplenium alternifolium.
Pyrola rotundifolia.
Salix nigricans.
Polypodium Dryopteris.

4 and no higher.
Meconopsis cambrica.
Potentilla fruticosa.
Galium sylvestre.
Mercurialis perennis.

Of the lower Agrarian species of Great Britain we can expect only a limited illustration in Donegal. As already stated, the county may be regarded as all above Watson's zone 1, and for the most part above zone 2, or only dipping into it. Any detailed analysis of the Flora in this direction would be misplaced and rather serve to guide one into the knowledge of the Flora of the southern counties of Ireland by enumerating our numerous absentees. A few remarks will therefore suffice.

There are about 200 species in Great Britain (omitting *Rubi*, whose distribution is not conclusively known) which range no higher than Watson's lowest zone. Of these 23 occur in Ireland, and only 3 in Donegal, one of which is perhaps a doubtful native anywhere in Ireland. These 3 are:–

Erodium moschatum. Euphorbia hyberna.
Orobanche Hederæ.

Of those Irish ones which do not occur in Donegal the majority are Atlantic in type, and the remainder almost entirely English.

Of the species confined to Watson's zone 1 not occurring in Ireland, above 70 belong to the Germanic type, which is very poorly represented in Ireland; a somewhat less number are English in type, and the remainder chiefly Atlantic.

The species of British plants confined to zones 1 and 2, the two lowest agrarian, amount to nearly 300. Of this number 180 are Irish, and here again there is a great falling off in Donegal. It is in this group of plants that our largest number of desiderata occurs. Those that do occur in Donegal are as follows:–

*Chelidonium majus.
Aquilegia vulgaris.
Crambe maritima.
†Barbarea arcuata?
Nasturtium amphibium.
*Brassica campestris.
Sagina apetala.
†Malva moschata.
†Althæa officinalis.
Euonymus europæus.
Rhamnus catharticus?
Ulex Gallii.
Rosa arvensis.
Epilobium hirsutum.
Cornus sanguinea.
*Smynium Olusatrum.
Apium graveolens.
Helosciadium nodiflorum.
Sium angustifolium.
S. latifolium?
Œnanthe Lachenalii.
Crithmum maritimum, A.
*Pastinaca sativa.
Thrincia hirta.
Carduus tenuiflorus.
Carduus pratensis.
Bidens tripartita.
*Inua Helenium.
Pulicaria dysenterica.
Hieracium tridentatum.
Anthemis nobilis.
Convolvulus Soldanella.
Atropa Belladonna.
*Verbascum Thapsus.
*Veronica Buxbaumii.
*V. polita.
Bartsia viscosa, A.
†Linaria repens.
†Verbena officinalis.
Calamintha officinalis.
Mentha sativa.
*Ballota nigra.
*Nepeta Cataria.
Myosotis palustris.
†Symphytum officinalis.
†Lysimachia Nummularia.
Statice occidentalis, A.
S. bahusiensis.
Polygonum minus.
Rumex Hydrolapathum.
Euphorbia portlandica, A.
E. exigua.
E. Paralias, A.
E. amygdaloides.
†Salix rubra.
†S. Smithiana.
Cephalanthera ensifolia.
Orchis pyramidalis, G.E.
Allium vineale.
Potamogeton pectinatus, B.
P. flabellatus.
P. gramineus.

Zostera nana.
Arum maculatum.
Typha angustifolia.
Juncus obtusiflorus.
Scirpus Savii, A.
Eleocharis acicularis.
Carex stricta.
C. strigosa.
Glyceria distans.
G. loliacea.
†Bromus erectus.
Avena flavescens.
Lepturus filiformis.
Polystichum angulare.
Lastræa Thelypteris.
L. spinulosa.
Adiantum Capillus-veneris, A.
Equisetum maximum.

There are several doubtful natives in the foregoing, and several more, probably introduced species, might have been added. It may be mentioned appropriately here that all these lists have a slight uncertainty in their preparation. This arises from: (*a*) Doubtfully native species; (*b*) Uncertain records; (*c*) Differing views as to "varieties." There are also interrogatory marks to several of the zonal distributions in Watson. I do not think, however, these inaccuracies are of much consequence, and I have omitted the species altogether, in which they do occur, as a rule.

In this list of 74 infer and mid-Agrarian species, all with the exception of 8 are of Watson's English type; 6 are Atlantic (marked A.), and 1 each Germanic and British. As there remain but a few English type plants in Donegal it will be well to enumerate them. They are those which range through all the Agrarian zones, since no English type plant extends higher, or into the Arctic region. They are:–

Ranunculus Lingua.
Nuphar lutea.
Senebiera Coronopus.
Drosera intermedia.
Elatine hexandra.
Silene anglica.
Trifolium minus.
Prunus avium.

Potentilla reptans.	Stachys Betonica.
(Pyrus Malus).	Lysimachia vulgaris.
P. Aria.	Centunculus minimus.
Ceratophyllum demersum?	Samolus Valerandi.
Lythrum Salicaria.	Taxus baccata.
Œnanthe fistulosa.	Epipactis palustris.
(Sambucus Ebulus).	Habenaria chlorantha.
(Valerianella dentata).	Potamogeton lucens.
Apargia hispida?	Juncus glaucus.
Bidens cernua.	Cladium Mariscus.
Carlina vulgaris.	Phleum arenarium.
Convolvulus arvensis.	Melica uniflora.
C. sepium.	Ceterach officinarum.

These all range through zones 1, 2, and 3.

We may here dispose of the Germanic type. I do not believe there are above half a dozen native plants out of the 127 in south-east England found in Ireland. One of these is *Carex Bœnninghauseniana*. It is believed a hybrid, doubtfully Germanic. Two others occur in Donegal, *Orchis pyramidalis* and *Bromus erectus*, the latter, I believe, not indigenous.

There are a few plants confined in England to the middle and upper Agrarian zones, or to either of these. Very few of these are Irish. They are nearly all northern. Those in Donegal are:–

Circæa alpina	2, 3. S.
Rubus suberectus	2, 3. S.
Callitriche autumnalis	2, 3. S.
Ligusticum scoticum	2, 3. S.

Hieracium crocatum	3.S.
H. corymbosum	3.S.
Eriocaulon septangulare	3. S.
Equisetum umbrosum	2, 3. S.
E. trachyodon	3. S.

This list disposes of the last combination of zones except that to which the bulk of the common British species belongs–the three Agrarian zones within the British type. It also brings forward the residue of the Scottish (and Highland) species. The two *Hieracia* are possibly Scottish. All the remaining species not dealt with are the Agrarian British. The total of these is 304 species, not all, however, undoubtedly native. All the lowland species usually met with only in the lowlands, and all the common maritime plants belong to this group of British Agrarian species. A few are to be here included, not British or English. These are *Pyrola minor*, *Mertensia maritima*, *Orobanche rubra*, *Lamium intermedium*, *Galeopsis versicolor*, *Utricularia intermedia*, *Salix pentandra*, *Blysmus rufus*, *Carex limosa*, *C. filiformis*, *Festuca sylvatica*, *Elymus arenarius*, and *Equisetum hyemale*. These belong to the Scottish type; and three species of the Agrarian zones, *Pinguicula lusitanica*, *Lastræa æmula* and *Hymenophyllum tunbridgense* are Atlantic.

If we summarise these results they will illustrate the distribution. We find there are about 228 species in the Donegal Flora that extend into the Arctic zone, omitting a number of critical forms, and about 455 species which belong to the Agrarian zones; total , 683.

In consequence of the omission in the foregoing calculation of a number a *Rubi*, *Hieracia*, *Potamogetons*, on

account of their distribution being insufficiently ascertained; and of a number of naturalised and probably introduced species which seem to have no place in such estimates, this total of species (683) is unduly small, and not to be accepted as the county record.

A COMPARISON OF THE FLORA OF DONEGAL WITH THE FLORA OF THE ADJOINING COUNTIES AND DISTRICTS.

The counties which border on Donegal are Derry, Tyrone, and Fermanagh, with Leitrim. For the purposes of comparison we have the admirable *Flora of North-east Ireland*, by Messrs Stewart and Corry, which gives the Derry plants separately. This work affords also a means for a general view of the plants of the north-east of Ireland, alongside those of the north-west, *i.e.* Districts 11 and 12 of *Cybele Hibernica*.

For Tyrone we have but little information apart from that of the *Cybele Hibernica*, and it will be unsatisfactory to deal with Tyrone apart from the whole district, which includes also Fermanagh, Cavan, Armagh, Monaghan.

For Leitrim we have again the *Cybele Hibernica*, but to include all District 9, in which Leitrim is, would be quite unsuitable. District 9 runs south to the latitude of Dublin. The only available and satisfactory comparison here is that of the Ben Bulben group of mountains, with those of Donegal on the opposite side of Donegal Bay. And for Ben Bulben and the adjoining range in Sligo and Leitrim we are happily furnished with Messrs Barrington and Vowell's exhaustive Report, published by the R.I.A., 1885. Mr. Barrington has also given us a paper on the Flora of the

shores of Lough Erne, which, coupled with another on the same district by Mr Stewart, enables us to form a fairly complete estimate of Fermanagh.

In the following enumerations of plants belonging to different counties, I have enclosed in brackets those which are probably, or certainly, colonists, and omitted them from the totals. Further, I have here only made mention of what are usually regarded as species. The letters after the plants indicate the types in Watson's *Compendium*.

Species occurring in Derry, but not in Donegal:–

Thalictrum flavum, E.
[Papaver Argemone], B.E.
[Thlaspi arvense], B.
Nasturtium palustre, E.
Arenaria verna, S.
Spergularia rubra, B.E.
Erodium maritimum, A?
[Rhamnus catharticus], E.
Sanguisorba officinalis, I.E.
Rubus Chamæmorus, H.
Rosa involuta, B.
Rosa hibernica, I.
?Saxifraga granulata, B.*
Cicuta virosa, E.
Œnanthe phellandrium, E.G.
Chærophyllum temulum, B.E.
Pyrola secunda, S?
[Hyoscyamus niger], E.B.
Lathræa Squamaria, E.
Melampyrum sylvaticum, S.
Mentha Pulegium, E.
Salix nigricans, S. (almost certainly in Donegal).
Spiranthes Romanzoviana. †
Sagittaria sagittifolia, E.
Scilla verna, A.S.
Lemna trisulca, E.B.
Calamagrostis Epigejos, E.B.
C. Hookeri, L.I.
Poa nemoralis, B?
Pilularia globulifera, B.

*A prefixed query signifies "is it native?" A suffix, "is it truly there at all?"

† Recently discovered by Mrs. Leebody.

Species occurring in Donegal, but not in Derry:–

Thalictrum alpinum, H.
T. flexuosum, S.
Trollius europæus, S.
Aquilegia vulgaris, E.I.
Crambe maritima, E.
Raphanus maritimus, A.
Drosera intermedia, E.
Helianthemum vulgare, B.E.
Geranium sanguineum B. (A?)
Erodium moschatum, A.
Ononis arvensis, B.
Myriophyllum verticillatum, E.
Sedum Rhodiola, H.
Saxifraga aizoides, H.
S. umbrosa, A.
S. hirta, H.
Poterium Sanguisorba, E.
Agrimonia odorata, E.
Cornus sanguinea, E.
Saussurea alpina, H.
Carlina vulgaris, E.B.
Hieracium argenteum, H.
H. umbellatum, E.
H. gothicum, H.
[and other *Hieracia*].
Arctostaphylos uva-ursi, H.
Convolvulus soldanella, E.
Myosotis collina, B.
[Atropa Belladonna], E.
Orobanche Hederæ, E.A.
Linaria repens, E.
Bartsia viscosa, A.
Utricularia neglecta, A.
[Verbena officinalis], E.
Statice occidentalis, A.E.
Polygonum bistorta, B.I.
P. viviparum, H.
Euphorbia amygdaloides, E.
E. hyberna, A.
Epipactis palustris, E.B.
E. latifolia, E.
Eriocaulon septangulare, A.
Juncus obtusiflorus, E.
Typha angustifolia, E.
Potamogeton nitens, S.
P. decipiens, E.
P. prælongus, S.I.
P. flabellatus, B.
P. filiformis, S.
Zostera nana, E.
Eleocharis uniglumis, B.S.
Cladium Mariscus, E.B.
Eriophorum latifolium, B.E.
Carex stricta, E.I.
C. Bœnninghauseniana, G.
C. limosa, S.
C. strigosa, E.
C. pendula, B.E.
C. aquatilis, (2 forms or species), H.

C. riparia, B.E.
C. filiformis, S.B.
Milium effusum, B.E.
Trisetum flavescens, E.B.
Sclerochloa rigida, B.E.
S. loliacea, E.
S. distans, E.B.
Bromus commutatus, B.
Equisetum pratense, S.
Lastræa Thelypteris, E.
Polystichum Lonchitis, H.
Asplenium viride, H.
Adiantum Capillus-veneris, A.
Trichomanes radicans, A.
Ceterach officinarum, E.

If we scrutinize these two lists we learn that Derry has 32 species not in Donegal, Donegal has 71 species not in Derry; or Derry has 11 English, 9 British, 4 Scottish, 2 Highland, 2 Intermediate, 1 Local and 3 Atlantic species not found in Donegal; and Donegal has 29 English, 14 British, 11 Highland, 10 Atlantic, 7 Scottish and 1 Germanic not in Derry.

Donegal gains unexpectedly on Derry in the English type, and the paucity of British species, proportionally, in Donegal makes the flora of the latter all the more interesting in its component parts.

This comparison brings out a peculiarity already noticed. Derry has 8 monocotyledons not in Donegal. Donegal has 34 monocotyledons not in Derry. This is where the increase really comes, that is to say in marsh and aquatic species, of which these 34 are almost entirely made up.

Let us now see how Donegal, or the north-west, fares as compared with the north-east of Ireland. Down might fairly be omitted, but it will be found to contain few non-Donegal species that do not also occur in the real north-eastern county, *i.e.*, Antrim. It will be unnecessary to re-enumerate the Derry plants.

Species occurring in N.E. Ireland, not in N.W. (Donegal):–

Ranunculus fluitans, E.
[Papaver hybridum] E. (Down only).
Meconopsis cambrica, A.I.
Glaucium luteum, E.B. (Down only).
[Sisymbrium Sophia] B.E.
Lepidium campestre, B.E.
Elatine Hydropiper, E.L. (Down only).
[Silene noctiflora] E.G. (Down only).
Sagina ciliata, E.B.
Cerastium arvense, B.E.
Malva rotundifolia, B.E.
[Lavatera arborea] A.
Hypericum dubium, E.B.
H. hirsutum, B.E.
Geranium sylvaticum, S.
G. pratense.
Rhamnus catharticus, E.
R. Frangula, E.
Trifolium striatum, E?
Vicia Orobus, S.I.
Lathyrus palustris, E.
Saxifraga Hirculus, S.I.
Adoxa Moschatellina, B.
Galium cruciatum (Down) B.I.
[G. Mollugo, E.B.]
[Matricaria Chamomilla] E.
Helminthia echioides, E.
Hieracium flocculosum (Down) S.
Pyrola secunda, S.
Andromeda polifolia, I.S.
Cynoglossum officinale, E.B.
[Lithospermum arvense] B.
[Solanum nigrum] E.
[Hottonia palustris] E.
[Chenopodium rubrum] E.G.
Atriplex littoralis, B.
A. arenaria, B.L.
A. portulacoides (Down), E.
Malaxis paludosa (B).
Hydrocharis Morsus-ranæ, E.
Butomus umbellatus, E.
Lemna gibba, E.G.
[Zannichellia polycarpa] L.
Carex elongata? E.
C. muricata, B.E.
C. Buxbaumii, L.
C. Pseudo-cyperus, E.
C. paludosa? (Down only?) B.
[Sclerochloa procumbens, E.G.]
Hordeum pratense E.
Polypodium Dryopteris? S.

A good number of those species given as occurring in Donegal, but not in Derry, are found in Antrim or Down.

Crambe maritima (Down).
Raphanus maritimus.
Geranium sanguineum (Down only?)
Ononis arvensis.
Myriophyllum verticillatum.
M. spicatum.
Sedum Rhodiola.
Saxifraga aizoides.
Agrimonia odorata.
Saussurea alpina (Down).
Hieracium gothicum.
Arctostaphylos Uva-ursi.
Convolvulus Soldanella.
Myosotis collina.
Epipactis palustris?
Juncus obtusiflorus (Down).
Typha angustifolia.
Potamogeton nitens.
P. prælongus.
Eleocharis uniglumis (Down).
Cladium Mariscus.
Eriophorum latifolium?
Carex stricta?
C. limosa.
C. pendula.
C. riparia.
C. strigosa.
Milium effusum (Down only?)
Trisetum flavescens.
Sclerochloa rigida (Down).
S. loliacea (Down).
S. distans.
Bromus commutatus.
Equisetum pratense.
Lastræa Thelypteris?
Ceterach officinarum.

Finally, omitting Down plants, and undoubted aliens and colonists, we will exhibit, according to their types, the plants which belong to north-east and north-west Ireland respectively. The greater part of Down is south of Donegal. Antrim and Derry are larger than Donegal.

In North-east (Derry and Antrim) Ireland, but not in North-west (Donegal):–

ATLANTIC.

Meconopsis cambrica.
Erodium maritimum.
Scilla verna.
Spiranthes Romanzoviana.

HIGHLAND.

Rubus Chamæmorus.
Hieracium prenanthoides.

SCOTTISH.

Arenaria verna.
Geranium sylvaticum.
Vicia Orobus.
Saxifraga Hirculus.
Pyrola secunda.
Melampyrum sylvaticum.
Polypodium Dryopteris?

INTERMEDIATE.

Sanguisorba officinalis.
Rosa hibernica.

LOCAL.

Carex Buxbaumii.
Calamagrostis Hookeri.

BRITISH.

Lepidium campestre.
L. Smithii (native?).
Cerastium arvense.
Spergularia rubra.
Malva rotundifolia.
Hypericum hirsutum.
Rosa involuta.
Saxifraga granulata (native?)
Adoxa Moschatellina.
Chærophyllum temulum.
Atriplex littoralis.
Malaxis paludosa.
Carex muricata.
Poa nemoralis?
Hieracium euprepes, Heb.
H. stenolepis, Lundeb.
H. flocculosum, Backh.
H. bifidum, Tausch.

ENGLISH.

Thalictrum flavum.
Ranunculus fluitans.
Nasturtium palustre.
Hypericum dubium.
Rhamnus catharticus.
R. Frangula.
Lathyrus palustris.
Cicuta virosa.
Œnanthe Phellandrium.
Galium Mollugo (native?).
Helmimthia echioides.
Cynoglossum officinale.
Mentha Pulegium.
Atriplex laciniata.
Obione portulacoides.
Hydrocharis Morsus-ranæ.
Sagittaria sagittifolia.
Butomus umbellatus.
Lemna gibba.
L. trisulca.
C. Pseudo-cyperus.
Hordeum pratense.
Calamagrostis Epigejos.

In North-west but not in North-east:–

ATLANTIC.

Saxifraga umbrosa
Bartsia viscosa.
Statice occidentalis.
Euphorbia hyberna.
Eriocaulon septangulare.
Adiantum Capillus-veneris.
Trichomanes radicans.

HIGHLAND.

Thalictrum alpinum.
Saxifraga hirta.
Hieracium argenteum.
H. pallidum.
H. crinigerum.
H. Schmidtii.
H. sparsifolium.
H. gothicum.
H. proximum.
H. Somerfeltii.
Oxyria reniformis.
Polygonum viviparum.
Sesleria cærulea.
Polystichum Lonchitis.
Asplenium viride.

BRITISH.

Helianthemum vulgare.
Utricularia neglecta.
Polygonum Bistorta.
Potamogeton flabellatus.
Eleocharis uniglumis.
Sclerochloa rigida.

SCOTTISH.

Trollius europæus.
Hieracium hibernicum.
H. scoticum.
Potamogeton filiformis.
Carex filiformis.

GERMANIC.

Carex Bœnninghauseniana.

ENGLISH.

Aquilegia vulgaris.
Drosera intermedia.
Poterium Sanguisorba.
Cornus sanguinea.
Carlina vulgaris.
Hieracium tridentatum.
Orobanche Hederæ.
†Linaria repens.
Potamogeton decipiens.
Zostera nana.
Sclerochloa loliacea.

There are about fifty-five native species in Antrim and Derry not found in Donegal, against thirty-seven species, excluding some hawkweeds, in Donegal not in the north-eastern counties. The hawkweeds are about twelve well-marked forms, most of which will be regarded as species.

Amongst the species credited to the north-east, there are, however, not a few that are either extinct or nearly so, or not for a long time observed. It will be useful to point those out.

Draba incana–"Perhaps becoming extinct" in Derry. Rediscovered; "small and scarce." *Ir. Nat*, Jan.'94.

Crambe maritima–Extinct on Rathlin; the only Antrim station. This rare plant has not been observed for many years in Donegal.

Geranium sanguineum – Not recently seen?

Rhamnus catharticus and *R. Frangula* – "Extinct or nearly so; not seen in recent years." *R. Frangula* – Rediscovered, 1890. *Ir. Nat*, Jan. '94.

Lathyrus palustris – "Probably now lost in Antrim."

Pyrus Aria – "Almost extinct."

Saxifraga granulata – Is it native?

S. oppositifolia – Almost extinct in its one station.

Adoxa Moschatellina – "Soon destined to be extinct."

Galium Mollugo – Not native.

Leontodon hispidus – Not rediscovered and likely wrong.

Hieracium umbellatum – Not rediscovered and unlikely on Benevenagh.

Pyrola secunda – Seems doubtful. No one can find it.

Gentiana Amarella –Not recently found.

Mertensia maritima – "Refound, Co. Derry, 1893." *Ir. Nat.*, March, 1894.

Utricularia intermedia – Not recently found.

Rumex Hydrolapathum – Not recently found.

Salix nigricans and *S. phylicifolia* – Neither of these seen recently?

Epipactis palustris – "Cannot now be found."

Cephalanthera ensifolia – "Not found recently, though diligently sought for."

Potamogeton nitens – "Antrim." *Ir. Nat*, March '94.

Cladium Mariscus – "A few plants still linger." *Ir. Nat*, March '94.

Eriophorum latifolium – "Very rare, if not extinct."

Carex teretiuscula – "Very rare, possibly extinct."

C. stricta – "Antrim," 1893. *Ir. Nat*, March '94.

C. limosa – "Derry," 1892. *Ir. Nat*, March '94.

C. paludosa – "Extremely rare," and not found recently. A critical species.

Millium effusum – Not in Antrim?

Poa nemoralis – "Very rare; not seen by us."

Triticum caninum – Only "doubtfully noted" recently.

Hordeum pratense – Very rare and becoming extinct?

Polypodium Dryopteris – "Most probably extinct."

Osmunda regalis – Very rare, almost extinct.

Lastræa Thelypteris – Very rare and not found recently.

Pilularia globulifera – "Extremely rare," and not found recently.

Of the above thirty-seven important species, twenty are undoubted and in most cases frequent Donegal plants. The remainder are a portion of the north-east majority. The discrepancy between the two Floras is, therefore, more nominal than real. On the other hand, a few species could be picked out, whose claims to a place in the Donegal Flora were much more slender than to that of the north-east. But no such list, nor anything approaching to it, as that above could be produced. And it is chiefly, as it ought to be, in aquatic species that this proportionate improvement in the Western Flora is made apparent.

But we will first regard the difference from the point of view of Watson's types.

In the previous page I have given the lists of Atlantic, Highland, Scotch, and English type plants in Donegal. From these we learn that the north-west is numerically stronger than the north-east (1) in Highland species by about eight species, exclusive of *Hieracia*, which would perhaps still further strengthen the north-west; and numerically stronger in Atlantic type species by about four species. But in Scottish type species the north-east has a slight advantage of three or four, which may be increased by two of the intermediate type. In English and British the north-east is decidedly stronger, the numbers being about 25 English and 14 British, against 14 English and 5 British respectively. Considering the two districts as reliable dwelling places, for the species (more especially the rare ones) belonging to them, I think I have shown, however, that this predominance does not really exist.

As I have already mentioned, Donegal is strong in marsh-loving plants. Pondweeds, Sedges and Ferns may be selected as the strongest groups of plants which will predominate in places with a damp climate. In each of these groups Donegal is stronger than the north-east.

I will now endeavour to make some comparison between the Floras of Donegal and that of the adjoining county of Fermanagh, the only other neighbouring county which has been the subject of special and exhaustive attention. As it is, however, impossible to separate Ben Bulben from the other mountains (Glenade, Truskmore, &c.) of this group, some of which are in Leitrim, this whole group will be included. The area thus dealt with is that part of Ireland

adjoining Donegal on its extreme south and south-west, lying opposite our county on the other side of Donegal Bay, and to a large extent continuous in its formation with the limestone forming so conspicuous a feature from Killybegs to Belleek.

For the purpose of this comparison, in addition of the *Cybele Hibernica*, we have Mr. Stewart's report on the Botany of the West of Lough Erne (extending into Cavan).* Mr. Barrington's Report on the Flora of the shores of Lough Erne,† and Messrs Barrington and Vowell's Report on the Flora of Ben Bulben and adjoining mountain range, &c.‡ The area under consideration is partly in District 9 and partly in District 10 of the *Cybele Hibernica*.

Mr. Stewart's list is singularly meagre. I addition to a bramble and a hawkweed, there is , I think, but one species not occurring in the other Reports, and that is *Vaccinium Vitis-Idæa*. The hawkweed is *H. cinarescens*, called in the London catalogue, *pallidum crinigerum*, and occurring in Donegal in several places. *Dryas octopetala* is common on Ben Bulben. The others are all common plants.

In the Flora of Ben Bulben and adjoining mountains in Sligo and Leitrim, the non-Donegal plants are:–

Meconopsis cambrica.
Arabis petræa.
Arenaria ciliata.
Epilobium alsinifolium.
Saxifraga nivalis.
Galium sylvestre.
Lemna trisulca.
?Sagittaria sagittifolia.
Poa alpina.

* *Proc. R.I.A*, 2nd Ser, Vol. iii.
† *Proc. R.I.A*, 2nd Ser, Vol. iv.
‡ *Proc. R.I.A*, 2nd Ser, Vol. iv.

In Mr Barrington's Lough Erne Flora the following plants not found in Donegal occur:–

Thalictrum flavum.
Caltha radicans (var?)
Nasturtium sylvestre.
N. palustre.
Stellaria glauca.
Rhamnus catharticus.
Lathyrus palustris.
Geum intermedium (var?)
Cicuta virosa.
Œnanthe Phellandrium.
Lemna trisulca.
L. gibba.
Carex elongata.

Against this short list of species, it is of course out of reason to set down a total of Donegal plants not occurring in Fermanagh or in the Ben Bulben group. The number would be large and perhaps run to three figures. I have not even attempted to make it out, but many names occur to my memory.

One comparison and one only can be made with utility. Ben Bulben has been long famous as the home of some of the rarest Highland (alpine) plants in Ireland. Two are not found elsewhere in Ireland, *Saxifraga nivalis* and *Epilobium alsinifolium*; and one, *Arenaria ciliata*, has no other habitat in Great Britain. Against such rarities as these Donegal has nothing similarly interesting to offer. The number of species, will, however, be found to be in favour of Donegal. *Arenaria ciliata* is perhaps not Highland.

Highland species not in Donegal:–

Arabis petræa.
Arenaria ciliata.
Epilobium alsinifolium.
Saxifraga nivalis.
Poa alpina.

Highland species not in Ben Bulben district:–

Saxifraga stellaris.	Arctostaphylos Uva-ursi.
S. hirta.	Carex aquatilis (two forms).
Saussurea alpina.	Cryptogramme crispa.
Hieracia (about twelve, some Scotch?).	Lycopodium alpinum.
	Isoetes lacustris.

Galium boreale and *Vaccinium Vitis-idæa*, which do not occur on the Ben Bulben range, are found elsewhere in Fermanagh.

The Donegal *Hieracia* are especially interesting, and several forms are, so far, peculiar to Ireland.

There are only two Highland species in Ireland, which do not occur either in the Ben Bulben district or in Donegal.

One of these is *Alchemilla alpina*, which grows in Kerry and Wicklow. Possibly it has a dislike to limestone, but its absence from Donegal is very singular, seeing how abundant it is down to the margin of the sea at Skye and elsewhere in western Scotland.

The other is *Rubus Chamæmorus*, found only in the Sperrin Mountains on the boundary of two counties (and districts) Tyrone and Derry. Having re-discovered this in 1891, with the greatest difficulty, owing to the minute and almost hidden state in which it occurs, I do not think that it is at all impossible that it may yet be found in Donegal. No species that I am acquainted with needs more careful seeking for.

The materials for a comparison of the Floras of Donegal and Tyrone are too scanty, or too scattered, with regard to the latter county, to afford any correct results. There appear to be very few native Tyrone plants that do not occur in Donegal. With the exception of *Rubus Chamæmorus*, and a

few aquatics found also in Fermanagh, I think the number must be very small. Donegal is rich compared with Tyrone.

A few remarks upon the Northern (Scottish) type plants of Ireland generally will be useful, in order to see how far Ulster holds the predominance.

Of the Scottish type species, Messrs Barrington and Vowell record nineteen species from the Ben Bulben district, all of which occur in Donegal. The Intermediate type plant *Galium sylvestre*, should, however, be added to this list (as it is "Intermediate," inclining to Highland, not to Atlantic or English). One other, *Alsine verna*, is believed to occur, but was not seen. The Flora of Lough Erne adds another Scottish, *Potamogeton filiformis*, also a Donegal plant. The total appears to be twenty-two species, against about twice that number in Donegal.

Of the Northern (Scottish) type species found in Ireland, the following are those which are either doubtful natives or absentees in Donegal and N.E. Ireland.

Viola lutea?
Ajuga pyramidalis (Aran, Galway).
Polypodium Dryopteris?

With these may be mentioned the Intermediate type plants:–

Helianthemum canum, Interm. Atlant, Clare and Galway.
Potentilla fruticosa, Interm. Scott, Clare and Galway.
Gentiana verna, Intermed, Clare and Galway.
Allium Scorodoprasum, Intermed. Scott, Kerry and Cork.

In Atlantic species Ireland is well represented. The *Cybele Hibernica* enumerates forty-one out of the seventy

British as Irish. Those which are absent from the north of Ireland are as follows:–

Senebiera didyma (reaches Galway; not native).
Mathiola sinuata.
Linum angustifolium.
Lavatera arborea (as a native).
Rubia peregrina (reaches Mayo).
Inula crithmoides.
Campanula hederacea.
Sibthorpia europæa.
Euphorbia Peplis.
Asparagus officinalis.
Rhynchospora fusca (reaches Mayo).
Asplenium lanceolatum.

And here may be mentioned the south-western and western Irish species of an extreme Atlantic or Hibernian type. Those in italics are not in Great Britain:–

Helianthemum guttatum.
Saxifraga Geum et hirsuta.
Inula salicina.
Erica mediterranea.
Arbutus unedo.
Dabeocia polifolia.
Pinguicula grandiflora.
Neotinea intacta.
Sisyrinchium anceps.
Potamogeton longifolius?
Naias flexilis.
Carex punctata.

Of those not found in Great Britain which do reach the north of Ireland there are only:–

Arenaria ciliata (not in Donegal).
Saxifraga umbrosa.
Spiranthes Romanzoviana (not in Donegal).
Carex Buxbaumii (not in Donegal).

Mr More enumerates “twenty-four scarcest British plants occurring in Ireland.” Of these the following only occur in the north:–

Adiantum Capillus-veneris.
Hieracium caesium?
(Viola Curtisii.)
Elatine Hydropiper (not in Donegal).
Equisetum trachyodon.
Eriocaulon septangulare.
Arundo stricta (not in Donegal).
Euphorbia hyberna.

To these may be added:–

Hieracium Somerfeldtii.
H. hibernicum.
Carex aquatilis.
Trichomanes radicans.

As a set-off against the Atlantic and Hibernian plants which do not reach the north of Ireland we might enumerate the species, chiefly Highland and Scottish, which in Ireland are confined to the north. Chief amongst these are:–

Trollius europæus.
Silene acaulis.
Arenaria ciliata.
Geranium sylvaticum (British).
G. pratense (British).
Helianthemum vulgare (British).
Rubus Chamæmorus.
Rosa Hibernica.
Epilobium alsinifolium.
Saxifraga aizoides.
S. nivalis.
Ligusticum scoticum.
Adoxa moschatellina (British).
Hieracia.
Pyrola secunda.
Melampyrum sylvaticum.
Ulmus montana (native).
Salix nigricans.
Typha angustifolia (extinct near Dublin; English).
Carex elongata.
C. Buxbaumii.
C. aquatilis.
Calamagrostis stricta.
Equisetum umbrosum.
Cryptogramme crispa.

It is in the ordinary British type, in the English type, and to a small extent in the Germanic type, that the midland and eastern counties obtain species not found in the north.

With regard to Donegal, I have already mentioned some points in which the Flora is favoured in comparison with the north-east of Ireland. The groups which illustrate this best in the natural orders are Hawkweeds, Sedges, Ferns, and perhaps Pondweeds. In the Hawkweeds no doubt research has effected much. I have, however, collected in this genus all over Ireland, and I feel certain that Donegal will compare favourably with any other county for varieties in this intricate group.

The following forms have already been collected:–

Hieracium Pilosella.
H. anglicum.
H. anglicum, var. longi-bracteatum.
H. anglicum.
H. cerinthiforme.
H. cerinthiforme var. Hartii.
H. iricum.
H. Schmidtii.
H. Schmidtii, var. crinigerum.
H. argenteum.
H. hibernicum.
H. rubicundum.
H. cæsium.
H. vulgatum.
H. gothicum.
H. sparsifolium.
H. eupatorium.
H. buglossoides?
H. proximum.
H. auratum.
H. Somerfeltii.
H. Scoticum.
H. Scoticum, var. occidentale.
H. strictum, var. opsianthum.
H. rigidum, var. pullatum.
H. " " acrifolium.
H. " " scabresceus.
" tridentatum.
H. saxifragum, var. orimeles.
H. umbellatum.
H. crocatum.
H. boreale?
and several others as yet undetermined.

With the exception of *H. flocculosum*, in Down, and some forms of *murorum* occurring in the Wicklow

Mountains, there are few Irish forms not met with in Donegal. The nomenclature is that given by Mr. Hanbury, *Jour. of Bot*, July 1894.

The *Cybele Hibernica* enumerates forty-five sedges as Irish. To these, three have to be added – *C. aquatilis*, *C. Bœnninghauseniana* (a hybrid?), and *C. rhynchophysa* (a var.), making the total forty-eight. *C. acuta*, var. *prolixa*, and *C. aquatilis*, var. *virescens*, as well as *C. Bœnninghauseniana*, are, so far, peculiar to Donegal.

Of these forty-eight, Donegal has thirty-nine. District 12 claims forty, but several of these are extinct, or nearly so, in that district, though frequent in Donegal. District 1 (Kerry and Cork) are rich in Sedges, but, pending Mr. Scully's Flora of Kerry, there are several doubtful plants.

In Ferns, District 1 is the only rival. *Aspleium lanceolatum* occurs only there. The Oak fern, I believe, does not occur there, and neither does it in Donegal. Against *Asplenium lanceolatum* we can set the Parsely Fern in Donegal. And the variety *polyphyllum* of the Adder's Tongue belongs to Kerry and Donegal. So that Donegal stands bracketted with Kerry and Cork, each having all Irish ferns except two, the total being thirty-two.

In Pondweeds the information is too doubtful to pronounce an opinion. All except three that I am aware of as Irish, occur in Donegal. The three absentees are *P. plantagineus*, *P. lanceolatus*, and *P. densus*. Against these, however, are some forms in Donegal which Mr. Bennett does not seem to have met with from Ireland elsewhere. Kerry again would probably be the only rival with Donegal.

Frequent reference has been made to Watson's types of distribution of species. In this method he regards them as

belonging to one or other of six different types, and I have appended the initial letters of these types to each species in my table as given by Watson. But it must be remembered that these letters refer to their distribution in *Britain*, and not in Donegal, nor yet in Ireland; and sometimes a species regarded, for instance, as western from a British point of view, will not be western from an Irish point of view. The types are:–

1. British type – Species widely spread through South, Middle and North Britain.
2. English type – Species chiefly seen in South or in S.M. Britain.
3. Scottish – Species chiefly seen in North or in N.M. Britain.

Intermediate type – Species chiefly in Mid. Britain.

4. Highland type – Species chiefly seen about the mountains.
5. Germanic type – Species chiefly seen in East England.
6. Atlantic type – Species chiefly seen in West England.

Local Species – restricted to single, or few provinces.

It will now be seen how readily the species in Donegal range themselves into these types, especially if they be taken, as I now propose to do, in conjunction with the zonal distribution.

Although it would be easy to pick out from the foregoing lists the total number of plants belonging to Watson's different types in Donegal, I will append here lists of these that are English, Highland, Scotch, and Atlantic.

Highland species in Donegal:–

Thalictrum alpinum.	Draba incana.
Subularia aquatica.	Silene acaulis.

Dryas octopetala.
Sedum Rhodiola.
Saxifraga stellaris.
" aizoides.
" oppositifolia.
Galium boreale.
Hieracium anglicum.
" iricum.
" argenteum.
" gothicum.
? " crocatum.
? " corymbosum.
Saussurea alpina.
Arbutus Uva-ursi.
Vaccinuim Vitis-idæa.
Polygonum viviparum.
Oxyria reniformis.
Salix herbacea.
Juniperus nana.
Carex rigida.
C. aquatilis.
Sesleria cærulea.
Allosorus crispus
Polystichum Lonchitis.
Asplenium viride.
Lycopodium alpinum.
L. selaginoides.
Isoetes lacustris.

The total of this group in Britain is 113, and in Ireland 40. To these may be added *Cochlearia officinalis*, var. *alpina* and *Saxifraga Sternbergii*. The *Hieracia* that I have attached queries to appear to me to belong to the Scottish division, since according to Watson they do not range into any of the Arctic zones. Other *Hieracia* should be included here.

Scottish species occurring in Donegal:–

Thalictrum minus.
Trollius europæus.
Drosera anglica.
Sagina subulata.
Vicia sylvatica.
Prunus Padus.
Rubus saxatilis.
R. suberectus.
Circæa alpina.
Callitriche autumnalis.
Saxifraga hypnoides.
Parnassia palustris.
Ligusticum scoticum.
Hieracium pallidum (and others).
Crepis paludosa.

Gnaphalium dioicum.
Lobelia Dortmanna.
Pyrola media.
P. minor?
Orobanche rubra.
Lamium intermedium.
Galeopsis versicolor.
Mertensia maritima.
Pinguicula vulgaris.
Empetrum nigrum.
Salix pentandra.
S. phylicifolia.
Listera cordata.
Habenaria albida.
Potamogeton nitens.
P. prœlongus.
P. filiformis.
Eriocaulon septangulare.
Blysmus rufus.
Carex divica.
C. limosa.
C. filiformis.
Festuca sylvatica.
Elymus arenarius.
Polypodium Phegopteris.
Equisetum umbrosum.
E. trachyodon.
E. hyemale.

The total of this group in Britain is 117 species, and in Ireland, 66.

Atlantic species occurring in Donegal:–

Raphanus maritimus.
Arabis ciliata.
Viola Curtisii.
Hypericum Androsœmum.
H. Elodes.
Sedum anglicum.
Cotyledon umbilicus.
Erodium moschatum.
Carum verticillatum.
Crithmum maritimum.
Bartsia viscosa.
Orobanche hederæ.
Utricularia neglecta.
Pinguicula lusitanica.
Statice occidentalis.
Euphorbia hiberna.
E. Paralias.
E. portlandica.
Scirpus Savii.
Lastræa æmula.
Adiantum Capillus-veneris.
Hymenophyllum Tunbridgense.
H. Wilsoni.

And with these may be properly included –

Saxifraga umbrosa. Trichomanes radicans.

The total for this group in England is 70 species, and in Ireland, 41.

English type species occurring in Donegal:–

Ranunculus tricophyllos.
R. Lingua.
Aquilegia vulgaris.
Nuphar lutea.
Crambe maritima.
Senebiera Coronopus.
Nasturtium amphibium.
[Brassica campestris].
[Sinapis alba].
[S. nigra].
Drosera intermedia.
Eletine hexandra.
[Saponaria officinalis].
[Silene anglica].
Sagina apetala.
[Malva moschata].
[Althæa officinalis].
Euonymus europæus.
Ulex Nanus.
[Trifolium filiforme].
[Prunus insititia].
[Prunus cerasus].
P. avium.
Potentilla reptans.
Rubus cæsius.
Rosa arvensis.
Agrimonia odorata.
Poterium Sanguisorba.
[Pyrus Malus].
P. Aria.
Epilobium hirsutum.
Myriophyllum verticillatum.
? Ceratophyllum demersum.
Lythrum Salicaria.
[Sedum Telephium].
Cornus sanguinea.
Eryngium maritimum.
[Smyrnium Olusatrum].
Apium graveolens.
Helosciadium nodiflorum.
?Sium latifolium.
S. angustifolium.
Œnanthe fistulosa.
Œ. Lachenalii
[Pastinaca sativa].
[Torilis nodosa].
[Sambucus ebulus].
[Valerianella dentata].
[Dipsacus sylvestris].
Thrincia hirta.

? Leontodon hispidus.
Hieracium tridentatum.
H. umbellatum.
[Cichorium Intybus].
Carduus pycnocephalus.
C. pratensis.
Carlina vulgaris.
Bidens cernua.
B. tripartita.
[Inula Helenium].
I. dysenterica.
Anthemis nobilis.
[A. Cotula].
[Ligustrum vulgare].
Convolvulus arvensis.
C. Soldanella.
[Atropa Belladonna].
[Verbascum Thapsus].
[Veronica Buxbaumii].
Scrophularia aquatica.
Linaria repens.
Orobanche hederæ.
[Verbena officinalis].
[Calamintha officinalis].
[Ballota nigra].
Stachys Betonica.
[Nepeta Cataria].
[Symphytum officinale].
[Anchusa sempervirens].
Lysimachia vulgaris.
[L. Nummularia].
Centunculus minimus.
Samolus Valerandi.
Statice bahusiensis.
[Plantago media].
Polygonus minus.
Rumex Hydrolapathum.
[Euphorbia exigua].
E. amygdaloides.
[Salix rubra].
[S.Smithiana].
Taxus baccata.
Epipactis palustris.
Cephalanthera ensifolia.
[Iris fœtidissima].
Allium vineale.
Potamogeton gramineus.
P. lucens.
Zostera nana.
Arum maculatum.
Typha angustifolia.
Juncus glaucus.
J. obtusiflorus.
Cladium Mariscus.
Scirpus Tabernæmontana.
S. acicularis.
Carex disticha.
C. stricta.
C. strigosa.
Phleum arenarium.
Avena flavescens.
Melica uniflora.

Sclerochloa distans.
S. loliacea.
Lepturus filiformis.
Ceterach officinarum.
Polystichum angulare.
Lastræa Thelypteris.
L. spinulosa.
Equisetum maximum.

INTERMEDIATE TYPE.

[Myrrhis odorata].

Watson's types adopted for Great Britain are not suitable to Ireland. A much simpler and more obvious classification would suit the smaller island. I have drawn out several schemes, and that which appeared most useful was Northern, Southern, Eastern, Western and General. Each of these would have an Inner or Limited set of extreme cases, within a confined range. Northern would thus contain an inner circle of alpine, and all those growing commoner northwards. Southern, or rather South-western, would contain "Hibernian" and all those commoner southward. General would have two divisions, "Widespread Agrarian" and widespread, ascending the mountains. Eastern would include most of the English and Germanic species which barely reach Ireland, having their headquarters from Louth to Wexford. Western would be debateable in a few cases with southern, but forms a well-marked and large group. These divisions will, to a certain extent, agree with the climatic condition, which are the causes perhaps of the present distribution of many species.

In the above groups of Watson's type species there are some points to be noticed. In the English groups I have included all colonists and doubtful natives, as there are so many of these about which different views prevail. Also all those of Watson's English-British, English-Atlantic, that are included, as long as "English" predominates. I made

out, however, a separate list of those purely English type species occurring in Ireland and also undoubted natives. This list contains over eighty species, and less than half of these occur in Donegal. Of the native English type species that do occur in Donegal about a third are confined to the south-west of the county.

In the smaller Atlantic type there is also a considerable loss, but not, proportionately, so large as compared with the rest of Ireland. This group is at its maximum in Ireland, on the south-east coasts of Wexford and Waterford. Of the forty native Atlantic type species in Ireland, sixteen are absent from Donegal. To this type should be added the so-called "Hibernian" species, which will place the majority upon the west coasts.

In the Highland type species Donegal is much better represented. Omitting *Hieracia*, as their distribution is not sufficiently understood, there are thirty-one species in Ireland. Of these all, except six, occur in Donegal. If *Hieracia* be considered, there are several more to be added; probably the total number of Highland *Hieracia* in Ireland occurs in Donegal.

In Watson's Intermediate type, which is a "sub-division of the boreal and montane group regarded as a whole," Ireland is very weak. There are seven native species out of a British total of thirty-seven of this type, and there are none in Donegal. In Watson's *Compendium* (1870, p27), he associates this group with his Scottish, although his arguments seems to me to be sufficiently opposed to this course. They are species of restricted area, which run out northwards and have a tendency to the hilly districts of England and the lowlands. The very fact of their extreme

scarceness in Ireland, and their entire absence from Donegal, where the true Scottish type is well represented, points to the correctness of Watson's earlier views (Vol. iv, p.501) in keeping the plants of the Intermediate type in a separate group. It will be as well, here, to mention those that occur in Ireland, and it will be apparent, considering their Irish range, that they are better regarded as not Scottish type.

Helianthemum canum, Aran (Galway) and Clare.
Potentilla fruticosa, Clare and Galway.
Sanguisorba officinalis. In Mayo; very rare, N.E. Ireland.
Galium sylvestre, Kerry, Clare, Galway, Leitrim.
Andromeda polifolia, middle, south and west of Ireland; very rare or extinct, N.E. Ireland.
Gentiana verna, Mayo, Clare, Galway.
†*Allium Scorodoprasum*, Kerry and Cork.

All these Intermediate type would incline more naturally to "Atlantic" than "Scottish."

In the Scottish type, as compared with the rest of Ireland, Donegal is, naturally, well supplied. Out of about 56 species in Ireland, all except eight occur in Donegal. Another species, *Utricularia intermedia*, may no doubt be counted as Scottish.