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"All the works of our Creator are great, and worthy of our attention and investigation, the lowest in the scale as well as the highest, the most minute and feeble as well as those that exceed in magnitude and might. Nor ought those whose inclination or genius leads them to one department, to say to those who prefer another, 'We have no need of you,' for each in his place, by diffusing the knowledge of His works, and adding to the stock of previous discoveries, contributes to promote the glory of the Great Architect of the universe and the good of His creatures."
—KIRBY and SPENCE'S 'Introduction to Entomology.'

WILLIAM BLACKWOOD AND SONS,
EDINBURGH AND LONDON.

1881-1882.

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ZOOLOGY.

ON THE OCCURRENCE OF THE WHITE-BEAKED DOLPHIN (LAGENORHYNCHUS ALBIROSTRIS, GRAY), ON THE EAST COAST OF SCOTLAND.[1]

By J. M. CAMPBELL,
Joint Secretary of the Natural History Society of Glasgow, &c.

ALTHOUGH it is to be expected that many of the rarer cetacea frequent our coasts, the as yet imperfect knowledge of their habits, the difficulty of capture, and the nature of the element in which they live, all militate against the rapid accumulation of facts relating to their occurrence.

The species which is the subject of this paper, although recorded as British so long ago as 1846, has not yet been added to our list of Scottish fauna. Mr Alston in his paper 'On the Mammalia of Scotland,' read to this Society in April last year, referring to this species says, "The White-beaked Dolphin is another species whose appearance in Scottish waters is to be expected, as it seems frequently to visit the Faroes, and the east coast of England (*Cunningham*, *P. Z. S.*, 1876, p. 686), but as yet its actual occurrence does not seem to have been recorded."

This species was first figured and described by Brightwell in the 'Annals and Magazine of Natural History' (vol. xvii. p. 21), in 1846, under the name of *Delphinus tursio*, Fabr., from a female

[1] Read to the Natural History Society of Glasgow, November 30, 1880.

taken by herring fishermen at Great Yarmouth in October 1845, the skin and skeleton of which are now in the British Museum. There is, however, a skull of one which was killed at Hartlepool in 1834, in the museum of Cambridge University, the species not having been recognised at the time. Gray, after an examination of Brightwell's specimen, described it as a new species under the name *Lagenorhynchus albirostris.*

On the 29th December 1862 a full-grown male was found stranded on "Little Hilbre," one of two closely contiguous islands at the mouth of the Dee, Wales, and is described in the 'Annals and Magazine of Natural History' for 1863, p. 268, by Thomas J. Moore, of the Liverpool Museum, to whom it had been sent. In 1866 one was shot on the coast of Cromer, Norfolk, by H. M. Upcher of Sherringham Hall, the skull being preserved in the British Museum. In 1867, according to Bell, a young male, whose skeleton is in the University of Cambridge, was killed on the English coast. Dr Murie, in his 'Notes on the White-beaked Bottlenose' ('Linn. Soc. Jour., vol. xi. p. 141), in 1870, describes the anatomy of a full-grown male, captured a few years before on the south coast of England, part of the viscera of which is preserved in the College of Surgeons, and the skeleton in the British Museum. In September 1875 Dr Cunningham obtained a young female, caught off Great Grimsby, which he figured and described in the Zoological Society's Proceedings for 1876, the skeleton of which is in the Edinburgh University Museum. The same volume also contains a paper by Mr Clark on a young male caught on 26th March 1876, off Lowestoft.

In the 'Zoologist' for 1878, Mr A. G. More, Museum of Science and Art, Dublin, says in reference to this species: "We have long had in the Museum here a coloured cast of a Dolphin captured some fifteen years ago in the vicinity of Dublin Bay, which lately, by comparing a coloured sketch taken from the fresh animal with the excellent figure given in the Proceedings of Zoological Soc. for 1876, p. 679, pl. 64, I was able to identify as *D. albirostris*, J. E. Gray." The last recorded specimen was a young female captured by some Yarmouth fishermen on 24th August 1878, which Mr Thomas Southwell of Norwich has described in the 'Zoologist' of that year. These are, so far as I have been able to learn, all the British specimens which have been recorded. On the Continent it has been taken at Ostend, Keil, Bergen, Gullholmen, and Skanör.

The individual which I now describe—a young male—was taken by some fishermen near the Bell Rock on the 7th September last, and came into the hands of Mr Walker, a fish merchant in Glasgow, who presented it to the Kelvingrove Museum on the 9th, in good condition.

The following are a few measurements taken at the time:—

	Ft.	In.		Ft.	In.
Total length	5	8	Greatest breadth of pectoral	0	4¾
Length of muzzle	0	1½	Breadth of caudal	0	3¼
Length to eye	0	8¾	Height of dorsal	0	7½
Length to blow-hole	0	10	Circumference of thickest part	3	3¼
Length to ears	0	11½	Width of orbit	0	0¾
Length to pectoral limbs	1	1½	Width of blow-hole	0	1½
Length to dorsal	2	5½			
Length of pectoral	1	1			

Skull:—

Length, entire	1	0¾	Width of middle of beak	0	2¾
Length of nose from front of blow-hole	0	7¾	Width of lower jaw at condyles	0	5¾
Width at orbit	0	5¾	Length of lower jaw along one side, from condyles to symphysis	0	10
Width in front of notches (base of beak)	0	3¼			

In shape and colour it resembled more closely the Lowestoft specimen described by Mr Clark; the body tapering gradually from the dorsal fin, and, like the female described by Mr Southwell, it did not exhibit the humped appearance described by Dr Cunningham. The beaked shape of the head was very marked, the upper lip projecting 1½ inch beyond the head, which had a gradually-rounded outline. On each side of the upper lip were four black bristles, which projected but slightly through the skin.

The general colour above was a beautiful purplish-black, the entire beak from the furrow dividing it from the head, and the ventral surface till within 21 inches from the cleft of the tail, was of a satiny-white, slightly yellowish on the under surface. Above the pectoral fins and behind the eye was a greyish-white spot, thickly splashed or streaked with brown; a similar linear-shaped spot ran in an oblique direction from slightly before the dorsal fin, in the direction of the vent, and a larger one, which measured about 13 inches long and about 3 inches wide, ran along the side behind the dorsal.

The ear-opening was very small, and could be detected with difficulty, barely admitting an ordinary pin.

The number of teeth in the upper jaws was 23 on each side, and in the lower jaws 24 and 25; but some of them were barely through the gum, one or two at the front being mere denticles. They were sharp, conical, and curved inwards, and had a slight longitudinal groove on their anterior and posterior surfaces. They seemed to be quite free and movable. The lower jaw projected slightly beyond the upper.

Owing to insufficient facilities for maceration, a few of the teeth were lost; and, for a like reason, I have been unable with certainty to note the number of vertebræ, some of the smaller being merely cartilage. Previous to maceration, I had counted 90 vertebræ. The first two cervical vertebræ are anchylosed, the remainder free.

I have not any doubt that this individual is a young *Delphinus albirostris*, or, more properly, *Lagenorhynchus albirostris*, Gray.

I may remark that the figure given by Brightwell, and copied by Bell in his 'British Quadrupeds,' is very far from correct, that of Mr Clark, as I have already said, approaching nearer to this one.

Some interesting anatomical peculiarities have been noted by Mr Clark and Drs Cunningham and Murie in their respective papers.

NOTES ON THE BIRDS OF THE BASIN OF THE TAY AND ITS TRIBUTARIES.

By Colonel H. M. DRUMMOND HAY, C.M.Z.S., B.O.U., &c.

(*Continued from Vol. V., p.* 346.)

139. Sula bassana, Briss. (Solan Goose or Gannet.)

So near the Tay as the Bass Rock stands (five-and-twenty to thirty miles), computed to contain from ten to twenty thousand breeding-birds of this species alone, the mouth of the Tay is naturally a great resort, where from early spring to late in autumn the Solan Goose may constantly be seen, either in twos or threes, heavily winging their way close to the water, bent perhaps on some distant fishing excursion; or, in considerable numbers, high up in the air, plunging and dashing into the sea in pursuit of small fish, which congregate about the estuary,—ascending the river, according to Mr Nelson, even as high up as the Dundee Bridge

140. Larus marinus, Linn. (Great Black-backed Gull.)

Though never very numerous, the Great Black-backed Gull is well represented on all the lower parts of the Tay, occasionally ascending some way above Perth. Its breeding-grounds nearest to the Tay are the Bass and the Isle of May. The young birds during their first year assume a dark-grey speckled plumage, and formerly, when birds were not so well known as now, they were put down as a different species under the name of the Wagel. In this stage they are common in the river in autumn and winter.

141. Larus fuscus, Linn. (Lesser Black-backed Gull.)

In the mature plumage this is not a common bird, but is generally found in the dark-brown stage of the first year, when it is not unfrequent, in autumn and winter, in the tidal parts of the river below Perth.

Larus glaucus, Brunn. (Glaucous Gull.)

Larus islandicus, Edm. (Iceland Gull.)

Occasional examples of both these birds have been obtained in the lower parts of the Tay. A young Glaucous, mentioned by Mr Nelson as killed last winter near Broughty Ferry, is in the collection of the Dundee Naturalists' Society.

142. Larus argentatus, Brunn. (Herring Gull.)

Of all the larger gulls that frequent the Tay, the Herring Gull is perhaps the more common. Young birds of the year in their grey plumage may be frequently seen in winter, mixed with other gulls, picking up garbage in the river both below the Bridge at Perth and in the harbours at Dundee.

143. Larus canus, Linn. (Common Gull.)

This is a common bird on the Tay, and may be seen in all stages of plumage. In the autumn and spring it assembles in large numbers in the fields in search of grubs, following the plough, and often associated with rooks.

144. Rissa tridactyla, Bonap. (Kittiwake.)

The Kittiwake is common on the Tay, especially in the winter months, and is never, like some of the other gulls, to be seen inland, nor does it occur very high up the river. In summer it becomes more scarce, as it then retires to its nearest breeding-grounds on the Redhead, Isle of May, Bass, and St Abb's Head.

145. Chroicocephalus ridibundus, Eyton. (Black-headed Gull.)

Of all our gulls this is the most generally spread throughout the whole district, being more of an inland species than any of the others. It is found both in summer and winter, often assembling in large numbers in the fields. In spring, selecting inaccessible marshy spots for its nesting-grounds, it is to be found breeding in many places. A very large nursery, which has been recently formed, is to be seen at the White Myre, at Methven, near Perth, having, owing to improvements lately made on the Dupplin Loch, where for many years they held full sway, deserted it for the above-mentioned place. The change from the white head, which it retains all winter, to the brown cap of the breeding dress, takes place early in March, and is accomplished in an incredibly short time, said to be fully effected in the course of three or four days. The eggs are much sought after, and when they are being collected the noise from the old birds is perfectly deafening.

146. Actochelidon cantiaca, Kaup. (Sandwich Tern.)

A few pairs of the Sandwich Tern visit the Tay every summer, and from their strong rapid flight, and hoarse jarring cry, may easily be distinguished from the other terns with which they associate. Though I have not found their nests, I have no doubt but that they breed with us, having noticed them hovering over the sands on Tents Muir in the months of June and July in company with the three following:—

147. Sterna hirundo, Linn. (Common Tern.)

148. Sterna macrura, Naum. (Arctic Tern.)

149. Sterna minuta, Linn. (Lesser Tern.)

All the above are to be found every summer, the two former being the more abundant. The Common Tern is to be often seen on our lochs and upper waters, and the Lesser Tern confines itself more to the sands on Tents Muir, where they, along with the rest, have their breeding-grounds. They are now, however, very scarce to what they used to be. In my earlier days, terns bred in large numbers on the sandhills of Barry, at the mouth of the Tay; but this locality for them has long been left untenanted, owing to wanton destruction of their eggs, and from the continued and perpetual disturbance of the old birds during the

breeding season by egg-collectors, both there and on Tents Muir; and should there be no effort made to stop the practice, the Tern, like many of the rest of our birds, will soon be a thing of the past. In treating of the Golden Plover, I have already denounced the wholesale depredation of eggs on the breeding-grounds of Tents Muir; but since that was written, the following has come under my eye, written by Mr Harvie-Brown in the 'Proceedings of the Nat. Hist. Soc. of Glasgow,' and which so corroborates my own statements, and so aptly fits in under the present article, that I feel I cannot do better than copy it for the benefit of my readers who may have any influence either in Dundee, Leuchars, St Andrews, or elsewhere in the neighbourhood, to put a stop to this infamous traffic: "The destruction of Terns' eggs is really deplorable, besides that of almost every other species which breeds on Tents Muir in Fife. Not for the first time in his letters to me does Mr Henderson of Dundee describe the awful mischief committed on this breeding-haunt by boys who come out from Dundee and elsewhere and harry the nests, and destroy wholesale all the nests they come across. Mr Henderson states that the Terns are positively getting driven away by the continuous and wholesale destruction of their eggs. In this case the Protective Acts are a perfectly dead letter. The eggs are destroyed in thousands. Terns, Ring Plovers, Dunlins, Lapwings, &c., are suffering dreadfully. Scarcely a single bird gets flown; and as for Sheldrakes and Eiders, every egg is blown or boiled. Such is the state of matters here, and I can substantiate every word to be correct." Mr Harvie-Brown, commenting on the above, adds, "Have we not a Society of Field Naturalists at Dundee? I think so: and is it not part of their duty to try and prevent this destruction? It ought to be considered part of the duty of every local Natural History Society to do so. Pressure should be brought to bear on the magistrates, continued and repeated until something is accomplished."[1]

STERCORARIUS POMATORHINUS, Gould. (Pomatorhine Skua.)

STERCORARIUS PARASITICUS, Gould. (Arctic or Richardson's Skua.)

The autumn of last year (1879) will long be remembered by

[1] Tents Muir is in the hands of three proprietors, who, I am sure, would be willing to give every assistance were the matter taken up firmly by the Dundee Natural History Society.—H. M. D. H.

ornithologists for the remarkable arrival of Skuas on all our eastern shores. During the months of October and November they appeared in unaccountable numbers, more especially the Pomatorhine; many were killed on the Tay, as well as elsewhere in Scotland and in England, both of the above species being got in all the different stages of plumage. It is doubtful whether or not the two other species, the Great Skua (*Stercorarius catarrhactes*, Gray) and Long-tailed or Buffon's Skua (*S. longicaudus*, Vieill.), did not visit the locality at the same time.

Procellaria glacialis, Linn. (Fulmar.)

Mr Nelson mentions to me one example of this bird, which was caught alive a few years ago on Tents Muir, and seemingly in a dying condition. The Fulmar Petrel is nowhere common on our east coasts, but there are occasional instances of its being driven on shore in many different places.

Puffinus anglorum, Bliss. (Manx Shearwater.)

What I fully believe to have been a bird of this species I have noticed near the mouth of the Tay, but have received no mention of its ever having been noticed there by any of the Dundee naturalists; but as this Shearwater is well known to me, and breeds in Orkney and Shetland, from whence it may possibly stray, I am probably right in my conjecture.

Thalassidroma pelagica, Vig. (Storm Petrel.)

I have never noticed this species myself on the Tay, but Mr Nelson informs me that he has twice seen the Storm Petrel on the river, and on each occasion immediately after a severe gale. Mr Horn also mentions its capture on Loch Tay. No doubt, like some other sea-birds noticed there, it was driven off the western coast in some of the prevailing gales from that quarter.

In concluding the above list of birds of the district here selected, it will be necessary to make a few remarks in explanation. A glance at the map will show that what I have designated the basin of the Tay comprises the whole of the watershed, consisting of a large area in the very centre of Scotland, containing a considerable extent of mountain, lake, rich arable land, and sea, giving a bird-fauna at once large and interesting. This tract, stretching from the head of Loch Lydon, near the entrance of Glencoe in Argyle, the head of Glen Dochart and

Glen Lyon to the headlands of Barry and low-lying sands of Tents Muir on the sea-coast, in the counties of Forfar and Fife, covers a distance, as the crow flies, of nearly eighty miles; while, taking it in the widest part, from the hills above Glen Artney to the head of Glen Tilt on the borders of Aberdeenshire, we have a distance of close on fifty. Having been asked to give my ornithological experience of this district, which I have been more or less acquainted with all my life, I have endeavoured to do so—at the same time feeling that I must fall far short of doing the subject full justice, as it would require the joint observations of the many, over a long series of years, to do so thoroughly. With the assistance of friends, who have kindly given me information where I have not been able to gather it myself, together with what has fallen under my own immediate notice, I find that the number of birds which reside in or visit the district, casually or otherwise, amounts to 188, the distribution of which may be taken as follows:—Resident species, 86. Of these 61 are regular, 14 doubtfully so, and 11 sometimes leaving in winter and becoming partially migrant. Of the birds of passage there are 62 species: 29 of these are summer, 23 winter, and 10 appearing in autumn or spring, and doubtful as to remaining. In all, 148 of regular appearance.[1] Of the remaining 40 species, 31 are occasional or accidental, 6 doubtful, and of those supposed to have escaped from domestication, 3. This does not include the solitary instance of the Purple Waterhen (*Porphyria smaragdonotus*) obtained on the Tay: see 'Scot. Nat.,' vol. iv. p. 37.

REGULARLY RESIDENT.

1. Golden Eagle.
2. Sparrow-hawk.
3. Peregrine Falcon.
4. Kestrel.
5. White Owl.
6. Brown Owl.
7. Great Tit.
8. Blue Tit.
9. Coal Tit.
10. Long-tailed Tit.
11. Blackbird.
12. Water Ouzel.
13. Robin.
14. Hedge Sparrow.
15. Wren.
16. Tree-creeper.
17. Gold Crest.
18. Skylark.
19. Yellowhammer.
20. Corn Bunting.
21. House Sparrow.
22. Chaffinch.

[1] In the body of the list 149 are enumerated, arising from the accidental numbering of one species, No. 16, Eagle Owl, which is now altogether omitted as having been ascertained to have escaped from confinement.

23. Siskin.
24. Greenfinch.
25. Bullfinch.
26. Linnet.
27. Raven.
28. Carrion Crow.
29. Hooded Crow.
30. Rook.
31. Jackdaw.
32. Magpie.
33. Jay.
34. Wood-pigeon.
35. Capercailzie.
36. Blackcock.
37. Grouse.
38. Ptarmigan.
39. Partridge.
40. Heron.
41. Golden Plover.[1]
42. Ring Plover.[1]
43. Oyster-catcher.[1]
44. Curlew.[1]
45. Redshank.[1]
46. Dunlin.[1]
47. Woodcock.[2]
48. Common Snipe.
49. Waterhen.
50. Sheldrake.
51. Wild Duck.
52. Eider Duck.
53. Razorbill.
54. Guillemot.
55. Cormorant.
56. Great Black-backed Gull.
57. Lesser Black-backed Gull.
58. Herring Gull.
59. Common Gull.
60. Kittiwake.
61. Black-headed Gull.

DOUBTFUL, IF REGULARLY RESIDENT.

62. Sea Eagle.
63. Osprey.
64. Buzzard.
65. Merlin.
66. Kite.
67. Short-eared Owl.
68. Long-eared Owl.
69. Kingfisher.
70. Goldfinch.
71. Crossbill.
72. Lesser Redpole.
73. Coot.
74. Pochard.
75. Tufted Duck.

SOMETIMES LEAVING IN WINTER, AND BECOMING PARTIALLY MIGRANT.

76. Missel Thrush.
77. Song Thrush.[3]
78. Stonechat.
79. Pied Wagtail.
80. Grey Wagtail.
81. Meadow Pipit.
82. Reed Bunting.
83. Starling.
84. Lapwing.
85. Teal.
86. Little Grebe.

[1] Sea-shore in winter.

[2] Placed here instead of among the birds of passage, as it breeds and remains so constantly in the district.

[3] Though no instance has come under my notice of the Song Thrush remaining with us, it is said sometimes to do so.

BIRDS OF PASSAGE, SUMMER.

1. Nightjar.
2. Swift.
3. House Swallow.
4. House Martin.
5. Sand Martin.
6. Spotted Flycatcher.
7. Ring Ouzel.
8. Wheatear.
9. Whinchat.
10. Redstart.
11. Whitethroat.
12. Blackcap.
13. Garden Warbler.
14. Willow Wren.
15. Wood Wren.
16. Sedge Warbler.
17. Tree Pipit.
18. Cuckoo.[1]
19. Wryneck.
20. Stockdove.
21. Dotterel.
22. Common Sandpiper.
23. Red-necked Phalarope.
24. Land Rail.
25. Gannet.
26. Sandwich Tern.
27. Common Tern.
28. Arctic Tern.
29. Lesser Tern.

BIRDS OF PASSAGE, WINTER.

30. Redwing.
31. Fieldfare.
32. Snow Bunting.
33. Bramble Finch.
34. Mountain Linnet.
35. Godwit.
36. Knot.
37. Jack Snipe.
38. Wild Goose.
39. Bean Goose.
40. Pink-footed Goose.
41. White-breasted Goose.
42. Brent Goose.
43. Widgeon.
44. Scaup Duck.
45. Common Scoter.
46. Velvet Scoter.
47. Golden Eye.
48. Long-tailed Duck.
49. Goosander.
50. Red-breasted Merganser.
51. Great Northern Diver.
52. Red-throated Diver.

[1] I am glad to be able to state that since the commencement of this paper the Cuckoo, as well as the Owl, have been included in the Wild Birds Protection Amended Act, passed this last session—1880—making it illegal to kill them between the 15th of March and 1st of August. At the same time it cannot but be regretted, when altering the law, that the interests of the Woodcock should have been so entirely overlooked, and that instead of the shooting of these birds terminating on the 1st of February, as it ought to do, it is now extended to the 15th of March, when they are known to be breeding (see Article, No. 104). It can only be hoped that though the public may not do so, the true sportsmen will refrain from destroying them at such a season.

SPRING AND AUTUMN VISITANTS, DOUBTFUL AS TO ALWAYS REMAINING.

53. Rough-legged Buzzard.
54. Honey Buzzard.
55. Marsh Harrier.
56. Hen Harrier.
57. Grey Shrike.
58. Great Spotted Woodpecker.
59. Green Shank.
60. Water Rail.
61. Spotted Crake.
62. Black-throated Diver.

OCCASIONAL OR ACCIDENTAL.

1. Roller.
2. Hoopoe.
3. Waxwing.
4. Grasshopper Warbler.
5. Hawfinch.
6. Rose Pastor.
7. Green Woodpecker.
8. Turtle Dove.
9. Quail.
10. Bittern.
11. Whimbrel.
12. Sanderling.
13. Turnstone.
14. Great Snipe.[1]
15. Curlew Sandpiper.
16. Grey Phalerope.
17. Whooper.
18. Shoveller.
19. Pintail Duck.
20. King Duck.
21. Smew.
22. Great Crested Grebe.
23. Black Guillemot.
24. Little Auk.
25. Puffin.
26. Glaucous Gull.
27. Iceland Gull.
28. Pomatorhine Skua.
29. Richardson's Skua.
30. Fulmar.
31. Storm Petrel.

DOUBTFUL.

(*Examples not having been obtained for identification.*)

32. Pied Flycatcher.
33. Pine Grosbeak.
34. American White-winged Crossbill.
35. Mealy Redpole.
36. Hooded Merganser.
37. Manx Shearwater.

SUPPOSED ESCAPES.

38. Canada Goose.
39. Egyptian Goose.
40. Mute Swan.

(*Concluded.*)

[1] Omitted in List—see 'Scot. Nat.,' vol. ii. p. 360.

Occurrence of Rare Birds.—I have again to record the appearance of the Esquimaux Curlew (*Numenius borealis*), one having been shot by Mr H. C. Hadden in the Forest of Birse on 21st September last. This bird (which was a male) was the same weight as the one reported in the 'Scottish Naturalist,' vol. v. p. 36, 1879, but in length a quarter of an inch shorter, and less by half an inch in extent of wings. The stomach contained the same sort of food as the one referred to above. This is the third occurrence of the species in Scotland.

On 4th October, Mr Moir of Tarty shot a specimen of the Glossy Ibis (*Ibis falcinellus*) on the mud-flats near the mouth of the Ythan, Aberdeenshire. The bird was a male, and in good condition; its stomach was filled with a fibrous vegetable matter along with sixty-six specimens of the rat-tailed maggot (larva of Drone-fly, *Eristalis tenax*); two small pupa, different and unknown to me; four species of beetles, two of one sort, and one of each of the others, one of them being aquatic; four specimens of *Cyclas flavescens*; fragments of *Limnæus peregeri*; and eight small specimens of *Mytilus pusillus*; as also five angular species of stone, about the size of small peas. Extent of wings 39½ inches; from point of beak to end of tail, 24 inches; from flexure to end of primaries, 11 inches; tarsus, 4¼ inches; middle toe, including nail, 3¼ inches; beak, along ridge, 5½ inches; beak, legs, and toes, greenish grey; sides of head bare and of the same colour as the beak—those bare parts are, at their junction with the feathers, both above and below the eyes, edged with a narrow line of greenish white; iris, brown; weight 1½ pound.

So far as I can make out, this is the sixth occurrence of the species in Scotland. The first was shot in Ayrshire; second in Fifeshire, September 1842; third near Banchory, Kincardineshire, 1844, the wings of which were given to the late Professor Macgillivray, and the occurrence of the specimen is noted in his work on British birds; fourth one in Balta Sound, Shetland, October 1857, noted by Dr Saxby; fifth one reported by the late Mr J. H. Dunn to Mr Gray, author of the 'Birds of the West of Scotland,' and sixth, the one now noted.

On 18th October last a specimen of the Hoopoe (*Upupa epops*) was shot in Unst and sent to me. It was a female, and its stomach was filled with earwigs (*Forficula auricularia*).—Geo. Sim, Aberdeen.

Lesser Whitethroat in Fyvie.—*Sylvia corruca*, Lesser Whitethroat. A fine specimen of this bird was killed at Gourdas on the 4th November, and another seen at Mill of Tifty.—George Sim, Gourdas, Fyvie.

A Curious Bird.—When shooting last week at Moncreiffe, I killed a rather curious variety of a Pheasant. It flew over my head, and I took it for a cock, and killed it. On examination, we found that it was a mule. It had long tail-feathers, a head like a cock, and was the same size as one, but its back and wings and breast were like a hen's, and it had no spurs. Its neck was a sort of reddish brown,—exactly the colour of the upper part of a Capercailzie hen's breast. The keepers about there say they are not very rare; but I have never seen one before. Is it not rather a curiosity? [An old hen assuming male plumage.—Ed.]

I also saw lately a House-sparrow, with white wings and white feathers on its back—in Piccadilly, of all places.—T. J. Harry Moncreiffe, 59 Ennismore Gardens, London, S.W., *Nov.* 24.

Blatta germanica, L., in Glasgow.—While I was in Glasgow, at the meeting of the Cryptogamic Society, Mr John Rae, of the 'Glasgow Daily Mail,' gave me several specimens of a small Cockroach which is, he told me, very abundant in the office of that newspaper. On examining the insects I found them to belong to *Blatta germanica*. The species is easily distinguished from its congeners in Europe by the presence of two longitudinal dark bands on the thorax, and by the veins of the outer two-thirds of the hinder part of the elytra not branching from the long axis, but being nearly parallel to it.

B. germanica seems rather widely spread in central Europe, alike in houses and in the open country. In Stephen's 'Entomology' (vi. 46) it is said to be found in various seaports in the south of England, but only in ships, warehouses, or dwellings, so as to indicate that it has been introduced into Britain by commerce. Its habits resemble those of the only too common *Blatta orientalis*, L., but the latter insect seems to expel its smaller congener, as they are not found to remain together in a house.—J. W. H. Trail, 23*d Nov.* 1880. [*Blatta germanica* is said sometimes to expel *B. orientalis*, but this would appear to need confirmation.—Ed. Sc. Nat.]

A New British Trichopteron.—At the last meeting of the Glasgow Natural History Society, I exhibited specimens of *Molanna palpata* M'Lach., a species of Caddis-fly new to Britain. It has hitherto been known only from Finland and Siberia, and a specimen from St Petersburg was found among Kolenati's types of *M. angustata* in the Vienna Museum.

The remarkable form of the third joint of the maxillary palpus, in both sexes, at once distinguishes it from its congeners.

The above species was taken during my stay last summer at Cannich, Strathglass, Inverness-shire, and occurred commonly all through August. It was the common caddis-fly in all parts of the Strath visited by me.

I found it along the margins of lochs by brushing with the net the overhanging heather, &c. I cannot remember having seen it flying without its having been first disturbed. *Angustata*, De Geer, is the only other British species of the genus.—James J. King, 207 Sauchiehall Street, Glasgow.

We regret to have to record the death of one of our earliest contributors, Dr William Lauder Lindsay, F.R.S.E., F.L.S. Dr Lindsay was a student of science all his life, and was well-known for his investigations in one of the most difficult branches of Cryptogamic Botany—the Lichens. Of late years his attention was almost entirely directed to Psychology, with especial reference to the existence of mind in the lower animals, on which subject he wrote voluminously. For a long period Dr Lindsay was Medical Superintendent of the Royal Murray Asylum, Perth, but retired about a year ago on account of failing health. He died in Edinburgh, in November last, at the early age of 50.

The Sixth Annual Conference of the Cryptogamic Society of Scotland was very successfully held in Glasgow at the end of September. The island of Mull has been selected as the place of this year's Conference.

PHYTOLOGY.

SCOTTISH GALLS.

By J. W. H. TRAIL, M.A., M.D., F.L.S.

HELIANTHEMUM VULGARE, Gärtn.—(*b*) I have this autumn found on this plant, on Scotston Moor near Aberdeen, galls of a mite (*Phytoptus*) affecting the tip or apical half of the shoot. The mites seem to attack the young buds, causing the leaves to remain short and crowded, while numerous buds form but remain small. The epidermis of leaves and branches alike becomes covered with grey hairs, while the epidermal cells contain pink contents, frequently giving a pink tinge to the gall. The deformity is similar in its nature to the woolly galls so frequent on the Thyme (*T. serpyllum*), as also to the earlier stages of the "witch-knots" on Birch. The individual buds do not exceed one-fifth inch in diameter, though all the buds on a shoot may be attacked, so that the whole mass may be considerably larger. The gall described by me formerly ('Sc. Nat.,' ii. p. 31), though somewhat like the above, is readily distinguished by its appearance; and, as pointed out by Hardy ('Ann. Mag. Nat. Hist.,' 1850, p. 187), is the work of a midge, which he named *Cecidomyia helianthemi*.

The mite-gall has been found in Switzerland, and is described by Dr Thomas (Giebel's 'Zeitschrift,' 1872, vol. xxxix. p. 469), but he has not met with the midge-gall, and hence suggests that they are not distinct, but that the midge larvæ are inquilines, the mites being the gall makers. Dr Fr. Loew also has found the mite-galls in Lower Austria ('Verh. Zool. Bot. Gesellschaft,' Wien, 1879, vol. xxix. p. 721).

PRUNUS PADUS, L.—(*a*) I some years ago ('Sc. Nat,' i. p. 124), described shortly "nail-galls" (formed by a species of *Phytoptus*) on the leaves. I have met with these galls in many localities; they seem to be abundant wherever the plant occurs, and have been frequently mentioned by German authors.

(*b*) Another mite-gall, also the work of *Phytoptus sp.*, occurs

on the leaves, but is readily distinguished from the former, though frequently they occur on the same leaf. It seems almost, if not quite, restricted to the lower surface of the leaf, where it forms irregular patches of very variable extent, but frequently more or less limited by the larger veins of the leaf. The patches are usually more or less scattered; but frequently several seem to fuse together, and may cover a large part of the leaf. At first yellowish in colour they soon become darker, and finally become rusty brown. Usually opposite to each patch there is on the upper surface of the leaf a yellowish or reddish spot; but the galls are, as already said, confined to the lower surface. They consist of a close velvety pile of short, blunt, clubbed hairs; the club bears numerous very short branches or tubercles, or may be nearly smooth, and each hair is supported on a tapering stalk. Among these hairs live the four-footed mites.

These galls were abundant on some plants of *Prunus padus* at Forres in September, along with the "nail-galls," and I have also found them at Banchory, near Kingcausie, on Deeside. They have been described and figured by several Continental botanists as Fungi, under the names *Erineum padinum*, Duv., &c., *E. padineum*, Fries, or *Rubigo padi*, Mart. Greville gives a good description and figure of the supposed fungus, under the name *Erineum padi*, in his 'Scottish Cryptogamic Flora,' vol. iii. t. 157, fig. 1.

They seem widely distributed in Germany, and have been described by Dr Fr. Loew from Bavaria ('Verh. Z. B. Gesellsch., Wien, 1878, p. 140).

Chenopodium album, L.

Atriplex patula, L.

A. babingtonii, Woods.

On all of these plants one may frequently observe the leaves fleshy, pale, and rolled so as to enclose a space lengthwise, in which live multitudes of *Aphis atriplicis*, L. These pseudo-galls seem to be of very general distribution.

Quercus robur, L.

(*x*) Galls of *Aphilothrix albopunctata*, Schlecht., were found by me in May of this year near Aberdeen. The species was published as Scottish by Mr Cameron some years ago. The galls are sunk in the buds, projecting from among the bud-scales, and fall out of the buds to the ground in June. They are oval or ovate, about $\frac{1}{5}$-$\frac{1}{4}$ inch long × $\frac{1}{8}$-$\frac{1}{6}$ inch thick, have usually

a rather prominent sharp knob at the tip, are naked, smooth, and in colour are green or brown, with numerous short white longitudinal streaks. The wall is rather thick, and the inner gall is hard, but is closely united to the outer wall. Of the oak-galls formerly described by me, I found at Forres, in the month of September, galls of *Andricus terminalis*, *Biorhiza renum*, *Dryophanta folii*, *D. divisa*, *Andricus curvator*, *Neuroterus lenticularis*, *N. numismatis*, and old galls of *Spathegaster vesicatrix*. Of course the spring-forms had disappeared, but their occurrence is indicated by the existence of the autumn-galls. The gall of *Cynips Kollari* was shown me by Mr Smith, from Rafford near Forres.

Agrostis alba, L.—In the month of October I found, on the coast near Aberdeen, galls on this plant. They are situated on the leaf-blade close to where it joins the leaf-sheath; or, in a few cases, at distances not exceeding an inch from the sheath. The galls are dull red-purple swellings, oval or linear, rounded at the ends, and prominent below. They measure $\frac{1}{12}$ - $\frac{1}{5}$ by $\frac{1}{25}$ - $\frac{1}{20}$ inch. On making a transverse section of a gall it is found to be due to enlargement of one side of the leaf, chiefly around and between the midrib and the next longitudinal vein of the leaf, seldom extending markedly beyond the midrib or reaching the margin. All the features of the normal leaf can be recognised both externally and internally in the gall, but considerably altered. The affected part becomes twice or thrice as thick as the healthy leaf. The cuticle becomes much thickened, and the epidermal cells become less regular, thicker-walled, and seem to form two or three layers of cells instead of one layer. The chlorophyll becomes less abundant, and may be almost absent; and the cells that contain it in the healthy leaf are represented in the gall by considerably larger cells, lying with their long axis parallel to the surface of the gall. The thick-walled cells that usually form a sheath around each fibro-vascular bundle, and extend above and below it to the surfaces of the leaf, become much less conspicuous in the gall. In the centre of the gall a longitudinal cavity is formed, apparently by separation of the cells; it seems not to open externally. In this space live the makers of the gall,—*Anguillulæ*,—usually in considerable numbers. In the galls that I examined were numerous eggs and immature worms, but I found only one sexually mature female, which agreed with Bastian's genus *Tylenchus;* but in absence of mature males the determination must remain uncertain for the

present. In the eggs were embryos almost ready to emerge, so well formed that they moved actively within the transparent shell. They are three or four times as long as the oval eggs. In size the creatures approach very closely to those from the gall on *Elymus* described below. Usually only one gall is found on each leaf, but occasionally two may be situated side by side, separated by the midrib, or both may occur on the same side, but one a little way farther from the base of the leaf than the other. I have seen three galls on a leaf. Magnus ('Botan. Zeitung,' 1875, p. 579; and 1876, p. 586) has described similar galls found by him on leaves of *Festuca ovina*, L., and of *Agrostis canina*, L.; and *Anguillulæ* have been found to form galls on the inflorescence of *Agrostis sylvatica*, Huds., of *Phleum Boehmeri*, and of *Ph. pratense*, and have long been known (under the name of *Vibrio tritici*) to cause "ear cockles" or galls in the ovary of *wheat*, and, less frequently, of *oats* and of *rye*.

Elymus arenarius, L.—On this coast-frequenting grass I have found, near Aberdeen, galls on the fine rootlets pushed out from the rhizomes through the sand. They usually occur at the tip of the rootlet as a nearly round or oval swelling affecting its whole circumference, and tipped with a small knob,—the only-slightly-affected extreme end of the root. They vary in size from $\frac{1}{50}$ to $\frac{1}{20}$ inch in diameter; but, though so small, are easily distinguished, as the rootlets are only about $\frac{1}{100}$ inch thick. Some galls affect the rootlet nearer its base, causing a tapering swelling, which may reach $\frac{1}{8} \times \frac{1}{12}$ inch in size. A transverse section of a normal rootlet is found to present a central fibro-vascular bundle of rather small thin-walled cells and vessels, the whole surrounded by two layers of cells with the cell-walls markedly thicker, especially on the inner side of the cells. Between these layers and the epidermis lie four or five layers (forming the cortex) of regular thin-walled cells, those to the inside smallest, those in the middle much larger than the inner and slightly larger than the outer cells. These contain usually some protoplasm, seldom filling half the cell, in which lies a nucleus by no means conspicuous. Outside of all is the epidermis, composed of a single layer of cells, distinguished from those below them chiefly by being empty, and by giving off root-hairs.

Comparing the structure of a gall with this, we find the following differences: The root-hairs are absent, as might be anticipated from the position of the galls; the epidermis has the cells

usually empty, but not otherwise distinguishable from those below, and the gall is chiefly made up of a mass of thin-walled cells packed full of granular contents. In each cell is a strongly refracting nucleus, in which lies a distinct nucleolus. The layers of thick-walled cells have disappeared, but the fibro-vascular bundle is represented by cells smaller than those of the cortex. There is no distinct line of demarcation between the cortex and the central tissues, hence it is difficult to determine which has undergone the greater abnormal growth, but the cortex seems to be the less changed of the two. In the interior of the gall live the makers of it, as in *A. alba;* they are *Anguillulæ*, and belong to the genus *Tylenchus*, though of this I am not certain in the absence of males. In the small galls only one or two of the worms are to be found; but in the larger galls, in October, a multitude of eggs and of newly-hatched embryos are present, with an occasional adult female. The eggs are oval, with blunt ends, about $\frac{3}{1000} \times \frac{1-1-2}{1000}$ inch in size, and are so transparent as permit a full examination of the embryo within, which is three or four times as long as the egg. The immature worms, examined by me in October, were $\frac{60\times3}{4000} - \frac{100\times3}{4000}$ inch, and the adult females were about $\frac{32\times1}{1000}$ inch. The *Anguillulæ* from both this and the former gall are able to endure desiccation without being killed; but I have not had an opportunity as yet of testing this power for any long period of time. Galls of *Anguillulæ* on the roots of *Elymus arenarius* have been found in Denmark by Dr E. Warming ('Bot. Tids.,' 3d series, vol. ii., 1879); and root-galls formed by these creatures have also been found on *Poa annua*, on *Triticum repens*, on *wheat*, on *barley*, and on *oats*, but I am not aware that they have yet been met with on these plants in Scotland.

In the 'Scottish Naturalist,' vol. iv. p. 206, I gave references to *mite-galls*, described and figured as fungi, under the generic name *Erineum*, by Greville, in the 'Edinburgh Philosophical Journal.' I have since had access to two works by Greville,—the 'Flora Edinensis,' published in 1824, and the 'Scottish Cryptogamic Botany,' published in 1823-28. In the former are described, and in the latter are described and figured, the following mite galls, under the name *Erineum*.

1. *E. clandestinum*, Grev. = *E. oxyacanthæ*, Pers., on hawthorn-leaves ('Sc. Nat.,' iv. p. 14). 'Fl. Edin.,' p. 450; 'Sc. Cr. Fl.,' vol. iii. t. 141, f 2.

2. *E. fagineum*, Pers., on beech-leaves (below). 'Sc. Cr. Fl.,' vol. v. t. 250, f. 1. (Though noted by Greville as "frequent," I have not met with it.)

3. *E. populinum*, Pers., on *Populus tremula* on lower surface of leaves ('Sc. Nat.,' ii. p. 254, d). 'Sc. Cr. Fl.,' vol. v. t. 250, f. 2. At Darnaway and other places in Scotland, and at Oxford.

4. *E. Padi* = *E. Padineum*, Fries, on leaves of *Prunus Padus*, (see above), at Aviemore, and elsewhere in the Highlands. 'Sc. Cr. Fl.,' vol. iii. t. 157, f. 1.

5. *E. Alneum*, Pers., on lower surface of leaves of alder ('Sc. Nat.,' iv. p. 205). 'Fl. Edin.' p. 450; 'Sc. Cr. Fl.,' vol. iii. t. 157, f. 2. At Rosslyn.

6. *E. roseum*, Schultz = *E. Betulæ* D. C. ('Sc. Nat.,' iv. p. 17). 'Fl. Edin.,' p. 451, and 'Sc. Cr. Fl.,' vol. i. t. 21.

7. *E. betulinum*, Schum ('Sc. Nat.,' iv. p. 17), 'Fl. Edin.,' p. 451. Nos. 6 and 7 both occur on leaves of birch (*Betula alba*), and are common. They are forms of one gall apparently.

8. *E. pyrinum*, Pers., on leaves of *Pyrus malus*, and of *P. communis*, on Craigie Hill, and in Devonshire. 'Fl. Edin.,' pp. 449, 450; 'Sc. Cr. Fl.,' vol. i. t. 22. (I have not found this species.)

9. *E. tortuosum*, Grev., 'Fl. Edin.,' p. 450; 'Sc. Cr. Fl.,' vol. ii. t. 94. On birch.

10. *E. sorbi*, Kunze, on leaves of mountain-ash (*Pyrus aucuparia*). 'Sc. Cr. Fl.,' vol. v. t. 263, f. 1. Woods at Kinnordy, and elsewhere.

11. *E. Juglandis*, Gærtn. = *E. Juglandinum*, Pers. = *E. subulatum*, Grev., on leaves of walnut, (*Juglans regia*). 'Fl. Edin.,' p. 450; 'Sc. Cr. Fl., vol. v. t. 263, f. 2, "not unfrequent." (I am not acquainted with this gall, or with that on the mountain-ash, which latter gall is distinct from the mite-gall described by me, 'Sc. Nat.,' ii. 79; the latter gall is common.

THE GAELIC NAMES OF PLANTS.

By JOHN CAMERON.

(*Continued from Vol. V., p.* 361.)

Anthemis nobilis—Common chamomile. *Camomhil*, from the Greek χαμαι μηλος, which Pliny informs us was applied to the plant on account of its smelling like apples. (Spanish: *mancin-*

illa, a little apple.) *Lus-nan-cam-bhil* (M'Kenzie), the plant with drooping flowers. The plant is well distinguished by its flowers, which droop, or are *bent down*, before expansion; but though the name is thus applicable, it is only a corruption from the Greek.

> "Bi'dh mionntain, *camomhil* s'sobhraichean
> Geur bhileach, lonach, luasganach."—M'Intyre.
> There will be mints, chamomile, and primroses,
> Sharp-leaved, prattling, restless.

Luibh-leighis, the healing plant. This plant is held in considerable repute, both in the popular and scientific Materia Medica.

A. pyrethrum—Pellitory of Spain. Gaelic: *lus na Spàine*, the Spanish weed.

A. arvensis—Field chamomile. Irish: *coman mionla* (*coman*, a common; *mionla*, fine-foliaged. Gaelic: *mìn lach*).

Matricaria inodora—Scentless May-weed. Gaelic: *buidheag an arbhair*, the corn daisy. *Camomhil feadhain*, wild chamomile. Welsh: *llygad yr ych*, ox-eye.

Tanacetum vulgare — Tansy. Gaelic: *lus na Fraing*, the French weed. (French, *tanaisie.*) Irish: *tamhsae*, corruptions from *Athanasia*. (Greek: α, privative, and θανατος, death, *i.e.*, a plant which does not perish—a name far from applicable to this species).

Eupatorium cannabinum — Hemp agrimony. Gaelic and Irish: *cnaib uisge* or *caineab uisge*, water-hemp (from Greek κανναβις; Latin, *cannabis*, hemp; the root *can*, white).

Bidens cernua — Bur marigold. Irish: *sceachog Mhuire*, Mary's haw.

Achillea ptarmica—Sneezewort. Gaelic: *cruaidh lus*, hard weed. (Latin: *crudus*, hard, inflexible). *Meacan ragaim*, the stiff plant. *Roibhe*, moppy.

A. millefolium—Yarrow. Gaelic: *lus chosgadh na fola*, the plant that stops bleeding. *Lus na fola*, the blood-weed. *Earr thalmhainn*, that which clothes the earth (*earr*, clothe, array). *Athair thalmhainn*, the ground father. *Cathair thalmhainn*, the ground seat or chair. Probably alterations of *earr* (for *thalmhainn* see *Bunium flexuosum*).

> "*Cathair thalmhainn's* carbhin chroc-cheannach."—M'Intyre.
> The yarrow and the horny-headed caraway.

Solidago virgaurea—Golden rod. Gaelic: *fuinseag coille?* A name given by Shaw to the herb called "*Virgo pastoris.*" Also one of the names of the mountain-ash (*Pyrus aucuparia*, which see).

Jasione montana—Sheep-bit. Gaelic: *dubhan nan caora* (O'Reilly). *Dubhan*, a kidney; *caora*, sheep.

CAMPANULACEÆ.

Campanula—Gaelic: *barr-cluigeannach*, bell-flowered.

"*Barr-cluigeannach*-sìnnteach gorm-bhileach."
Bell-flowered extended, blue-petalled.

C. rotundifolia—Round-leaved bell-flower. Gaelic: *bròg na cubhaig*, the cuckoo's shoe. *Am pluran cluigeannach*, the bell-like flower. Welsh: *bysedd ellylon*, imp's fingers. Scotch: witch's thimbles.

Lobelia dortmanna—Water-lobelia. *Plùr an lochain*, the lake-flower.

ERICACEÆ.

Erica tetralix—Cross-leaved heath. Gaelic: *fraoch frangach*, French heath. *Fraoch an ruinnse*, rinsing heath; a bunch of its stems tied together makes an excellent scouring brush, the other kinds being too coarse. (*Fraoch*, anciently *fraech.*) Welsh: *grûg*. Greek: ἐρέικω, *ereiko*, to break, from the supposed quality of some of the species in breaking the stone (medicinally). The primary meaning seems to be to burst, to break, and appears to be cognate with the Latin, *fractum*. *Fraoch* also means wrath, fury, hunger. "*Laoch bu gharg fraoch*" (Ull.), a hero of the fiercest wrath. "*Fraoch!*" fury, the war-cry of the M'Donalds.

E. vagans—Cornish heath. Celtic: *gooneleg* (Dr Hooker), the bee's resort.

E. cinerea—Smooth-leaved heath. Gaelic: *fraoch bhadain*, the tufted heath.

"Barr an *fhraoch bhadanaich*."—OLD SONG.
The top of the tufted heath.

"Gur badanach caoineil mileanta
Cruinn mopach, mìn cruth, mongoineach
Fraoch groganach, dù dhonn grìs dearg."—M'INTYRE.

Literally—

That heath so tufty, mellow, sweet-lipped,
Round, moppy, delicate, ruddy,
Stumpy, brown, and purple.

Fraoch an dearrasain, the heath that makes a rustling or buzzing sound.

The badge of Clan M'Donald.

Calluna vulgaris—Ling heather. Gaelic: *fraoch*. Heath or

heather is still applied to many important domestic purposes, thatching houses, &c., and "the hardy Highlanders frequently make their beds with it—the roots down and the tops upwards —and formerly tanned leather, dyed yarn, and even made a kind of ale from its tender tops." *Langa* (M'Kenzie), ling.

Arbutus uva-ursi — Red bearberry. Gaelic: *grainnseag*, small, grain-like. It has small red *berries*, which are a favourite food for moorfowl. *Braoileag nan con*, the dogs' berry.

A. alpina—The black bearberry. Gaelic: *grainnseag dhubh*, the black grain-like berry.

A. unedo — Strawberry-tree. Irish: *caithne* (O'Donovan). *Caithim*, I eat or consume.

Vaccinium myrtillus—Whortleberry. Gaelic: *lus nan dearc*, the berry plant (*dearc*,[1] a berry). *Gearr-dhearc*, sour berry. *Fraochan*, that which grows among the heather. The berries are used medicinally by the Highlanders, and made into tarts and jellies, which last is mixed with whisky to give it a relish for strangers. *Dearcan fithich*, the raven's berries.

V. vitis-idæa — Cowberry; red whortleberry; cranberry. Gaelic: *lus nam broighleag*. Irish: *braighleog* (from *braigh*, top, summit, a mountain), the mountain-plant; ordinary signification, a berry. *Bó-dhearc*, cowberry. ("*Bó*, a cow, from which the Greeks derived βοος, an ox"—Armstrong.) Latin: *vacca* and *vaccinium*.

"Do leacan chaoimhneil gu *dearcach brioghleagach*."
Thy gentle slopes abounding with whortleberries and cowberries.

Badge of Clan M'Leod.

V. oxycoccos—Cranberry. Gaelic and Irish: *muileag*, a word meaning a little frog; the frogberry. It flourishes best in boggy situations. *Fraochag*, because it grows among the heather. *Monog*, bog or peat berry. *Mionag*, the small berry.

V. uliginosum—The bogberry. Gaelic: *dearc roide*, the gall or bitter berry. The fruit abounds with an acid juice; when the ripe fruit is eaten, it occasions headache and giddiness.

Ilicineæ.

Ilex aquifolium—Holly. Gaelic and Irish: *cuileann*. Welsh: *celyn*. A.-S.: *holegn*. (*C* in Gaelic corresponds with *h* in the Germanic languages.) *Cùl*, guard, defence; *cùil*, that which

[1] Originally from *dearc*, the eye; Sansk., *darç*, to see. The dark fruit resembling the pupil of the eye—hence the frequent comparisons of the eye (*sùil*) to this fruit (*dearcag*) in Gaelic poetry.

prohibits. Compare also *cuilg*, gen. of *colg*, a prickle, or any sharp pointed thing. The lower leaves of this tree are very prickly, and thus guard against cattle eating the young shoots. Welsh: *celyn*, tree, shelterer or protector; *cel*, conceal, shelter, cover.

"Ma theid thu rùisgte troimh thom droighinn
'S coiseachd cas-lom air *preas cuileann*
Cadal gun lein' air an eanntaig,
'S racadal itheadh gunn draing ort," &c.—BLAR SHUNADAIL.

If you go naked through a thorn thicket,
And walk barefooted on the *holly*,
Sleep without a shirt on the nettle,
And eat horse-radish without a grin, &c.

OLEACEÆ.

Olea europæa—European olive. Gaelic and Irish: *crann oladh* or *ola* (Greek: ελαια, a word, according to Du Théis, derived from the Celtic; Welsh: *olew*), the oil-tree.

"Sgaoilidh e gheugan, agus bithidh a mhaise mar an *crann-oladh*."

"He will spread his branches, and his beauty shall be as the *olive tree*."—HOSEA xiv. 6.

Syringa vulgaris—Lilac-tree. Gaelic: *craobh liath ghorm*, the lilac-tree.

Ligustrum vulgare—Privet. Gaelic: *ras chrann sìr uine*, the evergreen shrubbery-tree. *Priobaid* (M'Donald). (Latin: *privatus*; Irish: *priobhaid*, secrecy, privacy). Its chief use is to form hedges that are required for shelter, ornament, and privacy.

Fraxinus excelsior—Ash. Gael. and Irish: *craobh uinnseann*. Irish: *uinseann*, *uimhseann*, altered into *fuinse*, *fuinsean*, *fuinseog*.

"Gabhaidh an t' *uinnseann* as an àllt
'S a chàlltuinn as a phreas."—PROVERB.

The *ash* will kindle out of the burn,
And the hazel out of the bush.

Welsh: *onen*, corresponding to another Irish name, *nion*. Gaelic: *nuin*, and also *oinsean*. The names refer principally to the wood, and the primary idea seems to be lasting, long-continuing, *on* (in Welsh), that which is in continuity. *Uimh*, number; *seann*, ancient, old; *ùine*, time, season. *Nuin*, also the letter N. Heb., *nun*. *Fuinnseann* (see *Circœa*), though from the same root, may have been suggested by its frequent use in the charms and enchantments so common in olden times, especially against the bites of serpents, and the influence of the "Old Serpent." Pennant, in 1772, mentions: "In many parts

of the Highlands, at the birth of a child, the nurse puts the end of a green stick of ash into the fire, and while it is burning, receives into a spoon the sap or juice which oozes out at the other end, and administers this to the new-born babe." Serpents were supposed to have a special horror of its leaves.

"Theid an nathair troimh an teine dhearg
Mu'n teid i troimh dhuilleach an *ùinnsinn*."

The serpent will go through fire, rather than through the leaves of the ash.

The same superstition was equally common in other countries, and the name "ash," which is said to be from the Celtic word *æsc*, a pike, is more likely to be from the word *asc*, a snake, an adder.[1] German: *die esche.*

The badge of Clan Menzies.

GENTIANACEÆ.

Gentiana campestris—Field gentian. Gaelic: *lus a chrùbain*, the crouching plant, or the plant good for the disease called *crùbain*, "which attacks cows, and is supposed to be produced by hard grass, scanty pasture, or other causes. The cows become lean and weak, with their hind-legs contracted towards the fore-feet, as if pulled by a rope" (Armstrong). This plant, in common with others of this genus, acts as an excellent tonic; its qualities were well known in olden times. Welsh: *crwynllys*, bent-weed; *cryn*, bend, curve. Gaelic: *creamh*, is given also as a name for gentian.

"'N *creamh* na charaichean,
Am bac nan staidhrachean."—M'INTYRE.

Which Dr Armstrong translates, "gentian in beds or plots." The name *creamh* also applies to the leek. *Creamh*, hart's-tongue fern, garlic, and elecampane. Welsh: *craf*, garlic.

Erythræa, from ερυθρος, *erythros*, red flowers.

E. centaurium—Centuary; red gentian. Irish: *ceadharlach* (O'Reilly), the *centaur*. It is said that with this plant Chiron cured the wound caused by the arrows of Hercules in the Centaur's foot. Gaelic, according to Armstrong: *ceud bhileach*, meaning hundred-leaved, a corruption of the Irish name (*Ceud*, Irish: *ceadh;* Latin: *centum*, a hundred),—the origin of the name being probably misunderstood.

[1] In Scandinavian mythology the first man was called *Ask*, and the first woman *Ambla*—ash and elm. The court of the gods is represented in the Edda as held under an ash—*Yggdrasil*. Connected with these circumstances probably arose the superstitions.—CHAMBERS'S ENCYCLOPÆDIA.

E. littoralis—Dwarf-tufted centuary. Gaelic and Irish: *dreimire muire*, the seaside scrambler. *Dreim*, climb, clamber, scramble: *muire;* Latin: *mare;* German: *meer*, the sea.

Chlora perfoliata—Yellow-wort. Gaelic and Irish: *dreimire buidhe*, the yellow scrambler. Not in the Highlands, but found in Ireland, whence the name.

Menyanthes trifoliata—Bog-bean, buck-bean, marsh trefoil. Gaelic and Irish: *pònair chapull*, the mare's bean. (See *Faba.*) *Pacharan chapull*, the mare's packs or wallets, from *pac*, a pack, a wallet, a bundle. *Tri-bhileach*, the three-leaved plant. *Millsean monaidh*, the sweet plant of the hill.

"*Millseineach*, biolaireach sobhrach."—M'Lachuinn.

Abounding in bog-beans, cresses, primroses.

"The Highlanders esteem an infusion or tea of the leaves as good to strengthen a weak stomach" (Stuart).

Convolvulaceæ.

Convolvulus arvensis—Field bindweed. Gaelic: *iadh lus*, the plant that surrounds. (See *Hedera helix.*)

C. sepium—Great bindweed. Gaelic and Irish: *dùil mhial* (Shaw), from *dùl*, catch with a loop; and *mial*, a louse,—really signifying the plant that creeps and holds by twining.

Cuscuta epilinum—Flax dodder. Irish: *clamhainin lìn*, the flax kites. It is parasitical on flax, to the crops of which it is sometimes very destructive. *Cunach* or (Gaelic) *conach*, that which covers, as a shirt, a disease. A general name applicable to all the species. Welsh: *llìndag*, the flax choker.

Solanaceæ.

Solanum dulcamara—Bitter-sweet; woody nightshade. Gaelic and Irish: *searbhag mhilis*, bitter-sweet (Highland Society's Dictionary). *Fuath gorm*, the blue demon (*fuath*, hate, aversion, a demon). *Miotag bhuidhe.* Irish: *miathog buidhe*, the yellow nipper, pincher, or biter. *Slat ghorm* (*slat*, a wand, a switch; *gorm*, blue).

S. tuberosum—Potato. Gaelic: *bun-tata*, adaptation of the Spanish *batata.* Sir John M'Gregor has ingeniously rendered the word *bun-taghta*, a choice root!

Atropa belladona—Deadly nightshade; dwale banewort. Gaelic and Irish: *lus na h'oidhche*, the nightweed, on account of its large black berries and its somniferous qualities. Buchanan relates the destruction of the army of Sweno, the Dane, when he invaded Scotland, by the berries of this plant, which were mixed

with the drink with which, by their truce, they were to supply the Danes, which so intoxicated them that the Scots killed the greater part of the Danish army while they were asleep. Welsh: *y gysiadur*, the putter to sleep.

Hyoscyamus niger — Henbane. Gaelic and Irish: *gafann* (*gabhann*), the dangerous one. *Detheogha*, *deodha*, *deo*, breath, that which is destructive to life. *Caoch-nan-cearc*, that which blinds the hens. Its seeds are exceedingly obnoxious to poultry, hence the English name henbane. The whole plant is a dangerous narcotic. Welsh: *slewyg yr iâr*, preventing or curing faintness.

SCROPHULARIACEÆ.

Verbascum thapsus—Mullein; hag's taper; cow's lungwort. Gaelic and Irish: *cuineal Mhuire*, or *cuingeal Mhuire* (from *cuing*, asthma, or shortness of breath. In pulmonary diseases of cattle it is found to be of great use, hence the name, cow's lungwort, or *cuinge*, narrowness, straightness, from its high, tapering stem; *Mhuire*, Mary's).

Veronica beccabunga—Brooklime. Gaelic: *lochal*, from *loch*, a lake, a pool, the pool-weed or lake-weed, being a water-plant. *Lothal* (*lo*, water). Irish: *biolar mhùin*, the contemptible cress; *mùn*, urine. Welsh: *llychlys y dwfr*, squatter in the water.

V. officinale—Common speedwell. Gaelic and Irish: *lus cré*, the dust-weed. *Seamar chre* (see *Oxalis*).

V. anagallis—Water-speedwell. Irish: *fualachtar*, *fual*, water, the one that grows in the water.

Euphrasia officinalis—Eyebright. Gaelic: *lus nan leac*, the hillside plant; *leac*, a declivity. *Soillseachd nan sùil*, *soillse na sùl* (M'Donald), that which brightens the eye. *Rein an ruisg* (Stuart), water for the eye. *Glan ruis*, the eye-cleaner. Lightfoot mentions that the Highlanders of Scotland make an infusion of it in milk, and anoint the patient's eyes with a feather dipped in it, as a cure for sore eyes. Irish: *radharcain* (*radhairc*), sense of sight. *Lin radharc* (*lin*, the eye, wet), the eye wetter or washer. *Raeimin-radhairc* (*reim*, power, authority), that which has power over the sight. *Roisnin*, *rosg*, the eye, eyesight. *Caoimin* (*caoimh*), clean. Welsh: *gloywlys*, the bright plant. *'Llysieuyn eufras*, the herb Euphrasia (from ευφραινω, *euphraino*, to delight, from the supposition of the plant curing blindness). Arnoldus de Villa saith, "It has restored sight to them that have been blind a long time before; and if it were but as much used as it is neglected, it would half spoil the spectacle trade" (Culpepper).

Pedicularis sylvatica—Dwarf red rattle. Irish: *lusan grolla.*

P. palustris—Louse-wort; red rattle. Gaelic: *lus riabhach*, the brindled plant, possibly a contraction of *riabhdheargach* (Irish), red-streaked, a name which well describes the appearance of the plant. *Modhalan dearg*, the red modest one. *Lus na mial*, louse-wort, from the supposition that sheep that feed upon it become covered with vermin. *Bainne ghabhar*, goat's milk, from the idea that when goats feed on it they yield more milk. Its beautiful pink flowers were used as a cosmetic.

> "Sail-chuach 's *bainne ghabhar*,
> Suadh ri t' aghaidh,
> 'S cha n' neil mac righ air an domhain,
> Nach bi air do dheidh."
>
> Rub thy face with violet and goat's milk,
> And there is no prince in the world
> Who will not follow thee.

Rhinanthus crista-galli—The yellow rattle. Gaelic: *modhalan bhuidhe*, the yellow modest one. *Bodach na claiginn.* Irish: *bodan na cloigin*, the old man with the skulls. *Claigeann* or (Irish) *cloigoin*, a skull, from the skull-like appearance of its inflated calyces.

Scrophularia nodosa—Figwort. Gaelic: *lus nan cnapan*, the knobbed plant, from its knobbed roots. Old English: kernel-wort. *Donn-lus*, brown-wort, from the brown tinge of the flowers. *Farach dubh* (*faracha*, Irish), a beetle or mallet; *dubh*, dark. Wasps and beetles resort greatly to its small mallet-like flowers. Irish: *fotrum* (*fot*, *fothach*), glandered—from the resemblance of its roots to tumours. In consequence of this resemblance it was esteemed a remedy for all scrofulous diseases; hence the generic name *Scrophularia.*

Digitalis purpurea—Foxglove. Gaelic: *lus-nam-ban-sìth*, the fairy women's plant. *Meuran sìth* (Stuart), the fairy thimble. Irish: *an siothan* (*sioth*, Gaelic: *sìth*) means peace. *Sìthich*, a fairy, the most active sprite in Highland and Irish mythology. *Meuran*[1] *nan daoine marbh*, dead men's thimbles. *Meuran nan caillich mharbha*, dead women's thimbles. In Skye it is called *ciochan nan cailleachan marbhta* (Nicolson), the dead old women's paps. Irish: *sian sleibhe.* (*Sian*, a charm or spell, a wise one, a fox; *sleibhe*, a hill). Welsh: *menyg ellyllon*, fairy's glove.

[1] *Meuran* and *digitalis* (*digitabulum*), a thimble, in allusion to the form of the flower.

O'Reilly gives another Irish name, *bolgan beic* (diminutive of *bolg*, a sack, a bag. Greek, Βολγος, *beic*, bobbing, curtseying). And frequently in the Highlands the plant is known by the familiar name, *an lus mòr*, the big plant. *Lus a bhalgair* (Aberfeldy), the fox-weed.

Orobanchaceæ.

(From Greek, ορoβος, *orobos*, a vetch, and αγχειν, to strangle, in allusion to the effect of these parasites in smothering and destroying the plants on which they grow.) The name *mùchog* (from *h mùc* smother, extinguish, suffocate) is applied to all the species.

O. major and **minor**—Broom-rape. Irish and Gaelic: *siorralach*, (Shaw) — *sior*, vetches, being frequently parasitical on leguminous plants; or *siorrachd*, rape.

Verbenaceæ.

Verbena officinalis—Vervain. Gaelic and Irish: *trombhod*,—*trom*, a corruption of *drum*, from Sanskrit *dru*, wood; hence Latin, *drus*, an oak, and *bod* or *bòid*, a vow. Welsh: *dderwen fendigaid*, literally, blessed oak,—the "herba sacra" of the ancients. Vervain was employed in the religious ceremonies of the Druids. Vows were made and treaties were ratified by its means. "Afterwards all sacred evergreens, and aromatic herbs, such as holly, rosemary, &c., used to adorn the altars, were included under the term verbena" (Brockie). This will account for the name *trombhod* being given by O'Reilly as "vervain mallow;" M'Kenzie, "ladies' mantle;" and Armstrong, "vervain."

Labiatæ.

(From Latin, *labium*, a lip, plants with lipped corollæ.) Gaelic: *lusan lipeach*, or *bileach*.

Mentha—(From Greek Μινθη, *minthe*. A nymph of that name who was changed into mint by Prosperine, in a fit of jealousy, from whom the Gaelic name *mionnt* has been derived.) Welsh: *myntys*.

Mentha sylvestris—Horse-mint. Gaelic: *mionnt each*, horse-mint; *mionnt fiadhain*, wild mint; and if growing in woods, *mionnt choille*, wood-mint.

M. arvensis—Corn-mint. Gaelic: *mionnt an arbhair*, corn-mint.

M. aquatica — Water-mint. Gaelic: *cairteal*. Irish: *cartal*, *cartloin*, probably meaning the water-purifier, from the verb *cartam*, to cleanse, and *loin*, a rivulet, or *lon*, a marsh or swampy

ground. *Misimean dearg* (Armstrong), the rough red mint. The whole plant has a reddish appearance when young.

M. viridis — Garden-mint, spear-mint. Gaelic: *mionnt ghàraidh*, the same meaning; and *meanntas*, another form of the same name, but not commonly used.

"Oir a ta sibh a toirt an deachaimh as a *mhionnt*."—STUART.
For ye take tithe of mint.

(*To be continued.*)

MYCOLOGIA SCOTICA.

By Rev. JOHN STEVENSON.

IN continuation of "Mycologia Scotica,"[1] I propose to issue, from time to time, supplements containing additions to the Scottish Flora, and any farther information, which it may be thought desirable to communicate, regarding species which have already been recorded in the work.

As one species has been deleted, and as nine species were recorded at the end of the volume, with numbers indicating their places in the body of the work, the supplement begins with No. 2156.

In noting additional districts in Scotland, or other countries, in which species recorded in the volume have been found, I shall enumerate the species together under each district or country. This will be more convenient for those who desire to keep the catalogue up to date, than separate references to such species in their order throughout the supplement.

Glamis, *November* 1880.

CORRIGENDA.

Page
26, No. 139, *for* "marginellus" (Fr. non Pers.) *read* "mirabilis C. and Q."
31, No. 165, *for* "Rannoch" *read* "Kinnoull."
49, No. 266, *for* "Perth" *read* "Glen Tilt."
66, No. 352, *for* "Mnium" *read* "Sphagnum."
84, No. 446, *add* "Forth."
169, No. 902, *delete* "C. stabulare" from number of species.
178, No. 957, *for* "Perth" *read* "Rannoch."
231, No. 1207, *for* "Rannoch" *read* "Perth."

[1] Mycologia Scotica. The Fungi of Scotland, and their Geographical Distribution. By Rev. J. Stevenson. Printed for the Cryptogamic Society of Scotland. 1879.

Page
251, No. 1325, *for* "Rannoch" *read* "Errochd."
253, No. 1335, *for* "leaves and stems" *read* "flowers."
320, No. 1657, *for* "sallow" *read* "poplar."
322, No. 1667, *for* "Sphagnum" *read* "Splachnum."
342, No. 1770, *delete* "Rev. J. Keith."
353, No. 1833, *for* "Alder" *read* "Viburnum opulus."

The following districts are to be recorded under the species enumerated :—

Tweed.—Piggotia astroidea B. & Br.; Claviceps purpurea Tul.; Dothidea ulmi Fr.

Forth.—Rhizina undulata Fr.

Tay.—Agaricus radicosus Bull.; Cortinarius limonius Fr.; Russula Queletii Fr.; Trametes pini Brot.; Hydnum scrobiculatum Fr.; H. cyathiforme Schæff., var. tomentosum; Didymium microcarpon Fr.; Sphæropsis epitricha B. & Br.; Torula sporendonema B. & Br.; T. splendens Cooke; Entyloma Ungeriarum De Bary; Triposporium elegans Corda; Sporodum conopleoides Corda; Peziza strobilina Fr.; Polystigma fulvum D.C.; Spororma minima Awd.

Dee.—Triphragmium ulmariæ Link.; Puccinia arundinacea Hedw.; P. luzulae Lib.; Coleosporium tussilaginis Lev.; C. petasitis Lev.; C. campanulae Lev.; Trichobasis suaveolens Lev.; Ustilago hypodytes Fr.; U. antherarum Fr.; Peridermium pini Chev.; P. acicolum Lk.; Æcidium leucospermum, D.C.; Æ. compositarum, var. a. taraxaci Grev.; var. e. lapsani Purt.; Sphærotheca castagnei Lev.

Moray.—Agaricus mappa Fr.; A. carcharias Pers.; A. sejunctus Sow.; A. grammopodius Bull.; A. speireus Fr.; A. acicola Schæff.; A. acerosus Fr.; A. porrigens Pers.; A. nidorosus Fr.; A. chalybœus Pers.; A. præcox Pers.; A. flavidus Schæff.; A. inopus Fr.; A. furfuraceus Pers.; A. palludosus Fr.; A. squamosus Pers.; A. separatus L.; Cortinarius cyanopus Secr.; C. collinitus Sow.; C. hinnuleus Pers.; C. helvelloides Fr.; C. acutus Pers.; Lactarius fuliginosus Fr.; L. subdulcis Bull.; Hygrophorus coccineus Schæff.; Russula rubra D.C.; R. vesca Fr.; R. heterophylla Fr.; R. Queletii Fr.; R. lutea Huds.; Lentinus scoticus B. & Br.; Boletus elegans Schum.; B. cyanescens Bull.; Polyporus reticulatus Pers.; Hydnum udum Fr.; Sistostrema confluens Pers.; Hymenochæte rubiginosa Schrad.; Corticium calceum Pers.; Cyphella muscigena Fr.; Clavaria argillacea Pers.; Calocera cornea Batsch; Pistillaria quisquillaris Fr.; Physarum sinuosum Bull.; Craterium aureum Schum.; Lamproderma arcyrioides Somm.; Excipula strigosa Fr.; Sorosporium trientalis Woron.; Uromyces ficariæ Lev.; Lecythea valerianæ Berk.; Ceratium hydnoides A. and S.; Peridermium acicolum Link.; Rhinotrichum repens Preuss.; Penicillium crustaceum Fr.; Torula herbarum Link.; Puccinia compositarum Schl.; P. cirsii Lasch.; Milesia polypodii Berk. & White; Peronospora rufibasis B. & Br.; Mitrula cucullata Fr.; Peziza acetabulum L.; P. cupularis Linn.; P. coronata Bull.; P. caucus Reb.; P. strobilina Fr.; P. sphæroides Pers.; P. xanthostigma Fr.; P. furfuracea Fr.; Helotium lutescens Fr.; H. epiphyllum Fr.; Patellaria discolor Mont.; Cenangium pulveraceum Fr.; Phacidium leptideum

Fr.; P. dentatum Fr.; Stigmatea chætomium Fr.; Valsa abietis Fr.; Massaria fœdans Fr.; Psilosphæria pulviscula Curr.; Sphæria abbreviata Cooke; Gnomonia tubæformis Tode; Venturia Dickiei B. & Br.

CLYDE.—Agaricus maximus Fl. Wett.; A. caperatus Pers.; A. inopus Fr.; A. sapineus Fr.; A. cucumis Pers.; Russula Queletii Fr.; R. integra L.; Lenzites sæpiaria Schæff.; Polyporus sanguinolentus A. & S.; Calocera cornea Batsch; Tilmadoche mutabilis R.; Puccinia chrysosplenii Grev.; P. circææ Pers.; Coleosporium tussilaginis Lev.; Ceratium hydnoides A. & S.; Illosporium roseum Fr.; Hypocrea rufa Fr.; Diatrype disciformis Fr.

ARGYLE.—Craterium aureum Schum.; Helvella atra König.; Elaphomyces variegatus Vitt.

The following countries are to be added under the species enumerated :—

ENGLAND.—Paxillus leptopus Fr.

AMERICA (Pacific coast). — Agaricus vernus Fr.; A. strobiliformis Vitt.; A. strangulatus Fr.; A. excoriatus Schæff.; A. equestris Linn.; A. portentosus Fr.; A. resplendens Fr.; A. pessundatus Fr.; A. imbricatus Fr.; A. terreus Schæff.; A. sulphureus Bull.; A. carneus Bull.; A. gambosus Fr.; A. tigrinus Schæff.; A. albus Schæff.; A. phyllophilus Fr.; A. dealbatus Sow.; A. maximus Fl. Wett.; A. infundibuliformis Schæff.; A. fragrans Sow.; A. fusipes Bull.; A. tuberosus Bull.; A. exsculptus Fr.; A. ocellatus Fr.; A. Iris Berk.; A. strobilinus Fr.; A. rugosus Fr.; A. amictus Fr.; A. sanguinolentus A. & S.; A. pterigenus Fr.; A. hiemalis Osbeck.; A. capillaris Schum.; A. pyxidatus Bull.; A. oniscus Fr.; A. gracillimus Weinm.; A. integrellus Pers.; A. mutilus Fr.; A. hypnophilus Berk.; A. gloiocephalus Fr.; A. cervinus Schæff.; A. sericellus Fr.; A. clypeatus L.; A. orcella Bull.; A. serratulus Pers.; A. chalybœus Pers.; A. radicosus Bull.; A. marginatus Batsch; A. fastigiatus Schæff.; A. sambucinus, Fr.; A. versipellis Fr.; A. mesophœus Pers.; A. crustiliniformis Bull.; A. lupinus Fr.; A. semiorbicularis Bull.; A. erinaceus Fr.; A. lateritius Fr.; A. rubi Berk.; A. arvensis Schæff.; A. caput-Medusæ Fr.; A. capnoides Fr.; A. epixanthus Fr.; A. dispersus Fr.; A. lachrymabundus Fr.; A. velutinus Pers.; A. appendiculatus Bull.; A. ericæus Pers.; A. spadiceus Fr.; A. corrugis Pers.; Coprinus fimetarius L.; C. deliquescens Bull.; Bolbitius fragilis L.; B. tener Berk.; Cortinarius purpurascens Fr.; Gomphidius gracilis Berk.; Hygrophorus pratensis Pers.; H. puniceus Fr.; H. calyptræformis Berk.; H. controversus Pers.; Lactarius insulsus Fr.; L. chrysorrhœus Fr.; L. mitissimus Fr.; Russula delica Fr.; R. sanguinea Bull.; R. vesca Fr.; R. heterophylla Fr.; R. decolorans Fr.; Polyporus hybridus B. & Br.; Dædalea quercina L.; Hydnum cyathiforme Schæff.; H. niveum Pers.; Irpex Johnstoni Berk.; Radulum quercinum Fr.; R. salicinum Fr.; Corticium lacteum Fr.; C. lactescens Berk.; C. sanguineum, Fr.; Cyphella ochroleuca, B. & Br.; Exidia saccharina Fr.; Dacrymyces chrysocomus Bull.; Diachæa leucopoda Bull.; Actinothyrium graminis Kze.; Phragmidium bulbosum Schl.; Puccinia coronata Corda; P. vaginalium Link.; Uromyces ficariæ Lev.; Melampsora salicina Lev.; Trichobasis rubigo-vera Lev.; Urocystis parallela B. & Br.; Stilbum pellucidum Schrad.; Helminthosporium velutinum Link.; H. delicatulum Berk.; Cladosporium dendriticum Wallr.; Aspergillus candidus Link.; A. virens Link.; Peronospora nivea Ung.; P. gangliformis Berk.; P. viciæ Berk.; P. effusa Grev.; P. urticæ Casp.; P. trifoliorum De Bary; P. ficariæ Tul.; P. grisea Ung.; P. sordida Berk.; P. obliqua Cooke; Oidium fasciculatum Berk.; Botryosporium diffusum Corda; Sepedonium roseum Fr.; Mucor tenerrimus Berk.; M. stolonifer Ehr.; Acrostalagmus cinnabarinus Corda; Saprolegnia ferax Gr.; Peziza macrocystis Cooke; P. coprinaria Cooke; P. subtillissima Cooke; P. escha-

rodes B. & Br.; P. strobilina Fr.; P. elaphines B. & Br.; Helotium fibuliforme Fr.; H. agaricinum Berk.; H. subtile Fr.; H. salicellum Fr.; H. fagineum Fr.; Tympanis alnea Pers.; Cenangium rubi Fr.; Ascobolus ærugineus Fr.; A. immersus Pers.; A. carneus Pers.; Hysterium angustatum A. & S.; Sphærotheca pannosa Lev.; S. castagnei Lev.; Uncinula bicornis Lev.; Erysiphe lampocarpa Lev.; Nectria ochraceo-pallida B. & Br.; N. umbrina Fr.; Dothidea rosæ Fr.; D. junci Fr.; Stigmatea geranii Fr.; S. ranunculi Fr.; S. potentillæ Fr.; S. chætomium Fr.; Diatrype aspera Fr.; Melanconis longipes Tul.; Sordaria fimicola Rab.; Sphæria rostellata Fr.; S. commanipula B. & Br.

EGYPT.—Melampsora euphorbiæ Cast.

PERSIA.—Melampsora euphorbiæ Cast.

INDIA (British).—Calocera viscosa Fr.; Cladosporium herbarum Link.; Microthyrium microscopicum Desm.; Helvella crispa Fr.

AFRICA (South).—Agaricus dryophilus Fr.; A. septicus Fr.; A. papilionaceus Bull.; A. disseminatus Pers.; Coprinus niveus Pers.; Tremella lutescens Pers.; Hirneola auricula-Judæ L.; Scleroderma vulgare Fr.; Physarum cinereum Batsch; Arcyria punicea Pers.; Darluca filum Cast.; Hydrophora stercorea Tode; Stictis radiata Pers.; Xylaria hypoxylon Grev.; Poronia punctata, Fr.

AUSTRALIA.—Polyporus radiatus Sow.; Cyphella Curreyi Berk.; C. muscigena Fr.; Clavaria juncea Fr.; Tremella foliacea Pers.; Dacrymyces deliquescens Bull.; Crucibulum vulgare Tul.; Lycoperdon pyriforme Schæff.; Peziza Dalmaniensis Cooke; Helotium claro-flavum Berk.; Sphærella brachytheca Cooke.

NEW ZEALAND.—Agaricus melleus Fl. Dan.; A. semiorbicularis Bull.; Hygrophorus miniatus Fr.; Schizophyllum commune Fr.; Polyporus melanopus Fr.; P. applanatus Pers.; P. vulgaris Fr.; P. vaporarius Pers.; Kneiffia setigera Fr.; Hymenochœte rubiginosa Schrad.; Corticium serum Pers.; Clavaria amethystina Pers; C. inæqualis Fl. Dan.; Calocera cornea Batsch; Tremella albida Huds.; T. mesenterica Retz.; Dacrymyces deliquescens Bull.; Cyathus vernicosus D.C.; Crucibulum vulgare Tul.; Sphærobolus stellatus Tode.; Lycoperdon gemmatum Fr.; L. cælatum Fr.; L. pyriforme Schæff.; Scleroderma vulgare Fr.; Craterium vulgare Ditm.; Stemonitis ferruginea Ehr.; Lycogala epidendrum Bux.; Trichia fragilis, Sow.; T. varia Pers.; Dinemasporium graminum Lev.; Ustilago urceolorum Tul.; Ceratium hydnoides A. & S.; Gyromytra esculenta Fr.; Leotia lubrica Pers.; Geoglossum glabrum Pers.; Peziza aurantia Vahl.; P. fusispora Berk.; P. Dalmaniensis Cooke; P. stercorea Pers.; P. nivea Fr.; P. apala B. & Br.; P. cyathoidea Bull.; P. cinerea Batsch; P. ventosa Karst.; Helotium citrinum Fr.; Ascobolus furfuraceus Pers.; Bulgaria sarcoides Fr.; Microthyrium microscopicum Desm.; Claviceps purpurea Tul.; Nectria coccinea Fr.; N. sanguinea Fr.; Hypoxylon concentricum Grev.; Sphæria herbarum Pers.

2156. Agaricus (Amanita) virosus Fr. *Hym. Eur. p.* 18.

White; pileus conical then expanded, *acute*, glutinous (shining), somewhat lobato-repand at the margin, even; stem stuffed, cylindrical from the bulbous base, torn into scales; volva thick, and as well as the ring which is apical, and which breaks up into fragments of a floccose nature, loose; gills free, linear-lanceolate.

Pilei most frequently oblique, lobed and extended on one side after the manner of *Hygrophorus conicus*, scarcely ever depressed. The ring, which is torn into small fragments, adhering to the gills, the edges of which are floccose. Fœtid, poisonous.

In woods. Aug.—Sept.

East. —— —— —— —— Moray ——
West. —— Clyde —— ——

Grantown and Dunphail, 1879. Rev. J. Keith.
Cadder Wilderness (Glasgow Show), 1880.
Europe.

2157. **A. (Lepiota) Friesii** Lasch. *Fr. Hym. Eur. p.* 31.

Pileus fleshy, soft, torn into *adpressed tomentose scales*, ferruginous-fuscous; stem hollow, with a web-like pith, somewhat bulbous, scaly; the superior ring pendulous, equal; gills somewhat remote, linear, very crowded, branched. Stature nearly that of *A. procerus*. Handsome, strong-smelling.

In stubble-field. Sept.

East. —— —— —— —— Moray ——
West. —— —— —— ——

Rafford, 1879. Rev. J. Keith.
Europe.

2158. **A. (Tricholoma) frumentaceus** Bull. *Fr. Hym. Eur. p.* 52. *C. Hbk. No.* 254.

In woods, chiefly fir.

East —— —— —— —— Moray ——
West. —— —— —— ——

Chapleton and Altyre. Rev. J. Keith.
England. Europe.

* **A. (Clytocybe) fumosus** Pers. *Mycol. Scot. p.* 18.

Var. Polius. Rare. Rothiemurchus. Rev. J. Keith.

2159. **A. (Omphalia) hepaticus** Batsch. *Fr. Hym. Eur. p.* 160. *C. Hbk. No.* 215.

In woods. Sept.

East. —— —— Tay —— Moray ——
West. —— —— —— ——

England. Europe.

* **A. (Inocybe) calamistratus** Fr. *Mycol. Scot. p.* 52.

Black Wood, Rannoch. Dr B. White.

* **A. (Inocybe) dulcamarus** A. & S. *Mycol. Scot. p.* 52.

Rannoch, 1875. Dr B. White.

2160. **A. (Naucoria) tenax** Fr. *Hym. Eur. p.* 261. *Grevillea, i. p.* 86.

Pileus somewhat fleshy, campanulate then expanded, smooth, occasionally rugulose, slightly viscid, hygrophanous, when moist commonly cinnamon (becoming watery yellow at the margin), when dry ochraceous, but occurring with mingled shades of yellowish-

fuscous; stem stuffed then hollow, equal, *becoming yellowish-fuscous, slightly striated with adpressed fibrils, rather smooth, with a fugacious veil;* gills adnate, somewhat distant, pale olivaceous-fuscous then becoming ferruginous, entire and whitish at the edge.

In birchwood. Aug.

East. —— —— —— —— Moray ——
West. —— —— —— ——

Grantown, 1880. Rev. J. Keith.
England. Europe.

2161. **Coprinus radians*** Fr. *Hym. Eur. p.* 326. *C. Hbk. No.* 468.

On damp plaster. July.

East. —— —— Tay —— —— ——
West. —— —— —— ——

Coupar-Angus, 1880. J. S.
England. Europe.

* **Cortinarius (Phlegmacium) claricolor** Fr. *Mycol. Scot. p.* 84.
Keir (Glasgow Show), 1880.

2162. **C. (Myxacium) mucifluus** Fr. *Hym. Eur. p.* 355.

Pileus somewhat fleshy, campanulate-expanded, *smeared with an evanescent hyaline gluten, striate at the margin;* when full grown commonly revolute, depressed and very repand, livid clay-colour, when dry tan-colour, opaque; stem attenuated downwards, soft, floccoso-squamose and viscid from the fugacious veil, white or becoming azure; gills adnate, distinct, from clay-colour to watery cinnamon. *Odour sweet.*

In fir woods. Aug.

East. —— —— —— —— Moray ——
West. —— —— —— ——

Grantown. Rev. J. Keith.
Europe.

* **C. (Telamonia) limonius** Fr. *Mycol. Scot. p.* 92.
Scone, 1875. Dr B. White.

* **C. (Telamonia) helvolus** Fr. *Mycol. Scot. p.* 92.
Kinnoull, 1875. Dr B. White.

* **C. (Hygrocybe) duracinus** Fr. *Mycol. Scot. p.* 93.
Kinnoull, 1875. Dr B. White.

* **C. (Hygrocybe) leucopus** Bull. *Mycol. Scot. p.* 94.
Moncreiffe, 1876. Dr B. White.

2163. C. (Telamonia) flexipes * Pers. *Fr. Hym. Eur. p.* 384.

Pileus slightly fleshy, at first acutely conical then expanded, acutely umbonate, at length depressed round the umbo, *violet* then *fuscous-cinnamon* (pale yellow-tan), becoming hoary with whitish fibrils; stem slender, commonly equal, two lines thick, stuffed, flexuose, somewhat undulate, *fibrilloso-scaly*, pallid, *violet at the apex*, somewhat ringed with the white veil; gills adnate, broad, somewhat distant, from umber-violet to cinnamon, at first very dusky, dark purple or umber, becoming whitish at the edge.

In woods. Sept.

East. —— —— Tay —— Moray ——
West. —— —— —— ——

Glamis. J. S. Forres. C. B. Plowright.
Europe.

* **Hygrophorus subradiatus** Schum. Var. lacmus Fr. *Mycol. Scot. p.* 101.
Rannoch. Dr B. White.

* **H. turundus** Fr. *Mycol. Scot. p.* 102.
Scone, 1875. Dr B. White.

2164. Lactarius helvus Fr. *Hym. Eur. p.* 433.

Pileus fleshy, *fragile*, convex then plano-depressed, somewhat umbonate, dry, *silky then floccoso - scaly* and rivulose, *pallid brick-colour*, becoming pale; stem stuffed then hollow, *hoary-pubescent;* gills decurrent, thin, crowded, from whitish to ochraceous; milk scanty, somewhat acrid, white. Odour weak, somewhat sweet; taste mild.

In fir-wood. Aug.

East. —— —— —— —— Moray ——
West. —— —— —— ——

Grantown, 1880. Rev. J. Keith.
Europe.

2165. Russula fellea Fr. *Hym. Eur. p.* 447. *Grevillea, viii. p.* 3.

Pileus fleshy, thin, convexo-plane, polished, straw-colour, but often darker passing into pale yellow, opaque and *not becoming very pale*, margin even, at length striate, pellicle not separable; the *firm flesh* as well as *the stem*, which is spongy-stuffed then hollow, even, and *the gills*, which are adnate, crowded, very narrow, somewhat equal or bifid behind, *from white to straw-colour*. Very bitter. The gills in moist weather distil drops. The whole plant is straw-colour, and is one of the most distinct species.

Under beech-trees. Aug.—Oct.

East. —— —— Tay —— Moray ——
West. —— Clyde —— ——

England. Europe.

* **Lentinus scoticus** B. & Br. *Mycol. Scot. p.* 122.
On birch stick. Forres, Rev. J. Keith.

2166. Panus torulosus * Fr. *Hym. Eur. p.* 489. *C. Hbk. No.* 690.
On stumps. Aug.—Oct.

East.	——	——	Tay	——	Moray	——
West.	——	——	——	——		

England. Europe. America.
This species was inadvertently omitted in *Mycologia Scotica.*

* **Boletus cyanescens** Bull. *Mycol. Scot. p.* 129.
Grantown. Rev. J. Keith.

2167. Polyporous dryadeus Fr. *Hym. Eur. p.* 553. *C. Hbk. No.* 771.
On living oak. Aug.—Oct.

East.	——	——	——	——	——	——
West.	——	Clyde	——	——		

Cadzow Forest, 1880. Rev. J. Keith.
England. Europe.

* **P. trabeus** Fr. *Mycol. Scot. p.* 134.
Dunkeld. Dr B. White.

* **P. roseus** A. & S. *Mycol. Scot. p.* 138.
Thornliebank, 1880. In collection sent to Glasgow Show.

* **P. reticulatus** Pers. *Mycol. Scot. p.* 144.
Darnaway, 1879. Rev. J. Keith.

* **Trametes pini** Brot. *Mycol. Scot. p.* 145.
Black wood, Rannoch, 1875. Dr B. White.

2168. Hydnum scabrosum Fr. *Hym. Eur. p.* 599.
Pileus compactly fleshy, *at first turbinate*, then plane, *umber-ferruginous*, at first tomentose, then rough with flocci fasciculated in the form of minute crowded scales; flesh white; stem short, scarcely an inch long, equally thick, dotted with the decurrent spines, becoming cinereous and black at the base; spines grey-fuscous, whitish at the apex.
In pine-wood. Sept.

East.	——	——	——	——	Moray	——
West.	——	——	——	——		

Forres, 1879. C. B. Plowright and Rev. J. Keith.
Europe.

2169. H. melaleucum Fr. *Hym. Eur. p.* 606. *Grevillea, i. p.* 115.

Pileus coriaceous, thin, rigid, irregular, plane, striate, and, as well as the slender *smooth stem*, *black*, disc dotted with small elevations, margin and spines white. Inodorous.

In fir-wood. Sept.

East. —— —— —— —— Moray ——
West. —— —— —— ——

Forres, 1879. Rev. J. Keith.
England. Europe.

* **H. scrobiculatum** Fr. *Mycol. Scot. p.* 150.
Rannoch. Dr B. White.

* **H. cyathiforme** Schæff. *Mycol. Scot. p.* 151. Var. tomentosum Rannoch J. S. H. tomentosum B. & Br., is a variety of H. cyathiforme Schæff.

* **Radulum tomentosum** Fr. *Mycol. Scot. p.* 155.
Moncreiffe. Dr B. White.

2170. Cyphella gibbosa Lev. *Fr. Hym. Eur. p.* 664.

Small cups membranaceous, infundibuliform, *gibbous at the base*, *white*, externally and internally *even;* stem slender, rather long, of the same colour.

On potato stem. July.

East. —— —— —— —— Moray ——
West. —— —— —— ——

Forres, 1879. Rev. J. Keith.
Europe.

2171. Typhula filiformis Fr. *Hym. Eur. p.* 685. *C. Hbk. No.* 1005.

Among decaying leaves. Oct.

East. —— —— —— —— Moray ——
West. —— —— —— ——

Forres. Rev. J. Keith.
England. Europe.

2172. Geaster rufescens Fr. *C. Hbk. No.* 1077.

In mixed wood.

East. —— —— Tay —— —— ——
West. —— —— —— ——

Moncreiffe. W. Herd.
England. Europe. America.

* **Physarum sinuosum** Bull. *Angiordium* Grev. *Mycol. Scot. p.* 191. This plant, which had not been recorded since the time of Greville, was gathered at Darnaway in 1879 by Dr B. White.

(*To be continued.*)

PRELIMINARY LIST OF THE FUNGI OF PERTHSHIRE.

By F. BUCHANAN WHITE, M.D., F.L.S.

(*Continued from Vol. V., page* 367.)

CLXXVIII. DIATRYPE, Fr.

879. Quercina, Tul. Dupplin.
880. Stigma, Fr. Dupplin.
881. Disciformis, Fr. Dupplin.

CLXXIX. VALSA, Fr.

882. Nivea, Fr. Parkfield.
883. Ambiens, Fr. Dupplin.
884. Quaternata, Fr. Dupplin.
885. Curreyi, Nke. Dupplin.

CLXXX. CUCURBITARIA, Gray.

886. Berberidis, Gray. Dupplin.
887. Laburni, De Not. Annat Lodge.

CLXXXI. GIBBERA, Fr.

888. Vaccinii, Fr. Rannoch, Dalnaspidal.

CLXXXII. DIAPORTHE, Nke.

889. Inquilina, Fr. Dupplin.
890. Lirella, Fr. Perth.
891. Acus, Blox. Dupplin.

CLXXXIII. LASIOSPHÆRIA, De Not.

892. Ovina, P. Dupplin.
893. Hirsuta, Fr. Dupplin.

CLXXXIV. PSILOSPHÆRIA, Cke. and Plowr.

894. Pulvispyrius, P. Dupplin, Rannoch.
895. Moriformis, Ide. Aberfeldy.
896. Thallophila, Cke. Glen Shee.
897. Lichenicola, De Not. Ben Lawers.

CLXXXV. SORDARIA, De Not.

898. Curvula, De By. Rannoch, 1875.

CLXXXVI. SPORORMIA, De Not.

899. Notarisii, Ces. Rannoch, 1875.
900. Minima, Awd. Rannoch, 1875.

CLXXXVII. CONISPHÆRIA, Cke.

901. Pæcilostoma, B. and Br. Dupplin.

CLXXXVIII. SPHÆRIA, Fr.

902. Herbarum, F. Dupplin.
903. Rubella, P. Dupplin.
904. Acuminata, Sow. Dupplin.
905. Acuta, Mong. Scone, Dupplin.
906. Doliolum, P. Killiecrankie.
907. Complanata, Tde. Dupplin.
908. Maculans, Desm. Perthshire.
909. Empetri, Fr. Sow of Athole.

CLXXXIX. SPHÆRELLA, De Not.

910. Maculæformis, P. Dupplin.
911. Vaccinii, Cke. Rannoch.
912. Rusci, De Not. Moncreiffe.
913. Rumicis, Desm. Common.
914. Ostruthii, Fr. Glen Farg, Dupplin.

CXC. GNOMONIA, De Not.

915. Setacea, P. Killiecrankie.

CXCI. VENTURIA, De Not.

916. Atramentaria, Cke. Loch Tilt.
917. Alchemillæ, Grev. Ben Chonzie.

CXCII. PYRENOPHORA, Fr.

918. Phæocomes Fr. Kenmore.

CXCIII. STIGMATEA, Fr.

919. Conferta, Fr. Ben Lawers.
920. Geranii, Fr. Common.
921. Robertiani, Fr. Common.
922. Potentillæ, Fr. Kinnaird (*Potentilla argentea*).
923. Chætomium, Fr. Bonhard.

CXCIV. ISOTHEA, Fr.

924. Rhytismoides, Fr. Glen Tilt.

CXCV. CAPNODIUM, Mont.

925. Footei, B. and Desm. Moncreiffe.

CXCVI. ASTERINA, Lib.

926. Veronicæ, Lib. Birnam, Rannoch, Glen Tilt.

ADDENDA.

AGARICUS.

PLEUROTUS.

927. Euosmus, B. Dunkeld.

CORTINARIUS.

PHLEGMACIUM.

928. Triumphans Fr. Moncreiffe.

DERMOCYBE.

929. Myrtillinus, Fr. Rannoch, 1875.

HYGROPHORUS.

930. Clarkii, B. and Br. Abernethy.

931. Subradiatus, Schm. var. lacmus, Fr. Rannoch, 1879.

CXCVII. EXOBASIDIUM, Wor.

932. Vaccinii, Wor. Common in hilly districts on *Vaccinium vitis-idæa.*

933. Rhododendri, Fckl. On *Rhododendron ferrugineum* in gardens. Perth, Seggieden.

UREDO.

934. Statices, Desm. On a living plant of *Armeria grandiflora* at Annat Lodge. An introduction.

ERYSIPHE.

934.* Linkii, Lev. Fingask.

CXCVIII. PHELONITIS, Chev.

935. Strobilina, P. Inver, Dunkeld, Balinluig, Glen Tilt.

CXCIX. MYCOGALA.

936. Bicolor, P. Annat Lodge.

SPOROCYBE.

937. Alternata, B. Annat Lodge.

Correction.—No. 487. For "*Vernicosum*" read "*Verrucosum.*"

As the very peculiar organisms known as the Myxomycetes are usually, though I think erroneously, considered to belong to the Fungi, I give a list of the species that have been observed in Perthshire. At the same time, I am inclined to believe that the Myxomycetes have really as much (or more) affinity with the animal as with the vegetable kingdom.

MYXOMYCETES.

CC. BADHAMIA, B.

938. Utricularis, Bull. Kinnoull.

CCI. FULIGO, Hall.

939. Varians, Sommf. Common.

CCII. CRATERIUM, Trent.

940. Minutum, Leers. Rannoch.

CCIII. LEOCARPUS, Link.

941. Fragilis, Dicks. Dunkeld.

CCIV. TILMADOCHE, Fr.

942. Nutans, P. Parkfield, Scone.
943. Mutabilis, Rtfki. Rannoch.

CCV. DIDYMIUM, Schrad.

944. Microcarpon, Fr. Parkfield.

CCVI. SPUMARIA, P.

945. Alba, Bull. Common.

CCVII. STEMONITIS, Gled.

946. Fusca, Roth. Annat Lodge, Killiecrankie, Glen Tilt.

CCVIII. AMAUROCHÆTE, Rtfki.

947. Atra, A. and S. Rannoch.

CCIX. CLATHROPTYCHIUM, Rtfki.

948. Rugulosum, Wall. Moncreiffe, Kinnoull.

CCX. TUBULINA, P.

949. Cylindrica, Bull. Scone, Dunkeld, Kenmore, Killin.

CCXI. ENTERIDIUM, Ehr.

950. Olivaceum, Ehr. Kinnoull.

CCXII. RETICULARIA, Bull.

951. Lycoperdon, Bull. Common.

CCXIII. PERICHÆNA, Fr.

952. Decipiens, B. and Br. Kinnoull, 1875.

CCXIV. ARCYRIA, Hill.

953. Punicea, P. Moncreiffe, Kinnoull.
954. Incarnata, P. Rannoch.
955. Nutans, Bull. Kenmore.

CCXV. LYCOGALA, Mich.

956. Epidendrum, Bux. Common.

CCXVI. TRICHIA, Hall.

957. Chrysosperma, Bull. Moncreiffe, Dunkeld, Rannoch, &c.
958. Fallax, P. Dunkeld.
959. Varia, P. Dunkeld.

CCXVII. HEMIARCYRIA, Rtfki.

960. Clavata, P. Dunkeld, Rannoch.

(*Concluded.*)

REMARKS ON POLYPODIUM (PSEUDATHYRIUM) FLEXILE AND ITS RELATION TO P. (PS.) ALPESTRE.[1]

By F. BUCHANAN WHITE, M.D., F.L.S.

THOUGH as a Society we have hitherto entirely confined our attention to the lower cryptogamic plants, which, from their number and the consequent large field for research that they present, are certainly deserving of all the study that can be bestowed on them; yet that the higher cryptogams may be not altogether unnoticed in our annals, and as some of us do not condescend—or should I say, rise?—to the delights of lichenology, mycology, or bryology, I have ventured to put together a few notes on what I think every one will admit is, beyond doubt, the most interesting of all our Scottish ferns.

If we consult the most recent handbook of the British Flora—viz., the second edition, published in 1878, of Hooker's 'Student's Flora of the British Islands'—we will find that *Polypodium flexile* is dismissed in very few words. Under *P. alpestre* two varieties are given—namely:—

"VAR. 1, *alpestre proper:* stipes short, pinnæ spreading or ascending, narrow lanceolate, broadest at the base, pinnules crowded.

"VAR. 2, *humile* (*flexile*, Moore) (sp.): stipes very short, pinnæ short, spreading or deflexed, pinnules rather distant,"—which is very nearly the same words in which Hooker and Arnott describe the forms in the eighth edition (1860) of their 'British Flora.' Not having an earlier edition of the latter work, I do not know in which the description first appeared.

Turning now to the next most recent Flora—the seventh edition (1874) of Babington's 'Manual'—we find two species given, *P. alpestre* and *P. flexile;* but to the latter a query is prefixed, indicating, I suppose, Babington's doubt as to its being a distinct species. In the previous edition no query is prefixed. The words of the description are as follows:—

"*P. alpestre*—fronds lanceolate bipinnate, *pinnæ narrow lanceolate with a broad base contiguous*, pinnules widest at their base, acute pinnatifid with serrate lobes and branched veinlets.

"*P. flexile*—fronds linear lanceolate bipinnate, *pinnæ ovate lanceolate distant, pinnules narrow at their base*, obovate bluntish serrate, and with unbranched veinlets."

[1] Read at the Sixth Annual Conference of the Cryptogamic Society of Scotland, Glasgow, September 1880.

So much for the more recent writers. Let us see what the older authors say. Of these, the earliest I can cite is Newman, who, in the 'Phytologist' for June 1853, describes, for the first time, *P. flexile;* and in his work on 'British Ferns,' third edition (1854), describes and figures *alpestre* and *flexile*, and considers them to be quite distinct.

In the descriptions, which are rather too lengthy to reproduce here, stress is laid on many of the characters afterwards given in "Babington." Moore's larger works I unfortunately cannot cite; but in the abridgment of the 'Popular History of British Ferns,' published in 1860, he considers *flexile* as a "very distinct and remarkable variety" of *alpestre*, differing "in its lax spreading habit, narrow fronds, short deflexed pinnæ, and fewer pinnules." He further remarks that the plant, as seen in cultivation, produces stalkless, or almost stalkless, fronds, which often bear their sori abundantly at the base, but scarcely if at all upwards. These latter characters, however, disappear in some instances in wild and cultivated specimens.

Finally, I may notice that Mr H. C. Watson, in the last edition of the London Catalogue, places *flexile* as var. b. of *alpestre.*

Thus all modern authorities except Professor Babington are agreed in reducing *flexile* to the rank of a mere variety of *alpestre*, and even Babington is not so confident as he once was in upholding the specific rank of *flexile.*

Let us now consider—

1st, What are the characters by which *flexile* is distinguished from *alpestre.*

2d, What value is to be placed on these characters.

First, then, the distinctive characters of *flexile.* Taking the points emphasised by Babington, we will find that he lays stress on the shape of the pinnæ, these being (he says) narrow lanceolate with a broad base and contiguous in *alpestre*, and ovate lanceolate distant in *flexile.* I find, however, in my specimens, that the pinnæ in both forms are broadest at their base, and that in *flexile* they cannot be termed distant. In the next place, that (according to Babington) *alpestre* has pinnules widest at the base, acute, pinnatifid, with serrate lobes and branched veinlets; and *flexile* has pinnules narrow at their base, bluntish serrate, and with unbranched veinlets. Here, I think, we have one distinctive character which is constant—namely, the narrow base of the pinnules in *flexile.* As for the other characters, I do not find that they serve in all cases to distinguish *alpestre* from *flexile*, as some forms of *alpestre* have pinnules as blunt as in

flexile, and scarcely more than serrate, while the character derived from the veinlets is by no means constant; *alpestre* having often unbranched veinlets or only one at the base forked, while *flexile* has occasionally one of the lateral basal veinlets forked. In habit, however, as Babington points out, and as we will see presently, the two forms are very different.

Of the characters given by Hooker, none bear close analysis. Of the stipes, he says, that it is short in *alpestre*, very short in *flexile;* but, considering the different size of the two forms, *flexile* has often a stipes quite as long in proportion. In *alpestre* the pinnæ are spreading or ascending, in *flexile* they are spreading or deflexed—so that in both they may be spreading. All specimens of *flexile* I have seen, however, have deflexed pinnæ. Lastly, the pinnules in *alpestre* are said to be crowded, in *flexile* rather distant, a character that holds good of neither form. Finally, he says that the pinnæ in *flexile* are short, which seems to be a more constant character, though I do not think that they are really very much shorter in proportion.

Thus, on examination, one point of distinction after another disappears, leaving only as constant marks the narrow base of the pinnules, the somewhat narrower frond, the whole appearance and habit of the plant. To these I would have added the deflexed pinnæ, had Hooker not given them as spreading or deflexed; and also the fact (mentioned by Babington) that the sori are numerous at the base of the frond, becoming few, and finally disappearing upwards; but Moore says that this character also is not invariable. I may mention that I have compared the spores of both forms and find no difference. In many ferns, as you are aware, the spores afford good distinctive characters.

I have said that the general appearance and habit of *flexile* afford one of the best points of distinction. *Alpestre* has erect fronds, and its general appearance is, as is well known, very similar to that of *Athyrium filix-fœmina*, for which indeed it was long mistaken. *Flexile*, on the other hand, has somewhat narrower and more tapering fronds, with the stipes bent or elbowed a little above its attachment to the rachis, and in consequence the frond is far from erect, and, in fact, in many cases is nearly parallel to the surface of the earth, which, with the deflexed pinnæ and the pinnules narrowed at the base, give it a very distinct appearance. In addition, it is almost invariably smaller than *alpestre*—generally very much smaller—and, though its name implies a more pliant structure than *alpestre*, I think that in reality it is more rigid.

The second question I proposed was, "What value is to be placed on these characters?" To answer that we must see what points of distinction are considered of specific value in other ferns. Let us take, for example, *Polystichum aculeatum* and *lobatum*, which latter Hooker makes a subspecies, though Babington considers it to be only a slight variety. The characters on which Hooker assigns subspecific rank to *lobatum* are, that the pinnules are more rigid, and decurrent and confluent below. *Angulare* he also considers a subspecies of *aculeatum*, differing by its softer and more membranous texture, laxer and smaller pinnules which are stalked. It must be remembered that there is a host of varieties connecting, in a greater or less degree, all these subspecies, but more especially the two first mentioned. Or we may take the two British Woodsias—*hyperborea* and *ilvensis;* the latter differing from the former, according to Hooker, by being more erect and scaly, and with narrower and more deeply divided pinnæ.

If, then, such characters are considered sufficient in *Woodsia* and *Polystichum* to constitute species or subspecies, surely they ought to suffice to raise *flexile* to a higher rank than that of a mere variety of *alpestre*. There may be intermediate forms connecting *alpestre* and *flexile*, but if such there be, I have not been able to find any mention of them; and Newman, in first describing *flexile*, says expressly that amongst a large series no varieties were observed, "or any form that would indicate an approach to described species." Judging, however, from Newman's figures and descriptions, and Hooker's and Babington's descriptions, the Glen Prosen plant, which is the only one seen by Newman and Babington, and perhaps also by Hooker, does differ a little from the plants on the table to-night, which are from Ben Aulder, more especially in having both pinnæ and pinnules more distant. I have unfortunately no specimens to compare; but if I remember aright, a plant from Glen Prosen, which I saw some years ago, had the characters depicted by Newman. If this be the case these plants show no approach to *alpestre*, but on the contrary a greater divergence. *Flexile* is also reported to have been found in Sutherlandshire, but of this report I know nothing; nor do I know of any record of it having been met with out of Scotland, though I see that Babington refers with a query the *Polypodium rhæticum* of the Flora Danica to *flexile*. Grenier and Godron, on the other hand, consider the *rhæticum* of Linnæus to be the same as *alpestre* of Hoppe.

INSECTA SCOTICA.

THE COLEOPTERA OF SCOTLAND.

EDITED BY D. SHARP, M.B.

(*Continued from p.* 378.)

MORÆI L. Rare. On Hypericum.
DISTRIBUTION—EAST. Tweed ♀♀ o o o Sutherland o o
WEST. Solway ♀♀ o o o

DECEMPUNCTATUS L. Very local. On dwarf sallow.
DISTRIBUTION—EAST. o o• Tay o o o o o o
WEST. o o o o o o

LINEOLA Fab. Very rare. On sallow.
DISTRIBUTION—EAST. o Forth? Tay o o o o o
WEST. o o o o o

LABIATUS L. Not uncommon on birch.
DISTRIBUTION—EAST. ♀♀ ♀♀ ♀♀ ♀♀ Moray o o o
WEST. Solway ♀♀ o o o

C. vittatus Fab. is recorded in Murray's Catalogue, but no doubt by some error—D. S.

TIMARCHA Th.

CORIARIA Fab. Extremely local.
DISTRIBUTION—EAST. o o o o o o Orkney o
WEST. o o o o o

T. lævigata Duft. is recorded from Kirkcudbrightshire in Murray's Catalogue, but not on direct authority.—D. S.

CHRYSOMELA Th.

BANKSI Fab. Extremely rare.
DISTRIBUTION—EAST. o o o o o o o o
WEST. o Clyde o o o
"Ayrshire. Dr Gilbert M'Nab." Murray Cat.

STAPHYLÆA L. Common.
DISTRIBUTION—EAST. ♀ Forth Tay Dee Moray ♀♀ ♀♀ Shetland.
WEST. Solway Clyde ♀♀ o o

VARIANS Fab. Local.
DISTRIBUTION—EAST. Tweed Forth ♀ ♀ Moray o o o
WEST. Solway ♀ o o o

HÆMOPTERA L. Rare.
DISTRIBUTION—EAST. o Forth o o o o o o
WEST. o o o o o

I have seen no Scottish individual of this species.—D. S.

SANGUINOLENTA L. Local.
DISTRIBUTION—EAST. o o o o o Sutherland Orkney Shetland.
WEST. o Clyde ♀ o o

[DISTINGUENDA Steph.
DISTRIBUTION—EAST. o Forth o o o o o o
WEST. ♀ o o o o

The record of *C. sanguinolenta* L. in Murray's Catalogue, from Queensferry, probably refers to this species.—D. S.

MARGINATA L. Rare.
DISTRIBUTION—EAST. ♀ Forth ♀ Dee Moray o o o
WEST. Solway ♀ o o o

[MENTHASTRI Suff.
DISTRIBUTION—EAST. o o Tay o o o o o
WEST. o Clyde o o o

The records in Murray's Catalogue of *C. fulgida* and *C. graminis* perhaps refer to this species.—D. S.

FASTUOSA L. Scarce.
DISTRIBUTION—EAST. ♀ ♀ ♀ Dee ♀ ♀ Orkney o
WEST. Solway ♀ ♀ ♀ Hebrides.

POLITA L. Not uncommon.
DISTRIBUTION—EAST. ♀ ♀ ♀ ♀ ♀ o o o
WEST. Solway ♀ ♀ o o

LAMINA Fab. Very rare.
DISTRIBUTION—EAST. Tweed o o o o o o o
WEST. Solway o o o o

I have seen no Scottish individual of this species.—D. S.

HYPERICI Forst. Rare.
DISTRIBUTION—EAST. Tweed o o o o o o o
WEST. Solway Clyde o o o

(*To be continued.*)

ZOOLOGY.

THE MAMMALIA OF SCOTLAND.[1]

By F. BUCHANAN WHITE, M.D., F.L.S.

IN noticing on a previous occasion the excellent catalogues of the Fauna of Scotland, whose publication has been undertaken by the Natural History Society of Glasgow, we promised to recur to the subject of this catalogue.

It must not be thought that this and the other catalogues already published are mere dry lists. They are very far from that, containing a large amount of valuable and interesting information; and the catalogue under review is especially noticeable in this respect.

The number of still existent Mammals whose occurrence in Scotland is well ascertained is—including the recently recorded *Delphinus albirostris*—fifty-two, namely :—

Plecotus auritus L. (Long-eared Bat).
Vesperugo pipistrellus Schreber (Common Bat).
Vespertilio Daubentoni Leisler (Daubenton's Bat).

Erinaceus europæus L. (Hedgehog).
Talpa europæa L. (Mole).
Sorex tetragonurus Herman (Common Shrew).
Sorex minutus L. (Lesser Shrew).
Crossopus fodiens Pallas (Water Shrew).

Felis catus L. (Wild Cat).
Canis vulpes L. (Fox).
Martes sylvestris Nilsson (Yellow-breasted Marten).
Mustela vulgaris Erxleben (Weasel).
Mustela erminea L. (Stoat).
Mustela putorius L. (Pole-cat).
Meles taxus Schreber (Badger).
Lutra vulgaris Erxleben (Otter).

[1] The Fauna of Scotland, with special reference to Clydesdale and the Western District.—Mammalia. By E. R. Alston, F.L.S., F.G.S. Glasgow: published by the Natural History Society of Glasgow.

Phoca vitulina L. (Common Seal).
Phoca grœnlandica F. (Greenland or Harp Seal).
Cystophora cristata Erxleben (Hooded Seal).
Halichœrus gryphus F. (Grey Seal).
Trichechus rosmarus L. (Walrus).

Megaptera longimana Rudolphi (Hump-backed Whale).
Balænoptera musculus L. (Common Rorqual).
Balænoptera Sibbaldi Gray (Sibbald's Rorqual).
Balænoptera rostrata F. (Lesser Rorqual).
Physeter macrocephalus L. (Sperm-Whale).
Hyperoodon rostratus Chemnitz (Common Beaked Whale).
Hyperoodon latifrons Gray (Broad-fronted Beaked Whale).
Ziphius cavirostris Cuvier (Cuvier's Whale).
Mesoplodon bidens Sowerby (Sowerby's Whale).
Monodon monocerus L. (Narwhal).
Delphinapterus leucas Pallas (White Whale).
Orca gladiator Lacépède (Grampus).
Globicephalus melas Trail (Pilot Whale).
Phocæna communis F. Cuvier (Porpoise).
Delphinus tursio F. (Bottle-nosed Dolphin).
Delphinus acutus Gray (White-sided Dolphin).
Delphinus albirostris Gray (White-beaked Dolphin).

Cervus elaphus L. (Red Deer).
Capreolus capræa Gray (Roe Deer).

Sciurus vulgaris L. (Squirrel).
Mus rattus L. (Black Rat).
Mus decumanus Pallas (Brown Rat).
Mus musculus L. (House Mouse).
Mus sylvaticus L. (Long-tailed Field Mouse).
Mus minutus Pallas (Harvest Mouse).
Arvicola agrestis (Common Field Vole, or Short-tailed Field Mouse).
Arvicola glareolus Schreber (Bank Vole).
Arvicola amphibius L. (Water Vole, or Water Rat).
Lepus europæus Pallas (Brown Hare).
Lepus variabilis Pallas (Blue or Mountain Hare).
Lepus cuniculus L. (Rabbit).

Of the above-mentioned fifty-two species, twenty-two are marine, and of these only three can be said to be of common

occurrence. Seven others are not very rare, but are chiefly confined to the northern seas; and the remaining dozen have mostly been very seldom seen, or at least identified. It is noteworthy that five species which have been found in the Scottish seas have not yet occurred on the English coasts; while on the other hand, four English species cannot yet with certainty be included in our list, though two of them probably visit our shores. Seven Scottish species have not yet been recorded as Irish.

Of the thirty species of land-mammals, nineteen are more or less widely distributed, though some of them are absent from, or rare in, certain districts; ten are now rather local, having in some cases become almost or quite extinct in wide districts of the Lowlands; and one (the Black Rat), formerly not uncommon, is rapidly vanishing altogether, and, in fact, may be considered almost extinct as a *native* animal, the few specimens that occur now being generally found in or near sea-ports, where it is probably a recent introduction. Mr Alston does well to caution investigators not to confound the black variety of the Water Vole with the true Black Rat, for which ignorant observers may mistake it.

Of the Scottish terrestrial mammals, only one—the Blue or Mountain Hare—is said not to occur in England, but not less than twelve are absent from Ireland. On the other hand, nine bats and the dormouse occur in England and not in Scotland, and four bats in Ireland and not in Scotland.

In the second part of his catalogue Mr Alston treats us to some interesting particulars of certain extinct species. Of these the one which was the latest to disappear was the Wolf (*Canis lupus* L.), which seems to have lingered on till 1743, when the last was killed in Morayshire, the slayer thereof surviving till 1797, so that the tradition was still fresh at the beginning of this century. The Wolf seems to have been not uncommon in the fifteenth and sixteenth centuries, and is mentioned in several old laws of that period, while there are no less than five Gaelic names for it.

The Brown Bear (*Ursus arctos* L.), for which there are two Gaelic names, disappeared at a much earlier date—probably not later than the ninth or tenth century, if not much earlier.

The Wild Boar (*Sus scrofa* L.) would appear to have been a later survivor, but as early as the thirteenth century seems to have required special protection, and probably soon after became

extinct as a wild beast, as Mr Alston has not been able to find any records later than 1263.

For the occurrence, in historic times in Scotland, of the Beaver (*Castor fiber* L.), the evidence is not very satisfactory, though three Gaelic names survive; and there was a tradition that Beavers inhabited one river in the twelfth century, at which time they had not become extinct in Wales.

Of the remaining extinct Scottish species the Elk (*Alces machlis* Ogilby) and the Reindeer (*Rangifer tarandus* L.) were probably the latest survivors, and *may* have lingered on to historic times, though that is somewhat doubtful. There is no doubt, however, that they colonised Scotland after the close of the glacial period, as did also the *Bos longifrons* (probably the ancestor of the modern short-horned cattle), the Urus (*Bos primigenius* Boganus—the progenitors, according to some authors, of the White Cattle of Cadzow and Chillingham, which Mr Alston does not believe), the Irish Deer (*Megaceros giganteus* Blumenbach), the Horse (*Equus caballus* L.), and possibly the Mammoth (*Elephas primigenius* Blumenbach). The evidence for the post-glacial existence of the latter and of the Irish Deer in Scotland is not quite so strong as might be wished.

In tracing the distribution both of the living and extinct mammalia, Mr Alston has been at considerable pains to ascertain what species are or have been indigenous in the various islands that lie off the west and north of Scotland. Putting aside the aërial and marine mammals (bats, seals, and cetaceans) and the introduced domestic species (the common mouse and the two rats), twenty-four living terrestrial species are left, all of which occur on the mainland,—seven reach the inner islands, six attain the outer islands, seven (including two now extinct in the islands) are recorded from Orkney, and only one from Shetland. These numbers do not include certain species introduced by human agency, nor others for whose occurrence more evidence is required. Of the twenty-four species twelve occur in Ireland. From this distribution Mr Alston arrives at an ingenious theory as to the time and order of the arrival in Scotland of the various species. First stating that Professor Leith Adams has shown that both the recent and extinct Irish mammals agree with those of Scotland rather than of England, and that there is reason to suppose that Ireland received that part of its fauna from the south of Scotland, after the separation (of Ireland) from Wales and western England, Mr

Alston shows in tabular form the distribution of the twenty-four species alluded to above, and then proceeds to say: "The facts indicated by the above table are at first sight somewhat contradictory. As Ireland possesses the greatest number of species in common with the mainland of Scotland, it might well be supposed to have been in connection with it up to a later date than even the inner islands. On the other hand, we have the presence of other forms, as of the Field Vole in the Hebrides, and of the same species with the Water Shrew or Water Vole in Orkney, which are conspicuous by their absence from the Irish fauna. It appears to me, however, that this apparent contradiction may be explained, if we remember the more northern position of the Scottish islands, and the nature of the country lying between them and the south-western source from which our mammalian fauna was undoubtedly derived.

"A consideration of the relative depths of the channels which respectively divide Ireland and the islands from the mainland of Scotland, would lead us to the conclusion that the severance of the former took place first, and that the Orkneys remained longer uninsulated. An upheaval of about 240-270 feet would bring the latter again into communication with Caithness, while it would require a rise of about 300-320 feet to reunite the Hebrides with Skye, and of from 700 to 900 feet to restore land communication between the various parts of south-western Scotland and north-eastern Ireland. Nor does the distribution of mammal life seem to me to contradict such a hypothesis. The absence from the known fossil fauna of Scotland and Ireland of most of the characteristic postpliocene English animals shows that the northward migration of these forms was slow, gradually advancing as the glacial conditions of the northern parts of our islands decreased in intensity. Thus it is not difficult to suppose that the Hedgehog, Ermine, Badger, Squirrel, and Mountain Hare may have found their way through southern Scotland into Ireland long before they were able to penetrate into the still sub-arctic regions of the Highlands. Subsequently, when the continued depression of the land had isolated Ireland, and the improvement of the climate had continued, the Shrews and Voles may well have found their way northwards along the comparatively genial coasts, before the larger beasts of prey could find a sufficient stock of game. When they reached Orkney, however, they appear to have found it a veritable

Ultima Thule, for the absence from Shetland of any land animal (except the half-aquatic Otter) seems to indicate that those islands were already separated before the arrival of any form of mammalian life.

"Such a hypothesis of the dispersal of English mammals through Scotland and Ireland appears to me to be the only one which explains the peculiarities of their present distribution, and is likewise in accord with the facts of physical geography. Should it be accepted, the recent and extinct mammals of Scotland may be arranged in five categories, in the order of the dates of their immigration. This I have attempted to show in the following list, in which the extinct species are marked with an asterisk :—

"List of Extinct and Recent Scottish Mammals arranged in the probable order of their arrival from the southward.

I. Before deposit of boulder clay—

* *Elephas primigenius.*
* *Rangifer tarandus.*

II. Before separation of Ireland—

Erinaceus europæus.
Sorex minutus.
* *Canis lupus.*
Canis vulpes.
Martes sylvestris.
Mustela erminea.
Meles taxus.
Lutra vulgaris.
* *Equus caballus.*
* *Sus scrofa.*
* *Megaceros giganteus.*
Cervus elaphus.
Sciurus vulgaris.
Mus sylvestris.
Lepus variabilis.
Lepus cuniculus.

III. Before separation of Hebrides—

Sorex tetragonurus (?).
Arvicola agrestis.
* *Bos longifrons.*

IV. Before separation of the Orkneys :—

Crossopus fodiens.
* *Bos primigenius.*
Arvicola amphibius.

V. Since separation of Orkneys—

Talpa europæa.
Felis catus.
* *Ursus arctos.*
Mustela vulgaris.
Mustela putorius.
* *Alces machlis.*
Capreolus capræa.
* *Castor fiber.*
Mus minutus.
Arvicola glareolus.
Lepus europæus."

The weak points of the above interesting hypothesis put

forth by Mr Alston are several, but I do not think that they will tell very much against his general conclusions. It is more than doubtful that the emigration into Ireland of the Scottish mammals took place between south-west Scotland and north-east Ireland, because, though the Irish Sea was absent, a great lake, "averaging 25 miles at least in breadth," stretched from the head of the Sound of Jura to Wales, and would present an effectual obstacle to the passage of the majority of the mammals. That Ireland derived many members of its fauna from Scotland seems clear; but before getting to Ireland, they would have to come farther north in Scotland than Mr Alston supposes.

It also seems very doubtful whether the Irish Deer (*Megaceros giganteus*) reached Ireland by way of Scotland, in which it seems to have been of very rare occurrence, though abounding in Ireland and the Isle of Man. "It may quite well," says Dr James Geikie,[1] "have entered Ireland from the south, crossing the river that flowed south through St George's Channel." Satisfactory evidence is yet wanting that either the Irish Deer or the Mammoth revisited Scotland after the close of the glacial epoch, though they were certainly to be found in other parts of the British Isles. The Reindeer, on the other hand, was certainly a postglacial (as well as an interglacial) animal in Scotland. Mr Alston's first category seems, therefore, to require emendation. Though from the scarcity in Scotland of interglacial deposits (these having been swept away by the last ice-sheet) it is impossible to say what species came to it during the genial interglacial periods, it is tolerably certain that it had many mammalian inhabitants, including, perhaps, many of still existent species, and others long since extinct in Britain. The first category would therefore include many more species than the two mentioned above. Amongst these we know for certain was the Irish Deer. But all these animals would be driven out of Scotland by the last ice-sheet, and the colonisation would would have to be done over again. In the second category would therefore have to be included the Reindeer, and, more doubtfully, the Irish Deer and Mammoth. As for the other animals mentioned in this and the remaining categories, they may have arrived in the order that Mr Alston assigns to them; and he has certainly brought forward suggestive evidence in favour of his views. On the other hand, the eastern side

[1] Prehistoric Europe, p. 512.

of the country may well have been inhabited by some of the animals relegated to the last three categories, at as early a time as that in which the animals in the second category arrived. That they did not all at once cross to the western side, and thence make their way to the islands or to Ireland, may perhaps be accounted for by the barriers of ice and snow still remaining in the higher inland districts. That the eastern side of the country was colonised before the western side, there is every reason to believe, as the dry bed of the German Ocean presented an easy route,—first, for the majority of the plants which now compose our flora; second, for the herbivorous animals, who would have no inducement to come hither till food was provided for them; and third, for the carnivora. It seems to me, therefore, that it was from the south-east [1] that we got our fauna; and I do not understand Mr Alston's unexplained remark regarding "the south-western source from which our mammalian fauna was undoubtedly derived."

PHRONIMA SEDENTARIA AND ITS BEROE.

By Rev. G. GORDON, LL.D.

UPWARDS of seventy years ago, the late Dr Fleming, when a licentiate of the Church of Scotland, paid a visit to the then distant and comparatively inaccessible isles of Shetland. While sojourning in a region so rich in objects attractive to the youthful eye of a zealous naturalist, there happened to be a vacancy in the pastoral charge of Bressay, the small island which, with the Mainland, forms the Sound of that name into a commodious refuge from almost every wind that blows.

A presentation to Bressay had been in due time issued by the patron in favour of a young gentleman in Aberdeenshire, who, however, owing to the infrequency of communication or to stress of weather, was unable to lodge the document, within the stipulated six months, with the Presbytery. The youthful Fleming had been a frequent visitor and favourite at "the Manse," and the clergymen of the bounds exercised their right, and, by *jus devolutum*, presented him to the vacant parish.

From his *magnum opus*, 'The British Animals,' we see how

[1] The present distribution of the Mountain Hare (*Lepus variabilis*) is suggestive that it did not come through England (else why did it not leave colonies on some of the suitable ranges of mountains?), but crossed directly to Scotland.

much material he had collected while he was pastor of Bressay. The Rev. and venerable Patrick Barclay, while residing in his latter days at Elgin, was wont to tell that he knew Fleming well, that his brethren used to joke him as being a great robber of mantelpieces, the usual receptacle of curiosities, from which they were ever glad to see Fleming take, *per fas et nefas*, whatever he coveted. Mr Barclay said that he recollected one occasion on which, while he was with Fleming on the sea-shore, the eye of the young naturalist detected a prize among the newly cast up marine rejectamenta; that he seized it as a hawk does his prey, and became so excited, dancing and crying out "Eureka! Eureka!!" that his companion thought he was going demented. May it not have been the long unique British specimen of *Phronima sedentaria* that Dr Fleming then and there picked up? In 'The British Sessile-eyed Crustacea,' at p. 26, vol. ii., it is said: "The only specimen of this species which we have seen as a native of the British coast is one in the British Museum, taken by Dr Fleming on the 3d November 1809, at Burray, in Zetland, amongst rejectamenta of the sea. This specimen, unfortunately, is in a very dilapidated condition." Now, Burray is on the west side of the Mainland of Shetland, and not far from Sandsting, where Mr Barclay was minister. Be this as it may, the only other notice we know of British *Phronima sedentaria*, is when some specimens, also from Shetland, were exhibited by Dr Johnston, before the Berwickshire Naturalists' Club. Spence Bate was obliged to have recourse to foreign specimens and plates, in order to illustrate the species.

Other species of this division (*Hyperina*) show a strong attachment to, or are parasites upon, Medusæ; but we question if any of them have selected such an elegant abode as that in which *Phronima sedentaria* has ensconced itself. Its chosen *Beroe* looks like a fairy's crystal palace, little larger than a lady's silver thimble, open at both ends. Surely, as shown by what is now to be stated of Mr Robertson's experience, no objects, in beauty or interest, can be more suited for study and admiration in the aquarium than *Phronima* and its *Beroe*. But, alas! the captures of them have been few and far between; for it is probable that the present now to be noticed is but the third occasion on record of these treasures of the deep having been got on the British shores, or rather on these of Shetland, as Ultima Thule alone, as yet, holds the honour of yielding this, as it does many another rarity dear to the naturalist.

In January 1880, after continued south-west winds, some specimens of this *Phronima* and its accompanying *Beroe* were brought to Mr William Robertson, at Hillswick, in Northmaven parish, Shetland. They had been picked up at the head of Urrafirth, one of the voes that run inland from the magnificent bay of St Magnus, on the north-west of the Mainland. They were alive, and Mr Robertson put two of them, or rather four animals—*i.e.*, two crustaceans and two medusæ, in pairs, into a vessel with salt-water. The fishermen were altogether unacquainted with these creatures, but Mr Robertson, having Adam White's popular work by him, was able to identify them. As soon as they were put into the water, Mr Robertson says they revived and seemed to enjoy themselves by swimming, or rather by propelling themselves around the sides of the vessel, at times, however, settling down to the bottom, and again coming to the surface. In the mornings they were found lying at the bottom; but when water fresh from the sea was added, they rose from it and spurted about. All this was done while the *Phronima* was embosomed in its *Beroe*. Even when otherwise at rest on the bottom, the crustacean's tail seemed constantly in motion, causing a current to pass through the *Beroe*, and around the bottom of the vessel. A week after they were got, one of them became quieter, and the crustacean came out of the *Beroe* at times. Then a few dark specks, covered with a thin film, appeared on the inside of the *Beroe*. A few days after this, the specks disappeared; but one morning, on removing the water, a lot of small objects were seen floating on it. Next morning the same thing was observed. On the third morning, these objects showed themselves, on a more close inspection, to be the young of *Phronima*. These young crustaceans kept to the surface of the water, but if it was stirred, they then sank to the bottom, lay on their backs, and kept constantly working with their tails. The adults lay the same way when they were out of the *Beroes*. Mr Robertson concludes his notice of the habits of these little-known animals: "I now began to renew the water twice a-day, as the old ones seemed to be getting less active, but the young throve rapidly. At length one of the old ones died, and four days thereafter the other. Then some of the young began to drop off, so I thought it was of no use working longer with them. I took them out and preserved them in spirits of wine." Much about the same time, Mr Robertson was informed that a number of the same animals had been thrown ashore in Ronas Voe,—the

grandest for rock scenery among the voes, or arms of the sea, in Shetland. Mr Robertson resides in one of the more promising localities for discoveries, and it is hoped that his observant eye will yet add other rarities, if not new species, to the British fauna.

In a second communication, Mr Robertson states—that only two specimens (two *Phronimas*, each with its *Beroe*) were brought to him, in a shell, from Urrafirth; that the tail of the crustacean was the sole moving power that carried both itself and dwelling round the sides of the vessel; that the *Phronima* often left and returned to its *Beroe;* that hundreds of them were cast ashore about the same time, January 1880, at Ronas Voe; and that the fishermen saw "a good lot of them" around the mouth of that voe or arm of the sea.

BIRNIE, ELGIN, 18*th January* 1881.

Story of a Dog.—Following up the articles which appeared some years ago in this journal, written by Dr L. Lindsay, I beg leave to record certain observations which I have verified in regard to an intelligent collie at present alive in Alyth. He is a dog of the pure collie breed, by name "Towser." His points are somewhat perfect. He is black and tan; bushy in the hair, marked with a yellow spot above the eyes; clean in his habits; neat in form; and, withal, a symmetrical and elegant dog. His age is eight off; and though on the shady side of a dog's life, his master got him when six weeks old. He stands high, is placid and gentle in manner, and rather leans to the side of being timid and shy when in the company of other dogs. He is not pugnacious, and lives a life of forbearance. His mother belonged to the Baronet of Banff, and on his paternal side he linked his genealogy with a collie belonging to a Dundee flesher, whose days had been devoted to the work of shepherding; and on both sides of the house his progenitors had been given to the trade of a collie—that is to say, his parents had exercised their reasoning or instinctive faculties in work which, for want of a better word, may be called intellectual. At the age of three months Towser gave evidence of adaptation by an incessant inclination to take bonnets off the heads of boys, as also to carry things in his mouth. There was no dog in the house with him or near him, so that Towser's gift was not imitative, but was seemingly that of the poet—*nascitur, non fit.* Nor had he any teaching such as is given by a gamekeeper or showman for a special purpose: all his inclinations were his own, and any humouring of these qualities was the result of his own cogitation. The consequence of that intuitive propensity was in the end to make him a first-rate carrier. At an early period of his career he commenced to beg for money—his medium of exchange being, preferably over all others, a halfpenny. When he succeeds in getting this coin, he usually sets off with it to the baker to purchase a biscuit; and on reaching the shop he raises his fore-feet on to the counter (having first made audible signs at the door if it should be shut), gets his

biscuit, and retires to consume it, which he usually does within a few yards of the shop-door. The solicitation for the coin is done by pawing the expected donor, and the pawing instantly stops when the coin is delivered to the dog. Towser's custom is not confined to one special baker or grocer, but he drops his change at any shop where biscuits are sold; and I could name one baker and three grocers who have Towser in their books. Of a Saturday night, when his master and he may lounge about the street getting and receiving attentions, as is wont, Towser has been seen to get as many as half-a-dozen halfpennies, all of which he changed into biscuits, and by a process of ratiocination thought nothing of it if the fun was general. Sometimes he will take it into his head to barter his halfpenny with his master's wife for a piece of pork—but this is when he is not so hungry, or when satiated; and if hungry, he prefers his biscuit to swine's flesh. One other marked feature in Towser's dealings is, that he retains his halfpenny till the subject of exchange is laid down, be it biscuit or flesh; and he seems never to lose sight of the elementary principle of a sound commercial policy. He has been known to sulk and turn a disdainful eye on any one who tried to cheat him with something that was not a coin; and farewell to any interchange of courtesy, at least for the night, with one who was dastard enough to fool him. On one occasion, however, Towser himself gave way to a trick,—let us hope it was frolic. One day he paid the baker for a halfpenny biscuit with a farthing, and ran off with some evidences of glee before the seller had time to detect the mistake. The baker would fain convince me that there was a glimmer of joy in Towser's eye as he went off with more hurry than usual, which was explained by the dividend. His master, being a carpenter, has frequently written a message on a spill of wood or piece of paper, and sent Towser miles with the billet to the workshop for an answer, which was effected by his speedy return with a small parcel of nails or tape, or suchlike, that had been required in an emergency. Messages such as these have been repeatedly fulfilled by Towser with much fidelity. Towser's duty, for which it may be said he earns his bread, is to watch at night his master's wood-yard. On one occasion, when he was only a year old, he recognised on the street a person who was suspected of having taken some wood overnight when Towser was on the chain, and by growls and threats raised a suspicion that was afterwards verified. The whole bearing of the dog is contemplative, and his character is highly companionable and attached. In addition to his general character for intelligence, he often strolls alone, returning home guiltless of any wickedness, and seemingly wiser and better for his contemplation.—William Japp, Alyth, 31*st January*.

The Capercaillie in Scotland.—I am still endeavouring to keep records of the advance of the Capercaillie throughout Scotland; and with the view of another appendix shortly, I write to ask if any readers of the 'Scottish Naturalist' have kept any notes on the subject since the date of my last (Scot. Nat., July 1880). If so, I shall feel obliged by their communicating them to me. I have already collected some additional material; and I propose, when a sufficiency comes to hand, to send the appendix to the Editor if he will accept of it. The districts from which I especially desire new statistics are as follows:—

Southward of the line of the Firth of Forth and Clyde Canal, and of the Firths of Forth and Clyde.

Argyleshire, beyond Ardkinglas or other new localities, or up Glendochart and on Loch Awe side.

Dumbartonshire.

Any increase or extension in the east of Fife.

Any occurrences in any new localities in any county.

Kincardineshire and Aberdeenshire. Any extension along Deeside.

Inverness-shire, or beyond.

Also notice of any new introduction in Scotland, England, or Ireland.

Any marked increase or decrease at any locality.

Any statistics of numbers killed at any locality in one day's shooting, or in a season, stating number of guns.

I would be glad also if I could by any means obtain a return of an approximate total killed throughout Scotland in 1880-81, say up to the end of February or end of January 1881.

Should any statistics be forthcoming, I would be obliged if they could be forwarded before the 20th April.—J. A. HARVIE-BROWN, Dunipace House, Larbert.

Effects of the Winter of 1880-81.—Considering the unusual and long-continued severity of the winter of 1880-81, it seems very desirable that records should be made of its effects on animal and plant life, and I hope my readers will send me these from their respective districts.—F. BUCHANAN WHITE.

The Woodlark.—The song of the Woodlark (*Alauda arborea*) was heard here on Christmas-day amid the rigours of a snowstorm. This is the first time in this district we have heard the low sweet melodious voice of this gifted songster. Being captured for preservation, it proved to be a female, notwithstanding its great musical faculties.—G. SIM, Fyvie.

Occurrence of Vertigo pusilla in Scotland.—I found *Vertigo pusilla* last August a few miles from Dumfries, under stones on a bank close to the river Cluden, which for some distance forms the boundary between Dumfriesshire and the Stewartry of Kirkcudbright. The spot is situated on the right or Kirkcudbrightshire bank of the river. I believe no Scottish locality for this species has hitherto been recorded. A more diligent and extended search than I had at the time an opportunity of making would probably prove the district to be rich in species of *Vertigo*. Among the stones alluded to, besides *V. pusilla*, of which I obtained about a dozen, I found several specimens of *V. pygmæa* and *V. edentula*, as well as a single specimen of *V. substriata*. *V. edentula* is abundant in that neighbourhood, in woods, especially on the under side of the leaves of *Luzula sylvatica*.—R. RIMMER, 12 Westbourne Crescent, Hyde Park, W., March 4, 1881.

PHYTOLOGY.

THE LIFE AND LABOURS OF A SCOTTISH NATURALIST, GEORGE DON OF FORFAR.[1]

By JOHN KNOX.

GEORGE DON, the subject of this sketch, was born in the parish of Menmuir in the year 1764. The exact date of his birth cannot be ascertained, but he was baptised on the 11th October, as the old parochial register testifies: "11th October 1764, Alexander Don had a son baptised, named George." His mother's name was Isobel Fairweather. Both parents were descended from respectable farmers in the parish,—the immediate progenitor of the Dons being a Thomas Don, who came from Aberdeenshire and settled in a farm in Edzell in the seventeenth century. The father of the Botanist, Alexander Don, was a shoemaker, and for a few years after his marriage resided first in Menmuir, and then in the neighbouring parish of Careston. At last—probably about 1772 or 1773—he came to Forfar, where he had an uncle who followed the same trade as himself. Here he took up his abode in the Little Causeway, a dreary square off the West High Street to the south. What education, in the technical sense, young Don received it is impossible to say. The likelihood is that it was very scanty. In whatever way he attained it, he wrote a bold, fairly-formed hand, and his style is clear and vigorous. His real education, however, was got out of doors, in the fields and by the lochside. His powers of observation very early attracted attention. It is said that on a visit to some relatives in his native parish, when still a mere boy, he collected and planted a number of wild flowers in his friend's garden, arranged according to a system of his own. In Forfar the tradition is that he began to learn his father's trade, but soon left it, his passion for flowers being so strong as to prevent him making any progress. He was then sent to Dupplin

[1] Communicated to the Perthshire Society of Natural Science on January 6, 1881.

Gardens, which were under the charge of a relative, and there he spent some years as a gardener. His evenings were devoted to study, or to long rambles in search of plants—now across the Earn to the Ochils, and again to the outlying spurs of the Grampians; and in this way he acquired a complete knowledge of the local flora. "On one of these botanical rambles," writes his grandson, George Alexander Don, in a letter to me, "he fell in with a young woman carrying a heavy pitcher of water. Entering into conversation with her, and helping her by taking her burden from her and carrying it himself, he began his acquaintance with Caroline Stewart, his future wife—an active, energetic woman, as my father has described her to me."

Where he went to on leaving Dupplin is matter of uncertainty. It is said he went to the south of England, and after remaining there for a few years, came to Edinburgh and wrought as a gardener. In 1790—it may be a year or two earlier—he was settled as a nurseryman in Forfar, where he remained till his death. He was appointed Superintendent of the Edinburgh Royal Botanic Garden under the Regius Keepership of Professor Rutherford (1784-1819), but whether before he returned to Forfar or after, cannot now be known. If after he took up his residence in Forfar, he must have held the appointment but for a very short time, as by a careful collation of dates incidentally given in his 'Account of the Native Plants,' &c., it is clear he was never long away from Forfar after 1790—the year in which he found the Caltha radicans.

The ground which he converted into his famous Botanic Garden was a patch of nearly two acres lying just outside the town of Forfar to the north—a feu from the estate of Carsegray. The ground as a whole sloped to the west, and was shaped somewhat like a horse-shoe. From all sides, except the west, it fell towards the centre, from which a small oval-shaped knoll rose, known as the Dove hillock. On this Don built his house. From this knoll the ground dipped down to the west into what had been at one time the bed of Forfar Loch. Here he formed a large artificial pond, which he stocked with aquatic plants and fish. A walk ran round the garden, leaving room for a broad border, in which the native plants were arranged according to their orders, in their appropriate soils, of which there was abundance of all kinds at hand—loam, clay, sand, gravel, and moss. In addition to this he rented several acres of land from the town, which were used as a nursery for young trees.

At this time Forfar was a small land-locked place, of about 5000 inhabitants. The principal trades were weaving coarse linens, shoemaking, and brewing. It being the county-town, there was a comparatively large number of writers and other functionaries connected with the administration of the law. The Forfarians of that day were a shrewd, kindly folk, with old-fashioned, home-spun ways. The only man of note in it at this time was the Rev. John Jamieson, afterwards Dr Jamieson, author of the 'Dictionary of the Scottish Language,' who was minister of the Secession Church. With him Don is said to have been on terms of intimacy, and also with Mr Clarke, teacher of classics in the Burgh School, whose only title to remembrance is that he sent a pound to Burns on his death-bed, and to whom the poet wrote a letter of warm thanks, with as warm an entreaty for another note. About this time a section of Forfarians—including among its number some of the most influential men in the town—sympathised deeply with the French in their efforts to rid themselves of the tyranny under which they had so long groaned, and looked upon Buonaparte, for a time, at least, as the regenerator of society. They were followers of William Godwin, the founder of philosophic Radicalism, and adopted as their creed the principles—so far as they were practicable—laid down in his 'Inquiry concerning Political Justice.' It was through their exertions mainly that the Forfar Library was founded in 1795—a library that will compare favourably with any other of its class. In addition to books, they also provided themselves with a telescope, microscope, and other philosophical instruments. To these men Don attached himself, and continued to be closely associated with them down to the time of his death.

In 1799 he was made a member of the Library, on the conditions set forth in the following minute:—

"*1st February* 1799.—George Don, Botanist, was admitted a member of the Library in consideration of having presented to the Library three volumes of Botanical Drawings; and excepting the price of addenda, he is not to be liable in payment of any dues."

There is now only one volume of Botanical Drawings in the Library—a volume of plates of Fungi, "Sowerby Delineator, 1796,"—doubtless one of the three presented by Don. This little incident is significant enough. The Botanist is too poor to pay the subscription in money, but presents the three volumes of plates. He thus gains the command of a good library, and,

at the same time, places within the reach of the subscribers a valuable aid to the study of his favourite science. We cannot tell what use he made of the Library, as the reading-lists of those days are no longer in existence. That he would take full advantage of it there can be no doubt, especially in the winter, when he had most leisure. His companions were readers, and met regularly to discuss books, politics, and the news of the day, in "Nanny Dagetty's"—a half-forgotten public-house in the East High Street. When spring and summer came, his outdoor duties were sufficient to occupy his time. His active energetic nature soon led him into an extensive business. The county gentlemen largely consulted him as to their plantations and the best methods of laying out their estates. George Dempster of Dunnichen was one of the first to appreciate Don's abilities, and was a frequent visitor to the Forfar Garden.

His love for botany, however, was an overmastering passion, to which everything else was subordinated, and drew him away from the ordinary, everyday work of the nursery, which, in summer and autumn especially, was often left to the care of men who did not always do their duty to their master's satisfaction. Hence frequent quarrels between master and servant; for Don, according to the testimony of those who knew him, was a choleric man. He was often away for two or three weeks at a time, but more frequently only for four or five days, in search of

> "Some rare floweret of the hills, or plant
> Of craggy fountain; what he hopes for, wins,
> Or learns, at least, that 'tis not to be won:
> Then, keen and eager as a fine-nosed hound,
> By soul-engrossing instinct driven along
> Through wood or open field,
> Intent upon his onward quest."

And when night came on, he would sit down under the shelter of some crag, eat his humble supper, and see

> "The hills
> Grow larger in the darkness, all alone
> Behold the stars come out above his head,"

till sleep closed his weary eyes.

These excursions extended not only over the whole county of Forfar from the Grampians to the sea—every foot of which was to him familiar ground—but over the greater part of the middle Highlands, from Inverness to Ben Lomond. He was on Ben Lawers in August 1793, where he saw the Charadrius

himantopus, or long-legged plover; and in Skye and on the summit of Ben Nevis in 1794, where he for the first time found the Sagina maritima. But Clova was the district which had most charms for him, and to the exploration of which he devoted most time and attention. "The lofty mountains which surround the upper part of Clova," says he, "present to the botanist an interesting field for rarities; not even Ben Nevis, Ben Lawers, and Ben Lomond, and the high mountains of Cairngorm, taken altogether, can furnish such botanical treasures as are to be met with on the mountains of Clova." He has, indeed, made Clova classic ground for the botanist.

For these long rambles over hill and dale Don was gifted by nature with capacities above most men. He was a tall, stalwart man, who could do the work of two ordinary men, and his power of endurance seems almost incredible. In these journeys he was often without food for long periods. He has been known to come into "Nanny Dagetty's," of an evening, direct from an excursion, and astonish his friends by clearing the table of everything eatable. They would rally him on his appetite; but his defence was, that he had tasted nothing for twelve hours at least, and had during that time walked close on thirty miles, and heavily laden too. He would bring with him plants, some of them already dried and fit for the herbarium, roots and seeds to be planted and sown in his garden, or sent to one or other of his correspondents; for he was in correspondence with some of the most eminent naturalists of the day, such as Dr Patrick Neill, Secretary of the Wernerian Society of Edinburgh; Sir Joseph Banks; Sir J. E. Smith, President of the Linnean Society, and others. There is a tradition in Forfar that a bishop of the Church of England—doubtless Dr Samuel Goodenough, Bishop of Carlisle—visited the town and inquired for Mr Don. It was not thought that such a grand man could have come to see George Don, and a messenger was sent with him to the residence of a Colonel Don. Seeing the Colonel at a distance, he said, "That's not the man," and was then taken to the Garden, where he found the botanist busy at work, and was soon in cordial conversation with him, to the great wonder of his guide.

It is much to be regretted that the details and incidents of these excursions, many of which were known to his associates, have not been preserved. They would have furnished matter for a volume of deepest interest both to the general reader and

the man of science. But the men who knew them are all gone, and nothing now remains but a few reminiscences.

Often, indeed, he returned from his expeditions with clothes torn or soiled with mud; but on one occasion he came back in a still more sorry plight. Camping out on the hillside one night, he had gathered a few dry sticks and kindled a fire to keep himself warm. He then lay down and fell fast asleep, but was soon awakened by his burning coat. On examining the state of matters, he found the tails completely gone.

When he set out for some of his longer rambles, it is said that he was in the habit of carrying two extra shirts with him; and when he thought it was time to have a change of linen he performed that operation by putting on an additional shirt.

He sometimes got so absorbed in the search of plants that he forgot the days of the week. There is a story of his coming laden with specimens into the manse of St Vigeans one Sunday morning just before the church went in. Mr Muir, the minister, who was a great friend of his, expressed astonishment at seeing him there in such a guise at such a time. Don, who had already noticed that some preparations were being made for going to church, asked why Mr Muir was to preach that day. Was it a Fast Day, or what? He was then told it was Sunday, and that he would have to go to church. "Oh, well, I have lost count!" said he; "but if I had my hands and face washed, I'll go to the kirk." He was shown up-stairs to a bedroom for this purpose, but not coming down in time, Mr Muir went up to call him. On opening the door he found the botanist stretched on the top of the bed in a profound slumber, which was not disturbed.

Of the numerous letters he must have written, I have only seen one—a letter to his friend Mr David Booth, who at the time was settled in Newburgh as a brewer. I am indebted for it to Mrs Stuart, Balgonie, Markinch, who kindly sent it to me along with several others relating to circumstances connected with Don's death. Mr Booth was a very able man; he was the author of the article "Brewing" in the Penny Cyclopædia, 'Interest Tables,' which are to be found in every bank office, 'An Analytical Dictionary of the English Language,' &c. At the time this letter was written he had been studying botany, and had asked Don to get him two volumes of botanical plates from the Forfar library. The David Mudie mentioned was at the time librarian, and Mr Roberts a writer in Forfar, both intimate friends of Don. Some of the older Forfarians say that Don was

an herbalist, and occasionally prepared decoctions and prescribed; and this the mention of the "powder for scrofula with directions" would seem to confirm.

George Don to David Booth.

"Botanic Garden, Forfar,
Nov. 19, 1812.

"Dear Sir,—I have procured two volumes of Botanical plates with some difficulty. I have given my line to David Mudie, and Mr Roberts has become Bound for me that they shall be returned at the end of two months, and then I shall endeavour to procure the other when you return the two just now sent. I have sent the powder for scrofula with directions.

"I will thank you to send the Jasmine fruticans and Serapis latifolia, and seed of Reseda lutea,* when the frost goes off.—With best wishes for the wellfare of Mrs Booth and family, I remain, dear sir, yours truly, G. Don.

"Mr David Booth.

(* And a plant of the Scirpus or Bull Rush that grows by the side of the river at Newburgh.)

"*N.B.*—I have had a long Botanical Excurtion since I was in Newburgh, and have been successful, having discovered the following new plants to Britain—viz., Salix lanata of Linn., and a nondescript species, Ranunculus rivalis of Linn., Astragalus campestris of Linn., Carex rariflora of Whalenberg, and also Carex salina of Swortz, and a nondescript species of Juncus, with many other rare plants, and some new and rare cryptogameous plants.—Yours as above, G. D.

"*P.S.*—The parcel is sent agreeable to your directions."

The first time Don appeared formally as an author was, so far as I am aware, in the year before he wrote the above letter. He contributed a paper to the discussion of a question which was, at the time, engaging the attention of naturalists—the decay of the Scots fir. It is in the shape of a letter addressed to his friend Dr Patrick Neill, and was afterwards published in the Memoirs of the Caledonian Horticultural Society. It affords unmistakable evidence both of Don's remarkably keen powers of observation and of his common-sense; and as it may not, even yet, have lost its interest, I shall quote the principal portions of it. The letter is dated "Forfar Gardens, 10th February 1811:—

"During the winter of 1810, when walking in some woods in the neighbourhood of Forfar, composed of Scotch fir, for the purpose of collecting mosses and lichens, my attention was drawn from these humble tribes by observing the very dissimilar appearances of different trees of what botanists consider as one species of Pinus, the Pinus sylvestris.

"After examining a great number of trees, I became satisfied that it is possible to distinguish in our plantations at least four varieties; and one of these, indeed, is of so fixed and marked a character that it may probably be entitled to rank as a species.

"It may here be proper to state that lately, while observing the cutting down of a fir plantation near Forfar, I was not a little surprised at the great difference in the size, and consequently in the value, of some of the trees in comparison with others of the same species—the difference in value being not less than four times that of others, and in some individual trees exceeding six times. I was at a loss to account for this fact, as the trees were growing promiscuously in the same soil and situation, and had been equally thinned. On more minutely examining those that far exceeded the others in size, I perceived that they were all of that variety which I have suggested as probably entitled to rank as a species.

"About a month ago I re-examined the varieties of the Pinus sylvestris, in order to collect some cones of each variety for seed, and I was then led to examine them with considerable care."

He then goes on to describe the different varieties, beginning with the common variety, which he calls variety 1, marked by its branches forming a pyramidal head; leaves marginated, of a dark or full green colour, and but little glaucous underneath; cones considerably elongated and tapering to the point; the bark of the trunk very rugged. This variety seems to be but short-lived, becoming soon stunted in appearance, and altogether a very inferior tree to variety 2 or 3. I shall now append his description of variety 2 :—

"This strongly-marked and permanent variety is distinguished from the former by the disposition of its branches, which are remarkable for their horizontal direction and for a tendency to bend downward close to the trunk. The leaves are broader than in variety 1, and serrulated, not marginated as in variety 1. From that circumstance alone I should at once pronounce them distinct. The leaves are distinguished at a distance by their

much lighter and beautiful glaucous colour. The bark of the trunk is not so rugged as in variety 1. The cones are generally thicker, not so much pointed, and they are smoother than those of variety 1. The tree seems to be a more hardy plant, being easily reconciled to very various soils and situations. It grows very freely, and quickly arrives at a considerable size. Now may I here be allowed to conjecture that the fir-woods which formerly abounded in every part of Scotland, and the trees of which arrived at a large size, had been of this variety or species. I have certainly observed that the greater part of the fir-woods of the present day, and which are so much complained of, are of the common variety, or variety 1; at least not more than one tree out of ten or twelve is of variety 2, or the more desirable kind. I think this is the most natural way of accounting for the supposed decline of the Scots fir in this country, for two reasons: 1, Because variety 2 still retains all the good qualities ever ascribed to the Scots fir; 2, Because, as variety 1 produces its cones much more freely than the other, the seed-gatherers, who were only to be paid by the quantity and not the quality, would seize upon the former and neglect the latter."

And he goes on to say that he has planted seeds of the four varieties in his garden, and will report; but he was cut off before the result of his experiment could be seen.

(*To be continued.*)

THE GAELIC NAMES OF PLANTS.

By JOHN CAMERON.

(*Continued from p.* 30.)

M. pulegium — Pennyroyal. Gaelic: *peighinn rioghail*, the same meaning.

> "Am bearnan bride 's a *pheighinn-rioghail.*"—M'Intyre.
> The dandelion and the *pennyroyal.*

Welsh: *coluddlys*, herb good for the bowels. *Dail y gwaed*, blood leaf.

Calamintha—Basil-thyme, calamint. Gaelic: *calameilt* (from Greek, καλος, beautiful; and μινθη, *minthe*, mint), beautiful mint. Welsh: *Llysie y gâth*, catwort.

Rosmarinus officinalis — Common rosemary. Gaelic: *ròs Mhuire.* Irish: *ròs-mar—mar-ros*, sea-dew, corruptions from the

Latin (*ros*, dew, and *marinus*), the sea-dew. *Ròs Mhairi*, Mary's rose, or rosemary. Welsh: *ròs Mair*. Among Celtic tribes rosemary was the symbol of fidelity with lovers. It was frequently worn at weddings. In Wales it is still distributed among friends at funerals, who throw the sprigs into the grave over the coffin.

Lavendula spica — Common lavender. Gaelic: *lus-na-tùise*, the incense plant, on account of its fragrant odour. *An lus liath*, the grey weed. *Lothail*, "*uisge an lothail*," lavender-water.

Satureia hortensis—Garden savory. Gaelic: *garbhag ghàraidh*, the coarse or rough garden plant, from *garbh*, rough, &c.

Salvia verbenacea—Clary. The Gaelic and Irish name, *torman*, applies to the genus as well as to this plant; it simply means "the shrubby one" (*tor*, a bush or shrub). The genus consists of herbs or undershrubs, which have generally a rugose appearance. A mucilage was produced from the seeds of this plant, which, applied to the eye, had the reputation of clearing it of dust; hence the English name, "clear-eye," clary (Gaelic: *clearc*, bright).

S. officinalis—Garden-sage (of which there are many varieties). Gaelic: *athair liath*, the grey father. *Sàisde* (from *sage*). *Slàn lus*, the healing plant, corresponding with *salvia* (Latin: *salvere*, to save). It was formerly of great repute in medicine. Armstrong remarks: "Bha barail ro mhòr aig na sean Eadalltich do 'n lus so, mar a chithear o'n rann a leanas,—

> "Cur moriatur homo cui *salvia* crescit in horto?"
>
> "C' arson a gheibheadh duine bàs,
> Aig am bheil *sàisde* fàs na gharaidh?"
>
> Why should the man die who has *sage* growing in his garden?

Teucrium scorodonia — Wood-sage. Gaelic: *sàisde coille*, wood-sage. *Sàisde fiadhain*, wild sage. O'Reilly gives the name *ebeirsluaigh*, perhaps from *obar*, shall be refused, and *sluagh*, people, multitude, because it did not possess the virtues attributed to the other species, and even cattle refuse to eat it.

Thymus serpyllum—Thyme, wild thyme. Gaelic and Irish: *lus mhic righ Bhreatainn*, the plant belonging to the king of Britain's son. *Lus an righ*, the king's plant. This plant had the reputation of giving courage and strength through its smell; hence the English thyme (from Greek: θυμος, *thymos*, courage, strength,—virtues which were essential to kings and princes in olden times). Highlanders take an infusion of it to prevent disagreeable dreams. Welsh: *teim*.

Origanum { **marjorana** / **vulgare** }—Marjoram. Gaelic and Irish: *oragan*, the delight of the mountain. Greek: ορος, *oros*. Gaelic: *ord*, a mountain; and Greek, γανος, *ganos*, joy. Gaelic: *gain*, clapping of hands. *Lus mharsalaidh*, the merchant's weed, may only be a corrupted form of marjoram, from an Arabic word (*maryamych*). *Seathbhog*, the skin or hide softener (*seathadh*, a skin, a hide, and *bog*, soft). "The dried leaves are used in fomentations: the essential oil is so acrid that it may be considered as a caustic, and was formerly used as such by farriers" (Don). Welsh: *y benrudd*, ruddy-headed.

O. dictamnus—Dittany. The Gaelic and Irish name, *lus a phiobaire*—given in the dictionaries for "dittany"—is simply a corruption of *lus a pheubair*, the pepperwort, and was in all probability applied to varieties of *Lepidium* as well as to *Origanum dictamni creti*, whose fabulous qualities are described in Virgil's 12th 'Æneid,' and in Cicero's 'De Natura Deorum.'

Hyssopus officinalis—Common hyssop. Gaelic: *isop*. French: *hysope*. German: *isop*. Italian: *isopo* (from the Hebrew name, אֵזוֹב, *ezob*, or Arabian, *azzof*).

"Glan mi le *h'* *isop*, agus bithidh me glan."
Purge me with *hyssop*, and I shall be clean.

Ajuga reptans—Bugle. Gaelic: *meacan dubh fiadhain* (Armstrong), the dusky wild plant. Welsh: *glesyn y coed*, wood-blue.

Nepeta glechoma—Ground-ivy. Gaelic: *iadh shlat thalmhainn*, the ground-ivy. (See *Hedera helix*, and *Bunium flexuosum*). *Aithir lus*, the serpent-weed,—it being supposed to be efficacious against the bites of serpents; hence the generic name, *Nepeta*, from *nepa*, a scorpion. Irish: *aignean thalmhuin* (*aigne*, affection, *thalmhuin*, the ground); *eidhnean thalmhuin* (see *Hedera helix*).

Ballota nigra—Stinking horehound. Irish and Gaelic: *gràfan* or *gràbhan dubh*, the dark opposer (*grab*, to hinder or obstruct). It was a favourite medicine for obstructions of the viscera: or it may refer to *grab*, a notch, from its indented leaves.

Lycopus europæus—Water-horehound. Irish: *feoran curraidh*, the green marsh-plant (*curach*, a marsh).

Marrubium vulgare—White horehound. Gaelic and Irish: *gràfan* or *gràbhan bàn*, the white indented, &c. (See *Ballota nigra*).

Lamium album—White dead-nettle; archangel. Gaelic:

teanga mhìn, the smooth tongue. *Ionntag bhàn*, white nettle. *Ionntag mhàrbh*, dead nettle. (For *Ionntàg* see *Urtica.*)

L. purpureum — The red dead-nettle. Gaelic: *ionntag dhearg*, red nettle.

Galeopsis tetrahit—Common hemp-nettle. Gaelic: *an gath dubh*, the dark bristly plant (*gath*, a sting, a dart). It becomes black when dry, and has black seeds.

G. versicolor—Large-flowered hemp-nettle. Gaelic: *an gath buidhe,—an gath mòr*, the yellow bristly plant—the large bristly plant. Very abundant in the Highlands, and troublesome to the reapers at harvest-time, from its bristly character. It is called yellow on account of its large yellow flower, with a purple spot on the lower lip.

Stachys betonica—Wood-betony. Gaelic: *lus bheathag*, the life-plant, nourishing plant (from Irish: *beatha;* Greek: βιωτα; Latin: *vita*,—life, food). "*Betonic*, a Celtic word; *ben*, head, and *ton*, good, or tonic" (Sir W. J. Hooker). *Biatas* (from *biadh*, feed, nourish, maintain). "A precious herb, comfortable both in meat and medicine" (Culpepper). *Glasair coille*, the wood green one. The green leaves were used as a salad: any kind of salad was called *glasag*.

S. sylvatica—Wound-wort. Gaelic: *lus nan scorr*, the wound-wort (*scorr*, a cut made by a knife or any sharp instrument). Irish: *caubsadan.*

Prunella vulgaris—Self-heal. Gaelic and Irish: *dubhan ceann chòsach*, also *dubhanuith*. These names had probably reference to its effects as a healing plant. "It removes all obstructions of the liver, spleen, and kidneys" (*dubhan*, a kidney, darkness; *ceann*, head, and *còsach*, spongy or porous). *Slàn lus*, healing plant. *Lus a chridh*, the heart-weed. Irish: *ceanabhan-beg*, the little fond dame; *cean*, fond, elegant, and *ban*, woman, wife, dame.

BORAGINACEÆ.

Borago officinalis—Borage. Gaelic and Irish: *borrach*, *borraist*, *borraigh*, all these forms are evidently derived from *borago*, altered from the Latin, *cor*, the heart, and *ago*, to act or effect. The plant was supposed to give courage, and to strengthen the action of the heart; "it was one of the four great cordials." *Borr* in Gaelic means to bully or swagger; and *borrach*, a haughty man, a man of courage. Welsh: *llawenllys* (*llawen*, merry, joyful), the joyful or glad plant.

Lycopsis arvensis—Bugloss. Gaelic: *lus-teang' an daimh*,

ox-tongue. *Boglus*, corruption of *bolg*, an ox; *lus*, a plant. Welsh: *tafod yr ych*, the same meaning. *Bugloss*, from Greek βους, *bous*, an ox, and γλωσσα, *glossa*, a tongue, in reference to the roughness and shape of the leaves.

Myosotis palustris—Marsh scorpion-grass or forget-me-not. Gaelic and Irish: *cotharach*, the protector (*cothadh*, protection); perhaps the form of the racemes of flowers, which, when young, bend over the plant as if protecting it. *Lus nam mial*, the louse-plant,—probably a corruption from *miagh*, esteem. *Lus midhe* (O'Reilly), a sentimental plant that has always been held in high esteem.

Symphytum officinale—Comfrey. Gaelic: *meacan dubh*, the large or dark plant. Irish: *lus na cnamh briste*, the plant for broken bones. The root of comfrey abounds in mucilage, and was considered an excellent remedy for uniting broken bones. "Yea, it is said to be so powerful to consolidate and knit together, that if they be boiled with dissevered pieces of flesh in a pot, it will join them together again" (Culpepper).

Echium vulgare—Viper's bugloss. *Boglus* (see *Lycopsis*) and *lus na nathrach*, the viper's plant.

Cynoglossum officinale—Common hound's-tongue. Gaelic and Irish: *teanga con* (O'Reilly). *Teanga chù*, dog's-tongue. Welsh: *tafod y ci*, same meaning. Greek: *cynoglossum* (κυων, *kyon*, a dog, and γλωσσα, *glossa*, a tongue), name suggested from the form of the leaves.

Lentibulariaceæ.

Pinguicula vulgaris—Bog-violet. Gaelic: *bròg na cubhaig*, the cuckoo's shoe, from its violet-like flower. *Badan measgan*, the butter mixer; *badan*, a little tuft, and *measgan*, a little butter-dish; or *measg*, to mix, to stir about. On cows' milk it acts like rennet. *Lus a bhainne*, the milk-wort. It is believed it gives consistence to milk by straining it through the leaves. *Uachdar*, surface, top, cream,—a name given because it was supposed to thicken the cream.

Primulaceæ.

Primula vulgaris—Primrose. Gaelic: *sobhrach*, *sobhrag*.

"A *shobhrach*, geal-bhui nam bruachag,
Gur fan-gheal, snughar, do ghnùis!
Chinneas badanach, cluasach,
Maoth-mhìn, baganta luaineach.
Bi'dh tu t-eideadh sa'n earrach
'S 'càch ri falach an sùl."—M'Donald.

Pale yellow primrose of the bank,
So pure and beautiful thine appearance!
Growing in clumps, round-leaved,
Tender, soft, clustered, waving;
Thou wilt be dressed in the spring
When the rest are hiding in the bud.

The Irish name *soghradhach* (Shaw), means amiable, lovely, acceptable. The Gaelic names have the same meaning. *Sobh* or *subh*, pleasure, delight, joy. *Soradh*, *soirigh*, are contractions; also *samharcan*. Irish: *samharcain* (*samhas*, delight, pleasure).

"Am bi na *samhraichean* s' neonan fann."—Old Song.
"Gu tric anns' na bhuinn sinn a t' *sòrach*."—Munro.
Often we gathered there the *primrose*.

Welsh: *briollu*,—*briol*, dignified; *allwedd*, key. "The queenly flower that opens the lock to let in summer" (Brockie).

P. veris—Cowslip. Gaelic: *muisean*, the low rascal, the devil. "*A choire mhuiseanaich*," a dell full of cowslips. Cattle refuse to eat it, therefore farmers dislike it. *Bròg na cubhaig* (M'Kenzie), the cuckoo's shoe. Irish: *seichearlan*, *seicheirghin*, *seicheirghlan*, from *seiche*, hide or skin. It was formerly boiled, and "an ointment or distilled water was made from it, which addeth much to beauty, and taketh away spots and wrinkles of the skin, sun-burnings and freckles, and adds beauty exceedingly." The name means the "skin-purifier." *Baine bó bhuie*, the yellow cow's milk. *Baine bo bleacht*, the milk-cow's milk.

P. auricula—Auricula. Gaelic: *lus na bann-righ*, the queen's flower.

Cyclamen hederæfolia—Sow-bread. Gaelic: *culurin* (perhaps from *cul* or *cullach*, a boar, and *aran*, bread), the boar's bread.

Lysimachia (from Greek λυσω and μαχὸμαι, I fight).

L. vulgaris—Loose-strife. Gaelic and Irish: *lus na sìthchaine*, the herb of peace (*sìth*, peace, rest, ease; *cáin*, state of). *Conaire*, the keeper of friendship. The termination "*aire*" denotes an agent; and *conall*, friendship, love. *An seileachan buidhe*, the yellow willow herb.

L. nemorum—Wood loose-strife; yellow pimpernel. Gaelic and Irish: *seamhair Mhuire* (*seamhair*, *seamh*, gentle, sweet, and *feur*, grass; *seamhrog* (shamrock), generally applied to the trefoils and wood-sorrel. (See *Oxalis*.) *Mhuire* of Mary; *Maire*, Mary. This form is especially applied to the Blessed Virgin Mary. *Lus Cholum-cille*, the wort of St Columba, the apostle of Scotland. *Columb*, a dove; *cillé*, of the church. This

name is given in the Highlands to *Hypericum*, which see. *Rosor* (O'Reilly). *Ros* is sometimes used for *lus*. *Ros-or*, yellow or golden rose. "From the Sanskrit, *ruksha* or *rusha*, meaning tree, becomes in Gaelic *ros*, a tree or treelet, just as *daksha*, the right hand, becomes *dexter* in Latin and *deas* in Gaelic. *Ros*, therefore, means a tree or small tree, or a place where such trees grow—hence the names of places that are marshy or enclosed by rivers, as Roslin, Ross-shire, Roscommon," &c.—CANON BOURKE.

Anagallis arvensis — Pimpernel, poor man's weather-glass. Gaelic: *falcair*. Irish: *falcaire fiodhain*, the wild cleanser (*falcadh*, to cleanse). The name expressing the medicinal qualities of the plant, which, by its purgative and cleansing power, removes obstructions of the liver, kidneys, &c. *Falcaire fuair*, —*falcaire* also means a reaper, and *fuair*, cold; *fuaradh*, to cool, a weather-gauge. The reaper's weather-gauge, because it points out the decrease of temperature by its hygrometrical properties —when there is moisture the flower does not open. *Loisgean* (M'Donald), from *loisg*, to put in flame, on account of its fiery appearance. *Ruinn ruise* (O'Reilly). *Ruinn* means sex, and by pre-eminence the "male;" *ruise* is the genitive case of *ros*. It is still called the male pimpernel in some places. The distilled water or juice of this plant was much esteemed formerly for cleansing the skin.

PLUMBAGINACEÆ.

Armeria maritima—Thrift. Gaelic: *tonn a chladaich* (Armstrong), the "beach-wave," frequent on the sea-shore, banks of rivers, and even on the Grampian tops. *Bàr-dearg*, red-top, from its pink flower. *Neòinean chladaich*, the beach daisy, from *clàdach*, shore, beach, sandy plain.

PLANTAGINACEÆ.

Plantago major—Greater plaintain. Gaelic and Irish: *cuach Phàdraig*, Patrick's bowl or cup,—in some places *cruach Phàdraig*, Patrick's heap or hill. Welsh: *llydain y ffford*, spread on the way.

P. lanceolata — Rib-wort. Gaelic and Irish: *slàn lus*, the healing plant.

> "Le meilbheig, le neòinean 's le *slàn-lus*."—M'LEOD.
> With poppy, daisy, and *rib-wort*.

Lus an t' slanuchaidh (*lus*, a wort, a plant-herb, chiefly used for

plant; it signifies also power, force, efficacy; *slanuchaidh*, a participial noun from *slan;* Latin, *sanus*), the herb of the healing, or healing power; a famous healing plant in olden times. *Deideag.* Irish: *deideog* (*ag* and *òg*, young, diminutive terminations; *deid*, literally *deud* or *deid*, a tooth), applied to the row of teeth, and also to the nipple (Gaelic, *diddi;* English, *titty*), because like a tooth, hence to a plaything,—play, *gewgaw*, bo-peep, a common word with nurses.

> "B'iad sid an geiltre glé ghrinn.
> Cinn *deideagan* measg feoir," &c.—M'Donald.
> Scenes of startling beauty,
> Plantain-heads among the grass, &c.

Armstrong translates it "gewgaws" amongst the grass; but the editor of 'Sar-obair nam Bard Gaelach'—see his vocabulary—gives *deideagan*, rib-grass, which renders the line intelligible. *Bodaich dhubha*, the black men,—children's name in Perthshire. Welsh: *llwynhidydl-penaùr.*

Paronychiaceæ.

Herniaria glabra—Rupture-wort; burst-wort. Gaelic and Irish: *lus an t' sicnich* (M'Kenzie), from *sic*, the inner skin that is next the viscera in animals. "*Bhrist an t sic*," the inner skin broke. "*Mam-sic*," rupture, hernia. Not growing naturally in Scotland, but was formerly cultivated by herbalists as a cure for hernia.

Chenopodiaceæ.

Amaranthus caudatus—Love-lies-bleeding. Gaelic: *lus a ghràidh*, the love plant. *Gràdh*, love.

Spinacia oleracea—Spinage. Gaelic: *bloinigean gàraidh. Blonag*, fat (Welsh, *bloneg;* Irish, *blanag*); *gàradh*, a garden. *Slàp chàil* (M'Alpin); *slàp*, to flap; *càl*, cabbage. Welsh: *yspigoglys.*

Beta maritima—Beet, mangel-wurzel. Gaelic: *betis*, *biotas.* Irish: *biatas.* Welsh: *beatws* (evidently on account of its feeding or life-giving qualities). Greek: *βίος.* Latin: *vita*, life, food; and the Gaelic: *biadh*, feed, nourish, fatten. Cornish: *boet.*

Suæda maritima—Sea-side goose grass. } Gaelic and Irish:
Salicornia herbacea—Glass-wort. } *praiseach na màra*, the sea pot-herb. Name applied to both plants. For *praiseach*, see *Crambe maritima.*

Atriplex hastata and **patula**—Common orache. Gaelic and

Irish: *praiseach mhìn. Mìn*, meal, ground fine, small. Still used by poor people as a pot-herb. *Ceathramha-luain-griollog* (O'Reilly), loin-quarters. *Ceathramadh caorach* (Bourke), sheep's quarters. The name *griollog* is applied also to the samphire.

A. portulacoides — Purslane-like orache. Gaelic and Irish: *purpaidh*, purple. A name also given to the poppy. Name given on account of the purple appearance of the plant, it being streaked with red in the autumn.

Chenopodium vulvaria (or **olidum**) — Stinking goosefoot. Irish: *elefleog. El* or *ela*, a swan; and *flè* or *fleadh*, a feast. It was said to be the favourite food of swans. Scotch: *olour* (Latin, *olor*, a swan).

C. album — White goosefoot. Gaelic and Irish: *praiseach fiadhain*, wild pot-herb. The people of the Western Highlands, and poor people in Ireland, still eat it as greens. *Praiseach glàs*, green pot-herb, a name given to the fig-leaved goosefoot (*ficifolium*).

C. Bonus-Henricus—Good King Henry, wild spinage, English Mercury. Gaelic and Irish: *praiseach bràthair*, the friar's pot-herb. (*Bràthair* means brother, also friar—*frère*). Its leaves are still used as spinage or *spinach*, in defect of better.

LAURACEÆ.

Laurus (from Sanskrit *labhasa*, abundance of foliage; root *labh*, to take, to desire, to possess—akin to Greek, λαμβανω, *lambano*).—Gaelic: *lamh*, a hand (Canon Bourke).

L. nobilis—The laurel, the bay-tree (which must not be confounded with our common garden laurel, *Prunus lauro-cerasus* and *P. lusitanicus*). Gaelic and Irish: *labhras. Crann laoibhreil*, the tree possessing richness of foliage. With its leaves poets and victorious generals were decorated. The symbol of triumph and victory. It became also the symbol of massacre and slaughter, hence another Gaelic name, *casgair*, to slaughter, to hit right and left. *Ur uaine*, the green bay-tree.

> "Agus e' ga sgaoileadh fèin a mach mar *ūr chraoibh uaine.*"
> And spreading himself like a green *bay-tree.*—PSALM xxxvii. 35.

Ur = bay or palm tree, from the Sanskrit, *ürh*, to grow up. Palm Sunday is styled "*Domhnach an ūir*," the Lord's day of the palm.

L. cinnamomum—Cinnamon. Gaelic and Irish: *caineal.*

> "'Se 's millse na 'n *caineal.*"—BEINN-DORAIN.
> It is sweeter than *cinnamon.*

Canal (Welsh: *canel*).

"Rinn mi mo leabadh cùbhraidh le mirr, aloe, agus *canal*."—PROVERBS vii. 17.

I have perfumed my bed with myrrh, aloes, and cinnamon.

From the Hebrew: קנמון, *qinnamon*. Greek: κινάμωμον, *kinamōmon*.

POLYGONACEÆ.

Polygonum (from πολυς, many, and γονυ, knee, many knees or joints).—Gaelic: *lusan gluineach*, kneed or jointed plants.

Polygonum bistorta—Bistort, snakeweed. Gaelic and Irish: *bilur* (O'Reilly). Seems to mean the same as *biolair*, a water-cress. The young shoots were formerly eaten. Welsh: *uysiau'r neidr*, adder's plant.

P. amphibium—Amphibious persicaria. Gaelic and Irish: *gluineach an uisge*, the water-kneed plant. It is often floating in water. *Gluineach dhearg*, the red-kneed plant. Its spikes of flowers are rose-coloured and handsome. Armstrong gives this name to *P. convolvulus*, which is evidently wrong.

P. aviculare—Knot-grass. Gaelic and Irish: *gluineach bheag* (O'Reilly), the small-pointed plant.

P. convolvulus—Climbing persicaria; black bindweed; climbing buckwheat. Gaelic and Irish: *gluineach dhubh*, the dark-jointed plant.

P. persicaria—The spotted persicaria. Gaelic and Irish: *gluineach mhòr*, the large-jointed plant. *Am boinne-fola* (Fergusson), the blood-spot. *Lus chrann ceusaidh* (M'Lellan), herb of the tree (of) crucifixion. The legend being that this plant grew at the foot of the Cross, and drops of blood fell on the leaves, and so they are to this day spotted.

P. hydropiper—Water-pepper. Gaelic: *lus an fhògair* (M'Kenzie), the plant that drives, expels, or banishes. It had the reputation of driving away pain, flies, &c. "If a good handful of the hot biting arssmart be put under the horse's saddle, it will make him travel the better though he were half tired before"—CULPEPPER. *Gluineach tèth*, the hot-kneed plant.

Rumex obtusifolius
,, **crispus**
,, **conglomeratus**
—Dock. Gaelic and Irish: *còpag*—*copagach*, *còpach*, bossy. Welsh: *copa*, tuft, a top.

R. sanguineus—Bloody-veined dock. Gaelic: *a chòpagach dhèarg*, the red dock. The stem and veins of leaves are blood-red.

R. alpinus—Monk's rhubarb. Gaelic: *lus na purgaid*, the purgative weed. A naturalised plant. The roots were formerly used medicinally, and the leaves as a pot-herb. Welsh: *arian-llys*. The same name is given for rue.

R. acetosa—Common sorrel. Gaelic: *samh*, sorrel. Irish: *samhadh bo*, cow-sorrel (for *samh* see *Oxalis*). *Puinneag* (M'Donald). Irish: *puineoga*. Name given possibly for its efficacy in healing sores and bruises (a pugilist, *puinneanach*). *Sealbhag*, not from *sealbh*, possession, more likely from *searbh*, sour, bitter, from its acid taste.

> "Do *shealbhag* ghlàn 's do luachair
> A bòrcadh suas ma d' choir."—M'Donald.
> Thy pure *sorrel* and thy rushes
> Springing up beside thee.

Sealgag (Irish, *sealgan*), are other forms of the same name. *Copog shraide*, the roadside or lane dock. *Sobh* (Shaw), the herb sorrel.

R. acetosella—Sheep's sorrel. Gaelic and Irish: *ruanaidh*, the reddish-coloured. It is often bright red in autumn. *Pluirin seangan* (O'Reilly), the small-flowered plant (*pluran*, a small flower; *seangan*, slender). *Samhadh caora* (O'Reilly), sheep's sorrel.

Oxyria reniformis—Mountain-sorrel. Gaelic and Irish: *sealbhaig nan fiadh*, the deer's sorrel.

Aristolochiaceæ.

Aristolochia clematitis—Birth-wort. *Culurin* (see *Cyclamen*).

Asarum europæum—Common asarum. Gaelic: *asair* (M'Donald), from the generic name, said to be derived from Greek—α, privative, and σειρα, bandage. The leaves are emetic, cathartic, and diuretic. The plant was formerly employed to correct the effects of excessive drinking, hence the French, *cabaret*.

Empetraceæ.

Empetrum nigrum—Crow-berry. Gaelic and Irish: *lus na fionnag* (*fionnag*, a crow). Sometimes written *fiannag*, *fiadhag* (*dearc fithich*, raven's berry; *caor fionnaig*, crow-berry), the berries which the Highland children are very fond of eating, though rather bitter. Taken in large quantities, they cause headache. Grouse are fond of them. Boiled with alum they are used to produce a dark-purple dye. *Lus na stalog* (O'Reilly), the starling's plant.

EUPHORBIACEÆ.

Euphorbia exigua } —Spurge. Gaelic and Irish: *spuirse*
„ **helioscopia** }
= spurge. *Foinneamh lus*, wart-wort.

E. peplus—Petty spurge. Gaelic and Irish: *lus leusaidh*, healing plant. The plants of this genus possess powerful cathartic and emetic properties. *E. helioscopia* has a particularly acrid juice, which is often applied for destroying warts, hence it is called *foinneamh lus.* Irish: *gear neimh* (*gear* or *geur*, severe, and *neimh*, poison, the milky juice being poisonous.)

E. paralias—Sea-spurge. Irish: *buidhe na ningean* (O'Reilly), the yellow plant of the waves (*nin*, a wave), its habitat being maritime sands. Not found in Scotland, but in Ireland, on the coast as far north as Dublin. This and the preceding species are extensively used by the peasantry of Kerry for poisoning, or rather stupefying, fish.

Buxus sempervirens — Box. Gaelic and Irish: *bocsa*, an alteration of *βυξος*, the Greek name.

"Suidhichidh mi anns an fhàsach an giuthas, an gall ghiúthas, agus am *bocsa* le cheile."—ISAIAH.

I will set in the desert the fir-tree and the pine and the *box* together.

The badge of Clan M'Pherson and Clan M'Intosh.

Mercurialis perennis—Wood mercury. Gaelic: *lus ghlinne-bhracadail. Lus ghlinne*, the cleansing wort; *bracadh*, suppuration, corruption, &c. It was formerly much used for the cure of wounds.

CUCURBITACEÆ.

Cucumis sativus—Cucumber. Gaelic and Irish: *cularan*, perhaps from *culair*, the palate, or *culear*, a bag.

"Is cuimhne leinne an t-iasg a dh 'ith sinn san Ephit gu saor; na-*cula-ain* agus na *mealbhucain.*"—NUMBERS xi. 5.

We remember the fish that we did eat in Egypt freely, and the cucumber and the melons.

"'Sa thorc nimhe ri sgath a *chularan.*"—M'DONALD.

The wild boar destroying his *cucumbers.*

Irish: *cucumhar* (O'Reilly), cucumber, said to be derived from the Celtic word *cuc* (Gaelic, *cuach*), a hollow thing. In some species the rind becomes hard when dried, and is used as a cup. Latin: *cucurbita*, a derivative from the Celtic. (See Loudon.) Welsh: *chewerw ddwfr* = water-sour.

Cucumis melo—Melon. Gaelic and Irish: *meal-bhuc*, from

mel or *mal* (Greek, μελον, an apple), and *buc*, size, bulk. According to Brockie, "*mealbhucain* (plural), round fruit covered with warts or pimples." *Mileog*, a small melon.

URTICACEÆ.

Urtica—A word formed from Latin: *uro*, to burn.

U. urens } —Nettle (Anglo-Saxon, *nædl*, a needle). Gaelic
„ dioica }

and Irish: *feanntag*, *neandog*,[1] *deanntag*, *iontag*, *iuntag* (from *feanta*, flayed, pierced, pinched—*feann*, to flay, on account of its blistering effects on the skin; *ang*, a sting; *iongna*, nails).

"Sealbhaichidh an t' ionntagach."—HOSEA.
The nettles shall possess them.

To this day it is boiled in the Highlands and in Ireland by the country people in the spring-time. Till tea became the fashion, nettles were boiled in meal, and made capital food. *Caol-fàil—caol*, slender; *fàl*, spite, malice.

Cannabis sativa—Hemp. Gaelic and Irish: *caineab*, the same as *cannabis*, and said to be originally derived from Celtic, *can*, white; but the plant has been known to the Arabs from time immemorial under the name of *quaneb*. *Corcach*, hemp.

"Buill do' n chaol *chòrcaidh*."—M'DONALD.
Tackling of hempen ropes.

Welsh: *cyuarch*.

(*To be continued.*)

NOTICES OF NEW BOOKS.

Prehistoric Europe: a Geological Sketch. By James Geikie, LL.D., F.R.S., of H.M. Geological Survey of Scotland. 8vo., pp. 592. London: Stanford.

The antiquity of our race has of late years formed a fruitful subject of discussion among archæologists and geologists; and indeed there is no chapter in the history of the world which is of such general interest and importance as that which a study of the Pleistocene and Recent deposits has revealed. It is now admitted that the date of the advent of man in Europe is vastly more remote than even the most liberal of the old chronologies would allow. Great changes in the relative position of land and sea, and widespread climatic vicissitudes, have taken place since the earliest known occupation of our area

[1] "*Neandog*, the common name for it in Ireland. In feminine nouns, the first consonant (letter) after the article *an* (the) is softened in sound. 'An feanntag'—'f' when affected loses its sound, and 'N' is sounded instead: 'N (f)eantog.'"—CANON BOURKE.

by man. It is the discussion of those climatic and geographical changes which forms the subject of the handsomely printed and beautifully illustrated work at the head of this notice. The Pleistocene or Quaternary and Recent deposits comprise a great variety of terrestrial, fresh-water, and marine accumulations, which have yielded relics and remains of man, together with those of various animals and plants ; and it is from a study of these and the mode of their occurrence that the geologist endeavours to shape out the history of the later geological changes. The older relics of man are strongly marked off from those belonging to more recent times, not only by their dissimilarity, but by the fact that they are associated with a more or less peculiar fauna and flora, and the consideration that they occur in positions which clearly evince their much greater antiquity. Archæologists have classified all these relics, and referred them to what are termed respectively the Palæolithic or Old Stone Period, the Neolithic or New Stone Period, the Bronze Age, and the Iron Age. The oldest of these epochs—the Palæolithic Period—is embraced by the Pleistocene or Quaternary Period of geologists, while the Neolithic and later epochs belong to Postglacial and Recent times. This is Dr Geikie's correlation of the archæological and geological periods, and it differs widely from that which Professor Prestwich, Sir Charles Lyell, and other English geologists, have maintained. It must be understood that the Ice Age or Glacial Period occurred in, and was nearly coextensive with, Pleistocene times ; and thus, according to our author, the Old Stone Age dates back to the Glacial Period, the prevalent opinion in England having hitherto been that Palæolithic man did not appear in Europe until glacial conditions were passing away. Amongst Continental geologists, however, it has long been the opinion that Palæolithic man lived in our continent during the Ice Age. It is clear, therefore, that in order to decide the true succession of events that took place during the accumulation of the Pleistocene and Recent deposits, it is necessary to consider a wide range of evidence, as well palæontological as physical. Accordingly, Dr Geikie first discusses in great detail the evidence furnished by the mammalia, which have left their remains in the Pleistocene deposits commingled with relics of Palæolithic man. These, as is well known, embrace a number of forms which are now extinct, or no longer indigenous. They belong to three marked groups—northern, temperate, and southern. This curious commingling of discordant species has been variously interpreted. Lyell was inclined to attribute it to former migrations—a view which has been supported of recent years by Professor Boyd Dawkins. But, as Dr Geikie has pointed out, the physical conditions of our continent will not permit us to suppose that a Siberian climate of strongly-contrasted summers and winters could ever have obtained in Pleistocene times. So long as Europe continues to be exposed to the influence of the Atlantic and the winds which come over that vast expanse of water, a Siberian climate in our continent is simply impossible. And besides this very strong objection to the migration hypothesis, there is another hardly less forcible. The annual migrations in Siberia take place between arctic and temperate provinces — the reindeer, the moose, and other associated forms trespass alternately upon each other's domains,—but in Europe, according to the hypothesis which Dr Geikie overturns, the migrations must have occurred between arctic and southern regions, across the whole breadth of the temperate zone—a view which is manifestly un-

tenable. He concludes, therefore, with Sir J. Lubbock, that the commingling of discordant forms in the Pleistocene deposits implies former changes of climate. When the hippopotamus was a native of Yorkshire, the conditions in North-western Europe were mild and genial; when the reindeer and its northern associates occupied the low grounds of Southern France, and the glutton and the marmot frequented the coast-lands of the Mediterranean, the climatic conditions of Europe must have been extremely severe. The testimony afforded by the Pleistocene flora is strikingly corroborative of this conclusion. It proves to us that during the Pleistocene period several very great changes of climate must have occurred. Thus we find that at one time there flourished near Paris a flora that comprised the fig, the judas-tree, the Canary laurel, laurustinus, and other plants; while at another epoch of the same period the prevailing character of the flora in Northern France was more northern than it is at the present day. In Central and Southern Europe similarly contrasted floras are met with in the Pleistocene deposits. Thus at Canstadt we encounter an assemblage of plants analogous to that discovered near Paris; while in the low grounds of Switzerland, and various regions in Germany, we come upon an arctic-alpine flora, containing the arctic willow, the dwarf birch, and other northern and high-alpine forms; and along with these, insects of northern habitats not unfrequently occur. In Southern Europe the contrasts between the floras of the Pleistocene are, as might have been expected, not so strongly marked. A flora betokening a singularly genial and equable climate is common in many deposits in Southern France and Italy; but we also meet with suggestive botanical evidence in favour of much less genial conditions having formerly prevailed. Thus the Siberian pine occurs in the peat-bogs of Ivrea, and the Scots fir in those near the Lake Varese. The testimony of the molluscs points in precisely the same direction as that of the mammals, the insects, and the plants. From the lists of species, and the references given by Dr Geikie, we gather that the evidence furnished by the plants and molluscs is much more abundant than probably many geologists are aware; and we may hope that those osteologists who think to work out the historical geology of the Pleistocene from a consideration of the mammalian evidence alone, will hereafter pay greater attention to the other palæontological evidence than they have hitherto done. Just as there are two more or less strongly contrasted floras met with in the Pleistocene deposits, so there are very dissimilar groups of molluscs. Thus in the neighbourhood of Paris the Canary laurel and its congeners are associated with many shells, some of which are still indigenous, some extinct, while many others are restricted to more southern regions. In similar latitudes, again, a large proportion of the Pleistocene molluscs are northern and high-alpine forms. Even so far south as the neighbourhood of Lyons, northern forms preponderate in certain Pleistocene accumulations; while in Corsica the shells met with in the Pleistocene breccias suggest a colder and wetter climate than that lovely island now enjoys. So far, then, as the palæontological evidence goes, it demonstrates that during the Pleistocene Period when Palæolithic man occupied our continent, very considerable changes of climate supervened; and the closing stage of that period, corresponding to the so-called "Reindeer epoch," was extremely severe,—an arctic-alpine flora then occupying the low grounds of Central Europe, while northern mammals ranged south to

the borders of the Mediterranean. The physical evidence furnished by the cave-accumulations and river-deposits of the Pleistocene is quite in keeping with the palæontological testimony. We have proof that these were formed under varying climatic conditions, and that the final phase was one of flooded rivers bearing sea-ward stone-laden ice-rafts, and of vast inundations which succeeded in covering enormous areas with the finely comminuted loam which they held in suspension, thus giving rise to the brick-earths, loams, *löss, lehm,* and *limons* of geologists. In and underneath these flood-deposits relics and remains of man, and the Pleistocene mammalia have again and again been detected.

As the *löss* is generally admitted by geologists to belong to the closing stage of the Pleistocene, it becomes of the utmost importance to trace its connection with the Ice Age or Glacial Period. Dr Geikie, therefore, presents us with a summary description of the conditions that obtained in Europe during that period, pointing out the former extent of the ancient glacier systems of the Alps and other mountainous districts of Central and Southern Europe, and showing how, during the climax of glacial cold, all Northern Europe was covered by an enormous ice-sheet that flowed south into Saxony. It was the flood-waters, due to the melting of the ice-masses and snow-fields which then attained so great a development in our continent, that gave rise to the *löss* and similar accumulations. As remains and relics of man occur in and underneath these deposits, it is clear, as foreign geologists indeed have long maintained, that Palæolithic man was contemporary with the Ice Age. But this Ice Age was not one of continuous arctic rigour. On the contrary, it was interrupted now and again by mild and genial epochs, and Dr Geikie describes a number of the more interesting and important of the interglacial deposits accumulated during those mild intervals. Reviewing the palæontological evidence supplied by the glacial and interglacial accumulations, he shows that the faunas and floras of those accumulations agree in every respect with the faunas and floras of the cave, alluvial, and other deposits of the Pleistocene Period. They are, in short, one and the same; and the conviction is forced upon us that the glacial and interglacial deposits are the precise geological equivalents of those Pleistocene deposits, the organic remains of which we have already referred to. In summing up the evidence supplied by the Pleistocene, our author demonstrates that the commencement of this period corresponded with that of the earliest glacial epoch, while its close concurred, in like manner, with the disappearance of the last great northern ice-sheet and the final retreat of the glaciers from the low grounds of Switzerland, &c. Palæolithic man and the southern and temperate mammals thus occupied North-western Europe during mild and genial interglacial epochs, retreating south when severe climatic conditions supervened, and leaving what are now the temperate regions of our continent to be clothed and peopled with arctic and high-alpine forms. Of course such great secular migrations imply geographical conditions differing considerably from the present, and the probable outline of sea and land in Pleistocene times is discussed at considerable length. Dr Geikie apparently does not think that the evidence is sufficient to prove that man arrived in Europe so early as Miocene times; but he is disposed to admit that he may have been living in Italy in a late Pliocene Period. The presumption is in favour of the appearance of Palæolithic man in North-western Europe before the advent of the earliest

glacial epoch of the Pleistocene ; but at present we have no direct proof that this was the case. According to our author, however, it cannot be any longer doubted that Palæolithic man lived in Europe through all the chances and changes of the glacial and interglacial epochs, down to the close of the Pleistocene Period. The direct and indirect evidence on this head seems indeed overwhelmingly strong. That Palæolithic man did not survive in North-western Europe to post-glacial times is shown by the remarkable fact that not a single relic of his former presence has ever been discovered in any post-glacial deposits. We have referred to the fact that a break or hiatus seems to separate the Palæolithic from the Neolithic Period. This, Dr Geikie shows, was due to the fact that the latest glacial epoch separates the one stage from the other. We find the Palæolithic accumulations in many places covered by the deposits laid down during the closing glacial epoch, while not a relic or vestige either of Palæolithic man, or the more characteristic southern mammals with which he was contemporaneous, has ever yet been detected in accumulations overlying the latest glacial deposits. When the last glacial epoch had passed away, a mammalian fauna, essentially the same as the present, appeared in Europe—the elephant, rhinoceros, hippopotamus, and their congeners, had vanished for ever. Palæolithic man seems to have disappeared during the last glacial epoch ; the northern mammals—reindeer, glutton, musk-sheep, &c. — gradually migrated northwards from France and Switzerland ; but the artistic folk of the Reindeer Period did not follow or accompany them through North-western Europe to the arctic regions. After the climate had lost its arctic character, and a temperate fauna and flora had spread through Central and North-western Europe, Neolithic man appeared upon the scene for the first time. The historical geology of Post-glacial and Recent times is hardly less interesting than that of the Pleistocene ; and our author has devoted to it, therefore, rather more than a third of his portly volume. But our space will not permit us to present any outline of the fascinating tale. We can only say that the geographical and climatic changes are discussed very fully, and that the author's views differ considerably from those which have hitherto been held. He is of opinion that in Post-glacial times Iceland and the Faeröe Isles were joined to the European continent by way of Britain and the North Sea ; and it is hard to see how the evidence adduced by him can be otherwise explained. The separation of our own islands from the continent took place during the Neolithic Period. Proofs are brought forward to show that considerable fluctuations of climate supervened during Post-glacial and Recent times—genial and cold wet conditions alternating—to the former of which are attributed the ancient buried forests in the peat-bogs of our own islands, Scandinavia, the Faeröe Isles, &c., while to the latter are assigned the accumulation of the larger proportion of the peat-bogs themselves. The evidence for these great geographical and physical changes the author finds not only in the peat-bogs, raised beaches, and recent alluvia, but also in the present distribution of plants and animals in North-western Europe, and in the results obtained during the recent deep-sea dredgings in the North Atlantic.

In concluding this too brief *résumé* of a work, the value of which—not merely from the vast array of facts brought together, but more especially from the lucid and masterly interpretation of the silent evidence that these facts present—it is impossible to rate too highly, we would urge upon all natural-

ists the desirability of giving more thought to a subject which would add immense interest to their studies, but which has been too generally neglected—viz., the origin and causes of distribution of faunas and floras. 'Prehistoric Europe' shows clearly and distinctly the main lines on which the distribution has taken place, and points out the causes thereof. It is open to every naturalist to work out, for his own country or district, the details which, carefully and conscientiously studied, cannot fail to throw a ray of light upon much that is yet obscure.

The London Catalogue of British Mosses and Hepatics. Published under the direction of the Botanical Record Club. 2d Edition. London: David Bogue. 1881.

So far as a neat "get-up" this catalogue leaves little to be desired, and will doubtless be found useful for "marking *desiderata* in exchanges of specimens," and even as an index to 'British Herbaria.' Exception, however, may be taken to an infringement of the rules of botanical nomenclature, inasmuch as the compilers have adopted the method of zoologists in quoting after the name of a species the author who first described the species, even though it has been removed to a genus subsequently founded. For example, *Rhabdoweissia fugax* Hedw. and *R. denticulata* Brid., though both Hedwig and Bridel describe the species as belonging to *Weissia*, and it was not till long afterwards that Bruch and Schimper founded the genus *Rhabdoweissia*. Zoologists hold that it is correct to write *R. fugax* Hedwig, but botanists say that it must be written *R. fugax* Bruch and Schimper, and whether this be right or wrong, we think it is a pity that the compilers of this catalogue have not conformed to the rules by which the majority of botanists have bound themselves. The catalogue of Hepatics is equally open to criticism in this respect. Another weak point in the catalogue is the attempt to indicate the distribution of each species. This is done by affixing to each the numbers of the "Watsonian provinces" from which it has been recorded. It is very right that all care should be taken not to include any provinces without good grounds, but that does not account for the extraordinary omissions that have been made. Hence no dependence can be placed on this part of the list as throwing any light upon the distribution of Mosses in Britain.

A List of British Birds. Compiled by H. W. Marsden, Gloucester. Published by the Compiler. 1881.

The Graduated List of British Birds, specially compiled for Labelling Eggs. Same Compiler and Publisher.

The "List has been compiled with the view of giving to Ornithologists and Oologists a reliable list of the Birds of Great Britain and Ireland; resident and migratory, and occasional and accidental visitors." It is well printed, and, so far as we have observed, generally correct, and ought therefore to fulfil its object. It may be noticed that no mention is made of *Parus britannicus* and *Acredula rosea*, which all ornithologists are not however agreed in considering distinct from *P. ater* and *A. caudata*. On the other hand, one or two species whose occurrence in Britain has never been proved are included in the list. The "Graduated List" gives the names (English) in such sizes of type as will permit of a labelled name being stuck upon every egg, no matter how small it may be, and will prove useful to those who think it is desirable to label their eggs.

INSECTA SCOTICA.

THE COLEOPTERA OF SCOTLAND.

EDITED BY D. SHARP, M.B.

(*Continued from p.* 48.)

LINA Th.

ÆNEA Fab. On alders. Local.
DISTRIBUTION—East. Tweed ♀♀ Tay ♀♀ o o o
West. Solway ♀♀ o o o

POPULI L. Rare.
DISTRIBUTION—East. Tweed Forth o o o o o o
West. ♀♀ o o o o

GONIOCTENA Th.

LITURA Fab. Abundant on broom.
DISTRIBUTION—East. ♀♀ ♀♀ Tay Dee Moray ♀♀ o o
West. Solway ♀♀ o o o

RUFIPES Payk. Very rare.
DISTRIBUTION—East. o o o o o o o o o
West. Solway o o o o
"Raehills. Rev. W. Little." Murray Cat.

PALLIDA L. Local. On sallows.
DISTRIBUTION—East. Tweed Forth ♀♀ Dee Moray o o o
West. Solway ♀♀ o o o

GASTROPHYSA Th.

POLYGONI L. Common.
DISTRIBUTION—East. ♀♀ ♀♀ ♀♀ ♀♀ ♀♀ ♀♀ o o
West. Solway ♀♀ o o o

RAPHANI Fab. On dock leaves, occasionally in vast numbers.
DISTRIBUTION—East. ♀♀ ♀♀ ♀♀ ♀♀ Moray ♀♀ Orkney o
West. Solway Clyde ♀♀ o o

PHÆDON Th.

TUMIDULUM Kirb. Common on *Heracleum sphondylium.*
DISTRIBUTION—EAST. Tweed ♀ ♀ ♀ ♀ o o o
WEST. Solway Clyde o o o

BETULÆ L. Local. In the water among *Montia fontana.*
DISTRIBUTION—EAST. ♀ Forth ♀ ♀ Moray o o o
WEST. Solway ♀ o o o

COCHLEARIÆ F. Probably common.
DISTRIBUTION—EAST. ♀ ♀ ♀ ♀ ♀ o o o
WEST. Solway ♀ o o o

CONCINNUM Steph. Local. In salt-marshes on a cruciferous plant.
DISTRIBUTION—EAST. o o o o o o o o
WEST. Solway Clyde o o o

PHRATORA Auct.

(*PHYLLODECTA* Th.)

VULGATISSIMA L. Common on willow bushes.
DISTRIBUTION—EAST. ♀ ♀ ♀ ♀ ♀ o o
WEST. Solway ♀ o o o

CAVIFRONS Th. Very rare.
DISTRIBUTION—EAST. o o o o Moray o o o
WEST. o o o o o
Strathglass. Dr Buchanan White.

VITELLINÆ L. On willow bushes, in great numbers.
DISTRIBUTION—EAST. ♀ ♀ Tay Dee Moray ♀ o o
WEST. Solway ♀ o o o

PRASOCURIS Th.

AUCTA F.
DISTRIBUTION—EAST. Tweed Forth ♀ Dee ♀ o o o
WEST. Solway Clyde o o o

MARGINELLA L.
DISTRIBUTION—EAST. ♀ ♀ ♀ ♀ ♀ o o
WEST. Solway ♀ o o o

PHELLANDRII L.
DISTRIBUTION—EAST. Tweed Forth ♀ Dee Moray o o o
WEST. Solway ♀ o o o o

BECCABUNGÆ Ill.
DISTRIBUTION—EAST. Tweed Forth Tay o o o o o
WEST. Solway ♀♀ o o o

ADIMONIA Th.

TANACETI L. Occasional.
DISTRIBUTION—EAST. Tweed ♀♀ ♀♀ ♀♀ Moray o o o
WEST. Solway ♀♀ Argyle o o

CAPREÆ L.
DISTRIBUTION—EAST. o o o o o o o o
WEST. Solway o o o o

SUTURALIS Th. Abundant amongst heather.
DISTRIBUTION—EAST. Tweed Forth ♀♀ Dee Moray ♀♀ o o
WEST. Solway ♀♀ ♀♀ o o

SANGUINEA F. Rare.
DISTRIBUTION—East. Tweed o o o o o o o
WEST. ♀♀ o o o o

GALERUCA Th.

LINEOA Fab.
DISTRIBUTION—EAST. o o o o o o o o o
WEST. Solway o o o o
"Raehills. Rev. W. Little." Murray Cat.

CALMARIENSIS L.
DISTRIBUTION—EAST. o o o o o o o o o
WEST. Solway o o o o
"Raehills. Rev. W. Little." Murray Cat.

TENELLA L.
DISTRIBUTION—EAST. Tweed Forth o o o o o o
WEST. Solway ♀♀ o o o

SAGITTARIÆ Gyll.
DISTRIBUTION—EAST. o o o o o o o o o
WEST. Solway o o o o
Dabton Loch, Thornhill, in numbers.

NYMPHÆÆ L.
DISTRIBUTION—EAST. Tweed Forth o o o o o o
WEST. o o o o o

VIBURNI Payk.
DISTRIBUTION—EAST. o o o o o o o o
WEST. Solway o o o o
"Raehills. Rev. W. Little." Murray Cat.

AGELASTICA Th.

HALENSIS L.
DISTRIBUTION—EAST. Tweed o o o o o o o
WEST. o o o o o
"Berwick-on-Tweed. Dr Philip M'Lagan." Murray Cat.

PHYLLOBROTICA Th.

QUADRIMACULATA L.
DISTRIBUTION—EAST. o o o o o o o o
WEST. ♀ Clyde o o o
This has been more than once found near Glasgow.

LUPERUS Th.

RUFIPES Fab. Common.
DISTRIBUTION—EAST. ♀ ♀ ♀ ♀ o o o o
WEST. Solway ♀ o o o

FLAVIPES L. Common.
DISTRIBUTION—EAST. ♀ ♀ Tay Dee Moray ♀ o o
WEST. Solway ♀ o o o

HALTICA Th.

ERICETI All. On heather. Local.
DISTRIBUTION—EAST. ♀ ♀ o o Moray o o o
WEST. Solway ♀ o o o

PUSILLA Duft.
DISTRIBUTION—EAST. ♀ ♀ o o o o o o
WEST. Solway ♀ o o o

CREPIDODERA Th.

TRANSVERSA Marsh. Common.
DISTRIBUTION—EAST. ♀ ♀ ♀ ♀ ♀ o o o
WEST. Solway ♀ o o o

FERRUGINEA Scop. Common.
DISTRIBUTION—EAST. ♀ Forth ♀ ♀ ♀ o o o
WEST. Solway ♀ o o o

RUFIPES L. Local.
DISTRIBUTION—EAST. ♀♀ Forth ♀♀ Dee ♀♀ o o o
WEST. Solway ♀♀ o o o

[HELXINES L.
DISTRIBUTION—EAST. Tweed Forth o o o o o o
WEST. Solway Clyde o o o

SMARAGDINA Foud.[1]
DISTRIBUTION—EAST. ♀♀ ♀♀ o o o o o o
WEST. Solway ♀♀ o o o

[NITIDULA L.
DISTRIBUTION—EAST. o o o o o o o o
WEST. Solway o o o o
"Raehills. Rev. W. Little." Murray Cat.

MODEERI L. Local.
DISTRIBUTION—EAST. Tweed ♀♀ ♀♀ ♀♀ Moray o o o
WEST. Solway ♀♀ o o o

MANTURA Auct.

(*BALANOMORPHA* Th.)

RUSTICA L. Not common.
DISTRIBUTION—EAST. ♀♀ ♀♀ o o o o o o o
WEST. Solway ♀♀ o o o

OBTUSATA Gyll. Local.
DISTRIBUTION—EAST. Tweed Forth o o o o o o
WEST. Solway ♀♀ o o o

PODAGRICA Th.

[FUSCIPES Fab.
DISTRIBUTION—EAST. o o o o o o o o
WEST. Solway o o o o
"Dumfriesshire. Rev. W. Little." Murray Cat.

[1] This species has hitherto escaped detection by British entomologists, but is, I believe, commoner than any of its allies; it is probable, therefore, that the *helxines* of Murray's Cat. is really this insect. At any rate I have not seen any Scottish species of the sub-genus (*Chalcoides* Foudras) except *C. smaragdina*. According to Foudras it is attached to the aspen (*Populus tremula*). Murray records yet another species from Dumfriesshire—viz., *C. pulchella* Steph.; but I do not know at all what is intended by it.

APTHONA Th.

LUTESCENS Gyll. Very local.
DISTRIBUTION—EAST. o o o o o o o o
WEST. Solway o o o o

CŒRULEA Payk. Local. On *Iris pseudacorus*.
DISTRIBUTION—EAST. ♀ Forth o o o o o o
WEST. Solway Clyde o o o

CYANELLA Redt.
DISTRIBUTION—EAST. o o o o o o o o
WEST. Solway o o o o

HERBIGRADA Curt.
DISTRIBUTION—EAST. Tweed o o o o o o o
WEST. o o o o o

Stichell Linn. R. Hislop.

PHYLLOTRETA Th.

LEPIDII E. H.
DISTRIBUTION—EAST. o o o o o o o o
WEST. Solway o o o o
"Raehills. Rev. W. Little." Murray Cat.

OBSCURELLA Ill.
DISTRIBUTION—EAST. o o o o o o o o
WEST. Solway o o o o
"Raehills. Rev. W. Little." Murray Cat.

VITTULA Redt. Very rare.
DISTRIBUTION—EAST. o o o o o o o o
WEST. Solway o o o o

UNDULATA Kutsch. Rare.
DISTRIBUTION—EAST. ♀ ♀ Tay o o o o o
WEST. Solway o o o o

NEMORUM L. Very common.
DISTRIBUTION—EAST. ♀ ♀ ♀ ♀ ♀ o o o
WEST. Solway ♀ o o o

TETRASTIGMA Com. Rare.
DISTRIBUTION—EAST. ♀ ♀ Tay o o o o
WEST. Solway ♀ o o o

FLEXUOSA Kutsch.
DISTRIBUTION—EAST. ♀♀ Forth o o o o o o
WEST. Solway Clyde o o o

BRASSICÆ Fab. Very rare.
DISTRIBUTION—EAST. ♀♀ o o o o o o o o
WEST. Solway o o o o

PLECTROSCELIS Th.

CONCINNA Marsh.
DISTRIBUTION—EAST. ♀♀ ♀♀ ♀♀ ♀♀ ♀♀ o o o
WEST. Solway ♀♀ o o o

ARIDELLA Payk.
DISTRIBUTION—EAST. ♀♀ ♀♀ ♀♀ ♀♀ Moray o o o
WEST. ♀♀ ♀♀ o o o

THYAMIS St.

(*LONGITARSUS* Th.[1])

HOLSATICA L. Local.
DISTRIBUTION—EAST. ♀♀ ♀♀ Tay o o o o o
WEST. Solway Clyde o o o

BRUNNEA Duft.
DISTRIBUTION—EAST. o o o o Moray o o o
WEST. Solway o o o o

FUSCICOLLIS Steph.
DISTRIBUTION—EAST. o o o o o o o o
WEST. Solway o o o o o

ATRICILLA Gyll.
DISTRIBUTION—EAST. o o o o Moray o o o
WEST. Solway o o o o o

MELANOCEPHALUS Gyll. Common.
DISTRIBUTION—EAST. Tweed Forth ♀♀ ♀♀ Moray o o o
WEST. Solway ♀♀ o o o

[1] There are nearly forty recorded British species of this genus, and Thomson gives twenty-six as found in Sweden. I have only captured nine species in Scotland, but the species are no doubt really more numerous than this; indeed Murray records fourteen Scottish species, but the names he uses do not allow me to identify the species he intended by them.

FEMORALIS Marsh.
DISTRIBUTION—EAST. ♀ Forth o o o o o o
WEST. ♀ ♀ o o o

PUSILLA Gyll.
DISTRIBUTION—EAST. o o o o o o o o o
WEST. Solway o o o o

TABIDA Panz. Common on *Senecio jacobæa.*
DISTRIBUTION—EAST. ♀ ♀ ♀ ♀ ♀ o o o
WEST. Solway ♀ o o o

LÆVIS Duft.
DISTRIBUTION—EAST. ♀ Forth o o o o o o
WEST. ♀ ♀ o o o

PSYLLIODES Th.

CHALCOMERA Ill.
DISTRIBUTION—EAST. Tweed Forth o o o o o o
WEST. ♀ o o o o

NAPI E. H. Common.
DISTRIBUTION—EAST. ♀ Forth ♀ ♀ ♀ o o o
WEST. Solway ♀ o o o

HYOSCYAMI L.
DISTRIBUTION—EAST. o Forth o o o o o o
WEST. o o o o o

"Dalmeny. Dr Greville." Murray Cat.

CHRYSOCPHALA L.
DISTRIBUTION—EAST. ♀ Forth ♀ ♀ ♀ o o o
WEST. Solway ♀ o o o

MARCIDA Ill.
DISTRIBUTION—EAST. Tweed Forth o o o o o o
WEST. o o o o o

CUPRONITENS E. H.
DISTRIBUTION—EAST. ♀ Forth ♀ ♀ Moray o o o
WEST. ♀ ♀ o o o

PICINA Marsh.
DISTRIBUTION—EAST. Tweed Forth o o o o o o
WEST. Solway ♀ o o o

APTEROPEDA Foud.

GRAMINIS Panz.
DISTRIBUTION—EAST. ♀♀ ♀♀ o o o o o o o
WEST. Solway Clyde o o o

MNIOPHILA Th.

MUSCORUM E. H.
DISTRIBUTION—EAST. Tweed o o o o o o o o
WEST. Solway ♀♀ o o o

SPHÆRODERMA Th.

TESTACEA Fab. Common on thistles.
DISTRIBUTION—EAST. ♀♀ Forth ♀♀ ♀♀ ♀♀ o o o
WEST. Solway ♀♀ o o o

CARDUI Gyll. On thistles.
DISTRIBUTION—EAST. ♀♀ Forth o o o o o o o
WEST. Solway ♀♀ o o o

CASSIDA Th.

VIRIDIS L.
DISTRIBUTION—EAST. ♀♀ Forth ♀♀ ♀♀ ♀♀ o o o
WEST. Solway ♀♀ o o o

CHLORIS Suff. Very rare.
DISTRIBUTION—EAST. o o o o o o o o o
WEST. Solway o o o o

OBSOLETA Ill. Common.
DISTRIBUTION—EAST. Tweed Forth ♀♀ ♀♀ ♀♀ o o o
WEST. Solway Clyde o o o

EQUESTRIS Fab. Rare.
DISTRIBUTION—EAST. ♀♀ Forth Tay o o o o o
WEST. Solway o o o o

HÆMISPHÆRICA Hbst. Very rare.
DISTRIBUTION—EAST. o o o o o o o o o
WEST. Solway o o o o

(*To be continued.*)

THE PERTHSHIRE NATURAL HISTORY MUSEUM.

IN the obituary notice of the late Sir Thomas Moncreiffe, mention was made of a scheme, which he had long and earnestly advocated, for providing Perth and Perthshire with a satisfactory Natural History Museum; and it was stated that there was reasonable hope that a fund would be raised, out of respect to his memory, for carrying the scheme into effect. The expectations of the promoters were not doomed to be disappointed. Friends both far and near came to their assistance, and a handsome building has been erected, of which we think a short description may not be uninteresting to our readers.

The building is in the Scottish baronial style, and has a frontage to South Tay Street of 58 feet, the greatest height being 58 feet 6 inches. Though not much expense has been incurred in external ornamentation (which, moreover, would not be in keeping with the style of architecture), an opportunity has been taken of relieving the general simplicity with appropriate designs in carved stone-work. For example, the capitals of the pillars flanking the doorway, some of the mouldings of the windows, and one or two panels in the walls, represent various forms of indigenous plants and animals.

On the ground-floor are three apartments,—namely, lecture-room, library, and laboratory or work-room. The lecture-room is 32 feet long by 22 broad, and 14 feet 6 inches high, and will contain seats for upwards of 150 persons. Out of it opens a smaller room, to be used as a work and microscope room. The library is 22 feet long by 16 broad, and 14 feet 6 inches high, and will also be used as a reading-room.

The museum-hall occupies the upper part of the building, and is 56 feet long by 22 broad, and 19 feet 6 inches high, to the spring of the rafters of the roof. The ceiling is open, and is made of varnished pitch-pine. Light is obtained from a row of

windows along one side, and a double series in the roof. Out of the museum-hall is another small room which will be useful as a private study.

To the rear of the building a piece of ground has been secured on which, if it should be at any time found necessary, additions more than doubling the accommodation, could be erected; but in the meantime it is proposed that this ground should be used as a garden, in which all the more notable Perthshire plants will be grown.

Though on ordinary occasions it is expected that the lecture-room will be quite large enough, yet for special occasions (such as conversazioni, &c.), arrangements have been made by which access from the building can be obtained to a much larger hall immediately adjoining, which again communicates with a large public hall, capable of seating upwards of 1200 persons.

The museum is to be strictly confined to the Natural History, Botany, and Geology of Perthshire, with the exception of a small well-selected type collection, illustrative of the chief forms and structure of animals and plants. In thus restricting the scope of the Museum, we think that the promoters have shown great wisdom; and if the Society (the Perthshire Society of Natural Science) in whose hands the management of the Museum is placed, keeps strictly to its programme, and works with reasonable energy, there seems every prospect that, considering the richness of the natural history of Perthshire, one of the most interesting and valuable local collections in Britain should, in course of time, be gathered together.

The cost of the building has been upwards of £1700, all of which has been subscribed. A further amount is necessary to defray the expense of furnishing, &c.; and to get funds for this, it is purposed to have a bazaar about the end of the year.

PHYTOLOGY.

ON THE GENUS USNEA, AND ANOTHER (EUMITRIA) ALLIED TO IT.

By JAMES STIRTON, M.D., F.L.S.

AMONGST a parcel of lichens recently received from Mr F. M. Bailey of the Colonial Museum, Brisbane, Queensland, I picked out what appeared, at first sight, as a very robust state of *Usnea ceratina*, without, however, any of the characteristic papillæ. Sections of the stems and branches revealed the fact that the thick corneous axis was hollow throughout its entire extent, and only pervaded by the arachnoid medullary fibres, while there were no such fibres surrounding this axis (their invariable site in *Usnea*), but instead a thin, beautiful, and rather dense *rufescent* layer, outside of which was the usual gonidial layer covered by the corneous cortex. Stimulated by this discovery, I re-examined my collections of *Usnea* from other localities, and detected plants from Madeira and tropical Western Africa, which possessed identical relationships of the constitution of the stems. The rufescent stratum was also seen in all. Now the only other genus to which such a series of lichens could, in the present state of classification, be allocated, is *Chlorea* (Nyl.), but a glance at the definition given in Nylander's Syn. showed that Nylander could not have had in contemplation such a series as this when he constituted the genus. In *Chlorea*, one at least of the species is irregularly hollow, as *Ch. vulpina*; others, as *Ch. Canariensis*, have solid axes precisely as in *Usnea*. In truth, the only constant characters that seem to warrant the separation of *Chlorea* from *Usnea* are, 1st, the flattened condition of the stems at the bifurcations; and 2d, the more or less scrobiculato-rugose aspect of the thallus generally, which conditions are, nevertheless, seen to a certain extent in *Usnea angulata* (Ach.) The only two species of *Chlorea*, as given by Nylander in his Synopsis, that might be even distantly included in the present series are the two last—viz., *Ch. cladonioides*, and

Ch. Soleirolii, but their rugose thalli form a barrier to such a classification. No mention, besides, is made of the condition of the axes in the description of these two species, which certainly differ considerably from the others included under *Chlorea*. But even if an analysis of the stems of these two should prove that they are associable with those of the series in question, I hold there are sufficient grounds for the separation of the two groups into a distinct genus. In this belief, I have thought it right to give expression to this view by constituting a new genus, under the name *Eumitria*.

I may mention that in all the seven specimens the thin rufescent layer mentioned above is tinged a somewhat deeper red by K; also in the specimens from Madeira the thallus externally is slowly tinged a purplish red by K, a colour produced, in all likelihood, by the same rufescent layer. Lastly, apothecia and spores are exactly as in *Usnea*.

(1.) *Eumitria Baileyi* sp. nov.—Thallus pallide glaucescens vel pallide cinerascens, lævis, rigescens, erectus vel prostratus (crassit. basi sæpe 2 mm., longit. (4-7) – pollicaris), ramosus, ramis attenuatis et sæpe incurvis vel contortis, longe et crebre fibrilloso-ramulosis; apothecia (in uno specimine) pallide carnea, mediocria, fibrilloso-ciliata, subtus lævia; fibrillæ medullares K flaventes.

Brisbane (F. M. Bailey), Fernando Po (G. Thomson).

Eumitria implicita sp. nov.—Similis præcedenti sed humilior vel similis *Usneæ floridæ*. Thallus pallidus vel pallide lutescens. Fibrillæ medullares (K—) et thallus extus K sordide rubens (reactione tarde patefacta).

Eumitria firmula sp. nov.—Similis *Usneæ ceratinæ* robustæ. Thallus erectus et rigidus, fibrilloso-ramulosus, papilloso-asper æque ac receptacula apotheciorum; fibrillæ medullares K flaventes.

Fernando Po (G. Thomson).

There are two forms from Africa, one much more robust and rigid than the other (alt. 3-5 inches), but scarcely separable.

The genus *Usnea*, although the most highly organised of all genera of lichens, is perhaps in the most unsatisfactory condition as regards the discrimination of species. The botanical characters derivable from external habit and configuration are very

fluctuating,—so much so, indeed, that botanists have virtually given up the attempt to discriminate species by this means. An investigation of the structure of the different parts of the stem and branches, taken in conjunction with the reactions by the usual chemical reagents on the medullary fibres more especially, has satisfied me that our knowledge of this perplexing genus may be much extended; and although I am not entirely reconciled to all the results arrived at, I consider myself warranted in stating them broadly, leaving to future investigators the task of modifying them. My conclusions have been deduced from a pretty extended series of specimens (about ninety) from various parts of the globe.

In the first place, however, I should like to define, or rather re-define, two species concerning which authors are by no means agreed—viz., *U. hirta* and *U. florida*.

Usnea hirta has thallus erect, rigid, either simple or *loosely* divaricato-ramose, and everywhere covered with short, spreading, usually simple branchlets or spines, analogous, in appearance at least, to those of *Rosa spinosissima*.

Usnea florida erect, densely and more or less intricately branched at various angles, the branches more or less (in different instances) divaricato-fibrillose, but not papillose. The fibrillæ are longer and less closely set than in *U. hirta;* at times nearly absent. This definition is at variance with the views of Tuckerman, &c.

My reason for amending (as I think) the distinction between *U. florida* and *hirta* is, that the branchings (main and secondary) are so very variable, that practically (whatever may be said to the contrary) *hirta* is known by the abundance of soredia, more especially on the branches, while in *florida* they are rarer, but seldom absent. Another remarkable coincidence is the fact that in both species these soredia are tinged a decided yellow by K. In this country there are two forms of *hirta;* in one, the more common, the medullary fibres are tinged a decided yellow by K; in the other there is no evident reaction. The latter I have also from the Himalayas. An authentic specimen of *U. hirta* has the medullary fibres K—.

It is evident that the possession (which I have not) of the original types could not help me, inasmuch as the two forms could not have been discriminated by Linnæus. In these circumstances let that which has a negative reaction by K on the medullary fibres still retain the name *hirta*,[1] while the other,

[1] *Hirta* is here employed in the original acceptation.

which gives a yellow reaction, may be named *U. hirsutula*. In both I—.

One very common reaction on the cortical layer of the thallus is K— or f y C yellow more or less pronounced in different cases; but, accordingly, one that can seldom be made use of in the discrimination of species. It is only recorded in one or two well-marked instances. Of all parts of the stem, that most frequently affected by K (*i.e.*, liquor potassæ) is the external medullary layer, composed, as a rule, of fibres more or less arachnoid. The surface of the dense central axis, and the medullary fibres in immediate contact with it, are those parts most apt to be affected by I (Iodine), and, in one section, the substance of the axis itself is affected by the same reagent. So far as my experience goes, C, either alone or in combination with K, does not give a red reaction in *Usnea*.

I premise also that *U. florida*, *hirta* (proper), *dasypoga*, *articulata*, and *ceratina* have all negative reactions, in the manner stated above, with K and I; and, so far as my authentic specimens from colder climates go, this statement is corroborated. At any rate, one must start from some such basis as this—more especially as no such attempt as the present has been made, so far as has been ascertained.

Section I.

Fibrillæ medullares K flavescentes; I cærulescentes, vel violascentes. Soredia K plerumque flavescentia.

1. Usnea similis *floridæ*, pumila, altit. 2 pollicum vix unquam superans.

α *Usnea intexta.*—Thallus pallide cinereo-glaucescens (K— C fl.); fibrillæ medullares I violascentes.

Crinan Canal, Scotland.

β *Usnea flammea.*—Thallus flavescens (K—C flavens).

Madeira (J. Payne).

γ *Usnea rubicunda* sp. nov.—Thallus fere totus rubigineus.

England (Mr Holmes).

δ *Usnea sublurida* sp. nov.—Thallus similis præcedenti, sed densius dendritico-ramosus, stipitibus et ramis rubigineis at ramulis cinereo-glaucescentibus vel cinereis.

In Scotia *passim*, &c. (J. M'Andrew).

2. *Usnea cornuta* (Flot.) has the reactions of this section, so far, at least, as the specimens in my hb. warrant. Of these one is from the south of England (Mr Holmes), two from British North America (Mrs Roy), another from the south of Scotland (Mr J. M'Andrew), and one from the Brazils (Mr Weir), more robust and laxer in habit, but still having the characteristic arching and sorediiferous terminations to the branches.

3. *Usnea radiata* sp. nov.—Similis infra *U. ceratinæ* et papilloso-aspera sed supra ramosa ut in *U. florida*. Apothecia mediocria vel magna (latit. usque ad 15 mm.) dense et longe fibrilloso-ciliata (fibrillis validis et ramosis), subtus hinc inde papilloso-aspera.

Brasilia (Mr Weir).

4. *Usnea concinna* sp. nov.—Similis *U. ceratinæ*, robusta (basi crassit-usque ad 2 mm.), erecta, rigida, ramosa, papilloso-aspera (præsertim supra); apothecia mediocria fibrilloso-ciliata, subtus lævia (rarissime pauci-papillosa); sporæ, .01-.012 × .006-.0075 mm.

In Brasilia (Mr Weir).

5. I possess a specimen from the Himalayas gathered by Mr J. Thomson, which corresponds to the description given of *U. Himalayana* (Bab.) by Nyl., Syn., p. 269, and which I consider a good species. Its reactions are those of this section. The soredia, which are thickly scattered over the whole surface, communicate with the medullary fibres through the external corneous layer, and are also often tinged blue with Iodine. Dr Nylander's description is far too meagre.

Section II.

Fibrillæ medullares K flaventes dein rubentes; I—

1. *Usnea perplexans* sp. nov.—Similis *U. floridæ*.

Pangi, Himalayas (Dr G. Watt).

2. *Usnea rubrotincta* sp. nov.—Similis *U. floridæ* sed thallo rubigineo et stipitibus hinc inde papilloso asperis.

Madeira (J. Payne).

The branching upwards is entirely that of *U. florida*

3. *Usnea dasæa* sp. nov.—Similis *U. hirtæ* sed robustior et rigidior et sorediis parvis albidis vix prominulis creberriter adspersa; axis centralis pergracilis.

Madeira (J. Payne).

4. *Usnea lurido-rufa* sp. nov.—Similis *U. hirtæ* sed thallo obscuriore, sordide vel sæpius lurido-rufo; apothecia mediocria breviter fibrilloso-ciliata æque ac infra, pallide glaucescentia vel pallida; sporæ sæpe parviores, .006-.008 × .005-.0065 mm.

In Himalaya (Coll. Hook. and Thomson, No. 1716).

5. *Usnea undulata* sp. nov.—Similis *U. hirtæ* sed robusta, thallo elongato undulato, ramoso (ramis sæpe uncinatis), pendulo (longit. fere pedalis).

In Africa Australi (Dre J. Shaw).

The external thallus K—C—.

6. *Usnea distensa* sp. nov.—Similis *U. dasypogæ* sed robusta elongata, pendula (pedalis et ultra).

In Africa Australi (Dre J. Shaw).

Rather more branched than in *U. dasypoga*, but the branching is for the most part from near the common stock. Thallus sordidly flavescent. Also an intermediate form from N. Z., where the elongated stems are prostrate (Mr J. Buchanan).

7. *Usnea filipendula* sp. nov.—Similis *U. dasypogæ* sed thallo gracili elongato et pendulo æque ac minute et crebre papilloso-aspero; fibrillæ medullares K fl. dein rufo-aurantiacæ, demum rubentes.

In America bor. (Mrs Roy).

8. *Usnea subsordida* (Strn.)—Similis *U. ceratinæ*, erecta rigida, thallo sæpissime obscuriore (cervino) et apotheciis pallidis vel pallide glaucescentibus; sporæ .01-.014 × .007-.0095 mm.

In Himalaya (J. Thomson), Neilgherries (Dr G. Watt).

I find the reactions of *Neuropogon melaxanthus* (Ach.) from N. Z. —viz., fibrillæ medullares K fl. dein rubentes; I—

Neuropogon trachycarpus (Strn.)—Similis *N. melaxantho* sed receptaculo apotheciorum fibrilloso-ciliato et papilloso-rugoso; fibrillæ medullares K—; axis centralis gracilis et fibrillæ medullares arachnoideæ, I—.

Kerguelen's Land (Challenger Expedition).

The central axis in *N. melaxanthus* is thick, and the medullary fibres rather compact. I have a vague recollection that K gives a negative reaction on the medullary fibres of a specimen of *N. melaxanthus* from Greenland; but I cannot at present corroborate this statement, as the specimen is not now in my possession.

Neuropogon Taylori (Hook.) has reactions—viz., thallus intus K—C—, extus K—C fl.

Usnea dasypoga (Fr.)—In a specimen of this from Peak's Island, Maine, North America, I find the central axis thick, solid, the medullary fibres compressed, and the reactions K—, I—.

There is another resembling this from Niagara Falls (Mrs Hawley, 1879) viz.—

Usnea variegata sp. nov.—Thallus cinereo-glaucescens, cinereo-virescens vel cinereus, gracilis, elongatus, pendulus, fibrillosus; axis centralis fusco-rufescens (præsertim stipitum) crassiusculus; fibrillæ medullares (K— vel vix tinctæ), eæ axin tegentes I cærulescentes dein violaceæ.

Usnea longissima (Ach.) is constant in its chemical reactions—viz., the thick corneous central axis is, without and within, blue, or a sordid blue, with Iodine. The medullary fibres are scarcely discernible, as the axis occupies nearly the whole stem, being merely covered by the thin cortical layer. Where perceptible, these fibres are scarcely, if at all, tinted yellow by K. In the great majority of cases the axis is of a pale colour, merging, though rarely, to rufescent.

In one specimen from the Himalayas (No. 1718, Hooker and Thomson) the axis is a brownish or violaceous black colour, and it gives a negative reaction with I. This lichen is also much more robust than usual, and has a crisped appearance. To this I propose giving the name *Usnea mekista*. It certainly deserves the rank of a sub-species.

Another *Usnea*, common apparently in South Africa (Professor

MacOwan), is allied rather to *U. longissima* than to any of the other groups.

Usnea amplissima sp. nov.—Thallus robustus ramosus, divaricato-fibrillosus, pendulus, elongatus (longit. 1-4-pedalis); axis centralis crassus, extus et, hinc inde, intus I niger vel nigro-violaceus (reactione sub lente visa); apothecia magna (latit. 10-30 mm.), fibrilloso-ciliata. Thallus extus K—C pallide fl.

The primary and secondary stems are rough, but scarcely papillose, and frequently articulated, but not constricted as in *U. articulata*. The main stem is often 2 mm. thick.

Section III.

With the thallus, as to branching and articulation, entirely that of *U. articulata*. In about a half of the specimens at hand, I gives on the surface of the filiform axis and fibrillæ more immediately in contact with it a vinoso-violaceous reaction; but as it is not always seen on even the same specimen, I have not taken account of this reaction at present.

1. *Usnea flexilis* sp. nov.—Thallus flavescens vel rufo-flavescens; fibrillæ medullares K fl. dein rufo-ferrugineæ vel rubentes.

Neilgherries (Dr G. Watt), Africa Austral. (Dr J. Shaw); Fernando Po (G. Thomson).

2. *Usnea subflexilis* sp. nov.—Thallus pallide flavescens; fibrillæ medullares K flaventes.

In Himalaya (J. Thomson).

3. *Usnea oncodes* sp. nov. — Thallus lutescens vel lutescenti-cervinus, rigidiusculus, crassiusculus, erectus, ramosus, ramis et ramulis prominule et creberriter cæsio-sorediosis; axis centralis filiformis; fibrillæ medullares K fl. dein ferrugineo-rubentes, I vinoso-violaceæ.

In N. Z. (J. Buchanan).

The thallus has the smooth aspect of *U. articulata*, and is also inflated, &c. There is another under this section from South Africa, gathered by Mr J. H. M'Lea. The thallus is, however, not smooth and glistening, but opaque, minutely papillose, and even slightly rugose.

1. *Usnea prælonga* sp. nov.—Thallus pallide cinereus vel pallide, cinereo-glaucescens, elongatus (pedalis et ultra), pendulus, inflato-articulatus, minute papillosus et nonnihil rugulosus, cephalodiis carneo-pallidis frequenter obsitus; axis centralis fere filiformis (I—) et fibrillæ medullares K—C—.

Section IV.

Fibrillæ medullares K—C—; I—.

1. *Usnea spinosula* sp. nov.—Similis *U. hirtæ* robustæ sed thallo et receptaculo apotheciorum creberrime aciculari-spinosis.

Neilgherries (Dr G. Watt).

The minute needle-like spines arise very often in groups of 3-6 from a common stock.

2. *Usnea endochrysea* sp. nov. — Similis *U. hirtæ* sed fibrillis medullaribus exterioribus rubentibus K pallide flavescentibus, interioribus albidis K—; apothecia mediocria testaceo-lutescentia fibrilloso-ciliata; sporæ, .009-.011 × .0055-.007 mm.

In Alabama Americæ bor. (Mrs Hawley).

3. *Usnea subcornuta* sp. nov. — Similis *U. cornutæ* sed fibrillæ medullares K—, I—. Stipites et rami sordide rubiginei.

In Madeira (J. Payne).

4. *Usnea mutabilis* sp. nov. — Similis *U. cornutæ* sed fibrillis medullaribus exacte ut in *Usnea endochrysea*.

In Alabama Americæ bor. (Mrs Hawley).

The stems and branches are thickly sorediate, but the terminations of the branches are only slightly arcuate, and are not continuously sorediate. I have another from the Neilgherries by Dr G. Watt, similar in constitution to the above as regards the medullary fibres, but much more robust, and with prominent soredia. This I leave in abeyance meanwhile.

Usnea Thomsoni sp. nov.—Similis fere omnino *U. ceratinæ* robustæ sed sporis amplioribus, .013-.017. × 009-.011 mm.; paraphyses irregulares, graciles, non bene distinctæ. Iodo gel. hym. cærulescens dein vinose fulvescens. Thallus flaves-

cens vel sordide flavescens, apicibus ramulorum et fibrillarum nigricantibus, stipitibus et ramis papilloso-asperrimis æque ac receptaculis apotheciorum; axis centralis gracilis.

Prope Darjeeling (Himalaya), J. Thomson.

Usnea subfusca sp. nov.—Similis *U. floridæ* sed stipitibus et ramis primariis papilloso-asperis, axi centrali crasso solido rufescente, centro rufo-fusco. Thallus extus K—C pallide flavescens.

Prope Owen Sound in Canada (Mrs Roy).

Of *U. lævis* (Eschw.) I possess one specimen from the Brazils (Mr Weir), whose characters correspond sufficiently with those described by Nylander in his Synopsis.
Fibrillæ medullares K fl. dein rubentes; thallus extus K flavens.

Usnea cavernosa (Tuck.) has the medullary fibres K yellow.

I possess only one specimen of an *Usnea* from South Africa, by Mr H. Bolus, which can be ranked with *U. angulata* (Ach.) It is a robust species. At the bifurcations the thallus assumes the form of broad flat plates (breadth from 1-2.5 mm.), while the plate-like form is also seen throughout the main stems, and so disposed as often to give them a triangular appearance in section. The central axis is thick, dense, and solid, nearly as in *U. longissima*, but I—; medullary fibres white, forming a thin layer surrounding the axis K—C—, I—; apothecia large, latitude often as much as 15 mm. Meanwhile this may be ranked as a sub-species of *U. angulata*, under the name *Usnea goniodes*.

Addendum.

The Usnea which, in Scotland at least, has most frequently the reactions, fibrillæ medullares K flaventes, I violascentes, is that which has the branchings most nearly allied to what I have defined under *U. hirta*. Casually looked at, specimens of this, loosely huddled together, give the impression of *Hypnum tamariscinum*. This may be called *Usnea subpectinata*. Thallus pallide cinereo-glaucescens vel pallide cinerascens.

Amongst my Scottish collections there is a fair sprinkling of another form, whose reactions argue in favour of a place near *U. articulata*, but whose stems are erect and not smooth, but here and there slightly rough.

Usnea constrictula sp. nov.—Thallus pallide cinereo-glaucescens rigidiusculus erectus, basi crassiusculus, opacus, ramosus et ramulosus ramulis plerumque divaricatis et sorediosis, articulatus et ibi constrictus sed non inflatus; axis centralis pergracilis; fibrillæ medullares arachnoideæ, K flaventes dein rubentes, I vinoso-violascentes; soredia K—.

Prope New Galloway (J. M'Andrew), &c.

There is present, besides, a member of the *florida* group, whose ramification is, however, more open and straggling, resembling in this respect the preceding, but whose pretensions to a specific distinction are more doubtful. In the first place it may be remarked that there are great differences in the thickness of the solid central axis. In some it is thread-like, and the surrounding medullary fibres are loosely arachnoid; in much the larger proportion it occupies the greater portion of the stem, while the medullary fibres are accordingly crushed and rendered compact. Now, how much significance in the way of specific distinction one may legitimately claim for such differences is an open question; but at any rate, these differences are remarkable enough.

The present *Usnea* has a slender axis, and the soredia are not tinged yellow by K. In the group to which it belongs this lichen forms a rare exception to the rule, "Soredia K flaventia."

Usnea mollis sp. nov.—Thallus pallide cinereus vel pallide cinereo-glaucescens, basi crassiusculus, erectus, ramosus ut in *præcedente* sed ramulis longioribus; axis centralis pergracilis; fibrillæ medullares K—, I—; soredia K—.

Prope New Galloway (J. M'Andrew).

THE LIFE AND LABOURS OF A SCOTTISH NATURALIST, GEORGE DON OF FORFAR.

By JOHN KNOX.

(*Continued from page* 70.)

THE next and the only other composition appeared in 1812. It is an 'Account of the Native Plants in the County of Forfar, and the Animals to be found there,' forming Appendix B to 'General View of the Agriculture of the County of Angus or Forfarshire. Drawn up for the Consideration of the Board of

Agriculture by the Rev. James Headrick, Minister of Dunnichen.' The volume is interesting and instructive, enabling the reader to compare the state of agriculture in the county now with what it was eighty years ago. Appendix B extends to nearly 49 closely printed octavo pages. The account of the plants does not pretend to be complete and exhaustive; especially of the lowland part of the county, the rarer plants only are mentioned. The alpine parts of the county, particularly the district of Clova, have received more complete and detailed examination. He mentions nearly 90 flowering-plants as found there, though some of these, which he regarded as distinct species, have been by later botanists relegated to the rank of varieties. He also enumerates nearly 100 mosses, and about 120 species of lichens, natives of the district. As the volume in which the "Account" was to appear was specially written in the interest of agriculture, considerable attention is directed to the nutritive qualities of the native grasses—a subject which was then engaging the attention of scientific men. Only the rarer plants, natives of the belt of land lying between the alpine district and the lowest part of the valley of Strathmore, are noticed. It was here that he found the *Caltha radicans*[1] and *Crepis pulchra*, which, however, have not been met with in a wild state since he saw them.

The next division deals with the vegetation of the marshes and lochs in the neighbourhood of Forfar. Here, he says, "the botanist will find his trouble amply repaid." He found the *Typha latifolia* in the lakes of Forfar, Rescobie, and Balgavies. It is not to be found there now, but in the Lunan water, which runs through lochs Rescobie and Balgavies, not far from Auldbar station, on the Caledonian Railway. Among the plants now entirely lost is the *Schœnus mariscus*, which he found in the Moss of Restenneth, but never producing flowers. The *Eriophorum alpinum* he also found in the same moss. He found, also, the *Isoëtes lacustris* in Loch Fithie, now no longer there. He says he introduced the *Stratiotes aloides* into Forfar Loch in 1792, and adds that "it is now (1811) in great abundance." There is no trace of it in Forfar Loch at the present day, though it is abundant in Loch Fithie. It occurs in some of the "pots" at the west end of Rescobie Loch, and also in the loch itself. Of the fourteen species of *Potamogeton* to be found there, he notes nine, and also thirty rare mosses.

[1] Compare note on page 142 *infra*.—Editor, 'Sc. Nat.

The flora of the part of the county between the valley of Strathmore and the sea is pretty fully represented. Among the plants in this division, which have not been found since, are the *Chærophyllum aureum*, of which there is a dried specimen in his ninth fasciculus, and the *Chærophyllum aromaticum*, "found in summer of 1810, by the side of the river called Lunan and Vinnie, not far from Guthrie, in a truly wild state, new to Britain, having never been seen by any one else."

After a rather unsparing criticism upon the views of a "Dr Richardson of Ireland" on the qualities of the *fiorin*, or bent-grass, as food for cattle, he takes his readers to the sea-shore. Starting from the North-Water Bridge, and wending his way westward—past Montrose, Arbroath, Sands of Barrie, Dundee, and along the banks of the Tay to the western boundary of the county—he discourses pleasantly of the various beauties as they appear, whether flowering-plants, mosses, or lichens. He finishes this portion of the account by telling us that "the larger plants (numbering over 300) contained in the above list may be seen in a growing state in my botanic garden in Forfar, where I have now the most extensive collection of hardy plants in Scotland."

Then follow lists of fuci, confervæ, zoophyta, infusoria, mammalia, birds, fishes, insects, worms, mollusca, and testacea. His knowledge of the animal kingdom, as seen in this condensed account, seems to have been nearly as intimate and extensive as his knowledge of the vegetable. He was a naturalist in the largest sense of the word. Nothing escaped his keen eye.

His fame, however, rests mainly on his discoveries as a botanist; and he was well known to all who were eminent in the science twenty years, at least, before the date of this his last, and, with the exception of the letter quoted above, his only publication. He is mentioned by Lightfoot in his 'Flora Scotica,' published in 1792, though he does not seem to have been one of that gentleman's correspondents. It was chiefly through the publication of Sir J. E. Smith's 'Flora Britannica' that he became known as the discoverer of so many plants. As a recognition of his services, he was elected an Associate of the Linnæan Society of London on the 6th of December 1803. In 1804 he began the publication of a Herbarium Britannicum, which was dedicated, by permission, to Sir Joseph Banks, President of the Royal Society of London. Four folio fasciculi of dried plants, each containing twenty-five

specimens, were to be published every year until a complete collection of dried native plants had been made. Each fasciculus was to contain at least a due proportion of the alpine plants of the north of Scotland, which are rare and of difficult access. "Since," says he, "the editor first began his botanical excursions into the Highlands of Scotland, in the year 1779, he is confident (and he hopes he may mention it without the imputation of vanity) that he has traversed more of the Caledonian alps than any other botanist has ever done. He has repeatedly ranged over the great mountains of Angusshire which surround the district of Clova, where no one on a similar pursuit had preceded him. He has also searched the vast range of mountains which stretch about sixty miles through the district of Knoydart, in Inverness-shire—a region which had never before, nor has since, been examined by a botanical eye. He is the only botanist, too, who has explored the lofty mountains of Cairngorm, and the great hills in its neighbourhood." Duplicates—where they could be got—of all the rarer mosses, were given—one specimen for the Herbarium, and another, inclosed in a little packet, that may be moistened for minute examination. The name and habitat of each plant were printed on a slip of paper and pasted on the page opposite. The contents of each fasciculus was printed and pasted on the outside of the blue paper boards forming the cover. As it is not likely that there are many of these fasciculi in their original state—the plants having been taken out and distributed among other collections—I shall give the contents of No. IX. as a specimen. On the cover is the following :—

HERBARIUM BRITANNICUM.

By G. Don.

Fasciculus IX.

Containing

201. Hippuris vulgaris.
2. Veronica fruticulosa.
3. Schœnus fuscus.
4. Potamogeton compressum.
205. Myosotis alpinus.
6. Pulmonaria maritima.
7. Chærophyllum aureum.
8. Scheuchzeria palustris.
9. Vaccinium oxycoccus.
210. Polygonum fagopyrum.
11. Cerastium aquaticum.
12. " arvense.
13. Astragalus campestris.
14. Satyrium albidum.
215. Carex rariflora.
16. " salina.
17. " rigida.
18. " limosa.
19. Equisetum sylvaticum.
220. Fontinalis squamosa.
21. Hypnum molluscum.
22. " crista castrensis.
23. " Schreberi.
24. " purum.
225. Lichen nivalis.

Why the publication was stopped I do not know. It may have been on account of his removal from Edinburgh to Forfar,—for he was, at the time it was published, superintendent of the Royal Botanic Garden in Edinburgh.[1] Or it may not have paid to continue it. At Forfar he was more his own master. He had no classes to attend to during the summer months, as he had in Edinburgh. His time was spent in a great measure as it had been before he left. He made long excursions for plants in summer and autumn. In winter he arranged his dried specimens. He was in the habit of making up herbaria for gentlemen who wished them. On one occasion we find him engaged in the formation of "a complete herbarium of all the British plants" for some one who had employed him. This was an occupation from which a steady income could not be expected. His exclusive devotion to what he calls his "favourite science" prevented him from giving that attention to the nursery which was needed if it was to be made a paying concern. He himself was not only often absent, but, in later years, he was in the habit of taking some of his apprentices or workmen with him to the hills. This they did not at all relish. They could not endure the camping out at night, and soon left him. His affairs grew more and more embarrassed, and matters came to a crisis in 1812, when some sort of arrangement—the exact nature of which I have failed to learn—had to be come to with his creditors. He never recovered this. His death following so soon after, he had no time — let him be as careful as he might— to get over his difficulties. So poor indeed was he, that in the following year, when on his deathbed, his family were in a state of absolute want, and had to depend for their daily bread on the charity of neighbours.

But the end was not far off. He came home from one of his excursions at the close of the autumn of 1813, labouring under a severe cold. He went about for some time not thinking seri-

[1] Since the first part of this sketch was published, I have seen that portion of the Winch correspondence in the library of the Linnæan Society, Burlington House, which relates to Don. This was kindly placed at my service by the secretary of the Society, B. Daydon Jackson, Esq. It contains eight letters from Don to Dr Winch of Newcastle. From these it appears that he went to the Botanic Garden in Edinburgh in the early part of December 1802. The last letter from Edinburgh is dated 3d December 1805. The last fasciculus appeared in 1806. At the latest he was in Forfar in the following year.

ously about it. He grew, however, gradually worse, and had to take to bed. His illness assumed the form of a suppurating throat, and, after suffering excruciating agony for six weeks, he died on the 14th of January 1814.

His funeral, according to the testimony of some still living that were present, was one of the largest that, up to that time, had been seen in Forfar. The whole town turned out to witness it, and followed the coffin to the grave in the churchyard. Many of his friends and acquaintances from the country were also present.

To the great body of the people in the town George Don was simply "the botanist." If they had been asked more closely as to what kind of man he was, they would probably have described him in some such way as the Kirkcaldy man described Adam Smith: "A puir cratur! gangs stotting about on the sands there for hours, and naebody kens what's in his head." One day coming down North Street with one of his men, on his way to the country, he came to a number of weavers lounging on the street. They thought they would puzzle him, and called his attention to a young plant at the wall side, hardly two inches above the ground. He knelt down and examined the leaf with his lens, and told them it was a gooseberry-bush. They were sceptical, but lifted the plant carefully, put it in a garden, and watched its growth until they were convinced he was right. This was thought a very wonderful feat. They had a very dim consciousness of his genius. He never mixed much with them, and therefore they did not know him intimately. About burgh politics, with their concomitant filth of jobbery and sacrifice of the public good for petty personal ends, I fancy he cared but little. He was the companion of men who were drawn together by similarity of opinions, political and religious, —who were sympathising with the French Revolution, and beginning to despair of religion as taught by Tory preachers from Scottish pulpits. Clear-headed and intelligent, they were not likely to be imposed on, and their testimony to his qualities of head and heart are complete and emphatic. If the esteem in which a man is held by his most intimate friends be the best test of his character, the letters of Messrs Roberts and Booth that follow, amply testify to the admiration and affection with which they regarded him.

The Mr Rodger mentioned in the letter was a well-known lawyer in Forfar.

William Roberts to David Booth.[1]

"FORFAR, *18th January* 1814.

"DEAR SIR,—Mr Rodger says he wrote to you yesterday communicating the unpleasant news of the death of our friend, George Don, but had omitted to request you to write a short sketch of this singular and celebrated botanical genius, and to cause the sketch to be published in one of the English diurnal newspapers. To stimulate you to this is my chief object in writing at present. If the article appear in one newspaper, it is probable it will be copied into all the other papers.

"A man of eminence in any art or science is entitled to notice, and when he leaves the world it argues a degree of inexcusable insensibility to devote no attention whatever to his memory. George was not only a self-taught man of science, but he was our particular friend. I therefore expect that you, who knew every trait of his character, will not delay a moment in taking up your able pen to celebrate his memory. Your description will aid a benevolent plan which a number of your acquaintances here have formed in behalf of the unhappy orphans left by our friend. Judge, then, how anxiously we will look for the effusion of your pen on departed genius and modest worth.

"George's family consists of five sons and one daughter. The two elder sons, George and David, have studied botany under their father, and have made considerable proficiency. They know the greater part of the immense variety of plants in his botanic garden. The second son, David, is a fine boy of about sixteen years of age, modest, communicative, and sensible, and the knowledge he has already acquired of plants would astonish you. Were his genius to be properly cultivated, I have not a doubt that he would soon be little inferior to what his father was in the science of botany.

"A number of individuals here have it in contemplation to support these two young men, to enable them to reside with, and provide for, the three infant sons. With a view to this benevolent plan, letters are to be sent to those gentlemen who corresponded with George on the subject of botany, soliciting their aid. Perhaps a small fund may be raised in this way to preserve the family from starving, and to enable the two elder sons to follow their pursuit in the knowledge of botany; and if

[1] Addressed to Mr Booth, Mr William Godwin's, 41 Skinner Street, London.

they meet with any encouragement, they may possibly become an acquisition to the world. They are young and vigorous, and able to traverse Alpine regions in the pursuit of rare plants. The eminent Dr Smith patronised and justly appreciated the talents of the father. Perhaps you could apply to him for some aid to this friendless family; perhaps you will think of others to whom you could make a similar application. Such sums as shall be received it is intended to place with a banker, and to be under the superintendence of some people here who are to direct the proper application of the cash. When this celebrated botanist died he was completely in want, and I believe your good friend Mr James Webster was the first to throw in a temporary supply.

"Be as kind to write to me at your convenience. From me you can expect little information. In this small place the same dull unvarying scene daily occurs; but you are in the metropolis, conversing with men of eminence, and perhaps you could communicate some information that would be amusing and interesting to me. Say whether the celebrated Godwin be engaged in any work at present. I lately, for the first time, perused his 'Enquirer' with greater interest than any book I ever read. I hope he will still continue to illuminate the intellects of men, which are, in general, sufficiently phlegmatic. You must have observed that our friend Holcroft gave a genuine description of the character of Buonaparte. Had he been less selfish and despotical, he would have rendered himself truly great, and have been the benefactor and regenerator of the world; but he seems to have felt too little interest in the happiness of his species, and viewed them as instruments calculated for no other purpose than to forward his schemes of self-aggrandisement,—that is, what he considered to be aggrandisement. Sorry am I to see that the *distinguished few* follow the footsteps of Buonaparte in this respect.—Ever your sincere friend,

"Will. Roberts.

"Conclude your sketch with an observation that Mr William Hutchison, writer in Forfar, is appointed to receive subscriptions for the support of the poor indigent family of George, and that any cash remitted to Mr Hutchison will be faithfully applied for that laudable purpose."

(*To be continued.*)

MYCOLOGIA SCOTICA.

By Rev. JOHN STEVENSON.

(*Continued from page* 39.)

2173. Hydnum acre Quel. *Bull. Soc. Bot. France*, 1877, *p.* 324, *t.* vi. *fig* 1. *B. & Br., No.* 1893.

Pileus fleshy, compact, turbinate then flattened, tomentose, then bristling with hairy tufts, tawny-bistre, more brown in the centre; flesh greyish or bistre, fragile and bitter; teeth grey-bistre, with the tips whitish; stem short, grey, bistre-colour at the base; spores very rough, tawny, ·006 mm. The pileus and flesh are of the colour of a jonquil, tinted with bistre or olive. The taste is bitter and peppery at the same time.

In pine-woods.

East. —— —— —— —— Moray ——
West. —— —— —— ——

Forres. Rev. J. Keith.
Europe.

2174. Exobasidium rhododendri Cr. *Grevillea, viii. p.* 8.

Forming sub-globose or irregular fleshy nodules, resembling galls, of a bright reddish colour; spores cylindrical, ·008 mm.

Among Hymenomycetes of doubtful affinity.

On shoots and leaves of *Rhododendron ferrugineum.*

East. —— —— Tay —— —— ——
West. —— —— —— ——

Perth. Seggieden. Dr B. White.
England. Europe.

* **Leptothyrium pictum** B. & Br. *Mycol. Scot. p.* 210.
Perth. Dr B. White.

2175. Sphæropsis malorum Berk. *C. Hbk. No.* 1251.

On stored apples. Winter.

East. —— —— —— —— Moray ——
West. —— —— —— ——

Forres. Rev. J. Keith.
England.

2176. Darluca typhoidearum B. & Br. *C. Hbk. No.* 1286.
Var. caricis Fckl.

On *Carex arenaria.* Autumn.

East. —— —— —— Dee —— ——
West. —— —— —— ——
Aberdeen. Professor J. W. H. Trail.
England. Europe.

2177. **Melasmia alnea*** Lev. *C. Hbk. No.* 1295.
On living alder-leaves. Summer.
East. —— Forth Tay Dee Moray ——
West. —— —— —— ——
England. Europe.

2178. **Phyllosticta violæ** * Desm. *C. Hbk. No.* 1352.
On leaves of violet.
East. —— —— Tay —— —— ——
West. —— —— —— ——
England. Europe.

2179. **Excipula macrotricha** B. & Br. *C. Hbk. No.* 1362.
On broom-sticks. March.
East. —— —— —— —— Moray ——
West. —— —— —— ——
Forres. Rev. J. Keith.
England.

2180. **Glæosporium cytisi*** B. & Br. *No.* 1897.
Spots white, sometimes encircled with red; perithecia minute; spores minute, elliptical.
On *Cytisus laburnum.* Aug.
East. —— —— Tay —— —— ——
West. —— —— —— ——
Pass of Killiecrankie, 1877. J. S.

2181. **Puccinia amphibii** Fckl. *Symb. Myc. Nchtrg. ii. p.* 15.
Stylospores. Sori rather large, orbicular, pale brown; spores ovato-globose, finely spinulose.
Teleutospores. Sori opaque-brown-black, at first enclosed by the dark tuberculated epidermis, which is at length ruptured; spores oblongo-clavate, constricted, obtuse for the most part in front, shortly pedicellate, brown.
On *Polygonum amphibium* var. *terrestre.* Autumn.
East. —— —— Tay —— —— ——
West. —— —— —— ——
Scone, &c. Dr B. White.
Europe.

2182. P. malvacearum Cda. *Grevillea, ii. p.* 137.

Hypophyllous, sori scattered, hemispherical, at first veiled in the centre by the persistent epidermis, circumference naked, umbilicate beneath ; spores densely crowded, ovoid-oblong, brown, even, somewhat constricted in the middle, obtusely acuminate, on very long hyaline pedicels.

On hollyhocks. Summer—autumn.

East. —— —— Tay —— —— ——
West. —— —— —— ——

Perth. Dr B. White.
England. Europe. Australia. Chili.

2183. P. pimpinellæ Lk. *Sp. ii. p.* 17. *Fckl. Symb. Myc. p.* 52.

On *Pimpinella saxifraga*. Sept.

East. —— —— —— —— Moray ——
West. —— —— —— ——

Aviemore. Rev. J. Keith.
Europe.

This species is described by Fuckel, along with others, growing on Umbelliferæ, which are named after the host plant. He regards them as distinct species, since all their æcidia, so far as known, are essentially different. They "have all similarly shaped teleutospores, which are longish, divided into two equal parts, obtuse at both ends, constricted in the middle, and with a very short pedicel."

* **P. veronicarum** D.C. *Mycol. Scot. p.* 238.
This is usually on *Veronica montana*.

* **P. cirsii** Lasch. *Mycol. Scot. p.* 237.
Rannoch. Dr B. White, 1875.

* **P. galiorum** Link. *Mycol. Scot. p.* 238. Add "Dee."
Professor J. W. H. Trail informs me that he has gathered the plant on *Galium verum* and on *Asperula odorata*, accompanied by smooth trichobasis spores, while on *Galium saxatile* it has rough spinose spores of the trichobasis form. Both have been regarded hitherto as of one species. The plant on *Galium saxatile* will probably be found to be a distinct species.

* **P. lychnidearum** Link. *Mycol. Scot. p.* 241. Add "Dee."
Professor Trail has gathered the so-called species of Fuckel, P. stellariæ, on *Stellaria uliginosa*, and P. sag-

inæ on *Sagina procumbens*. It is doubtful if there is sufficient ground for regarding these as distinct from P. lychnidearum.

* **P. fallens** Cooke. *Mycol. Scot. p.* 241. Add "Dee." Professor Trail has found a few spores of this Puccinia, mixed with a multitude of spores of Trichobasis fallens, on *Vicia sepium* and *Anthyllis vulneraria*.

* **Uredo vacciniorum** Pers. *Mycol. Scot. p.* 245. Usually on *Vaccinium myrtillus*.

2184. **Coleosporium senecionis** Fr. *C. Micro. Fungi, Ed. iv. p.* 218.

Spots obliterated; sori solitary or regularly crowded, sub-rotund or oval, on the under surface, surrounded by the ruptured epidermis; spores sub-globose when free, orange.

On various species of groundsel. Summer—autumn.

East. —— Forth Tay Dee Moray ——
West. —— Clyde —— Ross

England. Europe.

Very common and abundant. It will probably be found in all the districts.

2185. **Synchytrium mercurialis** Fckl. *Symb. Myc. p.* 74. *B. & Br. No.* 1389. *Grevillea, ii. p.* 162.

Tubercles chiefly confluent on the nerves of the leaves, hemispherical, greenish, depressed at the summit, each with a papilla which is white; sori oblong, grey, for the most part in pairs; zoospores globose, uninucleate, hyaline; spores echinulate, ·0012 – ·0015 in.

On *Mercurialis perennis*. Summer—autumn.

East. —— —— Tay Dee —— ——
West. —— —— —— ——

England. Europe.

2186. **Ustilago succisæ** Magn. *Waldh. Aperc. des Ustil. p.* 30.

Masses of spores pale; spores globose or subglobose, colourless, ·015—·016 mm.

On anthers of *Scabiosa succisa*. Sept.

East. —— —— Tay —— —— ——
West. —— —— —— ——

Rannoch, 1879. Dr B. White.
Europe.

2187. **Æcidium behenis** D.C. *C. Hbk. No.* 1622.
On *Silene maritima*. Summer—autumn.
East. —— —— —— Dee —— ——
West. —— —— —— ——
Nigg, Muchalls, &c. Professor J. W. H. Trail.
England. Europe.

2188. **Æ. depauperans** Vize. *Grevillea, v. p.* 57.
Spots none, peridia scattered, at first round, becoming elongated, parallel with the length of the stem; spores yellow.
On *Viola lutea*, var. *amœna*. Spring—summer.
East. —— —— Tay —— —— ——
West. —— —- —— ——
Perth. Dr B. White.
England.

* **Milesia polypodii** Berk. & White. *Mycol. Scot. p.* 261.
Findhorn, Morayshire. Dr B. White.

2189. **Sporocybe alternata** Berk. *C. Hbk. No.* 1698.
On damp paper.
East. —— —— Tay —— —— ——
West. —— —— —— —— —— ——
Perth. Dr B. White.
England. America.

2190. **Helminthosporium nanum** Nees. *C. Hbk. No.* 1712.
On dead stems. Oct.
East. —— —— Tay —— —— ——
West. —— —— —— ——
Parkfield. Dr B. White.
England. Europe.

* **Peronospora calotheca** De By. *Mycol. Scot. p.* 277.
Perth. Dr B. White.

* **P. obliqua** Cooke. *Mycol. Scot. p.* 278.
Messrs Berkeley and Broom, in "Notices of British Fungi" ('Annals and Magazine of Natural History,' February 1881), state that this clearly belongs to the genus *Ramularia*, as revived by Saccardo.

* **P. rufibasis** B. and Br. *Mycol. Scot. p.* 278.
Grantown. Rev. J. Keith.
Apparently frequent where *Myrica gale* grows.

2191. Helvella infula Schæff. *Grevillea, viii. p.* 99.

Pileus lobed, deflexed, sometimes gyroso-undulate, smooth, rufous, cinnamon, or purple-brown, much paler and tomentose beneath, margin adhering firmly to the stem, becoming undulated; stem thickened above and below, stuffed, then hollow, smooth, villous, pallid, or purplish white, often here and there irregularly lacunose; asci cylindrical; sporidia ellipsoidvate, binucleate, ·018 – ·022 × ·008 mm.; paraphyses septate, often twice or thrice branched, apices pyriform, coloured.

On sawdust and rotten pine-wood. Sept.—Oct.

East. —— —— —— —— Moray ——
West. —— —— —— ——

Rothiemurchus, 1879. Rev. J. Keith.
England. Europe.

* **Rhizina undulata** Fr. *Mycol. Scot. p.* 300.
Sheriffmuir. J. M'Ara.
Collection at Glasgow Show.

2192. Peziza (Humaria) xanthomela Pers. *C. Myc. fig.* 41.

Sessile, gregarious, somewhat deformed, becoming black beneath, disc somewhat convex, becoming yellow; asci cylindrical; sporidia elliptical, very small, hyaline, smooth, ·011 – ·012 × ·006 mm.; cups 2 mm. broad.

On the ground. Oct.

East. —— —— —— —— Moray ——
West. —— —— —— ——

Darnaway, 1879. Rev. J. Keith.
Europe.

2193. P. (Humaria) sulphurata Schum.? *Fr. Syst. Myc. ii. p.* 72; *Fl. Dan. t.* 1915, *f.* 2.

Nearly sessile, gregarious, at first concave, then becoming plane, sulphureo-lemon coloured, pallid externally, and at the margin which is tumid, and at first very slightly floculose; sporidia ·012 – ·017 × ·003 – ·0045 mm.

On the ground, and pine and oak leaves. Sept.—Nov.

East. —— —— —— —— Moray ——
West. —— —— —— ——

Cawdor and Forres, 1879. Rev. J. Keith.
Europe.

2194. P. (Humaria) Roumegueri Karst. *Grevillea, vii. p.* 64.

Apothecia gregarious, sessile, fleshy, orbicular, plane, naked, golden-yellow, paler externally and at the distinct, membranaceous, thin, erect margin, 3 – 4 mm. broad; asci cylindrical, about 240 mm. long (the sporiferous portion 138 mm.), about 12 mm.

thick ; spores 8 ; monostichous, fusoid-oblongated, 2-guttulate, even, hyaline, 24 – 27 mmm. long, 9 mmm. thick ; paraphyses moderately numerous, simple, curved at the apex, clavate, pale golden-tawny, tinted blue by iodine. The plant may be recognised at once by the paraphyses alone becoming blue with iodine.

Var. carnosissima Phill. *in litt.*

Sporidia ·016 – ·018 × ·005 – ·006 mm.

On decaying beech-leaves. Autumn.

East. —— —— Tay —— —— ——

West. —— —— —— ——

Glamis, Hunter's Hill, 1880. J. S.

Europe.

2195. P. (Sarcoscypha) bulbocrinita Phill. *in litt.*

Scattered, sessile, at first globoso-hemispherical, then expanded, concave, externally brown, clothed with long, straight, septate, fulvous hairs, which are bulbous at the base ; disc bluish-grey ; asci cylindrical ; sporidia 8, ovate, faintly coloured, ·02 × ·013 mm. ; paraphyses filiform. The peculiar bulbous base of the long hairs of the exterior is unlike anything seen in this group.

On damp decaying prunings. July.

East —— —— —— —— Moray ——

West. —— —— —— ——

Forres, 1879. Rev. J. Keith.

2196. P. (Sarcoscypha) hirto-coccinea Phill. and Plow. *Grevillea, viii. p.* 100.

Sessile, scattered or crowded, fleshy, hemispherical, then expanded, dull scarlet ; margin incurved, clothed with scattered, pale-brown, obtuse, septate hairs, longest on the margin ; flesh pale scarlet ; asci cylindrical ; sporidia 8, ovate with one or two large nuclei, ·022 × ·011 mm. ; paraphyses rather slender, clavate at the apices, filled with scarlet granules ; cups 6 – 10 mm across ; the hairs below the margin shorter, often clavate, composed of a single cell. The white mycelium at times conspicuous below the cups.

On mossy spots on the ground in pine-woods. Aug.

East. —— —— —— —— Moray ——

West. —— —— —— ——

Rothiemurchus, 1879. Rev. J. Keith.

2197. P. (Dasyscypha) leucophæa Pers. *Karst. Myc. Fenn. i. p.* 177.

Scattered or gregarious, sessile, hemispherical, pallid, strigoso-villose, with whitish or sulphur-coloured hairs, which become ferruginous-brown by drought and age ; epithecium whitish ; asci cylindraceo-subclavate ; sporidia fusoid-filiform, simple, ·007 – ·016 × ·001 – ·0015 mm. ; paraphyses rather acute at the apex.

On stems of *Stachys*. June.

East. —— —— —— —— Moray ——
West. —— —— —— ——

Forres, 1879. Rev. J. Keith.
Europe.

2198. P. (Dasyscypha) rhytismæ Phill. *Grevillea, viii. p.* 101.

Minute, gregarious, stipitate, white; cups at first globose, then expanded, clothed with short white hairs, bearing on their summits globular crystalline beads; stem rather long, villous to the base; asci cylindrical; sporidia 8, oblong-fusiform, ·003 – ·005 × ·001 mm.; paraphyses as broad but longer than the asci, acutely pointed.

Distinguished from its allies by its habitat, size of sporidia, and the rough globose beads on the points of the hairs.

Parasitic on *Rhytisma acerinum* Fr. June.

East. —— —— —— —— Moray ——
West. —— —— —— ——

Forres. Rev. J. Keith.

2199. P. (Dasyscypha ?) nuda Phill. *Grevillea, viii. p.* 101.

Scattered, plane or convex, with a long, solid, rather flexuous stem, pale orange-red, smooth, glabrous; asci cylindrical; sporidia 8, oblong or oblong-fusiform, ·005 – ·01 × ·002 – ·003 mm.; paraphyses broad, longer than the asci, acutely pointed, filled with granules; 5 mm. high, 2½ mm. across disc.

This is an anomalous species, having the long pointed paraphyses not hitherto observed in any section besides Dasyscypha, yet destitute of hairs of any kind that would justify placing it in that section.

On the ground among moss in fir-woods. Aug.

East. —— —— —— —— Moray ——
West. —— —— —— ——

Rothiemurchus, 1879. Rev. J. Keith.

2200. P. (Hymenoscypha) alniella Nyl. *Karst. Myc. Fenn. i. p.* 129.

Subgregarious, stipitate, white or pallid-white; cup plane; stem slender, short, or very short; asci cylindraceo-clavate; sporidia 8, biseriate, or obliquely uniseriate, oblong enucleate, ·006 – ·012 × ·002 – ·004 mm.

On catkins of alder. Oct.

East. —— —— —— —— Moray ——
West. —— —— —— ——

Forres, 1879. Rev. J. Keith.
Europe.

2201. P. (Hymenoscypha) echinophila Bull. *C. Hbk. No.* 2085.

On chestnut husks. Sept.—Nov.

East. —— —— —— —— Moray ——
West. —— —— —— ——

Cawdor and Forres, 1879. Rev. J. Keith.
England. Europe.

2202. P. (Hymenoscypha) scutula Pers. *Karst. Myc. Fenn. i. p.* 110.

Gregarious, stipitate, rather firm, smooth, brick-red, or whitish becoming yellowish; cup patelliform, margin quite entire, epithecium darker, yellow, or becoming brick-yellowish, nearly plane or slightly convex; stem paler, flocculose, nearly equal, sometimes rufescent or rose-coloured downwards; asci cylindraceo-clavate, sporidia acicular-elongate, for the most part somewhat curved, 2-6 nucleate, ·019 – ·026 × ·004 – ·005 mm.

On stems of *Spiræa*. Oct.

East. —— —— —— —— Moray ——
West. —— —— —— ——

Forres, 1879. Rev. J. Keith.
Europe.

(*To be continued.*)

THE GAELIC NAMES OF PLANTS.

By JOHN CAMERON.

(*Continued from p.* 82.)

Parietaria officinalis — Wall pellitory. Gaelic and Irish: *lus a bhallaidh*, from *balladh* (Latin, *vallum;* Irish, *balla*), a wall. A weed which is frequently found on or beside old walls or rubbish heaps, hence the generic name "parietaria," from *paries*, a wall. Irish: *mionntas chàisil* (*càisiol*, any stone building), the wall-mint. For *mionntas*, see *Mentha*.

Humulus lupulus—Hop. Gaelic and Irish: *lus an leanna*—*lionn luibh*, the ale or beer plant. *Lionn*, *leann* (Welsh, *lhyn*), beer, ale.

Ulmus—Elm. Celtic: *ailm*. The same in Anglo-Saxon, Teutonic, Gothic, and nearly all the Celtic dialects. Hebrew: אלה, *elah*, translated oak, terebinth, and elm.

U. campestris—Gaelic and Irish: *leamhan*, *slamhan* (Shaw), *liobhan*. Welsh: *llwyfen*. According to Pictet, in his work, 'Les Origines Indo-Européennes ou les Aryans Primitifs,' p. 221, "To the Latin: 'Ulmus' the following bear an affinity (respond)—Sax.: *ellm*. Scand.: *almr*. Old German: *elm*. Rus.: *ilemu*. Polish: *ilma*. Irish: *ailm*, *uilm*, and by inversion,

'*leamh*,' or '*leamhan*.'" He says the root is *ul*, meaning to burn. The tree is called from the finality of it, "to be burned." That is his opinion, and he is probably right. The common idea of *leamhan* is that it is from *leamh*, tasteless, insipid, from the taste of its inner bark; and *liobh* means smooth, slippery. And the tree in Gaelic poetry is associated with or symbolic of slipperiness of character, indecision. Cicely M'Donald, who lived in the reign of Charles II., describing her husband, wrote as follows:—

"Bu tu' n t-iubhair as a choille,
Bu tu' n darach daingean làidir,
Bu tu' n cùileann, bu tu 'n droighionn,
Bu tu' n t' abhall molach, blàth-mhor,
Cha robh meur annad do' n chritheann,
Cha robh do dhlighe ri feàrna,
Cha robh do chàirdeas ri leamhan,
Bu tu leannan nam ban àluinn."

Thou wast the yew from the wood,
Thou wast the firm strong oak,
Thou wast the holly and the thorn,
Thou wast the rough, pleasant apple,
Thou hadst not a twig of the aspen,
Under no obligation to the alder,
And hadst no friendship with the elm,
Thou wast the beloved of the fair.

Ficus—Nearly the same in most of the European languages. Greek: συκῆ. Latin: *ficus*. Celtic: *fige*.

F. carica—Common fig tree. Gaelic and Irish: *crann fìge* or *fìghis*.

"Ach fòghlumaibh cosamhlach do'n *chrann fhìge*."
Learn a parable from the fig-tree.

Morus—Greek: μόρος, *moros*. Latin: *morus*, a mulberry. Loudon, in his 'Encyclopedia of Plants,' says it is from the Celtic *mòr*, dark-coloured. There is no such Celtic root; it may be from the Sanskrit, *murch*, Scotch, *mirk*, darkness, obscurity; and the Greek name has also this meaning,—the fruit being of a darkish red colour. Old Ger. and Danish: *mur-ber*.

M. nigra — Common mulberry. Gaelic and Irish: *cràann-maol-dhearc*, tree of the mild aspect, or if *dearc* here be a berry, the mild-berry tree. *Maol* (Latin, *mollis*) has many significations. Bald, applied to monks without hair, as *Maol Cholum*, St Columba; *Maol Iosa*, *Maol Brighid*, St Bridget, &c. A promontory, cape, or knoll, as *Maol Chinntìre*, Mull of Cantyre.

Malvern, *maol*, and *bearna*, a gap. To soften, by making it less bitter, as "dean maol é," make it mild. Hence mulberry, mild-berry (Canon Bourke).

Amentiferæ and Cupuliferæ.

Catkin-bearers—Gaelic: *caitean*, the blossom of osiers.

"'Nis treigidh coileach á ghucag
'S *caitean* brucach nan craobh."—M'Donald.
Now the cock will forsake the buds
And the spotted catkins of the trees.

Quercus—Said in botanical works to be from the Celtic, *quer*, fine. There is no such word in any Celtic dialect, and even Pictet has failed, after expending two pages on it, to explain it.

Q. robur—("Robur comes from the Celtic, *ro*, excelling, and *bur*, development"—Canon Bourke). The oak. Gaelic and Irish: *dair*, genitive *dàrach*, sometimes written *dàrag*, *dùr*, *drù*. Sanskrit: *dru*, *druma*, *druta*, a tree, the tree; *daru*, a wood.

"Sàmhach' us mòr a bha 'n triath,
Mar dharaig 's i liath air Lùbar,
A chaill a dlu-dheug o shean
Le dealan glan nan spéur,
Tha 'h-aomadh thar srùth o shliabh,
A còinneach mar chiabh a fuaim."—Ossian.

Silent and great was the prince
Like an oak-tree hoary on Lubar,
Stripped of its thick and aged boughs
By the keen lightning of the sky,
It bends across the stream from the hill,
Its moss sounds in the wind like hair.

Om, *omna*, the oak (O'Reilly). "Cormac, King of Cashel, Ireland, A.D. 903, says of *omna* that it equals *fuamna*, sounds, or noises, because the winds resound when the branches of the oak resist its passage. According to Varro, it is from *os*, mouth, and *men*, mind, thinking—that is, telling out what one thinks is likely to come. Cicero agrees with this, 'Osmen voces hominum'"—Canon Bourke. Compare Latin: *omen*, a sign, aprognostication,—it being much used in the ceremonies of the Druids. *Omna*, a lance, or a spear, these implements being made from the wood of the oak. Greek: δόρυ, a spear, because made of wood or oak. *Eitheach*, oak, from *eithim*, to eat, an old form of *ith*. Latin: *ed-ere*, as "oak" is derived from *ak* (Old German) to eat (the acorn). The "oak" was called *Quercus esculus* by the Latins. *Rail*, *railaidh*, oak.

"Ni bhiodh achd, aon dhearc ar an *ralaidh.*"
There used to be only one acorn on the oak.

Canon Bourke thinks it is derived from *ro*, exceeding, and *ail*, growth; or *ri*, a king, and *al* or *ail*—that is, king of the growing plants. The Highlanders still call it *righ na coille*, king of the wood. The Spanish name *roble* seems to be cognate with *robur.*

Q. ilex—Holm-tree. Gaelic and Irish: *craobh thuilm*, genitive of *tolm*, a knoll, may here be only an alteration of "holm." *Darach sior-uàine*, evergreen oak.

Q. suber—The cork-tree. Gaelic: *crànn àirceain.* Irish: *crann àirc. Airc*, a cork.

Fagus sylvatica—Beech. Gaelic and Irish: *craobh fhaibhile.* Welsh: *ffawydd. Fai*, from φαγω, to eat. φηγός, the beech-tree. This name was first applied to the oak, and as we have no *Quercus esculus*, the name *Fagus* is applied to the beech and not to the oak. *Oruin* (O'Reilly), see *Thuja articulata. Beith na measa*, the fruiting birch. *Meas*, a fruit, as of oak or beech—like "mess," "munch." French: *manger*, to eat.

F. sylvatica var. **atrorubens**—Black beech. Gaelic: *faibhile dubh* (Fergusson), black beech, from the sombre appearance of its branches. The "mast" of the beech was used as food, and was called *bachar*, from Latin, *bacchar;* Greek, βάκχαρις, a plant having a fragrant root. A name also given to *Valeriana celtica* (Sprengel), Celtic nard.

Carpinus—Celtic: *car*, wood; and *pin*, a head,—it having been used to make the yokes of oxen.

C. betulus—Hornbeam. Gaelic: *icamhan bog*, the soft elm. (See *Ulmus campestris.*)

Corylus avellana—Hazel. Gaelic and Irish: *càlltuinn*, *càlldainn*, *càllduinn*, *cailtin*, *colluinn.* Welsh: *callen.* Cornish: *colwiden.* Perhaps from Armoric: *call.* Gaelic: *coill.* Irish: *coill*, a wood, a grove. New Year's time is called in Gaelic, *coill;* "*oidhche coille*," the first night of January, then the hazel is in bloom. The first night in the new year, when the wind blows from the west, they call *dàir na coille*, the night of the fecundation of trees ("Statistics," par. Kirkmichael). In Celtic superstition the hazel was considered unlucky, and associated with loss or damage. The words *càll*, *còl*, *collen*, have also this signification; but if two nuts were found together (*cnò chòmhlaich*), good luck was certain. The Bards, however, did not coincide with these ideas. By it they were inspired with poetic fancies.

"They believed that there were fountains in which the principal rivers had their sources; over each fountain grew nine hazel trees, *caill crinmon* (*crina*, wise), which produced beautiful red nuts, which fell into the fountain, and floated on its surface, that the salmon of the river came up and swallowed the nuts. It was believed that the eating of the nuts caused the red spots on the salmon's belly, and whoever took and ate one of these salmon was inspired with the sublimest poetical ideas. Hence the expressions, 'the nuts of science,' 'the salmon of knowledge.'" —O'Curry's 'Manners and Customs of the Ancient Irish.'

The badge of Clan Colquhoun.

Alnus—Name derived from Celtic. *Al*, a growth; and *lan*, full. According to Pictet, it is from *alka*, Sanskrit for a *tree.*

A. glutinosa—Common alder. Gaelic and Irish: *feàrn*—*feàrn*, same origin as *varâna* (Sanskrit), a tree. Welsh: *gwernen*—*gwern*, a swamp. It grows best in swampy places, and beside streams and rivers. Many places have derived their names from this tree, *Gleann Fearnaite. Fearnan*, near Loch Tay; *Fearn*, Ross-shire, &c. *Ruaim* (O'Reilly) (*ruadh*, red), it dyes red. When peeled it is white, but it turns red in a short time. The bark boiled with copperas makes a beautiful black colour. The wood has the peculiarity of splitting best from the root, hence the saying

"Gach fiodh o'n bhàrr, 's am *feàrna* o'n bhun."
Every wood splits best from the top, but the alder from the root.

Betula alba—Birch. Gaelic and Irish: *beatha.* Welsh: *bedu*, seemingly from *beath.* Greek: *βιωτη.* Latin: *vita*, life. Also the name of the letter *B* in Celtic languages, corresponding to Hebrew *Beth* (meaning a house). Greek: *Beta.* Generally written *beith.*

"Sa *bheith* chubhraidh."—Ossian.
In the fragrant birch.

The Highlanders formerly made many economical uses of this tree. Its bark (*meilleag*) they burned for light, and the smooth inner bark was used, before the invention of paper, for writing upon, and the wood for various purposes.

The badge of the Clan Buchanan.

B. verrucosa—Knotty birch. Gaelic: *beatha carraigeach*, the rugged birch; *beatha dubh-chasach*, the dark-stemmed birch.

B. pendula—Gaelic: *beatha dubhach*, the sorrowful birch (*dubhach*, dark, gloomy, sorrowful, mourning, frowning). In

Rannoch and Breadalbane: *Beatha cluasach*, the many (drooping) *car* birch. (Stuart.)

B. nana—Dwarf birch. Gaelic: *beatha beag* (Fergusson), the small birch.

Castanea vesca—Common chestnut. Gaelic and Irish: *chraobh geanm chno.*

"No na craobha *geanm-chno* cosmhuil r'a gheugaibh."—EZEKIEL xxxi. 8.
Nor the chestnut-tree like his branches.

Geanm or *geann*, natural love, pure love, such as exists between relatives,—the tree of chaste love, and *cno*, a nut. The Celts evidently credited this tree with the same virtues as the chaste tree, *Vitex agnus castus* (Greek, ἁγνὸς; and Latin, *castus*, chaste). Hence the Athenian matrons, in the sacred rites of Ceres, used to strew their couches with its leaves. *Castanea* is said to be derived from Castana, a town in Pontus, and that the tree is so called because of its abundance there. But the town Castana (Greek, Κάστανον) was probably so called on account of the virtues of its female population. If so, the English name chestnut would mean chaste-nut, as it is in the Gaelic. Welsh: *castan* (from Latin, *caste*), chastely, modestly. The chestnut-tree of Scripture is now supposed to be *Platanus orientalis*, the Chenar plane-tree.

[**Æsculus hippocastanum** — The horse-chestnut. Gaelic: *geanm chno feadhaich* (Fergusson). Belongs to the order *Aceraceæ*. Was introduced to Scotland in 1709.]

Populus alba — Poplar. Gaelic: *pobhuill.* Irish: *poibleag.* German: *pappel.* Welsh and Armoric: *pobl.* Latin: *populus.* This name has an Asiatic origin, and became a common name to all Europe through the Aryan family from the East.[1] Pictet explains it thus: "Ce nom est sans doute une reduplication de la racine Sanskrit *pul*, magnum, altum." *Pul pul*, great, great, or big, big, as in the Hebrew construction, very big. We still say in Gaelic *mòr mòr*, big, big, for very big. *Pul pul* is the Persian for poplar, and *pullah* for salix. This tree is quite common in Persia and Asia Minor, hence it was as well known there as in Europe. The name has become associated with *populus*, the people, by the fact that the streets of ancient Rome were decorated with rows of this tree, whence it was called *Arbor populi.* Again, it is asserted that the name is derived from the constant

[1] See Canon Bourke's work on 'The Aryan Origin of the Gaelic Race and Language.' London: Longman.

movement of the leaves, which are in perpetual motion, like the *populace*—"fickle, like the multitude, that are accursed."

P. tremula—Aspen. Gaelic and Irish: *critheann*, trembling.

"Mar *chritheach* san t' sìne."—ULL.
Like an aspen in the blast.

With the slightest breeze the leaves tremble, the poetic belief being that the wood of the Cross was made from this tree, and that ever since the leaves cannot cease from trembling. *Eadhadh.* Welsh: *aethnen* (*aethiad*, smarting). The mulberry tree of Scripture is supposed to be the aspen (Balfour), and in Gaelic is rendered *craobh nan smèur.* (See *Morus* and *Rubus fruticosus.*)

"Agus an uair a chluineas tu fuim siubhail an mullach *chraobh nan smèur*, an sin gluaisidh tu thu féin."—2 SAMUEL v. 24.

And when thou hearest a sound of marching on the tops of the mulberry trees, that then thou shalt bestir thyself.

The badge of Clan Fergusson.

Salix—According to Pictet, from Sanskrit, *sâla*, a tree.

"Il a passe au *suale* dans plusieurs langues
. . . Ces noms derivent de sâla."

Gaelic and Irish: *seileach*, *saileog*, *sal*, *suil.* Cognate with Latin: *salix.* Fin.: *salawa.* Anglo-Saxon: *salig*, *salh*, from which *sallow* (white willow) is derived. Welsh: *helyg*, willow. (See *S. viminalis.*)

S. viminalis — Osier willow; cooper's willow. Gaelic and Irish: *fineamhain* (from *fin*, vine; and *muin*, a neck), a long twig—a name also applied to the vine.[1] *Vimen* in Latin means also a pliant twig, a switch osier. One of the seven hills of Rome (Viminalis Collis) was so named from a willow copse that stood there; and Jupiter, who was worshipped among these willows, was called "Viminius;" and his priests, and those of Mars, were called *Salii* for the same reason. The worship was frequently of a sensual character, and thus the willow has become associated with lust, filthiness. Priapus was sarcasticaliy called "Salacissimus Jupiter," hence *salax*, lustful, salacious; and in Gaelic, *salach* (from *sal*); German, *sal*, polluted, defiled. The osier is also called *bunsag*, *bun*, a stump, a stock. *Maothan*, from *maoth*, smooth, tender. *Gall sheileach*, the foreign willow.

[1] "*Finemhain* fa m' chomhair" (in Genesis)—a vine opposite to me.

S. caprea, and **S. aquatica**—Common sallow. Gaelic and Irish: *sùileag*, probably the same as Irish, *saileog* (Anglo-Saxon, *salig*, sallow). *Sùil*—the old Irish name—(in Turkish *su* means water), in Irish and Gaelic, the eye, look, aspect, and sometimes *tackle* (Armstrong). The various species of willow were extensively used for tackle of every sort. Ropes, bridles, &c., were made from twisted willows. "In the Hebrides, where there is so great a scarcity of the tree kind, there is not a twig, even of the meanest willow, but what is turned by the inhabitants to some useful purpose."—WALKER'S 'Hebrides.' And in Ireland, to this day, "gads," or willow ropes, are made. *Gealsheileach* (Armstrong), the white willow or sallow tree. Irish: *crann sailigh fhrancaigh*, the French willow.

S. babylonica—The Babylonian willow. Gaelic: *sceileach an t' srutha* (*sruth*, a brook, stream, or rivulet), the willow of the brook.

"Agus gabhaidh sibh dhuibh féin air a' cheud là meas chraobh àluinn, agus *seileach an t' srutha*."—LEV. xxiii. 40.

And take unto yourselves on the first day fruit of lovely trees, and willows of the brook.

MYRICACEÆ.

Myrica gale—Bog myrtle, sweet myrtle, sweet gale. Gaelic: *rideag*. Irish: *rideog*, *rileog* (changing sound of *d* to *l* being easier). *Ròd* or *roid* is the common name in the Highlands, perhaps from the Hebrew, רתם, *rothem*, a fragrant shrub. It is used for numerous purposes by the Highlanders, *e.g.*, as a substitute for hops; for tanning; and from its supposed efficacy in destroying insects, beds were strewed with it, and even made of the twigs of gale, which is there called *nodha*. "And to this day it is employed by the Irish for the same purpose by those who know its efficacy. The *rideog* is boiled and the tea or juice drunk by children to kill 'the worms.' I think children educated in our national schools should be taught to know these plants and their value."—CANON BOURKE.

Badge of the Clan Campbell.

CONIFERÆ.

Pinus—French: *le pin*. German: *pyn-baum*. Italian: *il pino*. Spanish: *el pino*. Irish: *pinn chrann*. Gaelic: *pin-chrann*. Anglo-Saxon: *pinu*. All these forms of the same name are derived, according to Pictet, from the Sanskrit verb *pina*, the

past participle of *pita*, to be fat. juicy. From *pina*, comes Latin, *pinus*, and the Gaelic, *pin*.

P. sylvestris — Scotch pine, Scots fir. Gaelic: *giùthas*, *giùbhas*.

> "Mar *giùbhas* a lùb an doinionn."—OSSIAN.
> Like a pine bent by the storm.

Giùthas, probably from the same root as *picea*, pitch pine. Sanskrit: *pish*, soft, juicy. Gaelic: *giùbhas*, a juicy tree,—from the abundance of pitch or resin its wood contains; *con* or *cona* (O'Reilly), from Greek: χωνος, *konos*, a cone, a pine. Hence *conadh*, fire-wood. *Fir* in English, from Greek, πῦρ, fire, because good for fire.

Badge of the Macgregors—Clan Alpin.

(*To be continued.*)

PRELIMINARY LIST OF THE FLOWERING PLANTS AND FERNS OF PERTHSHIRE.

By F. BUCHANAN WHITE, M.D., F.L.S.

AS some of our readers are doubtless aware, a Flora of Perthshire has been in preparation for some years, and, in fact, might ere now have been published had it been thought advisable. As, however, every year sees additions to our knowledge of the indigenous flora, there has been a not unnatural desire to delay the publication, the more especially as some parts of the county still remain virtually unexplored. With a view, therefore, to rendering our knowledge more complete, and to show more particularly in what groups it is most defective, we now publish a preliminary list of the flowering plants and vascular cryptogams. This list is not more than what its title imports. For the Flora itself will be reserved all the information that has been collected regarding the distribution of the plants in area and altitude, their local names, uses, &c. In the same work due credit will be given to all who have assisted in the elucidation of the flora.

But before beginning the list, it will be desirable to devote a few lines to a brief description of the area whose indigenous plants are to be enumerated. The county of Perth, then, contains about 2000 square miles, and varies in altitude from sea-level to close upon 4000 feet above Ordnance datum. Geolo-

gically the county is divided into two great districts by a line running from south-west to north-east, the part to the south of this line belonging to the Devonian formation, and the part to the north to the Silurian. The Devonian district consists of a wide plain or valley of Old Red Sandstone, intersected by numerous trap-dykes, and bounded on the south and east by two ranges of trappean hills—that to the north of the Tay being known as the Sidlaws, while the one on the south is the Ochil range. In Perthshire these hills rarely attain an altitude of 1200 feet, and their flora is consequently scarcely at all alpine in character. The Devonian district is in fact co-extensive with the Lowland part of the county, and is a cultivated and fairly well-wooded country. The higher parts of the Ochils and Sidlaws are uncultivated, but extensively grazed by sheep; are not as a rule covered by wood; and their more interesting flora is to be found in the ravines. The Silurian division, on the other hand, is essentially a hilly country, and is co-extensive with the Highland part of the county. In it the only cultivated portions are the valleys, which for the most part are not very wide, the hills themselves being, as is most generally the case, covered with heather or grassy pasture, and more rarely with natural or planted woods. But though this is a region of hills, it is only in certain parts that the necessary conditions for the existence of the alpine flora are all to be found, and it is on the hills to the north and west of Loch Tay that this flora is to be found in its greatest perfection.

The county has no sea-board, but the Perthshire shores of the estuary of the Tay afford the necessary conditions for some of the maritime plants. Hence in the Carse of Gowrie district, a number of plants are to be found that do not occur elsewhere in the county.

In the following list, in addition to the truly indigenous plants, some of the better established or more widely spread aliens or naturalised plants are noticed.

RANUNCULACEÆ.

1. Thalictrum L.

1. Alpinum L. Local, but not uncommon on the richer hills.
2. Minus L.
   i. Sub-species minus L.
      Var. *montanum* Wallr. Local, but widely distributed.

ii. Sub-species majus Jacq.
Var. *flexuosum* Bernh. Rare, or confounded with the preceding.

II. ANEMONE L.

3. Nemorosa, L. Common.

III. RANUNCULUS L.

4. Aquatilis L.
i. Sub-species heterophyllus Auctorum.
Var. *peltatus* Fr. Common.
Var. *confusus* Godr. Very local (Kingoodie, &c.)
Var. *pseudo-fluitans* Bosw. Local.
ii. Sub-species pantothrix Brot.
Var. *trichophyllus* Chaix. Local.
iii. Sub-species circinatus Sibth. Very local (Kilmadock; Moncreiffe, but perhaps an introduction).
Several other forms have been observed, but have not yet been identified. There is much need of a more extensive study of the Perthshire varieties of *R. aquatilis*.
5. Hederaceus L. Common.
6. Sceleratus L. Very rare, except on the margins of the Tay from Kinfauns downwards.
7. Flammula L. Common.
Var. *pseudo-reptans* London Cat. Not uncommon.
8. Lingua L. Very rare and local.
9. Auricomus L. Somewhat local.
10. Acris L. Common.
Var. *vulgatus* Jord. In several places.
11. Repens L. Common.
12. Bulbosus L. Common.
13. Hirsutus Curt. In the Lowlands; local, and often an introduction.
14. Arvensis L. Carse of Gowrie only, and local.
15. Ficaria L.
Var. *divergens* F. Schultz. Common.
Var. *incumbens* F. Schultz. Local, or overlooked.

IV. CALTHA L.

16. Palustris L.
Var. *vulgaris* Schott. Common.
Var. *Guerangerii* Bor. Local, but widely distributed.
Var. *minor* Bosw. Common on the mountains.

v. Trollius L.

17. Europæus L. Local, but not uncommon, especially in the Highlands.

vi. Helleborus L.

18. Fœtidus L. Naturalised on Moncreiffe Hill, and occasionally found elsewhere.

vii. Aquilegia L.

19. Vulgaris L. Here and there as a naturalised plant, but appears to be native in a few localities.

BERBERIDACEÆ.

viii. Berberis L.

20. Vulgaris L. In hedges and woods, but scarcely even naturalised.

NYMPHÆACEÆ.

ix. Nuphar Sm.

21. Luteum L. Not uncommon.
22. Pumilum Sm. Loch Katrine, Loch Lubnaig, Loch of Menteith, and Methven Loch.

x. Nymphæa.

23. Alba L. Var. *minor* Besl. Somewhat local, but not uncommon in the Highlands. The large-flowered form occurs in several places in the Lowlands, but I am not sure but that in every case it has been planted.

PAPAVERACEÆ.

xi. Papaver L.

24. Argemone L.
25. Rhœas L. and var. *strigosum* Bœnningh.
26. Dubium L. Var. *Lamottei* Bor..

All these species are only weeds of cultivation, and vary in abundance from year to year. They are also almost confined to the Lowlands.

xii. Chelidonium L.

27. Majus L. Naturalised in several places.

FUMARIACEÆ.

xiii. Fumaria L.

8 . Capreolata L.

i. Sub-species pallidiflora Jord. Very rare. Carse of Gowrie.

ii. Sub-species Boræi Jord. Not uncommon.

29. Officinalis L. Common.
30. Densiflora D.C. Not uncommon.

Like the poppies, these are all weeds of cultivation, but are more persistent.

XIV. CORYDALIS.

31. Claviculata D.C. Local.
32. Lutea D.C. Naturalised on some old walls.

CRUCIFERÆ.

XV. CHEIRANTHUS L.

33. Cheiri L. Naturalised on rocks and old buildings.

XVI. NASTURTIUM Br.

34. Officinale Br. Common.
35. Sylvestre Br. Locally abundant.
36. Palustre D.C. Locally common.

XVII. BARBAREA Br.

37. Vulgaris Br. Not uncommon in or near cultivated ground. Doubtfully indigenous.

XVIII. ARABIS L.

38. Petræa Lamk. Ben Laoigh.
39. Hirsuta Br. Local.
40. Perfoliata Lamk. Near Almond Bank and Invermay.

XIX. CARDAMINE L.

41. Hirsuta L.

i. Sub-species hirsuta. More common than the next.

ii. Sub-species flexuosa With. Common.

42. Pratensis L. Common.
43. Amara L. Locally common in the Lowlands.

XX. DENTARIA L.

44. Bulbifera L. Said to have occurred at Dupplin, but it is doubtful if it is there now.

XXI. SISYMBRIUM L.

45. Thaliana Hook. Common.
46. Officinale L. Common on roadsides, &c.

47. Alliaria Scop. Not uncommon in the Lowlands. It seems to me very doubtful whether the last two species are really indigenous.

XXII. HESPERIS L.

48. Matronalis L. Thoroughly naturalised and locally abundant in several places.

XXIII. BRASSICA L.

49. Campestris L.
50. Sinapistrum Boiss.
51. Alba Boiss.

Mostly weeds of cultivation, but *campestris* occurs occasionally on rocks.

XXIV. DRABA L.

52. Rupestris Br. On several of the Breadalbane mountains.
53. Incana L.

Var. *contorta* Ehrh. Common on some of the richer hills.

Var. *confusa* Ehrh. Ben Lawers.

XXV. EROPHILA D.C.

54. Verna L. Common.

Var. *inflata* Hook. Ben Lawers, &c.

XXVI. COCHLEARIA L.

55. Officinalis L. Var. *alpina* Wats. Not uncommon on the higher mountains.

XXVII. SUBULARIA L.

56. Aquatica L. Not uncommon.

XXVIII. CAPSELLA Mœnch.

57. Bursa-pastoris D.C. A common weed.

XXIX. LEPIDIUM L.

58. Campestre Br. Not common.
59. Smithii Hook. Not uncommon in the Lowlands.

XXX. THLASPI L.

60. Arvense L. Very local. In cultivated fields at Rait and Fingask.
61. Alpestre L.

Sub-species sylvestre Jord. Very local. Spittal of Glenshee.

XXXI. TEESDALIA Br.

62. Nudicaulis Br. Very local. Aberargie and Bendochy.

XXXII. RAPHANUS L.

63. Raphanistrum L. A common weed of cultivation, more especially in the Lowlands. The yellow-flowered form only occurs.

RESEDACEÆ.

XXXIII. RESEDA L.

64. Luteola L. Local.
65. Lutea L. Kilspindie and Blairgowrie. Apparently a native.

CISTACEÆ.

XXXIV. HELIANTHEMUM Tourn.

66. Vulgare Gœrtn. Common.

VIOLACEÆ.

XXXV. VIOLA L.

67. Palustris L. Common.
68. Odorata L. Naturalised here and there.
69. Hirta L. Local, but rather widely distributed.
70. Canina L.
    i. Sub-species canina. Rather local.
    Var. *flavicornis* Sm. In several places.
    ii. Sub-species sylvatica Fr.
    Var. *Riviniana* Reich. Common.
    Var. *Reichenbachiana* Bor. Very rare, but perhaps overlooked.
71. Tricolor L.
    i. Sub-species tricolor. Common.
    ii. Sub-species arvensis Murray. A weed of cultivated ground. Not uncommon.
    iii. Sub-species lutea Huds. On the hills, both Devonian and Silurian. Not uncommon.
    Var. *amœna.* More especially on the higher hills.

POLYGALACEÆ.

XXXVI. POLYGALA L.

72. Vulgaris L.
    i. Sub-species vulgaris. Very local.
    ii. Sub-species depressa Wend. Common.

CARYOPHYLLACEÆ.

XXXVII. DIANTHUS L.

73. Armeria L. Carse of Gowrie. Local and rare. Doubtfully indigenous.
74. Deltoides L. Local, and chiefly on the trap hills.

XXXVIII. SILENE L.

75. Inflata Sm. Not very common.
    Var. *puberula* Jord. As common as the glabrous form.
76. Maritima L. Not uncommon on shingly banks of the rivers, and also on some of the mountains.
77. Acaulis L. Not uncommon on the richer hills.

XXXIX. LYCHNIS L.

78. Flos-cuculi L. Common.
79. Viscaria L. Local, but widely distributed from Gowrie to Rannoch.
80. Diurna Sibth. Common.
81. Vespertina Sibth. Common, but often sporadic.

XL. GITHAGO Desf.

82. Segetum Desf. A weed of cultivation, and not uncommon.

XLI. CERASTIUM L.

83. Tetrandrum Curt. Locally common. Shores of the Tay at Invergowrie, and also on trap hills remote from the sea.
84. Semidecandrum L. Common.
85. Glomeratum Thuill. Common.
86. Triviale Link. Common.
    Var. *holosteoides* Fr. Tidal shores of the Tay and Earn. Common.
    Var. *alpinum* Koch. Athole and Rannoch.
87. Arvense L. Local.
88. Alpinum L. Common on some of the richer hills.
89. Latifolium Sm. Breadalbane mountains. Local.
    Var. *Smithii* Syme. The commoner form.
    Var. *compactum* Syme. Ben Lawers.

XLII. STELLARIA L.

90. Cerastoides L. Rare. Ben Aulder, &c.

91. Nemorum L. Local.
92. Media L.
    i. Sub-species media. A common weed of cultivation.
    ii. Sub-species umbrosa Opitz. Very local. Rannoch.
93. Holostea L. Common.
94. Graminea L. Common.
95. Uliginosa L. Common.

(*To be continued.*)

Notes on the Past Winter.—The configuration of the ground here is that of an open depression, lying between two ridges at the eastern extremity of the Sidlaws. The ridges run east and west, and the ground dips gradually to a sprawling sheet of water lying along the bottom of the valley. The fences are mostly stone-dykes, about 3 feet high. Of these, one set runs with the dip, north and south. In the snowstorm of early March the wind was easterly, and nearly at right angles to these dykes. One can understand that when the snow has been blown level with the coping to windward, the current, in crossing these dykes at right angles, would be tilted with considerable uniformity. Some days subsequent to the storm, when the sun had begun to show places which were comparatively bare, I observed that each of these dykes had a belt of nearly bare ground, several yards wide, running parallel with it about 30 yards to leeward. In one place, where a dyke trended away towards the wind at a considerable elbow, the corresponding ribbon of thin snow followed with regularity, only there it was less defined. The uniformity of this result suggested that the current, after being tilted, was not broken up or twisted, but returned to the ground almost with the mathematical regularity of the dyke, sweeping the ground bare where it struck. It was interesting to observe every dyke, on both sides of the valley, with its companion stripe; but the interest became surprise when it was observed that the same belt ran along at about the same distance to leeward of an open two-bar paling. There is no doubt about this curious circumstance, but the area of observation was a single paling about 150 yards long.

In the old quarries at Turin Hill, the conglomerate has given way in several places since the autumn. When falling from any height it has gone totally to pieces. Farther west, where the conglomerate crops out in long lines which have not been disturbed by quarrying, the severe winter does not appear to have had any visible effect.

Many coots must have died during the winter. Among those which are left much quarrelling may be observed. Can the females have died more readily than the males?

The *Caltha* I found last spring ('Scot. Nat.', vol. v. p. 349) was thrown out of its ditch in the autumn, and had to be replanted elsewhere. It is not in a healthy state after the change. Luckily Mr Babington has rooted specimens growing in Cambridge Botanic Garden. Meantime it is now quite a settled matter that there is a *Caltha*, with uncontiguous sepals, at

the top of Rescobie Loch, flowering well side by side with *C. palustris*, in the last week of May, at an elevation of 200 feet. The plant looks very like the *B.* mentioned in 'Hooker and Arnott' as a garden variety. It agrees with Mr Babington's description of *C. radicans* in stem and sepals. The root-leaves can hardly be called triangular.—WALTER GRAHAM, Schoolhouse, Rescobie, *May* 23, 1881.

Caltha radicans.—Since the above note was written, I have received a post-card from Professor Babington, in which he says: "We have the roots of *Caltha* growing well which you kindly sent. They have flowered. I think that they are the true plant *radicans*, although, like you, I have (and still have) some little doubt. It may be that *radicans* is not different from *palustris minor*, but that is a mountain plant. The leaves of your plant are very 'peculiar.' "—ID., *May* 26.

Effects of the Winter 1880-81.—In this district (the environs of Leith) the result of the winter on various species of plants has been very disastrous. From the evergreen oak down to herbaceous plants, the weather of the past winter has told very severely. The holly, and its different varieties of gold and silver, has parted with a considerable number of leaves. Another of our native plants, the common yew (*Taxus baccata*), has been similarly dealt with, and, in addition, the young wood of the previous year on some plants is destroyed. The hedges of privet (*Ligustrum vulgare*) are completely stripped of their foliage, and many plants are killed. *Garrya elliptica* is a mass of dead leaves and shrunk catkins. That valuable shrub, *Aucuba japonica*, has all the young wood frost-bitten; the common ivy (*Hedera helix*) has suffered in foliage and young shoots; the strawberry-tree (*Arbutus unedo*) killed; rosemary (*Rosmarinus officinalis*) killed; lavender (*Lavandula spica*), dear to every one on account of the fragrance of its leaves and flowers, bushes 2½ feet high and 2 feet through, reduced to half their former size; wallflower—the destruction is 50 per cent; *Cedrus deodara*, loss of part of foliage and damaged branches. Notwithstanding the severity of the past winter, fruit-trees are covered with a profusion of blossom. The apple, pear, and indeed every fruit-tree, has flowered in a way that I have not seen for a great number of years.—M. KING, 120 Pitt Street, Bonnington, Edinburgh, *May* 30, 1881.

NOTICES OF NEW BOOKS.

Papilio. Organ of the New York Entomological Club. Vol. I., No. 1. (Communications to be sent to Mr Henry Edwards, 185 East 116th Street, New York.)

Students of entomology (or at least of some of its branches) cannot complain of a want of literature, periodical or otherwise, connected with their science. This new claimant for their support, being nicely got up, and having the promise of support from many of the leading American entomologists, deserves, and no doubt will obtain, success; but as the club of which it is the organ is not exclusively devoted to Lepidopterology, it seems a pity that the magazine is to be restricted to that branch.

The Scientific Roll and Magazine of Systematised Notes. Conducted by A. Ramsay. London: Bradbury, Agnew, & Co.

So far as can be judged from the numbers of this magazine which have been sent to us, it ought to prove eminently serviceable by bringing together notes that, from being widely scattered in the innumerable periodicals and other works that are now published, are in danger of being overlooked. At present the subject under treatment is that of climate, as the editor justly considers that a knowledge of meteorology is of great importance to many classes of people. An ample bibliography of the subject under consideration accompanies each part, and cannot fail to be of great utility to workers.

Dr L. Rabenhorst's Kryptogamen-Flora von Deutschland, Oesterreich, und der Schweiz. Vol. I.: Fungi. By Dr G. Winter. Nos. 1 and 2. Leipsic: E. Kummer. 1881.

This Cryptogamic Flora, though limited to the plants of Germany, Austria, and Switzerland, ought to be useful to every student of British Mycology who can read German. After introductory chapters on the morphology and physiology, collection and preservation, and classification of fungi, Dr Winter proceeds to describe the species belonging to the first class, *Schizomycetes*, which include such organisms as *Sarcina*, *Spirillum*, *Bacterium*, &c. Of these, 13 genera are described, tabulated, and illustrated by woodcuts. The species are then described and their synonyms given, 69 species in all being noticed, after which the second class, *Saccharomycetes*, is treated in like manner. Then follows the third class, *Basidiomycetes*, containing the six orders, *Entomophthoreæ*, *Ustilagineæ*, *Uredineæ*, *Tremellineæ*, *Hymenomycetes*, and *Gasteromycetes*. The classes to follow are—4, *Ascomycetes;* 5, *Myxomycetes;* 6, *Zygomycetes;* and 7, *Oomycetes*. The ground on which this classification is chiefly founded is the presence or absence of a sexual arrangement, the first four classes being considered as a sexual. This is a classification different from that to which British students are accustomed, and whether it is an improvement remains to be seen Apart from the various opinions that may be held with regard to the classification adopted, this promises to be a useful work; but as the parts which have been sent for review only go as far as the beginning of the *Uredineæ*, it would be rash to give a premature judgment. At the same time, the name of the author (Dr Winter) ought to be assurance of as satisfactory a conclusion as a commencement.

A List of European Birds, including all Species found in the Western Palæarctic Regions. By H. E. Dresser. London: Published by the Author.

Mr Dresser is well known as the author of the magnificent book, recently completed, 'The Birds of Europe,' and of other valuable ornithological works, which is sufficient testimony that the list before us is trustworthy. Professor Huxley's classification, which was also followed in the 'Birds of Europe,' is the one adopted; and the list, which includes 623 species, is neatly got up and well fitted to serve its object as a check-list.

Proceedings of the Natural History Society of Glasgow. Vol. IV., Part II. 1879-80. Glasgow: 1881.

We are always glad to receive these 'Proceedings,' since there are none

of the Scottish Natural History Societies that publishes more useful and interesting reports of its doings than the one in Glasgow. The society has received an accession of strength by the incorporation into it of the younger "Field Naturalists' Society;" and we fancy that neither of the two societies need regret the union. The contents of the part now under notice are of the usual varied description, embracing subjects of a geological, botanical, zoological, and meteorological nature, and are illustrated by two excellent lithographic plates. As usual, most of the papers relate to Scottish natural history.

Proceedings of the Berwickshire Naturalists' Club for 1879.

Like the society just noticed, this club is one of which a Scottish naturalist may be proud, but, unlike it, it adds archæology to its natural history studies. A large portion of the present part is occupied with antiquarian papers which, while both valuable and interesting, cannot well be noticed here. In addition to these there are, however, a goodly number of natural history notes of both local and general interest, including lengthy notices by the secretary (Mr Hardy) of the effects of the winter of 1878-79. The part is illustrated by four plates of archæological subjects.

The Grallatores and Natatores of the Estuary of the Tay; the Great Decrease in their Number of late years; the Causes; with Suggestions for its Mitigation. By Colonel Drummond Hay. Dundee: Published by the Dundee Naturalists' Society. 1881.

On the Protection of Wild Birds. By Thomas Edward. Banff: 1881.

These two pamphlets, both relating to the same subject, and both by authors than whom none are more competent to speak with the authority that knowledge imparts, may well be considered together; not that we have sufficient space at present to deal with anything like justice to the strong appeal for more and better protection for our wild birds, so feelingly made by Colonel Drummond Hay and Mr Edward. By both these naturalists not only is the utter absurdity, not to mention the unveracity, of the accusations so often brought against the various kinds of water-fowl as destroyers of fisheries, well shown up, but the various weak points in the recent Protection Act are clearly pointed out. The weakest point of all is that the eggs and nests are not covered by the Act, and till this is done, and more effectual means taken for enforcing the law, wild birds cannot be said to be properly protected. Therefore, while thankful for such protection as has been accorded, it is the duty of all lovers of birds, and in fact of all who have sense enough to see that birds are in many ways a blessing, and not (as some foolish people would have us believe) more or less of a curse, and who do not grudge them a little fruit,—it is their duty to strenuously endeavour to get the Act so amended as to include the eggs and nests. At the same time it is not to Acts of Parliament that we ought to look for a radical cure. This will only be brought about by the better education of the people of every degree: and it is on this line that naturalists and natural history societies ought to move. In the meantime we would urge on the various societies to endeavour to see that the present Act is enforced. They might also advantageously procure and circulate copies of the pamphlets above mentioned.

ZOOLOGY.

NOTES ON THE HABITS OF DYTISCUS LAPPONICUS, GYLL.

By F. BUCHANAN WHITE, M.D. F.L.S.

DYTISCUS LAPPONICUS, one of the large carnivorous water-beetles, is a species which, from its very local distribution in Britain, has been seen in a living state by, I suppose, but few entomologists in this country. A few notes, imperfect though they be, on its habits, may not therefore be uninteresting.

This beetle was first detected as a British species by the late Rev. Hamlet Clarke, who, about the year 1854, captured four specimens in a small but very deep lake in the Island of Mull, which were duly recorded in the 'Zoologist.' The next record that I find, though the insect had probably been captured in the interval, is in 1868, when the Rev. J. E. Somerville, now of Broughty Ferry, mentions, in the 'Entomologist's Monthly Magazine,' the capture in the Island of Mull in 1866 of no less than forty-five specimens. In the following year the same gentleman discovered *Dytiscus lapponicus* in Donegal in Ireland, where it appears to be, as usual, very local but not rare. About this time, also, Dr Sharp discovered a new Scottish locality, having taken one specimen during an entomological exploration of Strathglass. In addition to these localities, Mr Somerville informs me that he has met with the beetle in an island near Mull, which concludes the list of places in which, so far as I am aware, this species has been met with in the British Isles.

Thanks to information kindly given me by Mr Somerville, I was enabled, during a recent visit to the Island of Mull, to renew acquaintance with *Dytiscus lapponicus*, whom I first saw "at home" in Dr Sharp's locality in Strathglass. In both localities the lochs in which the beetle is found are somewhat similar in

character. In both cases they are near the tops of hills, but in one the altitude is about 2000 feet, and in the other, 600 or 700, above sea-level. In both the bottom is stony, with little or no vegetation, and in to and out of neither of them flows any conspicuous stream, consequently perhaps no fish inhabit them. In the Strathglass loch the *Dytiscus* occurred to me only in one corner, where, upon the only muddy part of the loch, rested some large stones. On or under these stones the beetles rested, betaking themselves to the deeper water when disturbed; and as they seemed to be very easily alarmed, repeated visits to the loch resulted in the capture of about a dozen specimens only.

Much bolder or less cunning were the Mull individuals. The margins of the loch where they occurred are thickly strewn with rather large loose stones, and amongst these, and close to the margin of the loch, the *Dytiscus* may be seen slowly paddling about, perhaps hunting for food, or making his way from one hiding-place to another. At first I made frantic endeavours to secure with my water-net the specimens thus seen; but after losing several, I found that the best way to get them was to go to work quietly with the hands, turning over the stones and picking up the beetles when found. So unsophisticated were they that unless alarmed by a too vigorous onslaught, they made no endeavour to escape by swimming into the deep water, but, like the ostrich, thought that when they had hid their head under a stone, they were quite safe. Though a few were seen in about two feet depth of water, most of those observed were in places where the depth would not be more than five or six inches, and one individual was secured when taking a promenade on a dry stone.

Though when out of water, and more especially when dead, *Dytiscus lapponicus* is rather a dingy-looking creature, being blackish-brown, with the margins of the pronotum paler, yet, when in his "native element," few of our indigenous beetles surpass him in beauty. His colour is then a pale brown, with resplendent green reflections, and numerous fine pale yellow longitudinal lines. Alas! when taken from the water most of this beauty vanishes, and all that is left is a rare beetle!

Along with the perfect beetle were a good many specimens of the larva. These are of the usual *Dytiscus* form, and are pale brownish-grey in colour, with darker markings. The larvæ move slowly about amongst the stones, or else grasp the edge of one of them by their legs, the hinder part of their body floating

gracefully in the water. What they live on I had no opportunity of ascertaining during the short time I spent at the loch, but I noticed one of them making a suspicious nibble at a newt's tail, —the newt, however, being a big fellow, easily shook off his assailant. I noticed that in those parts of the loch where newts were most frequent, there the *Dytiscus* also most did congregate; and Mr Somerville has recorded his experience of the frequent association of newts and *Dytiscus lapponicus*—not probably for an interchange of harmonious ideas.

All the larvæ noticed were nearly full grown, so that the time (beginning of September) when I visited the Mull loch is probably either too early or too late for getting the perfect insect in abundance. It was perhaps for this reason that I saw very few females; but as Mr Somerville also, on the various occasions that he has taken *Dytiscus lapponicus*, as I did too, in Strathglass, found the female much rarer than the male, perhaps such is really the case.

Helix rufescens in the South-west of Scotland.—I found in August several specimens of *Helix rufescens* in a rockery in the garden of the Manse at Lochmaben, Dumfriesshire. I believe this is only the second locality in Scotland from which it has been recorded, Bowling having been the first.—J. LANDALE, Burntisland. *September* 1881.

OBITUARY NOTICE OF THE LATE ROBERT WALKER, F.G.S.E.

MR ROBERT WALKER, Librarian and Registrar of the University of St Andrews, died rather suddenly, on 5th February last, at the age of fifty-six. He was a frequent contributor to the 'Scottish Naturalist,' and his labours merit record in our pages.

He began his career as a cabinetmaker; but early in life his taste for Natural History led to his employment in the Museum in the United College, of which he was Curator at the time of his death; and we understand that he has been succeeded in that office by his brother. In 1860 he was appointed Assistant, and in 1869 Chief, Librarian, of the University Library.

Mr Walker was an excellent geologist, and took great interest in pursuits connected with natural history: his persevering labours were the means of bringing to light many new or little known specimens of marine zoology. He was much consulted

by visitors regarding the zoology of the neighbourhood of St Andrews. We append a list of his published papers.

List of Papers by Mr Robert Walker.

1. On the occurrence of a species of Regalecus among the rocks at St Andrews; with a few notes on its anatomy.—Ann. Nat. Hist., X., 1862, pp. 13-17.
2. Observations on some of the fossil-fishes of Dura Den.—Ann. Nat. Hist., XI., 1863, pp. 72-80.
3. On the skeleton of a seal (*Phoca Grænlandica* ?), and the cranium of a duck, from the pliocene beds, Fifeshire.—Ann. Nat. Hist., XII., 1863, pp. 382-388.
4. Note on *Ophiolepis gracilis*, Allman, from the brick-clay of Seafield.—Ann. Nat. Hist., XIII., 1864, pp. 111, 112.
5. On clays, containing fossils, near St Andrews; with remarks on some of the latter.—Ann. Nat. Hist., XIV., 1864, pp. 200-209.
6. On ancient shell-mounds at St Andrews, Part I.—Phil. Mag., XXXIII., 1866, pp. 321-335.
7. Notes on some of the rare birds that have been obtained in the east of Fife during recent years.—Scot. Nat., I., 1871, pp. 78-81.
8. The baleen or whalebone whales (*Balænoidea*) of the north-east of Scotland.—Scot. Nat., I., 1871, pp. 102-111.
9. On the cachalot or sperm whale (*Physeter macrocephalus*) of the north-east of Scotland.—Scot. Nat., I., 1871, pp. 142-152.
10. *Megachile centuncularis*.—Scot. Nat. I., 1872, pp. 222, 223.
11. On the occurrence of the hooded seal (*Cystophora cristata*) at St Andrews.—Scot. Nat., II., 1873, pp. 1-8.
12. On King ducks (*Somateria spectabilis*) in St Andrews Bay, &c.—Scot. Nat., II., 1873, pp. 49-54.
13. On a porpoise (*Phocæna*) with intermediate teeth-like bodies.—Scot. Nat., II., 1873, pp. 49-54.
14. On the occurrence of the bonito (*Thynnus pelamys*) near St Andrews; with some remarks on the Scombridæ.—Scot. Nat., II., 1873, pp. 193-196.
15. On the Salmonidæ of the Eden, Fife; with remarks on their condition in other rivers.—Scot. Nat., II., 1873, pp. 337-346.
16. On a new species of Amblypterus (*A. anconœchmodus*) and other fossil-fish remains from Pitcorthie, Fife.—Edin. Geol. Soc. Trans., II., 1874, pp. 119-124.
17. On clays containing *Ophiolepis gracilis* and other organic remains; with notes on recent geological formations near St Andrews.—Scot. Nat., III., 1875, p. 41.
18. On the grey seal (*Halichœrus gryphus*) on the east coast of Scotland.—Scot. Nat., III., 1875, p. 154.

PHYTOLOGY.

THE LIFE AND LABOURS OF A SCOTTISH NATURALIST, GEORGE DON OF FORFAR.

By JOHN KNOX.

(*Continued from page* 116.)

WHETHER the sketch suggested in the above letter was ever written cannot now be known; if it was it has dropped out of sight. The other proposal, that of applying to "the eminent Dr Smith," was accepted and carrried out by Mr Booth, as will be seen from the following letter:—

David Booth to Sir J. E. Smith, F.R.S.

"London, 24*th January* 1814.

"Sir,—Mr George Don, of the Botanic Garden, Forfar, was for many years past my intimate friend: I also understand that he was your constant correspondent. He is now no more. He died on the 14th inst., of a putrid sore throat, after six weeks' excruciating pain.

"My residence is at *Newburgh in Fife*. I have been in London these two weeks past, and the above intelligence was communicated to me in a letter from Forfar. My correspondent states further that Mr Don died in extreme poverty, having been obliged during his illness to accept of the private donations of friendship, which must have ill accorded with his independence of mind. He has left a widow and six children, four of whom are incapable of labour. Two sons (who, I suppose, are from fifteen to sixteen years of age) have been accustomed to work in the garden, but they are quite unfit either to continue or to sell off the valuable collection of plants which it contains. Indeed there is no one in that quarter that can appreciate their value; and what has been collected by the labour of years, will most probably be thrown out as useless cumberers of the ground.

"I address you, without ceremony, as the guardian of British botany, to the advancement of which Mr Don dedicated his

life. In that department *you* knew his value; *I* knew him not only as a botanist but as a man, and I know that had he been capable of sprawling at the footstep of power, and licking the holy dust, it would not now have fallen to my lot to call upon his friends to save his family from ruin.

"I leave London in a few days, but should you be able to suggest any means to assist this unfortunate family, and should you require any further information on the subject, you will oblige me by writing per post to Newburgh, Fife, if you have not a correspondent nearer Forfar.—I am, with much respect, sir, your obedient servant,

"DAVID BOOTH.

"Sir J. E. SMITH,
"*President of Linnæan Society, Norwich.*"

To what does Mr Booth allude when he speaks of Don's incapability of "sprawling at the footstep of power, and licking the holy dust?" Has it any connection with his short tenure of the office of superintendent of the Royal Botanic Gardens at Edinburgh? Did his political opinions make the place too hot for him? It may be so. There is no direct evidence as to what his politics were, but those of his Forfar associates are known to have been radical enough. Or is it wrong to attribute his resignation to this cause? Was is not rather due to the fact that he was too far away from his beloved Highland hills, and would not be cooped up in Edinburgh?

The following is the answer of Sir J. E. Smith to Mr Booth's appeal:—

Sir J. E. Smith to David Booth.

"NORWICH, *Feb.* 4, 1814.

"DEAR SIR,—The intelligence in your obliging letter of Jan. 24th is truly grievous. Your name has been mentioned to me in the most respectful manner, and therefore I rely on your goodness to perform what I wish for the benefit of our lamented friend's family, and to excuse the trouble. I wrote immediately to Mr Dawson Turner, Mr Lambert, Sir J. Banks, and the Bishop of Carlisle. I have as yet an answer from Mr Turner only, who, being in debt to Mr Don 4 guineas, has most generously sent me £20 to pay it! To this I am happy to add £5, which is all that my circumstances justify, as I have, like our departed friend, sacrificed all to science, except what I derive from a slender patrimony.

"I hope something will come from the above sources, and many others to which I shall apply—but meanwhile £25 may be important to the widow. Pray instruct me how I shall dispose of it. Our bankers here can pay it in London. Please to write under cover to the Lord Bishop of Carlisle, 14 Berners Street, London.

"I have also consulted some friends about the plants, but to no purpose. I have begged Mr Sowerby to consult some of our common friends in London.

"Mr P. Neill of Edinburgh has written to me on the same subject as yourself. If you have any communication with him, as I presume, please to inform him that I am giving attention to the subject—but above all things, I am unable to write many letters. He seems to think of an annuity being settled; perhaps the money raised had best be so disposed of. This you and other friends in Scotland must settle. When I go to town in April I do not doubt picking up many a pound for the good cause. Only, please to appoint a place for it to be paid into in London as it comes. I must mention that, as President of the Linnæan Society, I have never allowed any subscription whatever to come before the Society *as a body*, for many good reasons; but I will do all I can with individuals. Is not Mr Brodie of Brodie likely to assist?—I remain, sir, your obliged and obedient servant,

"J. E. Smith."

The subscription list thus commenced was kept open till August of the following year. At that date a sum of £80, including interest, stood at the credit of this fund in Sir William Forbes's bank in Edinburgh. Dr Patrick Neill of Canonmills acted as treasurer. The money was under the control of a committee of Forfar friends, including Hutchison, Roberts, Rodger, and James Webster. Soon after her husband's death, Mrs Don removed to Newburgh, Fife; and to Mr Booth, who had all along taken a deep interest in the welfare of the family, was remitted, from time to time, such sums of money as were deemed expedient, and he saw that they were properly expended.

The following extract from a letter from Mr George Alexander Don, a grandson, head-gardener to the Right Hon. Beresford Hope, M.P., Bedgebury, Kent, completes the family history.

"After his death, in 1814, my grandmother sold all the nursery stock and went to live at Newburgh in Fife. As my grandfather

left no provision for wife or family, she had a hard struggle to bring up and educate the children decently. Out of the large family of fifteen she bore to my grandfather, only six reached adult age, and one of them, the eldest, and the only girl, I think, died soon after her father, and before they left Forfar. All the five sons were bred to gardening, and they all came to England and settled in different parts of the country. . . . The two eldest sons, David and George, did not long follow gardening, but having ability, and a great love for botanical science, struck out a higher and more congenial path for themselves. The others were not so fortunate, although they all held good appointments in their calling."

The garden was let to a famous botanist, Thomas Drummond of Rocky Mountain fame, who was tenant for ten or twelve years. On his leaving, the ground was divided. A part was given as a garden to the occupant of the house. The rest was parcelled out and let as gardens. Soon after this the house was licensed as a public-house, by which time any traces of its former glory had disappeared from the garden. The hillock and all to the west of it, included in the feu, is now enclosed within the grounds belonging to the Caenmore Linen Works,—the manager of which resides in the house, altered and enlarged, in which George Don lived. The lake in which were the aquatic plants and fishes, is filled up and levelled, and covered with grass.

He lies in Forfar churchyard in a nameless grave. Is this as it should be? The Police Commissioners have given his name to a street—Don Street; but, by nine out of every ten, it is thought that the name was given in honour of another family, large employers of labour in the town. During his short life he did more than any other individual has ever done in stimulating the study of the botany of his native country, especially of the Highlands. Nearly a century had elapsed between the publication of Sibbald's 'Scotia Illustrata' and the time when he began his excursions. During that time little or nothing had been done, in a comprehensive way at least, in the study and exposition of the native plants. He had begun his work of discovery thirteen years before the publication of the 'Flora Scotica' of Lightfoot. His first excursion into the Highlands was made when he was fifteen years of age, and from that time on, during the remaining thirty-four years of his life, his enthusiasm never flagged. He has been the pioneer of all who have since studied

the botany of our Scottish Highlands. If the incidents of his life could have been collected when full of life and colour, they would have formed a biography as interesting as that of Robert Dick or Thomas Edward. But at the time literature busied herself but little with such men as George Don. The broadening, humanising influence of Burns had not yet broken down the middle wall of partition which separated rich and poor in literature and science. It is now too late. The man is little more than a shadow. Yet something surely can be done for past neglect. Will not the votaries of the science he loved so well and served so devotedly subscribe a few pounds for a simple stone to mark the spot where his ashes rest?

NOTES ON A FEW RARE AQUATIC PLANTS.

By A. STURROCK.

Naias flexilis Rostk.

THIS plant was first observed (*vide* 'Sc. Nat.,' vol. iii. p. 198) in Great Britain by the late Mr D. C. Robb and myself in August 1875. This summer I have found it in Marlee, Fingask, and White Lochs, all in this neighbourhood. It was quite natural to expect that it would occur in the first-mentioned of these lochs, as Cluny Loch (where it was first observed) flows into it; but Fingask and White Lochs have no connection with the other two, as they discharge into the Lunan Burn after it leaves Marlee Loch. This discovery finally disposes of the conjecture that *Naias* may have been introduced into Cluny Loch by the Rev. Mr M'Ritchie, once minister of the parish.

Ranunculus confervoides Fr.

The Batrachian *Ranunculus*, discovered in Rescobie Loch last summer by Messrs Graham and Knox and myself (*vide* 'Sc. Nat.,' vol. v. p. 350), corresponds in every particular with Fries's description of *R. confervoides*, except in the carpels, which are scarcely "obovate-turbinate," as he describes them. Mr J. G. Baker of the Kew Herbarium, to whom I sent specimens, says that, compared with the Rescobie plant, the type specimen which they have from Fries is a little more slender in habit, with fewer segments to the leaf and fewer carpels. In July of this year we observed it in great abundance in Balgavies Loch, east of Rescobie, and connected with it; and Mr Knox

and I found it again in Fingask Loch, near Blairgowrie, on the 10th of the present month. This is a valuable addition to the flora of Perthshire.

Potamogeton Zizii Mert. et Koch.

This interesting but puzzling plant I have not seen described in any manual of British botany. It was, I believe, first observed as a British plant in Cauldshiel Loch near Melrose; and Dr B. White informs me that he has it in his herbarium from Cluny Loch and the Loch of the Lowes. I gathered it this summer in Rescobie, Cluny, and Ardblair Lochs—in the first-mentioned on the 26th of July last. There seems to be some difference of opinion amongst those who have distributed specimens as to the place this *Potamogeton* should hold amongst its congeners. Most of the German authors incline to consider it a variety of *P. heterophyllus* Schreb. Garcke in his 'Flora von Deutschland'—the only work of the kind to which I have access—thus describes it under *P. gramineus* L. : "Leaves very large, blunt, especially the upper ones; always mucronate, and often undulate." The Scandinavian authors, on the other hand, I am told, place it nearer to *P. lucens*. Its fruit is gibbous, like that of the former, and the uppermost leaves are sometimes a little different from the others, but in habit and general appearance it resembles the latter much more closely. In my opinion it ought to rank as a species between *P. heterophyllus* Schreb. and *P. lucens* L. Mr Arthur Bennett of Croydon, in a letter to me on the subject, remarks that perhaps Chamisso's idea is nearest to nature, who includes *heterophyllus*, *lucens*, and *Zizii* as sub-species under one super-species, *P. proteus* Cham. et Schl. It is perhaps worthy of remark that we found it more frequently barren than fertile. In Rescobie, however, most of the specimens we observed were in exceptionally good condition.

Potamogeton decipiens Nolte.

This very rare *Potamogeton* was discovered in Rescobie Loch by Messrs Graham, Knox, and Stewart, and myself, on the 26th of July last. This is, I believe, the first time it has been observed in Scotland. Like *P. Zizii*, it does not seem to fruit very freely. In a rich bed of it we got only a very few spikes, and no well-matured fruit. In close proximity we found a fine bed of the delicate variety of *P. nitens* Web., the *curvifolius* of Hartman.

The Schoolhouse, Rattray, 31*st August* 1881.

THE CRYPTOGAMIC FLORA OF MULL.

By F. BUCHANAN WHITE, M.D., F.L.S.
Secretary of the Cryptogamic Society of Scotland.

ALLURED by the tempting account of the rich field that the Island of Mull offered to the mycologist, the Cryptogamic Society of Scotland, at its Conference in Glasgow in 1880, determined to have its Conference for 1881 in Mull, which, whether it came up to the sanguine expectations of some of the members, or fulfilled the less confident anticipations of others, presented at least new ground for exploration. It was accordingly arranged that the Society should meet at Salen on August 29th; and on the afternoon of that day a party of the members, rather few in number, but all enthusiastic workers, landed at Salen, and proceeded to explore the neighbourhood.

Salen is a very small village situated on the south side of the small bay of the same name in the Sound of Mull. Surrounding the village are a few small woods of scrubby birch, and a plantation or two of larch, intermingled with some cultivated fields, in which weeds far outnumber the legitimate occupants of the ground. Beyond the woods are irregular and marshy moorlands, gradually rising into hills, and culminating in Ben More, the highest mountain in Mull, and about four miles from Salen.

To the mycologists of the party it was manifest at a glance that no rich field for their exploration need be expected here, and such turned out to be the case. Fungi were few and far between, nor did the other classes of the cryptogamic plants make up for their absence. The most notable fungi observed were *Peronospora rufibasis*, a species parasitic on *Myrica gale*, and which, though detected for the first time by the Rev. J. Stevenson only a few years ago, seems to occur wherever the Sweet Gale grows; and *Puccinia moliniæ* which, though growing on such a widely diffused plant as *Molinia cærulea*, has not hitherto been recorded from any other place in Britain than Rannoch, where I discovered it five or six years ago.

Under these circumstances it was determined to change the field of our explorations, and to move further north to Tobermory, a place which, by all accounts, presented greater attractions. We were the more inclined to do so as one of our party was Mr George Ross, late of Tobermory (now of Oban), who has done much to elucidate the phanerogamic botany of Mull,

and under whose guidance at Tobermory we lost no time finding out the best localities.

The village of Tobermory is rather an extensive one, and was once more populous than it is at present. It lies on the north side of a land-locked bay, whose steep and rocky shores are extensively covered with mixed wood. As regards beauty it far surpasses the much vaunted Oban. It is easy of access, and probably only requires to be better known to be much frequented.

Having arrived at Tobermory, no time was lost in beginning work; and though fungi were not so abundant as they might have been, yet enough were found to keep the mycologists well employed. The ground explored on this day were Mr Allan's beautiful woods around Aros Castle, and amongst the more interesting species observed were *Craterellus cornucopioides*, *Cyathus striatus* (detected by Dr Flaxman Spurrell, who had come all the way from Kent to join the meeting), the brilliantly coloured *Torrubia militaris*, and *Milesia polypodii*, parasitic on *Polypodium vulgare*, and which, since it was first described a year or two ago in the pages of this magazine, has been found in so many places that it is a wonder that it was overlooked for so long. In addition to fungi some attention was bestowed on other cryptogamic plants, but nothing very special was noticed, though the luxuriance of many of the larger foliaceous lichens (*Sticta*, *Peltigera*, &c.) compelled admiration.

The following day was devoted to an ascent of a hill a few miles from Tobermory. Here little was expected and less done in cryptogamic botany, the chief finds being *Glyphomitrium Daviesii*, and a few Algæ, including a very pretty species of *Chætophora?* It was remarkable that on ground where, on the mainland of Scotland, the common *Agaricus umbelliferus* would have been frequent, not a specimen was to be seen, nor did we meet with it at all in Mull. Nor was this the only fungus that was conspicuous by its absence during our explorations. *Xylaria hypoxylon* is a notable instance, as were many common species of *Polyporus*, *Clavaria*, and *Corticium*. But though on the hill in question cryptogamic plants (at least of much interest) were not abundant, the magnificent view, extending from the Outer Hebrides, by Skye, Ross-shire, Inverness-shire, Argyleshire, and Perthshire to Dumbartonshire, was ample reward for the little toil required by the ascent, and even cryptogamic botanists can delight in other objects than those of their favourite study.

On this day the party was recruited by the arrival of some members who were unable to come sooner, and in the evening the annual business meeting was held. This was purely formal, and the only matter of interest that need be mentioned was the decision to hold the next conference in Aberdeen, under the presidentship of the veteran cryptogamist, Dr Dickie.

On Thursday explorations were made in a new direction, a small loch being visited in search of the local *Isöetes echinospora*, which had been found there by Mr Ross. The *Isöetes* was found to be abundant, and likely to remain so, growing in a deep dark pool in the peat. When seen alive, this plant presents a very different appearance from the more widely distributed *Isöetes lacustris*. From this loch the party proceeded to another part of Aros Castle woods, where some interesting lichens (to be afterwards noticed), but no new fungi, were observed. The chief other plant of importance found was *Lastrea æmula*, in great luxuriance, but very local.

Next day, under the guidance of Mr Ross, an old wall was visited, on which that local and interesting moss, which is almost confined to Britain, *Glyphomitrium Daviesii*, was found in great abundance. Some of the party then went on to a loch a few miles off, and found *Isöetes lacustris*, a plant which seems to be rare, or overlooked, in Mull.

After this the Conference concluded, and most of the members went home, but three of us (Dr Stirton, Mr M. C. Duff, and I) went on to Skye to continue our explorations. In Skye we had two days in which to botanise. One of these was devoted to a visit to the indescribably grand scenery of Loch Coruisk and the Coolin Hills, and the short time that we were able to spend at this loch seems to show that a more lengthy exploration would be very profitable. Not that vegetation is by any means abundant there. In fact, one of the most remarkable features of the place, and a striking characteristic of the rocks which form the mass of the hills, is the almost perfect absence of vegetation. Still there are a few plants, and amongst these are some of very great interest. In the foremost rank of these is the beautiful moss *Myurium hebridarum*, which occurs in patches on the ground among stones, or under the shade of *Molinia cærulea*, or of heather, taking the place in this locality of the common *Hypnum cupressiforme*. The *Myurium*, which is as beautiful as it is rare, was discovered, on August 26, 1851, on one place of the north-west shore of North Uist,

by the late Rev. Dr C. Smith. It was subsequently found in the locality in which we saw it in Skye, where it was detected by the Rev. Dr Macmillan, and more recently in the Canary Islands and Azores, during the voyage of the Challenger, by Mr Moseley. In the Scottish stations it is barren, but in the more southern ones fruit has been found. When first discovered, this moss was supposed by the late Mr Wilson, with some doubt, to be a form of *Leucodon lagurus*, a species which is found at Cape Horn, and described by him under the title of var. *borealis*. Subsequently, Dr Schimper created for its reception the genus *Myurium*. From the peculiar distribution of this moss (in addition to other botanical evidence), Dr Stirton has suggested ('Notes on the Fauna and Flora of the West of Scotland,' p. xxix) that there may have been a land connection "along the great mid-Atlantic ridge" by which this and other species may have arrived at their present localities. Another moss which we found at Loch Coruisk is the already mentioned *Glyphomitrium Daviesii*. One beautiful lichen which occurred on loose boulders has been referred to *Umbilicaria pustulata*, but regarding it Dr Stirton will say something in another part of this report. Of fungi no species were observed.

Another day was spent on Ben Blabhein, a grand hill, resembling in its characteristics the Coolins, and situated at the head of Loch Slapan. As a whole, it was rather barren, as might have been expected from the nature of the rock; but one ravine proved an exception, and was, in the higher plants at least, rather rich. Amongst the cryptogams noticed here, was a peculiar form of *Polystichum lonchitis*, differing from the usual form in the much less spinulose margin of the pinnæ. Amongst other ferns found on this hill were *Asplenium viride*, in great profusion; *A. trichomanes*, with fronds eight or ten inches in length; *A. adiantum-nigrum;* a curious dwarf and slender form of *Lomaria spicant; Allosorus crispus*, &c. Amongst mosses, *Glyphomitrium Daviesii* again occurred, along with several others not yet determined. Of Hepaticæ, *Physotium cochleariforme* (seen also in abundance at Loch Coruisk) was one of the more remarkable. Fungi were rare, but *Dactylium modestum*, B. and Wh., parasitic on *Alchemilla alpina*, was in great abundance, and a *Puccinia* occurred on *Oxyria*, which may be *P. polygonorum* (as suggested by Mr Berkeley), but which is certainly very distinct from *P. amphibii*. No *Puccinia* has, I believe, been before recorded as parasitic on *Oxyria*.

Before concluding with Skye, it may be noticed that both Mr Duff and myself were struck by the unusual breadth and shortness of the fronds of *Polypodium vulgare*, growing on walls by the roadside, and by the unusual breadth of their pinnæ.

We now proceed to give lists of some of the cryptogamic plants noticed in Mull. It is almost unnecessary to remark that lists made during a visit of a few days cannot pretend to anything like completeness; and the object in publishing them is simply to show in what "lines" the cryptogamic flora runs, and what perhaps may be expected from a more exhaustive investigation.

Ferns and their Allies.

Hymenophyllum unilaterale Willd. (= Wilsoni Hook.) Common. *H. tunbridgense* occurs, but we did not see it.

Pteris aquilina L.

Lomaria spicant Desv.

Asplenium trichomanes L.

" adiantum-nigrum L. Common on walls.

" filix-fœmina Bernh.

Cystopteris fragilis Bernh.

Aspidium aculeatum Sw.

Nephrodium filix-mas Rich. In addition to the ordinary form, a curious dwarf and very rigid form was observed at low altitudes. In some plants the fronds were only seven or eight inches long, and yet with abundant fructification. We saw the same form in Skye, but at a higher altitude.

Nephrodium spinulosum Desv.

" dilatatum Desv.

" æmulum Baker. Very local but luxuriant.

" oreopteris Desv.

Polypodium vulgare L.

" phegopteris L.

" dryopteris L.

Equisetum arvense L.

" sylvaticum L.

" palustre L.

" limosum L.

Lycopodium selago L.

Isöetes lacustris L. Very local or rare.

" echinospora Dur. Very local.

Mr Ross informed us that, in addition to these, *Asplenium*

viride, *A. marinum*, *Osmunda regalis*, *Allosorus crispus*, &c., had been found by himself or others.

Fungi.

The following are among the species noticed :—

Agaricus muscarius L.
" rubescens P.
" granulosus Batsch.
" melleus Vahl.
" rutilans Schæff.
" laccatus Scop.
" butyraceus Bull.
" confluens P.
" rubromarginatus Fr.
" purus P.
" chalybæus P.
" hypnorum Batsch.
" æruginosus Curt.
" semiglobatus Batsch.
" fascicularis Huds.
" semilanceatus Fr.
" papilionaceus Bull.

Cortinarius cyanipes Fr.
" purpurascens Fr.

Hygrophorus pratensis Fr.

Gomphidius glutinosus Fr.

Lactarius torminosus Fr.
" blennius Fr.
" vellereus Fr.
" deliciosus Fr.
" mitissimus Fr.
" subdulcis Fr.

Russula nigricans Fr.
" fœtens F.
" emetica Fr.
" heterophylla Fr.
" Queletii Fr. This and a few others in this list were pointed out by the Rev. J. Stevenson.

Cantharellus cibarius Fr.
" tubæformis Fr.

Marasmius androsaceus Fr.

Boletus luteus L.

Boletus flavus With.
" bovinus L.
" chrysenteron Fr.
" subtomentosus L.
" luridus Fr.
" scaber Fr.
Polyporus brumalis Fr.
" perennis Fr.
" betulinus Fr.
" versicolor Fr.
" abietinus Fr.
Hydnum repandum L., and var. rufescens Fr.
Craterellus cornucopioides Fr.
Stereum hirsutum Fr.
Clavaria rugosa Bull.
" cristata Holmsk.
Calocera cornea Fr.
Tremella foliacea P.
Lycoperdon gemmatum Fr.
Reticularia umbrina Fr.
Æthalium septicum Fr.
Physarum nutans P.
Cyathus striatus Hoffm.
Melasmia alnea Lev.
Septoria hydrocotyles Desm.
" scabiosæcola Desm.
" lysimachiæ West.
" virgaureæ Desm.
" stachydis Desm.
Phyllosticta violæ Desm.
Asteroma padi Grev.
" rosæ De.
Ceuthospora lauri Grev.
Torula pulveracea C.
Phragmidium mucronatum, Link.
" bulbosum Schl.
" gracile Grev.
Puccinia scorodoniæ Link.
" compositarum, Sch.
" saniculæ Grev. With this occurred what appeared to be a young state of *Æcidium saniculæ*, but too immature to be certain.

Puccinia galiorum Lk.
" circææ P. On *Circæa alpina*, in very fine condition.
Ustilago urceolorum Tul.
Urocystis pompholygodes Sch..
Coleosporium tussilaginis Lev.
" rhinanthacearum Lev.
Melampsora salicina Lev.
" betulina Desm.
Uredo bifrons Grev.
Trichobasis oblongata B.
Lecythea valerianæ B.
Æcidium compositarum Mart., var. tussilaginis.
Milesia polypodii White.
Cladosporium herbarum Lk.
Sepedonium chrysospermum Lk.
Microsphæria penicillata Lev.
Spathularia flavida P. Detected by Mr T. King.
Leotia lubrica P.
Peziza badia P.
" macropus P.
" granulata Bull.
" calycina Schum.
Helotium æruginosum Fr.
" citrinum Fr.
Ascobolus depauperatus B. and Br. Not before recorded as a Scottish species. Identified by Mr C. B. Plowright.
Bulgaria sarcoides Fr.
Heterosphæria patella Grev.
Rhytisma salicinum Fr.
" acerinum Fr.
Torrubia militaris Fr.
Claviceps purpurea Tul.
Hypoxylon coccineum Bull.
Nectria cinnabarina Fr.
Polystigma fulvum D. C.
Dothidea junci Fr.
Sphæria coryli Batsch. Very rare.
" pulvis-pyrius P.
Stigmatea Robertiani Fr.
Dichæna strobilina Fr.
Asterina veronicæ Lib.

(*To be continued.*)

MYCOLOGIA SCOTICA.

By Rev. JOHN STEVENSON.

(*Continued from page* 125.)

2203. **P. (Hymenoscypha) subularis** Bull. *Fr. Syst. Myc. ii. p.* 118.

Brick-coloured, fragile; cup hypo-crateriform, quite entire; stem very long, slender; sporidia ·017 – ·02 × ·004 – ·005 mm.

On fallen seeds of *Angelica*. Oct.

East. —— —— —— —— Moray ——
West. —— —— —— ——

Forres, 1879. Rev. J. Keith.
Europe.

2204. **P. (Hymenoscypha) pallido-virescens** Phill. *Grevillea, vi. p.* 24.

Scattered or gregarious, stipitate, tough, pallid green; cup patelliform, often convex, margin quite entire; stem slender, somewhat flexuous, often villose, more or less elongated, slightly attenuate below, immersed in the earth; asci cylindraceo-clavate; sporidia elliptic, ·015 × ·005 mm.; paraphyses filiform, filled with globules.

On roots of grass. Oct.

East. —— —— —— —— Moray ——
West. —— —— —— ——

Forres, 1879. Rev. J. Keith.
England.

2205. **P. (Hymenoscypha) sordida** Fckl. *Symb. Myc. p.* 229.

Gregarious, dirty-coloured; cup smooth, patelliform, margined, the margin at length crispo-lacerate, involute; stem firm, scarcely equalling the diameter of the cup, disc at length reddish; asci linear, stipitate, 8-spored; sporidia biseriate, cylindrical, curved, hyaline, 8 × 2 mik.

On decaying stick of broom. Jan.

East. —— —— —— —— Moray ——
West. —— —— —— ——

Forres, 1880. Rev. J. Keith.
Europe.

2206. **P. (Mollisia) lacustris** Fr. *C. Hbk. No.* 2101.

On straw of *Phalaris arundinacea*. Nov.

East. —— —— —— —— Moray ——
West. —— —— —— ——

Forres. Rev. J. Keith.
England. Europe.

* **P. strobilina** Fr. *Mycol. Scot. p.* 221.
This has been gathered at Forres by the Rev. J. Keith, and by myself at Glamis, growing abundantly on fallen spruce-fir cones. The plant, which may be easily overlooked, is perhaps not uncommon.

2207. **Ascobolus viridis** Curr. *C. Hbk. No.* 2197.
On the ground. Oct.
East. —— —— —— —— Moray ——
West. —— —— —— ——
Forres, 1879. Rev. J. Keith.
England. Europe.

2208. **A. microsporus** B. & Br. *C. Hbk. No.* 2209.
On cow-dung. Aug.
East. —— —— —— —— Moray ——
West. —— —— —— ——
Aviemore, 1879. Rev. J. Keith.
England. Europe.

* **A. Cookei** Boud. *Mycol. Scot. p.* 338.
The specimens found by Dr B. White were on grouse-dung.

2209. **Phacidium minutissimum** Awd. *C. Hbk. No.* 2267.
On oak-leaves. June.
East. —— —— —— —— Moray ——
West. —— —— —— ——
Dunphail, 1879. Rev. J. Keith.
England. Europe.

2210. **P. tetrasporum** Phill. & Keith. *Gard. Chron.* Sept. 4 1880.
Epiphyllous, crumpent, circular or oblong, convex, cinereous, seated on a brownish-yellow spot, splitting irregularly into three or four laciniæ; disc black on the surface, brownish-yellow within; asci broadly clavate; sporidia 4, elliptical-ovate, with a septum near the lower end, often with a papilla, brown, ·025–028 × ·017 mm.; paraphyses numerous, septate, with brown pear-shaped heads, 1 mm across.
Simulating a Puccinia.
On juniper leaves. June.
East. —— —— —— —— Moray ——
West. —— —— —— ——
Altyre and Dunphail, 1880. Rev. J. Keith.

* **P. leptideum** Fr. *Mycol. Scot. p.* 344.
Rothiemurchus. Rev. J. Keith.

2211. **Hysterium (Lophodermium) eriophori** Phill. *in Litt.*

Superficial, scattered, roundish or elliptical, black, rugose, lips at length elevated, serrated ; asci clavate, broad ; sporidia 8, filiform, about 1 mm. long ; paraphyses numerous, slender.

On dead stems of *Eriophorum.* Aug.—Sept.

East. —— —— —— —— Moray ——
West. —— —— —— ——

Grantown. Rev. J. Keith.

2212. **Lophium læviusculum** Karst. *Myc. Fenn. ii. p.* 246. *Grevillea, viii. p.* 103.

Gregarious, erumpent-superficial, linear-elongated, hysteriform, black, nearly smooth, ·3–·7 mm. long ; asci fusiform-elongated, ·054–·060 mm. long, about ·006 mm. broad ; sporidia 8, fusiform-elongated, straight or nearly straight, usually faintly triseptate, yellowish, ·016–·022 × ·0025–·003 mm. ; paraphyses numerous, crowded, very slender.

On damp decaying fir-leaves. Aug.

East. —— —— —— —— Moray ——
West. —— —— —— ——

Grantown. Rev. J. Keith.
Europe.

* **Hypocrea citrina** Fr. *Mycol. Scot. p.* 358.
Forma fungicola. Darnaway. Dunphail. Rev. J. Keith.

2213. **Hypomyces violaceus** Tul. *Karst. Myc. Fenn. ii. p.* 210.

Mycelium densely spread over the matrix, floccose, whitish, at length violet, producing conidia of two sorts, some smaller, linear-oblong, 1 2 loculate, pallid, others larger, broadly ovate, smooth, brown ; perithecia emergent, sphæroid or sphæroid-depressed, umbilicate, opening by a scarcely perceptible ostiolum, crowded, purplish, very small ; asci cylindrical, ·055–·06 × ·004 mm. ; sporidia 8, uniseriate, ellipsoid or oblong, straight or somewhat unequally sided, simple, hyaline, ·006–·007 × ·002–·003 mm. ; paraphyses none.

In old saw-pit. Sept.

East. —— —— —— —— Moray ——
West. —— —— —— ——

Cawdor, 1879. C. B. Plowright.
Europe.

2214. **Microsphæria Hedwigii** Lev. *C. Hbk. No.* 1918.

On *Viburnum opulus.* Autumn.

East. —— —— —— Dee —— ——
West. —— —— —— ——

Aberdeen. Prof. J. W. H. Trail.
England. Europe. America.

* **Erysiphe lamprocarpa** Lev. *Mycol. Scot. p.* 354.
Also on *Plantago major*, and *P. lanceolata.*

2215. **H. chrysospermus** * Tul. *Karst. Myc. Fenn. ii. p.* 208.

Mycelium penetrating the living matrix, and at length entirely destroying it, producing conidia which, so long as it is white, are smaller, oblong, sometimes somewhat narrowed in the middle and septate, thereafter larger, sphæroid, verrucose, from yellow becoming golden or golden-brown, very copious; perithecia innumerable, very densely compacted into an uneven stratum, and partly sunk in the golden dust of conidia, ovoid, often conically-attenuated at the top, at first hyaline, then dirty, or of a faint and dirty gold colour, glabrous, minute; asci cylindrical, attenuated downwards, ·12–·15 × ·009 mm.; sporidia 8, uniseriate, elongate, somewhat curved and slightly mucronate at both ends or one only, unequally spuriously uniseptate, hyaline, ·021–·025 × ·006 mm.; paraphyses none.

On decaying agaric. Sept.

East. —— —— —— —— Moray ——
West. —— —— —— ——

Chapelton Wood, Forres, 1879. J. S.
Europe.

2216. **Nectra mammoidea** Phill. & Plow. *Grevillea, iii. p.* 126. *Pl.* 42, *fig.* 5.

Sub-cæspitose; perithecia medium-sized, globose, minutely furfuraceous, brick-red; ostiola papillate, persistently darker than the perithecia; sporidia elliptical, uniseptate, somewhat accuminate, rather irregular in size and form, ·001 in. × ·0004 in.

On currant-sticks. March.

East. —— —— —— —— Moray ——
West. —— —— —— ——

Forres, 1880. Rev. J. Keith.
England.

2217. **N. inaurata** B. & Br. *C. Hbk. No.* 2352.

On dead holly. April.

East. —— —— —— —— Moray ——
West. —— —— —— ——

Darnaway. Rev. J. Keith.
England.

2218. **Isothea saligna** Berk. *C. Hbk. No.* 2804.

On fallen sallow-leaves. May.

East. —— —— —— —— Moray
West. —— —— —— ——

Cothall, Forres Rev. J. Keith.
England. Europe.

2219. **Valsella clypeata** Fckl. *Symb. Myc. p.* 203.

Conceptacles clypeate, oblong, immersed in the parenchyma of the bark, black, inflating the epidermis into pustules, internally olive, disk orbicular but for the most part elliptic, slightly prominent through the ruptured epidermis; white; perithecia 4-8, densely crowded in the conceptacle, globose, minute, black, the ostiola papillæform in the at length punctiform disc, not exserted, black; asci sessile, oblong, polysporous, 52×7 mik; sporidia cylindrical, obtuse at both ends, slightly curved, simple, 6-7×1½ mik.

On bramble-stems. April.

East. —— —— —— —— Moray
West. —— —— —— ——

Altyre, 1880. Rev. J. Keith.
Europe.

2220 **Gibbera Saubinetii** Mont. *C. Hbk. No.* 2526.

Holly twigs. March.

East. —— —— —— —— Moray
West. —— —— —— ——

Forres, 1880. Rev. J. Keith.
England. Europe. America.

2221. **Massaria eburnea** Tul. *C. Hbk. No.* 2533.

On beech. July.

East. —— —— —— —— Moray
West. —— —— —— ——

Darnaway, 1879. Rev. J. Keith.
England. Europe.

2222. **Lophiostoma hederæ** Fckl. *Symb. Myc. p.* 157.

Perithecia scattered, nestling under the epidermis of the bark, rarely free, of middle size, globoso compressed, very black, ostiolum slightly prominent, broadly-compressed, semi-orbicular, subcrenulate, of the same colour; asci elongate, sessile, 8-spored, 80×8 mik; sporidia biseriate, fusiform, curved, 4-nucleate, triseptate (?) hyaline, 20×4 mik.

On ivy-stems. April.

East. —— —— —— —— Moray
West. —— —— —— ——

Forres, 1879. Rev. J. Keith.
Europe.

* **Psilosphæria Stevensoni** * B. & Br. *Mycol. Scot. p.* 388.

In recent "Notices of British Fungi" ('Annals and Magazine of Natural History,' February 1881), Messrs Berkeley and Broome give the following description of this species:—

Black, fragile, scattered, subglobose, smooth; sporidia oblong, 2-3 septate, ·0002 long. Under the lens it splits with pressure into several fragments.

2223. **Lasiosphæria superficialis** Curr. *Sphæria, C. Hbk. No.* 2567.

On pine-stick. Aug.

East. —— —— —— —— Moray ——
West. —— —— —— ——

Rothiemurchus, 1879. Rev. J. Keith.
England.

2224. **Sordaria maxima** Nees. *Niessl. Beitr. p.* 38. *Winter Sord. p.* 22, *t.* 8, *fig.* 12. *Grevillea, viii. p.* 107.

Perithecia gregarious, cæspitose often confluent, ovoid, oblong or subpyriform, brownish-black, rugulose, ·6–·12 mm. in height; asci clavate, cylindrical, stipitate, apex obtusely rounded, 4-spored, sporiferous portion ·14–·16 × ·02–·025 mm.; stem of ascus ·265–·280 mm. long; sporidia uniseriate, oblong, brownish-black, nucleate, involved in gelatine, ·034–·042 × ·018–·024 mm.

On rabbit-dung. July.

East. —— —— —— —— Moray ——
West. —— —— —— ——

Forres, 1879. Rev. J. Keith.
Europe.

* **Sporormia minima** Awd. *Mycol. Scot. p.* 396.

Rannoch. Dr B. White, 1875.

2225. **Sphæria sordaria** Fr. *C. Hbk. No.* 2599.

On fir-chips. Nov.

East. —— —— —— —— Moray ——
West. —— —— Argyle ——

England. Europe.

2226. **S. ditopa** Fr. *C. Hbk. No.* 2663.

On alder-twigs. April.

East. —— —— —— —— Moray ——
West. —— —— —— ——

Forres, 1880. Both forms. Rev. J. Keith.
England. Europe.

2227. S. persistens * B. & Br. *C. Hbk. No.* 2666.

On rose-stems. June—July.

East. —— —— Tay —— Moray ——
West. —— —— —— ——

England.

2228. S. nigrella * Fr. *C. Hbk. No.* 2728.

On *Angelica* stems. June—July.

East. —— —— Tay —— Moray ——
West. —— —— —— ——

England. Europe. America.

2229. S. rubicunda Neissl. *Grevillea, vi. p.* 27.

Sporidia 35 × 10 mk.

On a damp stick. April.

East. —— —— —— —— Moray ——
West. —— —— —— ——

Forres. Rev. J. Keith.
England. Europe.

2230. Sphærella anarithma B. & Br. *C. Hbk. No.* 2771.

On *Ammophila*. July.

East. —— —— —— —— Moray ——
West. —— —— —— ——

Forres, 1878. Rev. J. Keith.
England.

2231. S. ditricha Fr. *Syst. Myc. ii. p.* 515.

Gregarious, seated on a grey spot; perithecia hemispherical, very small, astomous, black, beset with erect divergent hairs; asci very shortly pedicellate or sessile, elongated; sporidia 8, biseriate, ovoid-oblongated, uniseptate, greenish-hyaline, ·012–·016 × ·005–·006 mm.; paraphyses numerous, slender.

On birch-leaves. June.

East. —— —— —— —— Moray ——
West. —— —— —— ——

Forres, 1879. Rev. J. Keith.
Europe.

* **Venturia Dickiei** De Not. *Mycol. Scot. p.* 409.

Grantown. Rev. J. Keith.

For the following species, gathered by Professor J. W. H. Trail, add "Dee":—

Puccinia variabilis Grev.; P. galiorum Link.; P. chrysosplenii Grev.;

Uromyces apiculosa Lev.; U. intrusa Lev.; U. polygoni Fckl.; Uredo vacciniorum Pers. on *Vaccinium vitis-idæa;* Coleosporium sonchi-arvensis Lev.; Trichobasis fabæ Lev.; Protomyces macrosporus Ung.; Peziza apala B. & Br.; P. arenivaga Desm.; Helotium virgultorum Fr.; Phacidium repandum Fr.; Stegia ilicis Fr.; Phyllactinia guttata Lev.; Nectria Rousseliana Mont.; Dothidea podagrariæ Fr.; Stigmatea potentillæ Fr., on *Potentilla anserina.*

THE GAELIC NAMES OF PLANTS.

By JOHN CAMERON.

(*Continued from p.* 133.)

P. picea—Silver pine. Gaelic: *giubhas geal* (Fergusson), white pine. First planted at Inveraray Castle in 1682.

Abies communis—Spruce-fir. Gaelic: *guithas Lochlannach*, Scandinavian pine.

> "Nuair theirgeadh *giubhas Lochlainneach.*"—M'Codrum.
> When the spruce-fir is done.

Lòchlannach, from *loch*, lake, and *lann*, a Germano-Celtic word meaning land—*i.e.*, the lake-lander, a Scandinavian.

> "Giubhas glàn na Lòchlainn,
> Fuaight' le copar ruadh."
> Polished fir of Norway,
> Bound with reddish copper.

P. larix—Larch. Gaelic and Irish: *laireag.* Scotch: *larick.* Latin: *larix*, from the Celtic, *làr*, fat, from the abundance of resin the wood contains. Welsh: *larswydden*, fat wood.

P. strobus (*Strobus*, a name employed by Pliny for an eastern tree used in perfumery)—Weymouth pine. Gaelic: *giùthas Sasunnach* (Fergusson), the English pine. It is not English, however; it is a North American tree, but was introduced from England to Dunkeld in 1725.

Cupressus—Cypress. Irish and Gaelic: *cuphair*, an alteration of Cyprus, where the tree is abundant.

C. sempervirens—Common cypress. Gaelic: *craobh bhròin*, the tree of sorrow. *Bròn*, grief, sorrow, weeping. *Craobh uaine giùthais*, the green fir-tree.

> "Is cosmhuil mi ri *crann uaine giuthais.*"—Hosea xiv. 8.
> I am like a green fir-tree.

The fir-tree of Scripture (Hebrew *berosh* and *beroth* are translated fir trees) most commentators agree is the cypress.

Thuja articulata—Thyine-wood. Gaelic: *fiodh-thine.*

"Agus gach uile ghnè *fhiodha thine.*"—REV. xviii. 12.
And all kinds of thyine-wood.

Alteration of *thya*, from *θνω*, to sacrifice. Another kind of pine, Hebrew, *oren* (Irish and Gaelic, *oruin*), is translated ash in Isaiah xliv. 14, and beech by O'Reilly.

Cedar—(So called from its firmness.) Hebrew: אֶרֶז, *erez. Cedrus Libani*, cedar of Lebanon. Gaelic and Irish: *crann sheudar*, cedar-tree.

"Agus air uile *sheudaraibh Lebanoin.*"—ISAIAH ii. 13.
And upon all the cedars of Lebanon.

The *cedar-wood* mentioned in Lev. xiv. 4 was probably *Juniperus oxycedrus*, which was a very fragrant wood, and furnished an oil that protects from decay—cedar-oil (*κέδριον*). "Carmina linenda cedro"—*i.e.*, worthy of immortality.

"Agus *fiodh sheudar*, agus scàrlaid, agus hiosop."
And cedar-wood, scarlet, and hyssop.

Juniperus—Said to be "from the Celtic *jeneprus*, which signifies rough or rude" (Loudon), a word *not* occurring in any Celtic vocabularies that I have consulted. It seems to be the Latinised form of the Celtic root *iu*, *iubh*, *iur*, *yw* (see *Taxus*). From the same root comes *yew* in English. Irish: *iubhar-beinne* (O'Reilly), the hill yew; *iubhar-talamh*, the ground yew; *iubhar-chraige*, the rock yew,—all given as names for the juniper. *Juniperus* is mentioned by both Virgil and Pliny. Both the Greeks and Romans reluctantly admitted that they were indebted to the Celts for many of their useful sciences, and even their philosophy (see Diogenes Laertius), as they certainly were for their plant and geographical names.

J. communis—Juniper. Gaelic and Irish: *aiteil*, *aitinn*, *aitiol.*

"Ach chaidh e fèin astar làtha do'n fhasach agus thàinaig e agus shuidh e fuidh *craobh aiteil.*"—1 KINGS xix. 4.

And he went a day's journey into the desert, and he sat under a juniper tree.

The juniper of Scripture, *Genista monosperma*, was a kind of broom. *Aiteil*, from *ait*. Welsh: *aeth*, a point, furze. Irish: *aiteann*, furze, from its pointed leaves. *Bior leacain* (in Arran), the pointed hillside plant. *Staoin* (in the North Highlands), *caoran staoin*, juniper berries (*staoin*, a little drinking-cup).

The badge of Clans Murray, Ross, M'Leod, and the Athole Highlanders.

J. sabina—Savin. Gaelic: *samhan* (Armstrong), alteration of "sabina," the "sabina herba" of Pliny. Common in Southern Europe, and frequently cultivated in gardens, and used medicinally as a stimulant, and in ointments, lotions, &c.

Taxus—According to Benfey, is derived from the Sanskrit, *taksh*, to spread out, to cut a figure, to fashion. Persian *tak*. Greek: τοξος, an arrow. Irish and Gaelic: *tuagh*, a bow made of the *taxos* or yew, now applied to the hatchet used in place of the old bow.

T. baccata — Common yew. Gaelic and Irish: *iuthar*, *iubhar*, *iughar*, from *iùi*. Greek: ἰός, an arrow, or anything pointed. Arrows were poisoned with its juice; hence in old Gaelic it was called *iogh*, a severe pain, and *ioghar* (Greek, ιχωρ, *ichor*) pus, matter. The yew was the wood from which ancient bows and arrows were made, and that it might be ready at hand, it was planted in every burial-ground.

> "'N so fein, a Chuchullin, tha' n ùir,
> 'S caoin *iuthar* 'tha 'fàs o'n uaigh."[1]—Ossian.
>
> In this same spot Chuchullin, is their dust,
> And fresh the yew-tree grows upon their grave.

Hence another form of the name *eo*, a grave. *Sìnsior*, *sinnsior* (O'Reilly), long standing, antiquity, ancestry. The yew is remarkable for its long life. The famous yew of Fortingall in Perthshire, which once had a circumference of 56½ feet, is supposed to be 3500 years old. *Sineadhfeadha* (O'Reilly), protracting, extending.

The badge of Clan Fraser.

ENDOGENS.

Orchidaceæ.

Orchis—Greek: ὄρχις, a plant with roots in the shape of testicles. "Mirabilis est *orchis* herba, sive serapias, gemina radice testiculis simili"—Pliny.

O. maculata—The spotted orchis. Gaelic and Irish: *ùrach*

[1] Laing is not correct when, in attacking the genuineness of the poems of Ossian, he asserts that the yew, so often mentioned in these poems, is not indigenous. There are various places, such as Gleniur, Duniur, &c., that have been so named from time immemorial, which prove that the yew was abundant in these places at least many centuries ago.

bhallach, from *ùr*, fresh; *ùrach*, a bottle; *uradh*, apparel, and *ballach*, spotted.

O. mascula—Early orchis. Gaelic: *moth ùrach*, from *mòth*, the male of any animal.

> "Lointeann far an cinn
> I'na *moth'raichean.*"—M'Intyre in 'Ben Doran.'
>
> Meadows where the early orchis grow.

Irish: *magairlin meireach*, (*magairle*, the testicles; *meireach* (Greek, *meiro*), joyful, glad). *Clachan gadhair* (*gadhar* a hound, *clach*, a stone). The name, *cuigeal an losgain*, the frog's spindle, is applied to many of the orchis; and frequently the various names are given to both *maculata* and *mascula*.

O. conopsea—Fragrant orchis. Gaelic: *lus tàghta*, the chosen or select weed.

Ophrys—Greek: οφρύς (Gaelic, *abhra*), the eyelash, to which the delicate fringe of the inner sepals may be well compared. "A plant with two leaves"—Freund.

O. or **Listera ovata**—Tway blade. Gaelic: *dà-dhuilleach*, two-leaved; *dà-bhileach*, same meaning.

Epipactis latifolia—White helleborine. Gaelic: *'elebor-geal.*[1] A plant used formerly for making snuff. "The root of hellebor cut in small pieces, the pouder drawne vp into the nose causeth sneezing, and purgeth the brain from grosse and slimie humors"—Gerard, 1597. This is probably the plant referred to in "Morag," when M'Donald describes the buzzing in his head, for even his nose he had to stop with *hellebore*, since he parted from her endearments.

> "Mo cheann tha làn do sheilleanaibh
> O dheilich mi ri d'bhriodal
> Mo shròn tha stoipt' á *dh-elebor.*
> Na deil, le teine dimbis."

Iridaceæ.

Iris—Signifying, according to Plutarch, the "eye." Canon Bourke maintains "it is derived from ἐιρω, to settle. And as a name it was by the pagan priests applied to the imaginary messenger, sent by gods and goddesses to others of their class, to announce tidings of goodwill. At times they imagined her sent to mortals, as in Homer, *to settle* matters, or to say they were destined to be settled. Such was the duty of Iris. Now

[1] See *Helleborus viridis*.

amongst Jews and Christians, the rainbow was the harbinger of *peace* to man, hence it was called 'Iris;' and the circle of blue, grey, or variegated tints around the pupil of the eye is not unlike the rainbow—therefore this circlet was so called by optic scientists, simply because they had no other word; and botanists have, by comparison, applied it to the *fleur-de-lis*, because it is varied in hue, like the iris of the eye, or the rainbow. *Iris* does not and did not convey the idea of eye."

I. pseudacorus — The yellow flag. Gaelic: *bog uisge* — *bog*, soft, but here a corruption of *bogha-uisge*, the rainbow. Gaelic and Irish: *seilisdear*, often *seileasdear*, and *siolastar*. The termination *tar*, *dear*, or *astar*, in these names, means one of a kind, having a settled form or position. One finds this ending common in names of plants—as, *oleaster*, *cotoneaster*, &c., like "τηρ" in Greek, "*dear*" in Gaelic. *Seil* (the first syllable), from *sol*, the sun; *solus*, light; *sol* and *leus*, *i.e.*, *lux*, light. Greek: Ηλιος (η or *e* long), hence *sēil*, *e* and *i* to give a lengthened sound, as in Greek. *Seileastar*, therefore, means the plant of light—*Fleur de luce*. Other forms of the word occur. *Siol* instead of *seil*, as *siolstrach*; *siol* or *sil*, to distil, to drop—an alteration probably suggested by the medicinal use made of the roots of the plant, which were dried, and made into powder or snuff, to produce salivation by its action on the mucous membrane. "*Feileastrom*, *feleastrom*, *felcastar*. Here *f* is the affected or digammated form. When *eleastar* (another form of the word) lost the '*s*,' then, for sound's sake, it took the digammated form (*f*)*eleastar*. *Strom* (the last syllable) is a diminutive termination. *Seilistear*, diminutive form *seilistrin*, and corrupted into *seilistrom*"—BOURKE.

Crocus—Greek: κρόκος. Much employed amongst the ancients for seasonings, essences, and for dyeing purposes.

C. sativus
Colchicum autumnale } —Saffron crocus, meadow saffron. Gaelic and Irish: *crò*, *cròdh*, *cròch*—*cròdh chorcar*.[1]

"'Se labhair Fionn nan chrò-shnuaidh."—CONN MAC DEARG.
Thus spake Fingal the saffron-hued.

"Spiocnard agus croch."—DANA SHOLHIM, iv. 14.
Spikenard and saffron.

Saffron was much cultivated anciently for various purposes, but above all for dyeing. "The first habit worn by persons of dis-

[1] For *corcur*, see *Lecanora tartarea*.

tinction in the Hebrides was the *lein croich*, or saffron shirt, so called from its being dyed with saffron"—WALKER. The Romans had their *crocōta*, and the Greeks ὁ κροκωτός, a saffron-coloured court dress. Welsh: *saffrwm*, saffron, from the Arabic name, *z'afarân*, which indicates that the name of the plant is of Asiatic origin.

AMARYLLIDACEÆ.

Narcissus pseudo-narcissus } —Daffodil. Gaelic: *lus a chròm-*
,, **jonquilla** }

chinn, the plant having a bent or drooping head.

Galanthus nivalis—Snowdrop. Gaelic and Irish: *gealag lair*,—*gealag*, white as milk; *làr*, the ground. *Galanthus*. Greek: γάλα, milk, and ἄνθος, a flower.

Aloe—Hebrew, אהלות, *ahaloth*. Gaelic and Irish: *aloe*.

"Leis na h-uile chraobhaibh tuise, mirr agus *aloe*."

With all trees of frankincense; myrrh and aloes.—SONG OF SOLOMON, iv. 14.

The aloe of Scripture[1] must not be confounded with the bitter herb well known in medicine.

LILIACEÆ.

Lilium—Greek: λείριον. From the Celtic: *li*, colour, hue. Welsh: *lliw*. Gaelic: *li*.

"A mhaise-mhna is ailidh *li!*"—FINGALIAN POEMS.
Thou fair-faced beauty.

"Lily seems to signify a flower in general"—WEDGEWOOD. Gaelic and Irish: *lilidh* or *lìli*.

Convallaria majalis—Lily of the valley. Gaelic: *lili nan lòn*. *Lili nan gleann*.

"Air ghilead, mar *lili nan lòintean*."—M'DONALD.
White as the lily of the valley.

"Is ròs Sharon mise *lili nan gleann*."—STUART.
I am the rose of Sharon, the lily of the glen.

"The lily of Scripture was probably *Lilium chalcedonicum*"—BALFOUR.

Allium—The derivation of this word is said to be from *all* (Celtic), hot, burning. There is no such word. The only word that resembles it in sound, and with that signification, is *sgallta*, burned, scalded; hence, perhaps, "scallion," the English for a young onion. Latin: *calor*.

[1] *Aquilaria agallochum*.

A. cepa (*ceap*, Gaelic: *ceap*, a head) — The onion. Gaelic: *uinnean*. Irish: *oinniun*. Welsh: *wynwyn*. French: *oignon*. German: *önjön*. Latin: *unio*. Gaelic: *siobaid*, *siobann*. Welsh: *sibol*. Scotch: *sybo*. German: *zwiebel*, scallions or young onions. *Cutharlan*, a bulbous plant. In Lorne, and elsewhere along the W. Highlands, frequently called *Sròn amh* (probably from *Sròn* and *amh*, *raw* in the *nose*, or *pungent* in the *nose*).

A. porrum[1]—Garden leek. Gaelic and Irish: *leigis*, *leiceas*, *leicis*. German: *lauch*, leek.

> "Agus na *leicis* agus na h'*uinneinean*."—NUMBERS xi. 5.
> And the leeks and the onions.

Irish: *bugha* (Shaw), leeks, fear. O'Clery, in his 'Vocabulary,' published A.D. 1643, describes it thus: "*Bugh*, *i.e.*, luibh gorm nó glàs ris a samhailtean sùile bhios gorm no glàs." That is, a blue or grey plant, to which the eye is compared if it be blue or grey. The resemblance between a leek and the eye is not very apparent, as the following quotation shows:—

> "Dhearca mar dhlaoi don *bhugha*,
> Is a dha bhraoi cearta caol-dhubha."—O'BRIEN.
> His eyes like a bunch of leeks,
> And his two eyebrows straight, dark, narrow.

Although Shaw gives the name to the leek, probably the plant referred to is the bluebell (see *Scilla non-scripta*). Irish: *coindid*, *coinne*, *cainnen*. Welsh: *cenin* (*cen*, a skin, peel, scales, given to onions, garlic, leeks).

> "Do roidh, no do *coindid*, no do ablaibh."
> Thy gale, nor thy onions, nor thy apples.

Coindid, though applied to leeks, onions, &c., means seasoning, condiments. Latin: *condo*.

A. ursinum — Wild garlic. From the Celtic. Gaelic and Irish: *garleag*. Welsh: *garlleg*, from *gar*, *gairce*, bitter, most bitter. *Gairgean*. *Creamh* (Welsh, *craf*), *cream*, to gnaw, chew. *Lurachan*, the flower of garlic.

> "Le d' *lurachain chreamhach* fhàson
> 'Sam buicein bhàn orr' shuas."—M'DONALD.

The feast of garlic, "Fèisd chreamh," was an important occasion for gatherings and social enjoyment to the ancient Celts.

[1] "Porrum" from the Celtic, *pori*, to eat, to graze, to browse.

"Ann's bidh creamh agus sealgan, agus luibhe iomdha uile fhorreas, re a n-itheadh úrghlas feadh na bleadhna ma roibhe ar teitheadh ó chaidreath na n-daoine, do 'n gleann dà loch."—IRISH.

Where garlic and sorrel, and many other kinds, of which I ate fresh throughout the year before I fled from the company of men to the glen of the Two Lochs.[1]

A. Scorodoprasum—Rocambole. Gaelic and Irish: *creamh nan crag* (M'Kenzie), the rock garlic.

A. ascalonicum—Shallot. Gaelic: *sgalaid* (Armstrong). (See *Allium*).

A. Schœnoprasum—Chives. Gaelic: *feuran*. Irish: *fearan*, the grass-like plant. *Saidse*. *Creamh ghàrdh*, the garden garlic. Welsh: *cenin Pedr*, Peter's leek.

A. vineale—Crow garlic. Gaelic: *garleag Mhuire* (Armstrong), Mary's garlic.

Narthecium ossifragum—Bog asphodel. Gaelic and Irish: *blioch*, *bliochan*, from *blioch*, milk. Welsh: *gwaew'r trenin*, king's lance.

"Nuair thigheadh am buaichaill a mach,
'Sa gabhadh e mu chùl a chrùidh
Mu'n cuairt do Bhad-nan-clach-glas,
A bhuail 'air m bu tric am *bliochd*."—M'LEOD.

When the cowherd comes forth,
And follows his cows
Around Bhad-nan-clach-glàs,
Often he is struck with the asphodel.

Scilla non-scripta—Bluebell; wild hyacinth. Gaelic: *fuath mhuic*, the pig's fear or aversion, the bulbs being very obnoxious to swine. *Brog na cubhaig*, cuckoo's shoe. Irish: *buth a muc*. Probably *buth* is the same as *bugha* (see *Allium porrum*), fear, the pig's fear. M'Lauchainn called it *lili gucagach*.

"*Lili gucagach* nan cluigean."
The bell-flowered lily.

S. verna—Squill (and the Latin, *scilla*, from the Arabic, *ăsgyl*). Gaelic: *lear uineann*, the sea-onion. *Lear*, the sea, the surface of the sea.

"Clos na mìn-*lear* uaine."—OSSIAN.
The repose of the smooth green sea.

Welsh: *winwyn y mor*, sea-onion.

[1] A most gloomy and romantic spot in the County of Wicklow.

"Glen da lough! thy gloomy wave,
Soon was gentle Kathleen's grave."—MOORE.

Tulipa sylvestris—Tulip. Gaelic: *tuiliop*. The same name in almost all European and even Asiatic countries. Persian: *thoùlybân* (De Souza).

Asparagus officinalis—Common asparagus. Gaelic: *creamh mac-fiadh*. Irish: *creamh-mùic fiadh*, wild boar's leek or garlic. The same name is given to hart's-tongue fern. *Aspàrag*, from the generic name σπαρασσω, to tear, on account of the strong prickles with which some of the species are armed.

Ruscus—Latinised form of Celtic root *rus*, wood, husk; *rusgach*, holly. Welsh: *rhysgiad*, an over-growing. Also *bruscus*, from Celtic, *brus*, *bruis*, small branches, brushwood.

R. aculeatus — Butcher's broom. Gaelic: *calg-bhrudhainn* (Armstrong). Irish: *calg-bhrudhan* (Shaw)—*calg*, a prickle, from its prickly leaves; and *bruth*, *bruid*, a thorn, anything pointed; *brudhan*, generally spelled *brughan*, a faggot. Or it may only be a corruption from *brum*, broom. *Calg bhealaidh*, the prickly broom. It was formerly used by butchers to clean their blocks, hence the English name "butchers' broom."

(*To be continued.*)

PRELIMINARY LIST OF THE FLOWERING PLANTS AND FERNS OF PERTHSHIRE.

By F. BUCHANAN WHITE, M.D., F.L.S.

(*Continued from page* 141.)

XLIII. ARENARIA L.

96. Verna L. Meall Duin Croisg, Breadalbane.
97. Rubella Hook. Rare. Breadalbane mountains.
98. Trinervia L. Common.
99. Serpyllifolia L.
    Var. *sphærocarpa* Ten. Common.
    Var. *leptoclados* Guss. Local, or overlooked.
100. Cherleria Fenzl. Breadalbane mountains.

XLIV. SAGINA L.

101. Apetala L.
    i. Sub-species apetala. Very local, or overlooked.
    ii. Sub-species ciliata Fr. Commoner than *apetala*, but also probably overlooked.
    iii. Sub-species maritima Don. Invergowrie.
102. Procumbens L. Common.

103. Saxatilis Wimm. Common on the richer hills.
104. Nivalis Fr. On several of the Breadalbane hills.
105. Subulata Wimm. Chiefly on the trap hills.
106. Nodosa L. Local.
Var. *glandulosa* Bess. Local.

XLV. SPERGULA L.

107. Arvensis L. A common weed of cultivation.

XLVI. SPERGULARIA Pers.

108. Rubra St Hil. Common, but sporadic.
109. Marina Camb.
Sub-species media L. Estuary of the Ta[illegible]

PORTULACEÆ.

XLVII. MONTIA L.

110. Fontana L.
Var. *minor* Gm. Dry places. Local.
Var. *rivularis* Gm. Watery places. Common.

XLVIII. CLAYTONIA L.

111. Perfoliata Don.
112. Alsinoides Sims. Both as escapes in several places. *C. sibirica* is also reported as an escape.

PARONYCHIACEÆ.

XLIX. SCLERANTHUS L.

113. Annuus L. A common weed of cultivation.
Var. *biennis* Reut. Local. In stony uncultivated places on the trap hills.

ELATINACEÆ.

L. ELATINE L.

114. Hexandra D.C. Very local.

HYPERICACEÆ.

LI. HYPERICUM L.

115. Androsæmum L. Very local; in the south-west of the county.
116. Calycinum L. Only where planted.
117. Perforatum L. Common.
118. Quadrangulum L.
i. Sub-species dubium Leers. Local.
ii. Sub-species tetrapterum Fr. Not uncommon.

119. Humifusum L. Rather local.
120. Pulchrum L. Common.
121. Hirsutum L. Somewhat local.

MALVACEÆ.

LII. MALVA L.

122. Moschata L. Widely distributed, but not very common. Possibly an introduction.
123. Sylvestris L. Not rare, but often, if not always, an escape.

LINACEÆ.

LIII. LINUM L.

124. Catharticum L. Common.
125. Usitatissimum L. Rare, and always introduced.

LIV. RADIOLA Gm.

126. Millegrana Sm. Local, but widely distributed.

GERANIACEÆ.

LV. GERANIUM L.

127. Sanguineum L. Local.
128. Sylvaticum L. Common.
129. Pratense L. Not uncommon.
130. Pyrenaicum L. Naturalised in a few places.
131. Phæum L. Not common. An introduction.
132. Molle L. A weed of cultivation.
133. Columbinum L. Very local.
134. Dissectum L. Common.
135. Robertianum L. Common.
136. Lucidum L. Rather local.

LVI. ERODIUM L'Her.

137. Cicutarium L'Her.
Var. *commixtum* Jord.
Var. *triviale* Jord.
Var. *pilosum* Bor.
Widely distributed, but not usually abundant.

OXALIDACEÆ.

LVII. OXALIS L.

138. Acetosella L. Common.

AQUIFOLIACEÆ.

LVIII. ILEX L.

139. Aquifolium L. Widely distributed, but rare as an indigenous plant.

EMPETRACEÆ.

LIX. EMPETRUM L.

140. Nigrum L. Common in the Silurian districts.

SAPINDACEÆ.

LX. ACER L.

141. Pseudoplatanus L. Naturalised.

LEGUMINOSÆ.

LXI. GENISTA L.

142. Anglica L. Not uncommon.

LXII. ULEX L.

143. Europæus L. Common.

LXIII. CYTISUS L.

144. Scoparius Link. Common.

LXIV. ONONIS L.

145. Arvensis L. Not uncommon.

LXV. MEDICAGO L.

146. Sativa L. Rare. An escape in a few places.
147. Lupulina L. Common.
148. Maculata Sibth. Near Doune. Doubtless an escape.

LXVI. MELILOTUS Tourn.

149. Officinalis L. Rare. An introduction.

LXVII. TRIFOLIUM L.

150. Arvense L. Local.
151. Incarnatum L. Rare. An escape.
152. Pratense L.
    Var. *sativum.* Common; an escape from cultivation.
    Var. *sylvestre.* Not uncommon.
153. Medium L. Not uncommon.
154. Striatum L. Local. Mostly on the trap hills.
155. Hybridum L. Not uncommon. An escape.

156. Repens L. Common.
157. Procumbens L. Common.
158. Minus Sm. Common.

LXVIII. ANTHYLLIS L.

159. Vulneraria L. Not uncommon.

LXIX. LOTUS L.

160. Corniculatus L.
Var. *vulgaris.* Common.
Var. *crassifolius* Pers. Invergowrie.
161. Major Scop. Common.

LXX. ASTRAGALUS L.

162. Glycyphyllos L. Local, and not common.
163. Hypoglottis L. Not uncommon, but local.

LXXI. OXYTROPIS D.C.

164. Uralensis D.C. Ben Chonzie and Ben Lawers. Rare.

LXXII. ORNITHOPUS L.

165. Perpusillus L. Local.

LXXIII. VICIA L.

166. Hirsuta Koch. Common.
167. Cracca L. Common.
168. Orobus D.C. Very local. Rannoch and Athole.
169. Sylvatica L. Local.
170. Sepium L. Common.
Var. *montana* Koch. On the higher mountains.
171. Sativa L.
i. Sub-species sativa. An occasional escape from cultivation.
ii. Sub-species angustifolia Roth.
Var. *segetalis* Koch. Local.
Var. *Bobartii* Forst. Local.
172. Lathyroides L. Local.

LXXIV. LATHYRUS L.

173. Pratensis L. Common.
174. Sylvestris L. Very rare. An escape.
175. Macrorrhizus Wimm. Common.
Var. *tenuifolius* Roth. Common.
176. Niger Wimm. Very local and rare. Killiecrankie.

ROSACEÆ.

LXXV. PRUNUS L.

177. Communis Huds.
   i. Sub-species spinosa L. Common.
   ii. Sub species insititia L. Rare. Doubtfully native.
   iii. Sub-species domestica L. An escape.
178. Avium L. Not uncommon, but doubtfully indigenous.
179. Padus L. Not rare.

LXXVI. SPIRÆA L.

180. Ulmaria L. Common.
181. Salicifolia L. In several places, but only where it has been planted originally.

LXXVII. RUBUS L.

182. Chamæmorus L. Common on the Silurian hills.
183. Saxatilis L. Not uncommon.
184. Idæus L. Common.
185. Fruticosus L. Common in the Lowlands, less common in the Highlands. The following forms have been noticed. Probably many others occur and should be looked for.
   i. Sub-species suberectus Anders. Common in the Highlands.
   ii. Sub-species fissus Lindl.
   iii. Sub-species plicatus W. and N.
   iv. Sub-species affinis W. and N.
   v. Sub-species rhamnifolius W. and N.
   vi. Sub-species latifolius Bab.
   vii. Sub-species leucostachys Sm. (?)
   viii. Sub-species villicaulis W. and N.
   ix. Sub-species macrophyilus Weihe.
      Var. *umbrosus* Arrh.
   x. Sub-species radula Weihe. Common.
   xi. Sub-species Kœhleri Weihe.
      Var. *infestus* Bab.
   xii. Sub-species foliosus Weihe.
   xiii. Sub-species corylifolius Sm. Common.

LXXVIII. DRYAS L.

186. Octopetala L. Local. Athole and Breadalbane.

LXXIX. GEUM L.

187. Urbanum L. Common.

188. Rivale L. Common. The hybrid *G. intermedium* Ehr. is not uncommon, but the form approaching *rivale* (*urbano-rivale*) is commoner than the other (*rivali-urbanum*).

LXXX. FRAGARIA L.

189. Vesca L. Common.

LXXXI. POTENTILLA L.

190. Comarum Nestl. Common.
191. Tormentilla Sibth.
    i. Sub-species erecta L. Common.
    ii. Sub-species procumbens Sibth. Not common, or overlooked.
192. Reptans L. Local, and not common.
193. Verna L. Sub-species maculata Pourr. Widely spread on the richer hills.
194. Anserina L. Common.
195. Fragariastrum Ehr. Common.
196. Argentea L. Local.

LXXXII. SIBBALDIA L.

197. Procumbens L. On the richer hills, but local.

LXXXIII. ALCHEMILLA L.

198. Arvensis Lamk. Common.
199. Vulgaris L. Common.
    Var. *montana* Willd. Rare.
200. Alpina L. Common on the Silurian hills.

LXXXIV. AGRIMONIA L.

201. Eupatoria L.
    i. Sub-species eupatoria L. Local.
    ii. Sub-species odorata Mill. St Fillans.

LXXXV. POTERIUM L.

202. Sanguisorba L.
    i. Sub-species sanguisorba L. Local and rare.
    ii. Sub-species muricatum Spach. Was established on rocks opposite Kinnoull church (whence it was recorded as *P. sanguisorba*), but the rocks have been removed and the plant is gone. It possibly grows in other places and has been confounded with the other species. *Sanguisorba canadensis* has been found in two localities.

LXXXVI. ROSA L.

203. Spinosissima L. Local, but not uncommon.
204. Villosa L.
i. Sub-species mollis Sm. Common.
Var. *subcærulea* Baker. Dunkeld.
ii. Sub-species tomentosa Sm. Common.
Var. *scabriuscula* Sm. Rare.
Var. *subglobosa* Sm. Not rare.
Var. *farinosa* Raw. Blair-Athole.
205. Involuta Sm.
Var. *Sabini* Woods. Rare.
Var. *Doniana* Woods. Rare.
206. Rubiginosa L. Not uncommon. An escape (?).
207. Canina L. Common. The following forms have been observed, but much remains to be done amongst the Perthshire roses, both of this and of other species.
Var. *lutetiana* Lem. Local.
Var. *sphærica* Gren. Local.
Var. *dumalis* Bechst. Common.
Var. *urbica* Lem. Common.
Var. *arvatica* Baker. Not uncommon.
Var. *dumetorum* Thuill. Dunkeld (?).
Var. *incana* Woods. Killin (?).
Var. *andevagensis* Bast. Not common.
Var. *cæsia* Sm. Rare.
Var. *verticillacantha* Merat. Not common.
Var. *Reuteri* Godet. Not uncommon.
Var. *subcristata* Baker. Common.
Var. *implexa* Gren. Local.
Var. *coriifolia* Fr. Local.
Var. *Watsoni* Baker. Local.
Var. *marginata* Wallrost. Rare.
208. Arvensis L. An escape in one or two places. *R. alpina* occurs on Kinnoull Hill, but is doubtless an escape.

LXXXVII. PYRUS L.

209. Communis L. One or two plants escaped from cultivation.
210. Malus L.
Var. *acerba* D.C. Widely distributed, but rather local. Truly wild.
Var. *mitis.* Here and there as an escape.

211. Aucuparia Gærtn. Common.

LXXXVIII. CRATÆGUS L.

212. Oxyacantha L.
Sub-species monogyna Jacq. Common, but usually though not always an introduction.

SAXIFRAGACEÆ.

LXXXIX. SAXIFRAGA L.

213. Oppositifolia L. Not uncommon on the Silurian hills.
214. Nivalis L. Rather local and rare.
215. Stellaris L. Silurian hills, not uncommon.
216. Umbrosa L. Naturalised in several places.
217. Aizoides L. Not uncommon.
218. Tridactylites L. Very local and rare.
219. Rivularis L. Reported from Ben Lawers.
220. Granulata L. Not uncommon.
221. Cernua L. Ben Lawers.
222. Hypnoides L.
Sub-species hypnoides L. Not uncommon on the hills.
Var. *platypetala* Sm.
Var. *gemmifera* Bosw.

XC. CHRYSOSPLENIUM L.

223. Alternifolium L. Local.
224. Oppositifolium L. Common.

XCI. PARNASSIA L.

225. Palustris L. Not uncommon.

RIBESIACEÆ.

XCII. RIBES L.

226. Grossularia L. An escape.
227. Alpinum L. Only where planted.
228. Nigrum L. Probably always an escape.
229. Rubrum L. Probably an escape.

CRASSULACEÆ.

XCIII. SEDUM L.

230. Rhodiola D.C. On many of the richer hills.
231. Telephium L. Sub-species purpurascens Koch.
Not uncommon but local, in the Lowlands. Native (?).
232. Villosum L. Local, and not very common.

233. Album L. Rare, and only where planted.
234. Anglicum L. Local.
235. Acre L. Common in the Lowlands.
236. Reflexum L. Naturalised in several places.

DROSERACEÆ.

XCIV. DROSERA L.

237. Rotundifolia L. Common.
238. Anglica Huds. Very local, and not common

HALORAGACEÆ.

XCV. HIPPURIS L.

239. Vulgaris L. Very local.

XCVI. MYRIOPHYLLUM L.

240. Alterniflorum D.C. Common.
241. Spicatum L. Rare or overlooked.

XCVII. CALLITRICHE L.

242. Verna L. Common. The following forms occur—
i. Sub-species vernalis Kuetz.
ii. Sub-species platycarpa Kuetz.
Var. *stagnalis* Kuetz.
iii. sub-species pedunculata D.C.
243. Autumnalis L. Locally abundant.

ONAGRACEÆ.

XCVIII. EPILOBIUM L.

244. Angustifolium L. Common.
Var. *brachycarpum* Leighton. Rare. An escape.
245. Hirsutum L. In the Lowlands only, and local.
246. Parviflorum Schreb. Local.
Var. *intermedium* Merat. In several places.
247. Montanum L. Common.
248. Tetragonum L.
Sub-species obscurum Schreb. Common. *Tetragonum* proper requires corroboration as a Perthshire plant.
249. Palustre L. Common.
250. Alsinifolium Vill. Common on many of the Silurian hills.
251. Alpinum L. Common on many of the Silurian hills.
Var. *anagallidifolium* Lamk. The usual form.

XCIX. CIRCÆA Tourn.

252. Lutetiana L. Local.
253. Alpina L. Local, but commoner than *lutetiana.*

Var. *intermedia* Ehrh. In several places.

LYTHRACEÆ.

C. LYTHRUM L.

254. Salicaria L. Rare, though frequently an escape. It is native in a few places.

CI. PEPLIS L.

255. Portula L. Rare or local.

UMBELLIFERÆ.

CII. HYDROCOTYLE L.

256. Vulgaris L. Common.

CIII. ASTRANTIA L.

257. Major L. Very rare. Banks of the Tay. An escape.

CIV. SANICULA L.

258. Europæa L. Local.

CV. CONIUM L.

259. Maculatum L. Rare, and like many other *Umbelliferæ* doubtfully native.

CVI. HELOSCIADIUM Koch.

260. Inundatum. Local.

CVII. CARUM L.

261. Carvi L. In a few places. An escape.

CVIII. CICUTA. L.

262. Virosa L. Near Methven. Very local and rare.

CIX. SIUM. L.

263. Angustifolium L. Rare. Carse of Gowrie.

CX. ÆGOPODIUM L.

264. Podagraria L. Common.

CXI. PIMPINELLA L.

265. Saxifraga L. Common.
266. Magna L. An escape at Leny near Callander, where also *Œnanthe pimpinelloides* has been found, but only as an introduction.

CXII. CONOPODIUM Koch.

267. Denudatum Koch. Common.

CXIII. MYRRHIS Scop.

268. Odorata Scop. Not uncommon, but local and scarcely indigenous.

CXIV. SCANDIX L.

269. Pecten-Veneris L. A weed of cultivation.

CXV. CHÆROPHYLLUM L.

270. Temulum L. Common in the Lowlands. Native (?).

CXVI. ANTHRISCUS Hoffm.

271. Vulgaris Pers. Very local. Kinnoul Hill. Native (?).
272. Sylvestris Hoffm. Common.

CXVII. ŒNANTHE L.

273. Crocata L. Banks of the lower parts of the Tay and Earn.

CXVIII. ÆTHUSA L.

274. Cynapium L. A weed of cultivation. Rather local.

CXIX. MEUM Jacq.

275. Athamanticum Jacq. Local, and not common.

CXX. ANGELICA L.

276. Sylvestris L. Common.

CXXI. PEUCEDANUM L.

277. Ostruthium Korh. An escape in a few places.

CXXII. HERACLEUM L.

278. Sphondylium L. Common.

CXXIII. DAUCUS L.

279. Carota L. Roadsides, &c. Not very common, and doubtfully indigenous.

CXXIV. CAUCALIS L.

280. Anthriscus Huds. Common. Native (?).

ARALIACEÆ.

CXXV. HEDERA L.

281. Helix L. Not uncommon.

CORNACEÆ.

CXXVI. CORNUS L.

282. Suecica L. On some of the Silurian hills, but local and rather rare.

CAPRIFOLIACEÆ.

CXXVII. VIBURNUM L.

283. Opulus L. Rather rare, but widely distributed.

CXXVIII. SAMBUCUS L.

284. Ebulus L. In several places, but not indigenous.
285. Nigra L. Not uncommon, but doubtfully native.

CXXIX. ADOXA L.

286. Moschatellina L. Local, but widely distributed.

CXXX. LONICERA L.

287. Periclymenum L. Not uncommon.

CXXXI. LINNÆA Gron.

288. Borealis Gron. Very rare and local.

RUBIACEÆ.

CXXXII. GALIUM L.

289. Verum L. Common.
290. Cruciata Scop. Chiefly in the Lowlands, where it is rather common.
291. Palustre L. Common.
Var. *Witheringii* Sm. Not uncommon.
292. Uliginosum L. Local or overlooked.
293. Saxatile L. Common.
294. Sylvestre Poll. Var. *montanum* Vill. Glen Tilt and Glen Shee.
295. Mollugo L. Sub-species erectum Huds. Not common.
296. Boreale L. Locally abundant, and chiefly on river banks.
297. Aparine L. Common.

CXXXIII. ASPERULA L.

298. Odorata L. Local, but not uncommon.

CXXXIV. SHERARDIA Dill.

299. Arvensis L. Not uncommon.

VALERIANACEÆ.

CXXXV. VALERIANA L.

300. Excelsa Poir (* = Officinalis L. var. *Sambucifolia* Mik.) Common.

301. Pyrenaica L. Naturalised in a few places.

CXXXVI. VALERIANELLA Tourn.

302. Olitoria Mœnch. Local. Possibly native in some localities.

303. Dentata Poll. Very rare. A casual in Carse of Gowrie.

(*To be continued.*)

REVIEW.

The Berries and Heaths of Rannoch. By A Snowdrop. London: G. Bell & Sons, 1881. Pp. 24. With 12 Coloured Plates.

The berries and heaths which adorn the Scottish mountain-sides are plants that are attractive to many of the numerous visitors whom sport, scenery, or business attract to Scotland every summer; and though, of course, they are well known to many who do not pretend to botanical knowledge, yet there must be a numerous class who will be glad to learn something about these plants, and to have that knowledge presented to them in an attractive form. Our author, therefore, whose modesty has led him to conceal his identity, has probably placed a boon within the reach of many anxious inquirers; and his work, though restricted to the species of one district only in Perthshire, will be found useful by the visitor to any part of the Highlands of Scotland.

The berries enumerated are the cranberry (*Vaccinium oxycoccos*), the common bilberry, or, as it is called in Scotland, blaeberry (*V. myrtillus*), the bog bilberry (*V. uliginosum*), the cowberry or whortleberry, often termed (though erroneously) the cranberry (*V. vitis-idæa*), the red bearberry (*Arctostaphylos uva-ursi*), the black bearberry (*A. alpina*), the crowberry (*Empetrum nigrum*), and the cloudberry (*Rubus chamæmorus*), which is often called the averon. The heaths of Rannoch are the ling (*Calluna vulgaris*), the four-leaved or cross-leaved heath (*Erica tetralix*), and the three-leaved heath or common bell heather (*E. cinerea*). In addition to these, two other species are figured, *Andromeda polifolia*, which occurs in South Perthshire, and *Loiseleuria procumbens*, which grows on several of the Rannoch hills.

In addition to popular and yet careful descriptions, accompanied by interesting remarks on the qualities of the fruit (in the case of the berries) and distribution of the plants, each species has a coloured plate (borrowed from Sowerby's 'English Botany') devoted to it, which should render its identification perfectly easy to every one. A list of the Gaelic names extracted from the papers, by Mr Cameron, in these pages, completes a book which, without any pretension on the part of the author to have put forward a novel scientific work, will doubtless be a pleasant companion to many a sojourner among the hills, and perhaps induce them to take up the study of botany for themselves.

* See Dr Bonnet's remarks in 'Le Naturaliste,' 1881, p. 386.

INSECTA SCOTICA.

THE COLEOPTERA OF SCOTLAND.

EDITED BY D. SHARP, M.B.

(*Continued from p.* 96.)

INDEX TO THE FAMILIES ENUMERATED.

(*Concluded.*)

GEOLOGY.

THE INTERCROSSING OF ERRATICS IN GLACIAL DEPOSITS.

By JAMES GEIKIE, LL.D., F.R.S., F.G.S.,
Of H.M. Geological Survey of Scotland.

AMONG the many phenomena connected with the glacial deposits of this country which have puzzled geologists to account for, there is none more remarkable than the "intercrossing of erratics." The fact that such wandered blocks have apparently crossed each other's tracks in their journeys, appears at first sight inexplicable on the assumption that their transport has been effected by land-ice. The phenomena in question, therefore, have always been appealed to by those who uphold the iceberg origin of our boulder-clays, &c., as evidence decisively in favour of their views. No one can deny that any degree and amount of intercrossing might take place in the case of icebergs. We can readily conceive how floating ice, detached from a long line of coast, might be compelled by shifting winds and changing currents to tack about again and again, so as to pursue the most devious course, and scatter their stony burdens in the most erratic manner over the sea-bottom. While, on the other hand, it is quite impossible to understand how a similar irregular distribution of erratics could take place under one and the same glacier, flowing in a determinate direction. It is little wonder, then, that the curious phenomena of the "intercrossing of erratics" should have had much importance attached to it by the upholders of the iceberg theory, seeing that all the other proofs which have been adduced in favour of this theory have only served to demonstrate its insufficiency. Upon the facts connected with the "intercrossing of erratics," the supporters of this time-honoured theory are now making what I must believe is their last stand. I purpose therefore, in this paper, to give a short outline of those facts, with the view of showing that so far from being antagonistic to the land-ice theory, they are in complete harmony with it; and indeed

must be considered as affording an additional demonstration of its truth.

Some years ago I called attention to the fact that in the middle districts of Scotland the boulder-clay not infrequently contains a curious commingling of northern and southern erratics.[1] I showed that this was the case throughout a belt of country extending from the sea-coast near Ayr, north-east to the valley of the Irvine, and thence across the watershed into the Avon, and east to Lesmahagow, then down the valley of the Clyde to Carluke, stretching away to the east by Wilsontown, and thereafter continuing along the crest of the Pentlands and the northern slopes of the Lammermuir Hills, by Reston and Ayton to the sea. "All along this line," I remarked, "we have a 'debatable ground' of variable breadth, throughout which we find a commingling in the till of stones which have come from the north and south. South of it, characteristic Highland stones do not occur, and north of it stones derived from the south are similarly absent." The explanation of these facts is obvious. The belt of ground referred to was evidently the meeting-place of the Highland and Southern *mers de glace*. Here the two opposing ice-flows coalesced and became deflected by their mutual pressure to right and left—one great current going east and another west. It is evident that the line of junction between the two *mers de glace* would not be rigorously maintained in one and the same position during a period of glaciation, but would tend to oscillate backwards and forwards, according as one or the other ice-sheet prevailed. Sometimes the Southern ice-sheet would be enabled to push back the Northern *mer de glace*, while at other times the converse would take place. Nor is it necessary to suppose that the advance of one ice-sheet was general along the whole line. On the contrary, it is most likely that the movement was quite irregular—an ice-sheet advancing in some places, while at other points its line of junction with the opposing ice-sheet remained stationary, or even retrograded. Such movements would obviously give rise to oscillations in the sub-glacial *débris* of clay and stones; and thus we have a simple and natural explanation of those intercrossings of erratics which are so characteristic of that region which I have termed the "debatable ground." And this conclusion is borne out by the fact that the glacial striæ of the same "debatable ground" afford like evidence of oscillation in the trend of the ice-flow.

[1] 'Great Ice Age,' p. 609.

Along the base of the Highland mountains in Forfarshire, &c., we meet with similar intercrossings of erratics. Thus we occasionally encounter in the boulder-clays overlying the Silurian regions erratics of Old Red Sandstone rocks which have come from the east or south-east; while the abundant presence of erratics of Silurian origin, on the other hand, bespeak an ice-flow from the west towards the low grounds. In some places within the Silurian area we encounter a greyish-blue boulder-clay, containing Silurian fragments only, while in other places within the same area the boulder-clay becomes reddish, and is charged with many boulders of Old Red Sandstone rocks. Now the greyish-blue till could only have been laid down by glacier-ice descending from the Silurian high grounds to Strathmore, while the red boulder-clay points to a partial invasion of the Silurian regions by land-ice, which had previously traversed the lower-lying Old Red Sandstone areas. These apparently contradictory movements are readily accounted for by the former presence in the area of the North Sea of the great Scandinavian *mer de glace.* My friend Dr Croll was the first to point out that the glacial phenomena of Caithness and the Shetlands could only be accounted for by the advance of the Scandinavian ice-sheet towards our coasts, where it encountered and deflected the Scottish ice-sheet out of its normal course—a sagacious induction, which the admirable and exhaustive researches of my colleagues, Messrs B. N. Peach and J. Horne, have now firmly established. The lower blue boulder-clay was evidently accumulated at a time when the Scottish ice was able to flow more or less directly east or south-east towards what is now the coast-line; while the overlying red boulder-clay points to a subsequent period when the presence of the Scandinavian *mer de glace* was sufficiently great to compel the Scottish ice out of its normal course, and cause it to flow in a north-easterly direction. In doing so it now and again passed from tracts of Old Red Sandstone to invade the Silurian area, and thus an overlying red boulder-clay was here and there accumulated upon the surface of a greyish-blue till in which not a single fragment of any Old Red Sandstone rock occurs.[1]

[1] The blue or grey boulder-clay of the region referred to, I am inclined to assign to an earlier epoch of the glacial period than I would the red boulder-clay. The latter I take to be the *moraine profonde* of the last ice-sheet which, as the researches of B. N. Peach and J. Horne have shown, flowed northwards along the seaboard of Scotland from as far south at

Recently Messrs B. N. Peach and J. Horne, in a most instructive paper on the "Glaciation of Caithness,"[1] have described some remarkable commingling of material which occur in a region where the glacial striæ afford equally striking evidence of conflicting ice-movements. These phenomena are developed here and there along a line which indicates the meeting-place of two rival ice-streams, on each side of which the boulder-clay presents different characteristics—the one boulder-clay being the *moraine profonde* of the ice that flowed E.N.E. and N.N.E. towards the Caithness plain, while the other is an accumulation formed underneath the ice that streamed across that plain from S.E. to N.W. These phenomena are thus, as my colleagues remark, quite analogous to those met with in the middle districts of Scotland, as described by me, and referred to in a preceding paragraph. Now it is obvious, that while these examples of "intercrossings" of erratics and "cross-hatching" of striæ all go strongly to support the land-ice theory of the glacial phenomena, they at the same time negative the notion of floating-ice having had anything to do with the production of the phenomena under review.

Before considering the evidence adduced by Mr Mackintosh and others as to the intercrossings of erratics in the drift-deposits of England, I shall mention some of the more remarkable examples of the same phenomena which have been noticed by Continental geologists. The first I shall cite are those which have been observed in the glacial accumulations of the Rhone valley in Eastern France. The land-ice origin of these accumulations has never been called in question, and as the intercrossings of erratics in that region are not only more common, but much more striking and apparently inexplicable than any which have been noticed elsewhere, it will be admitted that they of themselves afford a strong presumption that the conflicting courses followed by the erratics in certain regions of our own country are the result rather of oscillations in the flow

least as Fife—erratics of Fifeshire rocks occurring in the till of the Shetlands. Many facts connected with the glacial geology of Perthshire and Forfarshire have led me to the same conclusion. I believe, however, that the ice-sheet of an earlier cold epoch of the Glacial Period (represented as I think by the grey till just referred to) flowed south rather than north in the bed of the North Sea, from some point probably as far north as Aberdeenshire. But the facts upon which this belief is grounded are too numerous and detailed to be given here.

[1] Proc. Royal Physical Society, Edinburgh, 1881.

of land-ice than of the random and eccentric action of icebergs. The researches of Swiss and French glacialists have proved that during the climax of the Glacial Period an enormous area in the low grounds of Eastern France was covered with a huge *mer de glace* formed by the union of the great Rhone glacier with the glaciers descending from the mountains of Savoy and Dauphiny. A line drawn from Bourg by way of Chatillon, Villeneuve, Trévoux, and Lyons to Vienne, and thence south-east by Beaurepaire to the valley of the Isère, a few miles above St Marcellin, indicates roughly the furthest limits reached by the *mer de glace*. Over all the low grounds between that terminal line and the mountains are found widespread sheets of boulder-clay and sand and gravel, together with loose erratics. Now and again, too, well-marked terminal moraines make their appearance, while the rock-surfaces, when these are visible and capable of bearing and retaining glacial markings, present the usual aspect of *roches moutonnées*. The same kinds of morainic materials and ice-markings may of course be followed up into the valleys not only of the Alps properly so-called, but also into those of the hills of Bugey and the secondary mountain-chain of Savoy and Dauphiny. It has indeed long been known that local glaciers formerly occupied the mountain-valleys of Bugey. A number of small glaciers, for example, have descended from the slopes of the mountains west of Belley (such as Bois de la Morgue, Bois de Lind, &c.) to the Rhone, and again from Mont du Chat to the north-west. These glaciers were quite independent of the greater ice-streams of the neighbouring Alps of Savoy, and the same was the case with the glaciers of that mountainous tract which extends from Nantua south to Culoz, between the valleys of the Ain and the Rhone. From this elevated region many local glaciers descended, such as that of the Valromey which flowed for a distance of some twenty miles from north to south. Again, similar local glaciers have left abundant traces of their former presence throughout that mountainous belt of land that stretches between Chambery and Grenoble to the west of the valley of the Isère. The moraines of all those local glaciers, charged as they are with the *débris* of the neighbouring heights, clearly indicate that the local glaciers flowed each down its own particular valley. There are certain other appearances, however, which seem at first sight to contradict this view. Sometimes, for example, we encounter in the same valleys erratics which do not belong to the drainage-

system within which they occur, but have without doubt been derived from the higher Alps of Switzerland and Savoy. And the course followed by these foreign erratics has crossed at all angles that which the local glaciers have certainly pursued—occasionally, indeed, the one set of erratics has travelled in a direction exactly opposed to the trend taken by the others. As examples, I may cite the case of the erratics which occur in Petit Bugey. In this district we encounter many locally-derived erratics which have come from Mont du Chat to the west of the Lac du Bourget—that is to say, they have travelled in a north-westerly direction. But in the same neighbourhood are found many erratics of Alpine origin which have been carried from north-east to south-west, or at right angles to the course followed by the local erratics. Again, in the valley of the Seran we have evidence in erratics and terminal moraines of a local glacier which flowed south as far as the Lyons and Geneva Railway, in the neighbourhood of which, a few miles to the west of Culoz, its terminal moraines may be observed. This is the extinct Glacier du Valromey of MM. Falsan and Chantre. Now it is especially worthy of note that in the same valley we have distinct evidence of an ice-flow from south to north—*i.e.*, *up* the valley. Erratics and morainic materials which are unquestionably of Alpine origin have been followed a long way up the valley—for two-thirds of its length at least. Before they could have entered that valley and approached the slopes of Romey, they must have travelled down the valley of the Rhone from the higher Alps of Savoy in a *south-west* and *south* direction until they rounded the Montagne du Grand Colombier. It was only after they had rounded this massive mountain-ridge that they could pursue their course up the valley of the Seran, in a direction precisely opposite to that which they had previously followed. These and many similar and even more remarkable examples of the "intercrossings" of streams of erratics are described by MM. Falsan and Chantre, and graphically portrayed in their beautiful and instructive work on the 'Ancient Glaciers and Erratic Deposits of the Basin of the Rhone;' and the explanation of the phenomena given by them is extremely simple and convincing. The local erratics and moraines pertain partly to the commencement and partly to the closing stage of the Glacial Period. Long before the south branch of the great glacier of the Rhone had united with the glacier of the Arve, and this last with the glaciers of Annecy and Beaufurt,

and before these had become confluent with the glacier of the Isère, &c., the secondary mountain-ranges of Savoy and Dauphiny and the hills of Bugey were covered with very considerable snow-fields, from which local glaciers descended all the valleys to the low ground. But when the vast ice-flows of Switzerland, Upper Savoy, &c., at last became confluent, they completely overflowed many of the hilly districts which had formerly supported independent snow-fields and glaciers, and deposited their bottom-moraines over the morainic *débris* of the local glaciers. In other cases, where the secondary hill-ranges were too lofty to be completely drowned in the great *mer de glace*, long tongues of ice dilated into the valleys, and compelled the local ice out of its course; sometimes, as in the case of the Valromey, forcing it backwards up the valleys down which it formerly flowed. But when once more the mighty *mer de glace* was on the wane, then the local glaciers came again into existence, and reoccupied their old courses. And thus it is that in the hilly regions at the base of the higher Alps, and even out upon the low grounds and plains, we encounter that remarkable commingling of erratics which has been described above. Not unfrequently, indeed, we find one set of moraines superposed upon another, just as in the low grounds of Northern Germany, &c., we may observe one boulder-clay overlying another, the erratics in which give evidence of transport in different directions. The observations recorded by MM. Falsan and Chantre, and their colleagues, thus demonstrate that "intercrossings" of erratics of the most pronounced character have been brought about solely by the action of glaciers. In the case of the erratics and morainic accumulations of the basin of the Rhone, the action of icebergs is entirely precluded.

I may now mention some of the more remarkable examples of "intercrossings" of erratics which have been recorded from the glacial accumulations of North Germany, &c. An examination of the glacial striæ, *roches moutonnées*, and boulder-clays of Saxony leads to the conviction, according to Credner, Penck, Torell, Helland, and others, that the whole of that region has been invaded by the great Scandinavian *mer de glace* which flowed into Saxony from N.N.E. to S.S.W. Erratics from Southern Sweden and Gothland occur in the boulder-clay, and the presence of these, taken in connection with the direction of the glaciation, leaves us no alternative but to agree with the

conclusions arrived at by the Saxon geologists. But, apparently in direct contradiction of this conclusion, we have evidence to show that boulders of the same kinds of rock occur in Denmark and Holland, pointing to a former ice-flow from north-east to south-west and west. Thus boulders derived from Gothland occur at Gröningen in Holland, while fragments from the island of Öland are met with in Faxö; and erratics from the borders of the Gulf of Finland are encountered at Hamburg. Indeed, when geologists come to examine the erratics in North Germany and Poland generally, they find evidence of apparently two ice-flows—one of which went south-south-west, south, and south-east —spreading out, as it were, in a fan-shape towards the southern limits reached by the great "Northern Drift,"—while the other seems to have followed the course of the Baltic depression, overflowing the low grounds of Northern Prussia, Holland, &c., in a south-west and west direction. Now, it is quite evident that no one *mer de glace* could have followed these various directions at one and the same time. The explanation of the apparent anomaly, however, is not far to seek. It is reasonable to infer, that long before the *mer de glace* had attained its maximum dimensions, when as yet it was confined to the basin of the Baltic and was only able to overflow the northern regions of Prussia, &c., its course would be determined by the contour of the pavement upon which it advanced. It would, therefore, be compelled to follow the Baltic depression, and for a long time it would carry erratics from Finland, the Baltic Islands, and Eastern Sweden, in a south-west and west-south-west direction. And this would continue to be the direction even after a considerable portion of the low grounds of Prussia, &c., had been overflowed. But when the ice-sheet was enabled to advance south into Saxony, Poland, and Lithuania, erratics from Finland, the Baltic Islands, &c. would necessarily cease to travel towards the west, and hold on a S.S.E., S., and S.S.W. course. Again, when the *mer de glace* was on the decline, a time would return when the ice, as before, would be controlled in its flow by the Baltic depression, and this would give rise to a further distribution of erratics in a prevalent west-by-south direction.[1]

[1] For a fuller discussion upon the distribution of erratics on the Continent, I may refer to Appendix, Note B, in 'Prehistoric Europe,' where the reader will find references to the literature of this interesting subject.

(*To be continued.*)

ZOOLOGY.

SOME NOTES ON COLLECTING AND PRESERVING MYRIAPODA.

By T. D. GIBSON-CARMICHAEL.

NEWPORT, writing in 1844, remarked: "The myriapoda have been more neglected by naturalists than almost any other division of articulata;" and the remark, as far as this country is concerned, still remains true. On the Continent of late years much has been done both in the way of description of known species and research into the internal anatomy of the group; so much, indeed, that Haase, in the introduction to his pamphlet on 'Schlesiens Chilopoden,' claims for his study the merit that it is quite in accordance with the spirit of the time. It is much to be wished that some few, of the many persons interested in the fauna of this country, may take up the subject, at least so far as to collect specimens in their own districts, so that material may not be wanting to form a satisfactory list of our native species. They are not very numerous, yet they are to be found everywhere; and much might be done at little trouble by our collectors of shells or of beetles.

All that is needed for collecting them is a fairly wide-mouthed bottle, with some cotton-wool or bits of moss and broken bark in it. The creatures are easily caught with the fingers (the very small specimens are lifted by being touched with the wetted finger-tip), and on being placed in the bottle they run in among the moss or cotton-wool, where they become somewhat entangled, and lie still, without biting each other's limbs off, as they are apt to do when placed in an empty box or bottle.

Both centipedes and millipedes are to be found under stones, in decaying wood, under loose bark, in fungi, in rotting fruit —in fact, in most places where beetles are to be found. It is as well, on turning over a stone or raising a piece of bark or wood, to do so slowly, as many of the centipedes are very

quick in getting out of sight, while others drop to the ground at the slightest touch. First capture any of the quick-running centipedes, *Lithobii*, &c., which are visible; these are generally to be found in pairs. Then look carefully for any millipedes; those which roll themselves into a pill-like ball should be secured first, then any large *Julus* or *Polydermus;* small specimens are less liable to drop, and may be picked up more leisurely. The long narrow centipedes with many legs (*Geophili*), though rather hard to see when in a hole, seldom escape; for though they wriggle a great deal they make little progress, wasting their energies in knotting themselves in the most curious manner. These latter, and all millipedes, are more or less gregarious in their habits. The peculiar odour given out by *Julus* generally enables the collector to know where to expect many specimens.

A special look-out should be kept for specimens with eggs, or pairing, and for those which have just changed their skin, and are therefore particularly valuable for anatomical purposes. Such specimens should, where possible, be enclosed separately in a tube or pill-box, and the circumstances connected with them noted down.

Shady and damp localities are the best for myriapoda; both great dryness and great wetness being fatal.

On reaching home the specimens must be transferred to bottles containing fairly strong spirit (70 per cent is perhaps the most useful). It is as well to do this soon, as centipedes die and shrivel up very quickly; the calcareous covering of the millipedes enables them to live longer. I find it most convenient to open my collecting bottles over saucers containing boiling or very hot water, into which the creatures are dropped. This saves trouble, as it kills them instantaneously, and so any sorting of the specimens is rendered easy, and the chances of the animals escaping about the room are greatly diminished. It also has an additional advantage: many myriapoda, especially *Julus*, give off a pungent liquid when annoyed; this liquid stains the fluid they are immersed in, and by killing them in hot water before transferring them to spirit a great deal of this is got rid off.

There is no need to go into details as to the preservation of the animals for the cabinet—each will adopt his own plan for himself. I hope, however, that these remarks may be of some use, and may induce a few collectors, even if they do not form a collection for themselves, to secure a few specimens for those who do. I myself shall be glad to receive specimens from any

locality; and if I can be of any assistance in giving information as to literature, dissection, or any other matters, I shall be glad to do so. In the present state of knowledge any notes regarding the habits of myriapoda are of value. The literature of the subject is mostly contained in scattered papers in the transactions of foreign societies, but it is well worth studying.

CASTLE CRAIG, DOLPHINTON.

ON THE OCCURRENCE IN SCOTLAND OF THE BLUE-THROATED WARBLER.

BY J. A. HARVIE BROWN, F.R.S.E., F.Z.S.

ON the 24th September of the present year I received a box containing three birds which were captured during the two previous days at the lantern of the Isle of May Lighthouse, in the Firth of Forth, and which the reporter, Mr Joseph Agnew, head lighthouse-keeper, desired to have named. One of these was a Night-jar, *Caprimulgus europæus*, a species hitherto unknown at this station; another was an adult male Redstart, *Ruticilla phœnicura;* and the third is the subject of this notice.

Along with the box of birds, Mr Agnew sent me the third fully filled-in schedule which I have received from him for 1881, and I cannot pass on here without testifying to the intelligent interest and careful attention which is manifested in these schedules. At the same time, I am glad to testify in like manner to the general interest created by the Abstract of our Report on Migration, read at the last meeting of the British Association, and by the distribution of this report to the various lightship and lighthouse stations in England and Scotland. We have to thank the Trinity House for the liberal view they have taken of the work, and for relieving us of much expense in connection with it.

According to Mr Agnew's schedule, under date Sept. 17th, the wind was light westerly with haze. The next record occurs on the 22d, the date of the capture of this specimen and of numerous arrivals of Redstarts, Mavises, Swallows, Golden Plover, Ring Dotterel, Lapwings, Chaffinches, one Corn-crake, one Robin, Curlews, &c.—indeed, of a "rush" of migrants.

On that day, and for some days previous, the wind was strong S.E., and it continued so all day: weather, very thick haze, approaching to fog, with a continuous downpour of rain. Mr Agnew adds, "All the birds seen to-day seemed perfectly bewildered."

The bird of which I now speak is *Cyanecula Wolfi*, or the white-spotted—sometimes spotless—form of the Blue-throated Warbler. The other form, *Cyanecula suecica*, or Red-spotted Blue-throat, is more northern in its range in Europe than the bird under consideration, and hitherto, with only three exceptions, is the only species or form of the genus which has been recorded in Great Britain. *Cyanecula Wolfi* is found over Central Europe, and breeds in Holland, Germany, and southward, and is found in winter in Spain, Italy, and the shores of the Mediterranean (*vide* Dresser's 'Birds of Europe,' vol. i. p. 312); and according to Prof. Newton (Yarrell, 4th ed., vol. i. p. 324), has only once before occurred in Britain (*vide* Hadfield, Zool. 1866, p. 172, where the bird recorded as "Blue-throated Warbler" belongs to this form), *vide* Zool. 1876, p. 4956. The specimen in my possession closely agrees with the bird figured in Dresser's 'Birds of Europe' (vol. i. pl. 50), of which he says (p. 320), "a male of *C. Wolfi* in rather peculiar autumn plumage." I have now, therefore, to record the third occurrence of the white-spotted form (which two Dresser unites under *Cyanecula Wolfi*) in Britain, and its first occurrence in Scotland.

Now, in connection with the distribution and rare occurrences of European or other species in Britain, I wish here to say a few words. In 1875, on the 10th November, I obtained a Black Redstart, *Ruticilla titys*, at Kincardine-on-Forth, which was duly recorded, and the specimen exhibited, at the Royal Physical Society's meeting in Edinburgh, on the 21st February 1877. At that time I said, "What we have for a long time considered as accidental—purely accidental—occurrences of Continental species ought, in many instances, I think, rather to be held as indications of extension towards the north of their breeding limits on the Continent." Since then, as I will show, I have somewhat modified this opinion, as I think, besides such occurrences being partly due to northern extension of the breeding range, they are also due to prevalence of easterly and south-easterly winds and gales blowing the migrants more to the northward than in other circumstances they would be borne.

But on this point see the Report on Migration of Birds in 1880.

Again, near Alloa, at a locality not far removed from Kincardine on-Forth, where I shot the Black Redstart, Mr J. J. Dalgleish has recorded[1] the occurrence of another south-eastern species—viz., the Desert Wheat-ear—which will also be found alluded to in the same report. At that time also the prevailing winds were E. and S.E.

Now again occurs another Central and South European species (*C. Wolfi*) at the Isle of May, in the Firth of Forth, during prevailing and strong S.E. winds, which species has not before been recorded from Scotland.

What I want specially to point out here is, that the localities of Alloa and the narrow part of the Firth of Forth, and the Isle of May and the shores of the Firth, all *lie in a line*, or nearly so, running from E. to W.; and I only desire further to remark that Alloa and that part of the country appears to be visited by many other rarities, such as the Waxwing and Great Grey Shrike, and a line of distribution of the occurrences of the Great Grey Shrike runs also broadly across Stirlingshire, the narrowest part of Scotland. I indicate these facts for further study and comparison, only adding that, as far as I can at present judge from numerous statistics at command, I believe the waves of migration of certain species take certain and fixed lines, according to influence of weather and winds; or, in other words, that certain Continental species are known to turn up at certain localities in Britain with greater regularity and precision than at others—and that, in extraordinary seasons, and with prevalence of wind from unusual quarters, a corresponding change will take place in the distribution of so-called "accidental occurrences" of Continental species in Britain; and further, that this will be aided to a considerable extent by the northern range of such species on the Continent during the breeding season in exceptionally fine summers, or by the natural extension of the breeding haunts of many species.

One more point I would like to bring forward in support of what I still consider theory, but which to me seems strongly supported already by known facts. In 'The Field' of May 7th 1881, were recorded occurrences of the Pied Fly-catcher in Sutherland and Rosshire; and about the same date other occurrences were recorded from various parts of the east coast of

[1] Proc. Royal Phys. Soc. Edin., 1880-81, vol. vi. p. 64.

Scotland. A pair lingered a long time at one locality in East Sutherland, but finally disappeared. These, of course, belonged to the spring migration of 1881. Now, how are we indebted for such an unusual visitation so far west of the continent of Europe at this season? My idea—theory, if you will—is as follows: As we have shown in our Report for 1880 that birds were carried further west than usual by the easterly gales of the autumn of that year, the consequence of this was that the birds wintered at localities further west than usual, and also returned to their breeding haunts by routes removed farther west than usual in the following spring.

It may be said it is a pity to advance theories without sufficient bases of facts in such matters, and doing so might perhaps be characterised as unscientific; but I advance it in what I believe to be the interest of our inquiry, whether correct or erroneous; because what we want is more general attention to the meteorological necessities of our investigation, and a wider appreciation by our reporters and those who are assisting us of the necessity of a comparison of the data, year with year, in the future. It is on this account that I would urge the mapping out of the distribution of the occurrences of rare Continental forms in Britain, year after year, and also the comparison of these annual maps, the one with the other, and with the meteorological facts of each year.

Mr J. J. Dalgleish and Mr Freke are doing good work in enumerating all the occurrences of American birds in Europe and mapping them out, and *vice versâ*. It would be desirable to extend this plan to all specimens of the rarer Continental species in Britain, the meteorological data, and a corresponding map of Europe, showing the northward range of these birds in the breeding season. We ourselves have not time to devote earnestly to this additional work, but we believe that the field suggested would be sure to yield to any naturalist, taking it up as a separate branch, a rich harvest in course of time.

STORM-PETRELS FOUND IN PERTHSHIRE.

By COLONEL DRUMMOND HAY, C.M.Z.S.

I HAVE the pleasure of sending you notice of Leach's Fork-tailed Petrel (*Thalassidroma Leachii*) as having been picked up dead in Strathearn, in a field near Strathallan Castle, on Tues-

day the 22d November last, during the very severe gale of that morning. This bird was sent to me by Lord Strathallan, and proved to be an adult female. Another example of this rare British Petrel was got in Athole on the same morning by Mr Campbell, gamekeeper, who found it lying dead on the lawn in front of Blair Castle, as I was informed by Mr Malloch, Perth, in whose hands it had been placed for preservation, together with a fine specimen of the Little Storm-Petrel (*Thalassidroma pelagica*) got on the same day dead in a small pond near Dupplin Castle by Mr Hart.

To those who may not be familiar with these birds, it may not be uninteresting to mention something of their habits. The Little Storm-Petrel, the smallest of all our web-footed birds, though a rover for the greater part of the year over the wide Atlantic, often keeping for many days together in company with some ship, both for food and shelter, is abundant during the breeding season in June and July on most of the rocky promontories, holms, and skerries along all our coasts from Scilly to Shetland. Not so the Fork-tailed Petrel, a much larger bird,[1] and thoroughly oceanic in its habits, which, though perhaps not actually uncommon, yet being a much shyer and more retiring bird, seldom accompanies ships, like the Storm and Wilson's Petrel (which, however, I have occasionally seen them do, but keeping all the time at a respectful distance), and always breeding on some far outlying spots, is not often met with. The greater number of specimens obtained are generally, as in the present instance, either picked up dead far inland, or when driven on shore in an exhausted state, after some severe gale, many instances of which have occurred from time to time, both in this country and America. Strange to say, it was only comparatively a few years ago that this bird was held to be a distinct species, having been first separated by Dr Leach in the

[1] The total dimensions of the Strathallan specimen were as follows :—

Length from point of bill to longest tail-feather, .	8 inches.
" " to centre of fork of tail, .	7½ "
" from anterior joint of wing to longest quill,	6 "
" " carpel-joint to do., ...	6½ "
Total spread of wings, ...	18 "
Length of bill from base, ...	1 "
" of middle toe, ...	1⅛ "

whereas in the Storm-Petrel the whole length does not quite reach 6 inches, and the wing from the anterior joint not more than 4⅝ inches.

year 1819, he having purchased it at the sale of Mr Bullock's Collection, who obtained it during the year previous at St Kilda, where it was found breeding, and where it is still to be got at that season. This was the first authenticated specimen (which Dr Leach considered to be an undescribed species) obtained in Great Britain, and which he transferred to the national collection in the British Museum, now at South Kensington, there being at that time only three other examples known in Europe —two in private collections in France, and one in the Paris Museum.

From the absorption of all fat and oily matter, with which the Petrel is copiously supplied, and which, on capture, is ejected in large quantities from the mouth and nostrils, as also from the bloodless appearance of the flesh, as well as the total absence of all food in the stomach, both in the Strathallan bird and those received by Mr Malloch, there can be no doubt but what they were in a thoroughly starved condition,—possibly caught up in a cyclone many degrees to the southward and westward of these islands, and violently hurled along for days together at a considerable height, without once touching the ocean, as may be gathered from their having crossed the Grampian range at a height of not less than from two to three thousand feet, and perhaps considerably more, to the spots where they were found; and, what is worthy of remark, none of these birds had the slightest appearance of violence, bruising, or extravasation on them, all being in good feather; and, what is curious, the body was quite limp and perfectly free from all the stiffness and rigidity found in a recently shot bird, having to all appearance died some time before reaching the earth. Had they been merely blown off the ocean from the vicinity of St Kilda, or any part of the Outer Hebrides, at the rate the wind was travelling on the morning in question, a couple of hours at most would have been sufficient to transport them to where they were found; and in that short time the stomach could not have been empty, nor, in all probability, would such complete exhaustion have taken place as to produce death, but, on the contrary, life and vigour would still have been retained, and another half-hour carried them to the German Ocean, where life might have been preserved.

The velocity and suddenness of this particular gale was such as doubtless to cause more destruction to bird-life than can possibly ever be known; and so graphically is it all described by Professor Grant of Glasgow University, that I make no

apology for quoting his observations, bearing as they do on the present subject: "The evening of the 21st presented no indications of the terrible commotion which was approaching. The sky was beautifully clear in every direction, the wind was blowing gently, and there appeared every prospect of an especially favourable night for astronomical observation. About 5 P.M., however, several significant changes were perceptible. The barometer began to fall steadily; the wind, which had been blowing from the south-west during the day, was now found to be veering gradually towards the south, and was rapidly increasing in intensity, while the heavens in all directions were assuming a dark and threatening aspect. About 11 P.M. the storm was already raging with extraordinary violence, but it continued to increase in intensity till about 6 o'clock this morning. Just a few minutes before six, there occurred a tremendous gust of wind which, measured by Osler's anemometer, was equivalent to a wind pressure of 48 pounds on the square foot. This result received a satisfactory confirmation from the indications of Robinson's velocity anemometer. It was found by this instrument that the wind, for a few minutes about the same time, was travelling at the rate of nearly 80 miles an hour. As far as the self-recording instruments of this Observatory indicate, the storm of last night is the most violent with which Glasgow has been visited for at least twenty years."

SEGGIEDEN, PERTH.

Perthshire Natural History Museum. — The Perthshire Society of Natural Science, under whose charge this institution is, has had a most successful bazaar at Perth in aid of the funds for furnishing and endowing the museum. The bazaar was one of the most popular ever held in Perth, and produced a sum of nearly £1600. Contributions of scientific books, &c., will be gratefully received by the Society for its library.

PHYTOLOGY.

THE CRYPTOGAMIC FLORA OF MULL.

By F. BUCHANAN WHITE, M. D., F. L. S.
Secretary of the Cryptogamic Society of Scotland.

(*Continued from page* 162.)

Mosses.

THE following contribution to a catalogue of the Mosses of Mull has been compiled by Messrs George Ross and Thomas King; and, in addition to species noticed during the visit of the Society, includes a number observed by Mr Ross during his residence in the island. The absence of alpine species may be explained by the fact that Mr Ross had no opportunity of collecting on the higher mountains.

Andreæa petrophila Ehr.
" alpina Turn.
Sphagnum cymbifolium Ehr.
" compactum Brid.
" molluscum Bruch.
" acutifolium Ehr.
Phascum subulatum L.
Weissia controversa Hedw.
" mucronata B. and S.
Rhabdoweissia denticulata B. and S.
Blindia acuta B. and S.
Dicranum rufescens Turn.
" heteromallum Hed.
" scoparium Hed.
" majus Turn.
Leucobryum glaucum Hampe.
Ceratodon purpureus Brid.
Campylopus flexuosus Brid.
" longipilus Brid.
" turfaceus B. and S.
Pottia minutula Ehr.

Pottia truncatula L.
Didymodon rubellus B. and S.
Tortula muralis Timm.
" fallax Hed.
" ruralis Hed.
" intermedia Brid.
Hedwigia ciliata Hed.
Grimmia apocarpa B. and S.
" " var. rivularis.
" pulvinata Sm.
" Schultzii Brid.
" patens B. and S.
Racomitrium ellipticum B. and S.
" aciculare Brid.
" protensum Braun.
" sudeticum B. and S.
" fasciculare Brid.
" heterostichum Brid.
" lanuginosum Brid.
" canescens Brid.
Glyphomitrium Daviesii Schwg.
Ptychomitrium polyphyllum B. and S.
Orthotrichum rupestre Schl.
" crispum Hed.
" Bruchii Brid.
" phyllanthum B. and S.
Zygodon Mougeotii B. and S.
" viridissimus Brid.
Diphyscium foliosum W. and M.
Atrichum undulatum Beauv.
Pogonatum nanum Brid.
" aloides Brid.
Polytrichum commune L.
Aulacomnion palustre Schw.
Bryum alpinum L.
" inclinatum B. and S.
" capillare Hed.
" argenteum L.
Mnium rostratum Schr.
" hornum L.
" punctatum Hed.
" subglobosum B. and S.

Funaria hygrometrica Hed.
Physcomitrium pyriforme B. and S.
Bartramia arcuata Brid.
" fontana Brid.
" pomiformis Hed.
" ithyphylla Brid.
Splachnum ampullaceum L.
Fissidens bryoides Hed.
" osmundoides Hed.
" adiantoides Hed.
" taxifolius Hed.
Antitrichia curtipendula Brid.
Isothecium myurum Dill.
" myosuroides Dill.
Leskea sericea Dill.
Hypnum tamariscinum Hed.
" splendens Dill.
" rutabulum Dill.
" populeum Hed.
" plumosum Swartz.
" striatum Hed.
" prælongum Dill.
" denticulatum Dill.
" undulatum Dill.
" serpens Dill.
" hamulosum Fröl.
" cupressiforme Dill.
" crista-castrensis L.
" cuspidatum Dill.
" resupinatum Wils.
" purum Dill.
" squarrosum Dill.
" brevirostre Ehr.
" triquetrum Dill.
" loreum Dill.
Neckera crispa Dill.
" complanata B. and S.
Hookeria lucens Sm.
Fontinalis antipyretica L.

(*To be continued.*)

MYCOLOGIA SCOTICA.

By Rev. JOHN STEVENSON.

(*Continued from page* 170.)

2232. **Agaricus (Amanita) lenticularis** Lasch. *C. Hbk. No.* 15.

In woods.

East. Tweed —— —— —— —— ——
West. —— —— —— ——

Roxburgh. Rev. David Paul.
England. Europe.

2233. **A. (Lepiota) ermineus** * Fr. *Hym. Eur. p.* 33. *C. Illust. Pl.* 40.

White; pileus somewhat fleshy, campanulate then expanded, *even*, *smooth*, then *silky-fibrillose round the margin;* stem fistulose, equal, becoming smooth, with a remote, torn, evanescent ring; gills approximate. Fragile.

Grassy place in wood. Nov.

East. —— —— Tay —— —— ——
West. —— —— —— ——

Glamis, 1881. J. S.
England. Europe.

2234. **A. (Tricholoma) immundus** * Berk. *C. Hbk. No.* 72. *C. Illust. Pl.* 61.

In hilly pasture. Aug.

East. —— —— Tay —— —— ——
West. —— —— —— ——

Glamis, 1881. J. S.
England.

2235. **A. (Tricholoma) tumidus** Pers. *Fr. Hym. Eur. p.* 61.

Rigid-fragile; pileus bullate then expanded, undulate, *somewhat shining*, then incised, rimose, cinereous, bent inwards at the thin margin, 3 in. broad; stem solid, *rooting*, *swollen*, *striate*, *shining white*, 3 in. long (but among moist mosses it is very much elongated); gills marginate, broad, somewhat distant, shining white, at length rufescent-cinereous. Odour and taste insipid.

In woods. Oct.

East. —— —— —— —— Moray ——
West. —— —— —— ——

Forres, 1881. Rev. James Keith.
Europe.

2236. **A. (Collybia) platyphyllus** * Fr. *C. Hbk. No.* 139.

Among beech-leaves. Oct.

East. —— —— Tay —— —— ——
West. —— —— —— ——

Glamis, 1881. J. S.
England. Europe.

* **A. (Collybia) tenacellus** Pers. Var. stolonifer * Jung. *Fr. Hym. Eur. p.* 121.

Stem with a *creeping, somewhat stoloniferous root.*

Among pine-leaves. Nov.—Dec.

East. —— —— Tay —— —— ——
West. —— —— —— ——

Perth. Dr. B. White. Glamis. J. S.
England. Europe.

I have found this as frequently as *A. tenacellus*, from which it differs only in the root.

* **A. (Mycena) strobilinus** Fr. *Mycol. Scot. p.* 27.

Altyre, Sept. 1881. Rev. James Keith.
Not recorded for Scotland since the time of Greville.

2237. **A. (Nolanea) pisciodorus** * Ces. *Fr. Hym. Eur. p.* 208.

Pileus somewhat membranaceous, conical then campanulate, then convex, obsoletely umbonate, *velvety-soft, tawny-cinnamon;* stem somewhat fistulose, tough, very thinly pruinate, *chestnut* then *becoming black*, paler at the apex, somewhat velvety; gills slighty adnexed, pale yellow then flesh-coloured, at length tawny. Smell of rotten fish.

Among decayed fir branches. Oct.

East. —— —— Tay —— —— ——
West. —— —— —— ——

Glamis, 1881. J. S.
England. Europe.

Very similar in appearance to *A. cucumis* Pers., and easily mistaken without examination of spores.

2238. **A. (Pholiota) aurivellus** * Batsch. *C. Hbk. No.* 298.

On old fir-stump. Sept.

East. —— —— Tay —— —— ——
West. —— —— —— ——

Logie, Forfarshire, 1881. J. S.
England. Europe. America.

2239. A. (Pholiota) subsquarrosus * Fr. *Hym. Eur. p.* 221.

Pileus fleshy, convex, viscid, *brown-ferruginous*, with darker, floccose, *adpressed scales;* stem stuffed, equal, yellow-ferruginous, with darker adpressed scales terminated in an annular zone, without a distinct ring, 3 in. long, ½ in. thick; gills *somewhat free*, crowded, from yellow to dirty-tan colour.

Similar in appearance to *A. squarrosus*, but distinguished by well-marked features.

On old stump. Sept.

East. —— —— Tay —— —— ——
West. —— —— —— ——

Glamis, 1881. J. S.
Europe.

2240. A. (Pholiota) pumilus Fr. *C. Hbk. No.* 305.

Among moss. Sept.—Nov.

East. Tweed —— —— —— Moray ——
West. —— —— —— ——

Grantown. Rev. James Keith. Roxburgh. Rev. David Paul.
England. Europe. Australia.

2241. A. (Hebeloma) sinapizans * Fr. *C. Hbk. No.* 311.

In mixed wood. Sept.

East. —— —— Tay —— —— ——
West. —— —— —— ——

Glamis, 1881. J. S.
England. Europe.

* **A. (Flammula) carbonarius** Fr. *Mycol. Scot. p.* 60.

Growing along with *Rhizina undulata* Fr., both in abundance, on burnt sandy soil in fir-wood.

Logie, Forfarshire. J. S.

* **A. (Flammula) astragalinus** * Fr. *Mycol. Scot. p.* 60.

Glamis, Oct. 1881. J. S.

2242. A. (Hypholoma) elæcodes * Fr. *Hym. Eur. p.* 291.

Pileus fleshy, rather plane, somewhat umbonate, *dry*, *smooth*, opaque, brick-red or tan colour, flesh yellow; stem stuffed, then hollow, equal, fibrillose, of the same colour as the pileus, becoming ferruginous, commonly slender, incurved or flexuous; gills adnate, crowded, thin, *green*, then pure olivaceous. Cæspitose. Odour bitter.

On dead trunk. Sept.

East. —— —— Tay —— —— ——
West. —— —— —— ——

Glamis, 1881. J. S.
England. Europe.

2243. Cortinarius (Phlegmacium) saginus * Fr. *Hym. Eur. p.* 340. *Greville, vi. t.* 92.

Pileus fleshy, plano-convex, unequal, smooth, viscous, yellow, 4–5 in. broad; stem solid, somewhat bulbous, fibrillose, dingy yellow, (*becoming bright yellow*), *naked at the apex*, with a fugacious veil, 3 in. long, 1 in. and more thick; gills decurrent, broad, *eroded*, *dirty-pallid*, then cinnamon. Flesh white. Very gregarious, somewhat cæspitose, large.

In mixed wood. Oct.

East. —— —— Tay —— —— ——
West. —— —— —— ——

Glamis, 1881. J. S.
England. Europe.

2244. C. (Phlegmacium) turbinatus * Fr. *C. Hbk. No.* 497.

In mixed wood. Oct.

East. —— —— Tay —— —— ——
West. —— —— —— ——

Glamis, 1881. J. S.
England. Europe. America.

2245. C. (Myxacium) delibutus Fr. *Hym. Eur. p.* 357. *Quel., Grev., t.* 108, *f.* 2.

Pileus fleshy, thin, convexo-plane, obtuse, even, *glutinous*, yellowish, sometimes tawny on the disc, smooth, or when full grown fibrillose-silky, 2–3 in. broad; stem stuffed, at length hollow at the apex, elastic, *thin*, *attenuated*, *whitish*, and like the pileus *glutinous*, shining, 2–4 in. long, 3–4 lines thick; gills adnate, obsoletely emarginate, decurrent with a slight tooth, broad, plane, somewhat distant, serrulate, *pallid-blue* then clay-ferruginous. Soft. White within.

In woods. Aug.

East. —— —— —— —— Moray ——
West. —— —— —— ——

Grantown, 1881. Rev. James Keith.
England. Europe.

2246. C. (Myxacium) stillatitius Fr. *C. Hbk. No.* 503.

In woods. Aug.

East. —— —— —— —— Moray ——
West. —— —— —— ——

Grantown, 1881. Rev. James Keith.
England. Europe.

2247. C. (Dermocybe) cinnabarinus * Fr. *Hym. Eur. p.* 370. *Quel., Grev., t.* 110, *f.* 4.

Pileus fleshy, obtuse, silky, then become smooth, shining, and as well as the stuffed, short, firm, now and then bulbous, fibrillose stem, which never becomes yellow, and veil, *scarlet cinnabar;* gills adnate, broad, unequal at the edge, *somewhat distant*, darker. Odour of radishes.

In beech wood. Nov.

East. —— —— Tay —— —— ——
West. —— —— —— ——

Glamis, 1881. J. S.
England. Europe.

2248. C. (Hygrocybe) germanus * Fr. *Hym. Eur. p.* 397. *Quel., Grev., t.* 114, *f.* 2.

Pileus somewhat membraceous, conico-expanded, obtusely umbonate, somewhat silky, *fragile*, even, becoming fuscous (clay-colour), without striæ, scarcely an inch; stem somewhat fistulose, thin, equal, smooth, *lilac then becoming pale*, at length silvery, somewhat twisted, 3 in. long, 1 line thick; gills adnate, somewhat distant, broad, watery cinnamon. Strong smelling.

In pine-wood. Sept.

East. —— —— Tay —— —— ——
West. —— —— —— ——

Logie, Forfarshire, 1881. J. S.
Europe.

2249. Lactarius vietus * Fr. *Hym. Eur. p.* 432.

Pileus fleshy, thin, at first somewhat umbonate, viscid, then flattened, umbilicate, sometimes infundibuliform, even, zoneless, *when dry slightly silky*, flesh-coloured or livid grey, becoming very pale; stem stuffed then *hollow*, fragile, livid; gills somewhat decurrent, thin, dead whitish; milk from *whitish to grey*, tardily acrid. Thin, soft, fragile, variable in form.

In grassy wood. Oct.

East. —— —— Tay —— —— ——
West. —— —— —— ——

Glamis, 1881. J. S.
England. Europe.

2250. Polyporus zonatus Fr. *Hym. Eur. p.* 568.

Pileus somewhat corky-coriaceous, *convex*, *tuberculose and gibbous behind*, somewhat zoned, *villous*, *opaque*, becoming dead white at the margin; pores minute, rounded or become angular, obtuse, dead whitish.

On trunks.

East. —— —— —— —— Moray ——
West. —— —— —— ——

Dunphail, 1881. Rev. James Keith.
Europe.

* **Clavaria cinerea** Bull. *Mycol. Scot. p.* 173.
Along with the common form I have gathered fine specimens of the variety figured by Greville (*Scot. Crypt. Fl., pl.* 321), with short thickened stem, terminated by a thick fringe of subulate processes.

2251. **Clathrus cancellatus** Linn. *C. Hbk. No.* 1067.
In woods.

East. —— Forth —— —— —— ——
West. —— —— —— ——

Tynningham, 1881. Miss Violet Chambers.
England. Europe. America.

* **Hydrangium carneum** Wallr. *Mycol. Scot. p.* 185.
Edinburgh Botanic Garden, 1880. Dr M. C. Cooke.

* **Rhizopogon rubescens** Tul. *Mycol. Scot. p.* 186.
The plant recorded from Rannoch is referred to in Rev. M. J. Berkeley's Herbarium as *R. luteolus* Tul.

* **Hymenogaster Klotschii** Tul. *Mycol. Scot. p.* 186.
Edinburgh Botanic Garden, 1880. Dr M. C. Cooke.

2252. **Puccinia allii** Casp. (*P. mixta* Fckl.) *Symb. Myc. p.* 58.
Spots elongate, dark; sori dark brown, at first often rounded, becoming elongate, subepidermal; spores brown, cell walls nearly uniform in thickness, pedicels short, colourless. Many spores are two-celled, widened upwards, and rounded or squared at the apex, and slightly constricted in the middle (*P. allii* Casp.); others are smaller, undivided, and oval, obovate or quadrangular in form (*Uromyces alliorum* D. C.). Both kinds of spores vary considerably in form. Along with them, or in separate sori, of the same form but yellow, occur round or oval one-celled spores, with smooth, yellowish, nearly transparent cell walls, and deep yellow cell contents, forming *Uredo alliorum* D. C. (*Uredo limbata* Rabenh.) J. W. H. Trail.
On *Allium Schœnoprasum.* Summer.

East. —— —— —— Dee —— ——
West. —— —— —— ——

Nigg, Aberdeen. Mr W. Forrest.
Europe.

2253. Uredo statices Desm. *C. Hbk. No.* 1580.

On *Armeria maritima.* Summer.—Autumn.

East. —— —— —— Dee —— ——
West. —— —— —— ——

Aberdeen. Dr B. White.
England. Europe.

2254. Synchytrium taraxaci De By. & Wor. *Grevillea, ii. p.* 162.

Cellules variable, seated beneath the cuticle of living leaves. Zoogonidia ·00013 mm. diam.

On leaves of *Taraxacum officinale.* Summer—Autumn.

East. —— —— Tay Dee —— ——
West. —— —— Argyle ——

England. Europe.

2255. Ascobolus depauperatus B. & Br. *C. Hbk. No.* 2207.

On rabbit-dung.

East. —— —— —— —— —— ——
West. —— —— Argyle ——

Mull. Dr B. White.
England.

* **A. glaber** Pers. *Mycol. Scot. p.* 337, growing on the disc of *A. pilosus* Fr. *Mycol. Scot. p.* 339.

Mr W. Phillips, to whom I submitted this singular case of parasitism, has never met with a similar instance in his researches among *Elvellacei.*

2256. Apiosporium abietis Cke. *Grevillea, ix. p.* 94.

Effused, black, velvety. Mycelloid hyphæ black brown; perithecia globose, very small (·1 mm. diam.); asci clavate (·02 × ·007 mm.); sporidia elliptical, hyaline (·005 × ·002 mm.). Investing the young twigs with a black incrustation resembling soot, in which the perithecia are seated. The subiculum consists of an irregular mass of brown cells resembling a low form of *Sporidesmium.*

On twigs of living spruce.

East. —— Forth —— —— —— ——
West. —— —— —— ——

Glencorse. Penicuik. Dr M. C. Cooke.

The following districts are to be recorded for the species enumerated:—

Tweed.—Agaricus ustalis Fr.; A. columbetta Fr.; A. sulphureus Bull.; A. clavipes Pers.; A. inolens Fr.; A. stipitarius Fr.; A. tenerrimus Berk.; A. phlebophorus Dittm.; A. togularis Bull.; A. marginatus Batsch.; A. cucumis Pers.; A. gracilis Fr.; Bolbitius hydrophilus Bull.; Cortinarius

multiformis Fr.; Lenzites sæpiaria Schæff.; Boletus laricinus Berk.; Polyporus brumalis Pers.; P. sanguinolentus A. & S.; Triphragmium ulmariæ Link.; Puccinia malvacearum Cda., *Mycol. Scot. Supp.*, *Scot. Nat. vi. p.* 119; Peronospora obliqua Cooke; Peziza humosa Fr.

FORTH.—Lenzites sæpiaria Schæff.; Hydnanguim carneum Wallr.; Hymenogaster Klotschii Tul.; Sphæria sabuletorum B. & Br. on *Psamma arundinacea.*

DEE.—Paxillus atro-tomentosus Batsch.; Polyporus perennis L.; Uredo alliorum D. C.

MORAY.—Agaricus pterigenus Fr.; A. radicosus Bull.; Cortinarius claricolor Fr.; C. livido-ochraceus Berk.; C. leucopus Bull.; C. decipiens Pers.; Lactarius hysginus Fr.; Marasmius porreus Pers.

ARGYLE.—The following species were gathered on the Island of Mull, during the meeting of the Cryptogamic Society of Scotland in August 1881. Many of the commoner species, which have already been recorded for Argyle, were noticed on the same occasion :—

Agaricus granulosus Batsch.; A. butyraceus Bull.; A. confluens Pers.; A. dryophilus Bull.; A. rubro-marginatus Fr.; A. polygrammus Bull.; A. atro-albus Bolt.; A. alkalinus Fr.; A. ammoniacus Fr.; A. filopes Bull.; A. vulgaris Pers.; A. chalybœus Pers.; A. pascuus Pers.; A. scaber Müll.; A. semilanceatus Fr.; A. separatus L.; A. fimiputrus Bull.; Coprinus atramentarius Bull.; C. plicatilis Curt.; Cortinarius cyanopus Secr.; C. purpurascens Fr.; C. cinnamomeus L.; C. torvus Fr.; Gomphidius glutinosus Schæff.; Hygrophorus chlorophanus Fr.; Lactarius insulsus Fr.; L. blennius Fr.; L. vellereus Fr.; L. deliciosus L.; L. quietus Fr.; L. theiogalus Bull.; L. glyciosmus Fr.; L. mitissimus Fr.; Russula nigricans Bull.; R. rubra D. C.; R. vesca Fr.; R. heterophylla Fr.; R. fœtens Pers.; R. Queletii Fr.; R. ochroleuca Pers.; R. alutacea Fr.; R. fellea Fr., *Mycol. Scot. Supp.*, *Scot. Nat. vi. p.* 36; Cantharellus tubæformis Fr.; Marasmius peronatus Bolt.; M. rotula Scop.; Boletus luteus L.; B. flavus With.; B. chrysenteron Bull.; B. subtomentosus L.; B. edulis Bull.; B. luridus Schæff.; Polyporus perennis L.; P. varius Fr.; P. vulgaris Fr.; Craterellus cornucopioides L.; Thelephora palmata Scop.; Corticium læve Pers.; C. calceum Pers.; Calocera cornea Batsch.; Tremella foliacea Pers.; Lycoperdon gemmatum Fr.; Fuligo varians Sommf.; Tilmadoche nutans Pers.; Reticularia lycoperdon Bull.; Cyathus striatus Hoffm.; Melasmia alnea Lev., *Mycol. Scot. Supp.*, *Scot. Nat. vi. p.* 118.; Septoria hydrocotyles Desm.; S. scabiosæcola Desm.; S. lysimachiæ West.; S. stachydis Desm.; Phyllosticta violæ Desm.; Asteroma padi Grev.; A. rosæ D. C.; Ceuthospora lauri Grev.; Torula pulveracea Corda.; Puccinia moliniæ Tul.; P. scorodoniæ Link.; P. galiorum Link.; P. circæae Pers.; Coleosporium tussilaginis Lev.; Melampsora betulina Desm.; M. salicina Lev.; Lecythea saliceti Lev.; L. valerianæ Berk.; Trichobasis oblongata Berk.; Synchytrium mercurialis Fckl., *Mycol. Scot. Supp.*, *Scot. Nat. vi. p.* 120; Urocystis pompholygodes Lev.; Æcidium compositarum var. tussilaginis Pers.; Milesia polypodii White; Ceratium hydnoides A. & S.; Cladosporium herbarum Link.; Peronospora rufibasis B. & Br.; Peziza badia Pers.; P. humosa Fr.; P. trechispora B. & Br.; P. stercorea Pers.; P. firma Pers.; P. cinerea Batsch.; Helotium æruginosum Fr.; H. pallescens Fr.; H. claro-flavum Berk.; Bulgaria sarcoides Fr.; Rhytisma salicinum Fr.; R. acerinum Fr.;

Microsphæria penicillata Lev.; Erysiphe Martii Link.; Asterina veronicæ Lib.; Torrubia militaris Fr.; Claviceps purpurea Tul.; Hypocrea rufa Fr.; Polystigma fulvum D. C.; Dothidea junci Fr.; Stigmatea Robertiani Fr.; Hypoxylon coccineum Bull.; Diatrype disciformis Fr.; Gnomonia coryli Batsch.

Ross (Skye).—Dactylium modestum Berk. & White.

The following countries are to be added under the species enumerated:—

Africa (South).—Agaricus muscarius L.; A. procerus Scop.; A. excoriatus Schæff.; A. ustalis Fr.; A. melaleucus Pers.; A. expallens Pers.; A. velutipes Curt.; A. laccatus Schæff.; A. radicatus Relh.; A. butyraceus Bull.; A. acervatus Fr.; A. tintinnabulum Fr.; A. clavicularis Fr.; A. corticola Schum.; A. hiemalis Osbeck.; A. capillaris Schum.; A. rusticus Fr.; A. integrellus Pers.; A. ostreatus Jacq.; A. atro-cæruleus Fr.; A. cervinus Schæff.; A. togularis Bull.; A; alnicola Fr.; A. pediades Fr.; A. tener Schæff.; A. hypnorum Batsch.; A. arvensis Schæff.; A. campestris L.; A. silvaticus Schæff.; A. obturatus Fr.; A. melaspermus Bull.; A. semiglobatus Batsch.; A. fascicularis Huds.; A. Candolleanus Fr.; A. ericæus Pers.; A. atro-rufus Schæff.; A. semilanceatus Fr.; A. fœnisecii Pers.; A. corrugis Pers.; A. spadiceo-griseus Schæff.; A. separatus L.; A. campanulatus L.; A. caliginosus Jung.; A. graciliis Fr.; A. pronus Fr.; Coprinus micaceus Bull.; C. radiatus Bolt.; C. ephemerus Bull.; C. plicatilis Curt.; Bolbitius Boltonii Pers.; B. fragilis L.; Paxillus panuoides Fr.; Hygrophorus virgineus Wulf.; H. coccineus Schæff.; Marasmius rotula Scop.; M. saccharinus Batsch.; Schizophyllum commune Fr.; Hydnum ochraceum Pers.; Clavaria Kunzei Fr.; Puccinia galiorum Link.; Hypoxylon rubiginosum Fr.

Australia.—Agaricus cristatus A. & S.; A. inversus Scop.; A. esculentus Wulf.; A. speireus Fr.; A. corticola Schum.; A. capillaris Schum.; A. gracillimus Weinm.; A. atro-cæruleus Fr.; A. præcox Pers.; A. languinosus Bull.; A. flavidus Schæff.; A. pediades Fr.; A. inquilinus Fr.; A. ericæus Pers.; A. atro-rufus Schæff.

Tasmania.—Agaricus laccatus Scop.; A. radicatus Relh.

Mauritius.—Polyporus betulinus Fr.; Hydnum ochraceum Fr.; Hirneola auricula-Judæ L.

THE GAELIC NAMES OF PLANTS.

By JOHN CAMERON.

(*Continued from p.* 178.)

Naiadaceæ.

Potamogeton.—Greek: ποταμός, a river, and γείτον, near.

P. natans — Broad-leaved pondweed. Gaelic: *duiliasg na h'aibhne*, the river leaf. Most of the species grow immersed in ponds and rivers, but flower above its surface. *Liobhag*, from

liobh, smooth, polish, from the smooth pellucid texture of the leaves, their surface being destitute of down or hair of any kind. Irish: *liachroda*,—*liach*, a spoon, *rod*, a water-weed, sea-weed; *liach-Brighide*, Bridget's spoon. Probably these names were also given to the other species of pondweeds (such as *P. polygonifolius*) as well as to *P. natans*.

Zostera marina—The sweet sea-grass. Gaelic and Irish: *bilearach* (in Argyle, *bileanach*), from *bileag*, a blade of grass. The sea-grass was much used for thatching purposes, and it was supposed to last longer than straw.

ALISMACEÆ.

Alisma.—Greek: ἄλισμα, an aquatic plant; said to be from a Celtic root, *alis*, water. If ever this was a Celtic vocable it has ceased to have this signification: in Welsh *alis* means the lowest point, hell.

A. Plantago—Water-plantain. Gaelic and Irish: *cor-chopaig* (*cor* or *cora*, a weir, a dam, and *copag*, a dock, or any large leaf of a plant). It grows in watery places. Welsh: *llyren*, a duct, a brink or shore.

Triglochin palustre—Arrow-grass. Gaelic: *bàrr a' mhilltich*,—

"Bun na cìpe is *bàrr a' mhilltich*."—M'INTYRE.

bàrr, top, and *milltich* (Irish), "good grass," and *milneach*, a thorn or bodkin—hence the English name arrow-grass. Generic name from τρεῖς, three, and γλωχίς, a point, in allusion to the three angles of the capsule. Sheep and cattle are fond of this hardy species, which afford an early bite on the sides of the Highland mountains. *Milltich* is commonly used in the sense of "grassy;" *maghanan millteach*, verdant or grassy meadows.

LEMNACEÆ.

Lemna minor—Duckweed. Gaelic:[1] *mac gun athair*, son without a father. Irish: *lus gan athair gan mhathair*, fatherless motherless wort. A curious name, perhaps suggested by the root being suspended from its small egg-shaped leaf, and not affixed to the ground. *Gran-lachan*,—*gran*, seed, grain, and *lach*, a duck. The roundish leaves, and the fact that ducks are voraciously fond of feeding on them, have suggested this and the following names: *Ròs lachain*, the ducks' rose or flower. Irish:

[1] *Mac-gun-athair* may have originally been *meacan air*,—*meacan*, a plant, *air*, gen. of *àr*, slow (hence the name of the river "Arar" in France, meaning the slow-flowing river,—"*Arar* dubitans qui suos cursos agat"—SENECA), the plant that grows in slow or sluggish water.

abhran donog (O'Reilly),—*abhran* is the plural of *abhra*, an eyelid, and *donog*, a kind of fish, a young ling. The fish's eyelids; more likely a corruption of *aran tunnaig*, duck's bread or meat.

It was used by our Celtic ancestors as a cure for headaches and inflammations.

ARACEÆ.

Arum, formerly *aron*, probably from the ancient Celtic root *ar*, land, earth; hence Latin, *aro*, to plough, and Gaelic, *aran*, bread, sustenance. The roots of many of the species are used both for food and medicine.

A. maculatum—Wake-robin, lords and ladies. Gaelic: *cluas chaoin*, the soft ear (*caoin*, soft, smooth, gentle, &c., and *cluas*, ear). The ear-shaped spathe would probably suggest the name. *Cuthaidh*, from *cuth*, a head, a bulb—hence *cutharlan*, any bulbous-rooted plant. *Cuthaidh* means also wild, savage. *Gachar* and *gaoicin cuthigh* are given in O'Reilly's Dictionary as names for the Arum, from *cai*, a cuckoo. Old English: cuckoo's pint.

ORONTIACEÆ.

Acorus calamus—Sweet-flag. Gaelic: *cuilc-mhilis*, sweet-rush;

"*Cuilc mhilis* agus canal."
Calamus and cinnamon.

cuilc, a reed, a cane. Greek: κάλαμος, applied to reeds, bulrush canes, *e.g.*, *cuile na Léig*, the reeds of Lego. *Cobhan cuilc*, an ark of bulrushes. *Cuilc-chrann*, cane; *milis* (Greek: μέλισσα, a bee), sweet. Before the days of carpets, this plant is said to have supplied the "rushes" with which it was customary to strew the floors of houses, churches, and monasteries.

TYPHACEÆ.

Typha, from Greek, τυφος, a marsh, in which all the species naturally grow.

T. latifolia—Great reed-mace or cat's-tail. Gaelic and Irish: *bodan dubh*, from *bod*, a tail, and *dubh*, large, or dark. *Cuigeal nam bàn-sìth*, the fairy-woman's spindle. It is often, but incorrectly, called *bog bhuine* or bulrush (see *Scirpus lacustris*). The downy seeds were used for stuffing pillows, and the leaves for making mats, chair-bottoms, thatch, and sometimes straw hats or bonnets.

T. angustifolia—Lesser reed-mace or cat's-tail. Irish: *bodan* (O'Reilly), dim. of *bòd*, a tail.

Sparganium.—Name in Greek denoting a little band, from the ribbon-like leaves.

S. ramosum—Branched bur-reed. Gaelic: *righ seisg*, the king's sedge, from its being a large plant with sword-shaped leaves. *Seisg mheirg* (Stewart),—*meirg*, rust, a standard or banner.

S. simplex—Upright bur-reed. Gaelic: *seisg madraidh.* Armstrong gives this name to *S. erectum*, by which he doubtless means this plant. *Seisg*, sedge, and *madradh*, a dog, a mastiff. Name probably suggested by the plant being in perfection in the dog-days, the month of July, *mìos Mhadrail.*

Juncaceæ.

Juncus, from the Latin *jungo*, to join. The first ropes were made from rushes, and also floor covering. Ancient Gaelic: *aoin*, from *aon*, one. Latin: *unus.* Greek: ἑν. Ger.: *ein.*

> "A dàth amar dhàth an aeil,
> Coilcigh eturra agus *aein.*
> Sída eturra is brat gorm,
> Derg ór eturra is glan chorn."

(From the description of the Lady Crehé's house by Caeilté MacRonain, from the Books of Ballymote, a rare ancient poem.)

> The colour [of her *dún*] is like the colour of lime:
> Within it are couches and *green rushes;*
> Within it are silks and blue mantles;
> Within it are red gold and crystal cups.

J. conglomeratus—Common rush. Gaelic and Irish: *luachar*, a general name for all the rushes, meaning splendour, brightness; hence *luachar*, a lamp. Latin: *lucerna.* Sanscrit: *lauchanan*, from the root, *lauch*, light. The pith of this and the next species was commonly used to make rush-lights. The rushes were stripped of their outer green skin, all except one narrow stripe, and then they were drawn through melted grease and laid across a stool to set. "The title *Luachra* was given to the chief Druid and magician, considered by the pagan Irish as a deity, who opposed St Patrick at Tara in the presence of the king and the nobility, who composed the convention"—'Life of St Patrick.' *Bròg braidhe* (O'Reilly),—*bròg*, a shoe; but here it should be *bròdh*, straw; *braidhe*, a mountain, the mountain straw or stem.

J. effusus—Soft rush. Gaelic: *luachar bòg*, soft rush. Irish: *feath*, a bog. It grows best in boggy places. *Fead*, which seems to be the same name, is given also to the bulrush. *Fead*, a whistle, a bustle.

"'S lionmhor *feadan* caol,
Air an éirich gaoth."—M'Intyre.

Doubtless suggested by the whistling of the wind among the rushes and reeds. The common rush and the soft rush were much used in ancient times as bed-stuffs; they served for strewing floors, making rough couches, &c.

J. articulatus—Jointed rush. Gaelic: *lochan nan damh.* This name is given by Lightfoot in his 'Flora Scotica,' but it should have been *lachan nan damh. Lachan,* a reed, the ox or the hart's reed.

J. squarrosus—Heath-rush, stool-bent. Gaelic: *bru-corcur* (M'Alpine),—*bru-chorachd,* the deers' moor-grass; *bru,* a deer, a hind; *corcach,* a moor or marsh. See *Scirpus.*

"*Bruchorachd* ás ciob,[1]
Lusan am bi brigh," &c.
—M'Intyre in 'Ben Doran.'

Heath-rush and "deer's hair,"
Plants nutritious they are, &c.

Specimens of this plant have also been supplied with the Gaelic name *moran* labelled thereon, and in another instance *muran.* These names mean the plants with tapering roots; the same signification in the Welsh, *moron,* a carrot. (See *Muirneach—Ammophila arenaria.*)

J. maritimus and **acutus**—Sea-rush. Irish: *meithan* (O'Reilly). *Meith,* fat, corpulent. *J. acutus* (the great sea-rush) is the largest British species.

Luzula.—Name supposed to have been altered from Italian, *lucciola,* a glow-worm. It was called by the ancient botanists *gramen luxulæ* (Latin, *lux,* light).

L. sylvatica—Wood-rush. Gaelic: *luachar còille,* the bright grass or rush of the wood. The Italian name *lucciola* is said to be given from the sparkling appearance of the heads of flowers when wet with dew or rain. *Learman* (Stewart), possibly from *lear* or *léir,* clear, discernible; a very conspicuous plant, more of the habit of a grass than a rush, the stalk rising to the height of more that two feet, and bearing a terminal cluster of brownish flowers, with large light-yellow anthers.

Cyperaceæ.

Schœnus (from χοῖνος or σχοῖνος, a cord in Greek).—From plants of this kind cords or ropes were made.

[1] See *Scirpus cæspitosus.*

S. nigricans — Bog-rush. Gaelic: *seimhean* (Armstrong). Irish: *seimhin* (*seimh*, smooth, shining—the spikelets being smooth and shining; or which is more likely, from *siobh* or *siobhag*, straw,—hence *sioman*, a rope made of straw or rushes; the Greek name σχοῖνος for the same reason).

Scirpus, sometimes written **sirpus** (Freund), seems to be cognate with the Celtic *cirs*, *cors*, a bog-plant; hence Welsh, *corsfruyn*, a bulrush (Gaelic, *curcais*). Many plants of this genus were likewise formerly used for making ropes. (Cords, Latin, *chorda;* Welsh, *cord;* Gaelic and Irish, *corda;* Spanish, *cuerda*,—all derived from *cors*.)

S. maritimus—Sea-scirpus. Gaelic and Irish: *bròbh*. Name from *brò*. *brà*, or *bràdh*, a quern, a hand-mill. The roots are large and very nutritious for cattle, and in times of scarcity were ground down in the *muileann bràdh* (French, *moulin à bras*), to make meal; *bracan*, broth,—hence *bracha*, malt, because prepared by manual labour (Greek, βραχίων; Latin, *brachium;* Gaelic, *braic;* French, *bras*, the arm).

S. cæspitosus—Tufted scirpus, deer's hair, heath club-rush. Gaelic: *ciob*, *cìpe*, and *ciob cheann dubh* (*ciob* = χιβος; Latin, *cibus*, food; *ceann*, head; *dubh*, black).

> "Le'n cridheacha' meara
> Le bainne na cìoba."—M'Intyre.

This is the principal food of cattle and sheep in the Highlands in March, and till the end of May. *Cruach luachair*,—*cruach*, a heap, a pile, a hill, and *luachair*, a rush.

The badge of the Clan M'Kenzie.

S. lacustris—Bulrush, lake-scirpus. Gaelic: *gobhal luachair*, the forked rush (*gobhal*, a fork), from the forked or branched appearance of the cymes appearing from the top of tall, terete (or nearly so), leafless stems. When this tall stem is cut, it goes by the name of *cuilc*,[1] a cane, and is used to bottom chairs. Irish: *gibiun*,—*gib* or *giob*, rough, and *aoin*, a rush. Gaelic and Irish, *bòg mhuine*, *boigean*, *bòg luachair*, *bòg*,[2] a marsh, a fen, swampy ground, to bob, to wag,—names indicating its habitat, also its top-heavy appearance, causing it to have a bobbing or wagging motion. *Curcais* (*curach*, a marsh, a fen) is more a generic term, and equals *scirpus*. *Min-fheur*, a bulrush. (See *Festuca ovina*.)

[1] "Mu lochan nan cuilc a tha ruadh."—Tighmora.

[2] *Bòg* and *bòlg* are frequently interchanged: *bòlg luachair*, prominent or massy rush; from *bòlg*, gen. *builg*, comes *bul* in bulrush.

Badge of Clan M'Kay.

Eriophorum (from ἔριον, wool, and φέρω, to bear).—Its seeds are covered with a woolly substance—hence it is called cotton-grass.

E. vaginatum and **E. polystachyon**—Cotton-sedge. Scotch: *cat's-tail.* Gaelic and Irish: *canach.* Irish: *cona* (from *can*, white), from its hypogynous bristles forming dense tufts of white cottony down, making the plant very conspicuous in peaty bogs. The *canach* in its purity and whiteness formed the object of comparison in Gaelic poetry for purity, fair complexion, &c., especially in love-songs:—

"Do chneas mar an *canach*
Co cheanalta thlà."—M'INTYRE.

Thy skin white as the cotton-grass
So tender and gentle.

"Bu ghile na'n *canach* a crùth."—OSSIAN.

Her form was fairer than the down of Cana.

In Ossian the plant is also called *caoin cheann* (*caoin*, soft), the soft heads, fair heads.

"Ghlac mi'n *caoin cheanna* sa' bheinn
'Siad ag aomadh mu shruthaibh thall
Fo charnaibh, bu dìomhaire gaoth."—TIGHMORA.

I seized cotton-grasses on the hill,
As they waved by their secret streams,
In places sheltered from the wind.

This is only the plural form of the name *canach—caineichean.*

"*Na caineichean* àluinn an t-shléibh."—M'LEOD.

O'Reilly gives the name *sgathog fiadhain* to *E. polystachyon*,—*sgath*, a tail, and *og* (dim. termination), the little tail,—to distinguish it from *vaginatum*, which is larger. Scotch: *cat's-tail.*

Badge of Clan Sutherland.

Carex (likely from Welsh, *cors;* Gaelic, *càrr*, a bog, a marsh, or fenny ground).—This numerous family of plants grows mostly in such situations. *Seisg*, sedge; *gallsheilisdear*, also *seilisdear amh* (for *Seilisdear*, see *Iris*), — *amh*, raw — the raw sedge. Welsh: *hesg. Seasg*, barren, unfruitful. Except *C. rigida*, they are scarcely touched by cattle. According to Dr Hooker, *carex* is derived from Greek, κείρω, from the *cutting* foliage. The Sanscrit root is *kar*, to cut, shear, divide.

C. vulgaris, and many of the other large species—Common

sedge. Gaelic: *gainnisg* (Stewart), —*gainne*, a sedge, reed, cane, arrow; and *seasg*.

GRAMINEÆ.

Agrostis alba—Fiorin-grass. Gaelic and Irish: *fioran*, *feorine*, or *fior-than*; derived from Gaelic: *feur*, *feoir*, grass, herbage, fodder. Latin: *vireo*, I grow green,—*ver*, spring; *fœnum*, fodder—*r* and *n* being interchangeable. This name is applied in the dictionaries to the common couch-grass, because, like it, it retains a long time its vital power, and propagates itself by extending its roots.

Alopecurus—Foxtail-grass. Gaelic: *fiteag*,—*fit*, food, refreshment. Latin: *vita*.

A. geniculatus.—Gaelic: *fiteag chàm*,—

"A chuiseag dheireach's an *fhiteag cham*."—M'INTYRE.

cam, bent, from the knee-like bend in the stalk. A valuable grass for hay and pasture.

Arundo Phragmites—Reed grass. Gaelic: *seasgan; seasg*, a reed. *Lachan*, the common reed. Irish: *cruisgiornach*, *cruisigh*, music, song; from its stem *reeds* for pipes were manufactured. Welsh: *cawn wellt*, cane-grass; *gwellt*, grass.

Anthoxanthum odoratum — Sweet meadow-grass. Gaelic: *mislean*, from *milis*, sweet.

"'San canach mìn geal 's *mislean* ann."—M'INTYRE.

The soft white cotton-grass and the sweet grass are there.

Borrach (*borradh*, scent, smell).—(In some places this name is given to the *Nardus stricta*, which see.) This is the grass that gives the peculiar smell to meadow hay. Though common in meadows, it grows nearly to the top of the Grampians (3400 feet); hence the names are given as "a species of mountain grass" in some dictionaries.

Milium effusum — Millet-grass. Gaelic: *mileid*. Welsh: *miled*. The name derived from the true *millet* misapplied. Millet is translated in the Gaelic Bible *meanbh pheasair*, small peas (see *Faba vulgaris*).—Ezekiel iv. 9.

Phleum pratense—Timothy grass, cat's-tail grass. Gaelic: *bodan*, a little tail; the same name for *Typha angustifolia*. "This grass was introduced from New York and Carolina in 1780 by Timothy Hanson."—LOUDON. It seems to have been unknown in the Hebrides and the Highlands before that date; for Dr Walker ('Rural Econ. Hebrides,' ii. 27) says, "that it may be

introduced into the Highlands with good effect." Yet Lightfoot (1777) mentions it as "by the waysides, and in pastures, but not common." *Bodan* is also applied to *P. arenarium* and *P. alpinum*.

Lepturus filiformis.—Gaelic: *dur fheur fairge*, sea hard grass. *Dur*, hard (Latin, *durus*); *feur*, grass; *fairg*, the sea, ocean, wave. It grows all round Ireland, as well as in England and South Scotland. Irish: *durfher fairge* (O'Reilly).

Calamagrostis.—Etym. κάλαμος, and ἀγρόστις, reed-grass.

C. Epigejos—Wood small reed. *Cuilc fheur*, cane-grass; *gainne* = cane. *Lachan coille*, wood-rush.

Ammophila arenaria (or **Psamma arenaria**)—Sea-maram; sea-matweed. Gaelic and Irish: *muirineach*, from *muir* (Latin *mare*, the sea), the ocean. It is extensively propagated to bind the sand on the sea shore; generally called *mùran* on west coast. The same name is applied to the carrot, an alteration of *mòron*—a plant with large tapering roots. M'Intyre alludes to "*mùran brìghar*," but whether he refers to the carrot or to this grass is a matter of controversy. Not being a seaside Highlander, he was more likely to know the carrot, wild and cultivated, far better than this seaside grass, and associating it with groundsel (a plant which usually grows rather too abundantly, wherever carrots are sown), makes it a certainty that he had not the "sea-maram" in his mind. (See *Daucus carota*.)

Avena sativa — Oats. Gaelic and Irish: *coirc*. Welsh: *ceirch*. Armoric: *querch*. Probably from the Sanskrit *karç*, to crush.

> "Is fhearr siol caol *coirce* fhaotuinn a droch fhearann na' bhi falamh."
> Better small oats than nothing out of bad land.

The small variety, *A. nuda*, the naked or hill oat, when ripe, drops the grain from the husk; it was therefore more generally cultivated two centuries ago. It was made into meal by drying it on the hearth, and bruising it in a stone-mortar, the "*muileann bràdh*"—hand-mill or quern. Many of them may still be seen about Highland and Irish cottages.

A. fatua and **A. pratensis**—Wild oats. Gaelic: *coirc fiadhain*, wild oats; *coirc dubh*, black oats. Also applied to the Brome grasses.

(*To be continued.*)

PRELIMINARY LIST OF THE FLOWERING PLANTS AND FERNS OF PERTHSHIRE.

By F. BUCHANAN WHITE, M.D., F.L.S.

(*Continued from page* 191.)

DIPSACACEÆ.

CXXXVII. DIPSACUS Tourn.

304. Sylvestris L. Very local and rare. Kinnoull Hill.

CXXXVIII. SCABIOSA L.

305. Succisa L. Common.
306. Arvensis L. Common in the Lowlands.

COMPOSITÆ.

CXXXIX. ARCTIUM L.

307. Lappa L.
Sub-species minus Schkuhr. Not uncommon.

CXL. SAUSSUREA D. C.

308. Alpina D. C. On the richer hills, but not very common.

CXLI. CENTAUREA L.

309. Nigra L. Common.
310. Scabiosa L. Chiefly in Gowrie, where it is not uncommon.
311. Cyanus L. A weed of cultivation.

CXLII. CARDUUS L.

312. Crispus L. Rather local.
Var. *litigiosus* Gren. and Godr. Moncreiffe.
313. Lanceolatus L. Common.
314. Arvensis Curt. Common.
Var. *horridus* Koch. In several places.
315. Palustris L. Common.
316. Heterophyllus L. Not uncommon.
317. Marianus Gærtn. A casual, and not common.

CXLIII. EUPATORIUM L.

318. Cannabinum L. Very local.

CXLIV. PETASITES Tourn.

319. Vulgaris Desf. Not uncommon in the Lowlands.
320. Fragrans Presl. Naturalised in several places.
321. Alba Gærtn. Naturalised in one or two places.

CXLV. TUSSILAGO Tourn.

322. Farfara L. Common.

CXLVI. ASTER L.

323. Tripolium L. Lower part of the Tay. Several other Asters are naturalised on different parts of the Tay, including *A. novi-Belgii*, *A. longifolius*, &c.

CXLVII. ERIGERON L.

324. Alpinus L. Rare. Breadalbane.

CXLVIII. BELLIS L.

325. Perennis L. Common.

CXLIX. SOLIDAGO L.

326. Virgaurea L. Common.

CL. ANTHEMIS L.

327. Arvensis L. Local, but not uncommon in the Lowlands, and occurs also in the Highlands. *Anthemis cotula* L. has been found at Birnam, and may possibly have been overlooked elsewhere.

CLI. ACHILLEA L.

328. Ptarmica L. Common.
329. Millefolium L. Common.

CLII. MATRICARIA L.

330. Inodora L. Common.

CLIII. CHRYSANTHEMUM L.

331. Segetum L. A weed of cultivation.
332. Leucanthemum L. Common.
333. Parthenium Pers. Naturalised in many places.

CLIV. TANACETUM L.

334. Vulgare L. Not uncommon. Native (?)

CLV. ARTEMISIA L.

335. Vulgaris L. Not uncommon. Native (?)

CLVI. GNAPHALIUM L.

336. Sylvaticum L.
i. Sub-species rectum Sm. Common.
ii. Sub-species norvegicum Gunn. Reported from Athole.
337. Uliginosum L. Common.
338. Supinum L. On many of the richer hills.

CLVII. ANTENNARIA Br.

339. Dioica Br. Common.

CLVIII. FILAGO L.

340. Germanica L.
Var. *spathulata* Presl. Local, but not uncommon in the Lowlands.

341. Minima Fr. Not uncommon.

CLIX. DORONICUM L.

342. Pardalianches L.

343. Plantagineum L. This and the preceding are naturalised in several places.

CLX. SENECIO L.

344. Vulgaris L. A weed of cultivation.

345. Sylvaticus L. Local.

346. Jacobæa L. Common.
Var. *flosculosus* Jord. Rare. Rannoch.

347. Aquaticus Huds. Common.
Var. *barbaræifolius* Reich. Banks of the Tay.

CLXI. LAPSANA L.

348. Communis L. Common.

CLXII. HYPOCHŒRIS L.

349. Radicata L. Common.

CLXIII. TRAGOPOGON L.

350. Pratensis L. Not common, and chiefly in Gowrie.
Var. *minor* Fr. The usual form.

CLXIV. LEONTODON L.

351. Hirtus L. Reported long ago from Dupplin.

352. Autumnalis L. Common.
Var. *pratensis* Koch. Commonest on the hills.

CLXV. LACTUCA L.

353. Virosa L. Very local.

CLXVI. TARAXACUM Juss.

354. Officinale Wigg.
Var. *dens-leonis* Desf. Common.
Var. *erythrospermum* Andrz. Very local.
Var. *lævigatum* D. C. Very local.
Var. *palustre* D. C. Not uncommon on the hills.

CLXVII. CREPIS L.

355. Virens L. Common.
356. Paludosa Mœnch. Not uncommon.

CLXVIII. SONCHUS L.

357. Arvensis L.
358. Oleraceus L.
i. Sub-species oleraceus.
ii. Sub-species asper Hoffm.
All weeds of cultivation. *S. asper* is the least common.

CLXIX. HIERACIUM L.

359. Pilosella L. Common.
360. Aurantiacum L. Naturalised in a few places.
361. Alpinum L. Rare.
Var. *holosericeum* Backh. Breadalbane and Athole.
Var. *eximium* Backh. Rannoch and Athole.
Var. *calenduliflorum* Backh. Rannoch and Glenshee.
362. Nigrescens Willd. Rare.
Var. *pulmonarium* Sm. Breadalbane.
Var. *globosum* Backh. Athole.
Var. *senescens* Backh. Breadalbane.
Var. *chrysanthum* Backh. Athole.
Var. *lingulatum* Backh. Breadalbane.
363. Lawsoni Sm.
Sub-species anglicum Fr. Not uncommon on the hills.
Var. *acutifolium* Backh. Breadalbane.
364. Murorum L.
i. Sub-species murorum. Common.
ii. Sub-species pallidum Backh. Not common.
argenteum Fr. Rare.
iii. Sub-species cæsium Backh. Rare.
365. Sylvaticum Sm.
Sub-species vulgatum Fr. Common.
366. Prenanthoides Vill. Local.
367. Strictum Fr. Local.
368. Crocatum Fr.
i. Sub-species inuloides Tausch. Breadalbane.
ii. Sub-species corymbosum Fr. Breadalbane, &c.

LOBELIACEÆ.

CLXX. LOBELIA L.

369. Dortmanna L. Not uncommon.

CAMPANULACEÆ.

CLXXI. CAMPANULA L.

370. Rotundifolia L. Common.
Var. *montana* Bosw. On the hills.
371. Latifolia L. Local.
372. Rapunculoides L. Naturalised in a few places.

ERICACEÆ.

CLXXII. VACCINIUM L.

373. Myrtillus L. Common.
374. Uliginosum L. Local; on the higher hills.
375. Vitis-idæa L. Common in the Highlands; rarer in the Lowlands.

CLXXIII. OXYCOCCOS Tourn.

376. Palustris Pers. Rare, but widely distributed.

CLXXIV. ARCTOSTAPHYLOS Adan.

377. Uva-ursi Spreng. On the hills, but local.

CLXXV. ANDROMEDA L.

378. Polifolia L. Blairdrummond Moss.

CLXXVI. ERICA L.

379. Tetralix L. Common.
380. Cinerea L. Common.

CLXXVII. CALLUNA Salis.

381. Vulgaris Salis. Common.

CLXXVIII. PHYLLODOCE Salis.

382. Cærulea Bab. Sow of Athole.

CLXXIX. LOISELEURIA Desv.

383. Procumbens Desv. On the higher Silurian hills, but not general.

CLXXX. PYROLA Tourn.

384. Minor Sw. Not uncommon in the Lowlands, rarer in the Highlands.
385. Media L. Not uncommon in the Highlands, rarer in the Lowlands.
386. Rotundifolia L. Reported from "Mid Perth."
387. Secunda L. Local and rare.
388. Uniflora L. Scone.

OLEACEÆ.

CLXXXI. FRAXINUS Tourn.

389. Excelsior L. Not uncommon, both native and naturalised.

GENTIANACEÆ.

CLXXXII. ERYTHRÆA Pers.

390. Centaurium Pers. Local and rare.

CLXXXIII. GENTIANA L.

391. Campestris L. Common, especially in the Highlands.
392. Amarella L. Blair-Athole. Moor of Durdie (?)
393. Nivalis L. Very local. Breadalbane.

CLXXXIV. MENYANTHES Tourn.

394. Trifoliata L. Common.

CLXXXV. LIMNANTHEMUM Link.

395. Nymphæoides Link. Moncreiffe, but doubtless planted.

CONVOLVULACEÆ.

CLXXXVI. CONVOLVULUS L.

396. Arvensis L. Local and rare.
397. Sepium L. Rare, and not native.

CLXXXVII. CUSCUTA Tourn.

398. Europæa L. Seggieden, but doubtless an introduction.
499. Trifolii Bab. Occasionally found. An introduction.

BORAGINACEÆ.

CLXXXVIII. ECHIUM Tourn.

400. Vulgare L. Local.

CLXXXIX. SYMPHYTUM Tourn.

401. Officinale L. and var. *patens* Sibth. Not common. Doubtfully indigenous.
402. Tuberosum L. Local. Native (?)

CXC. ANCHUSA L.

403. Arvensis Bieb. A weed of cultivation.
404. Sempervirens L. Naturalised in a few places.

CXCI. LITHOSPERMUM Tourn.

405. Officinale L. Loch Earn and Kinclaven.
406. Arvensis L. Chiefly in Gowrie. A weed of cultivation.

CXCII. MYOSOTIS L.

407. Palustris With. Common.
Var. *strigulosa* Reich. In several places.
408. Lingulata Lehm. Common.
409. Repens Don. Local.
410. Alpestris Schmidt. Breadalbane.
411. Arvensis Hoffm. Common.
Var. *umbrosa* Bab. Not uncommon.
412. Collina Hoffm. Local.
413. Versicolor Reich. Common.

CXCIII. CYNOGLOSUM Tourn.

414. Officinale L. Gowrie only, and local.
415. Montanum Lamk. Barnhill and Fingask; perhaps native.

SOLANACEÆ.

CXCIV. HYOSCYAMUS Tourn.

416. Niger L. Very local and rare, and only a casual.

CXCV. SOLANUM Tourn.

417. Dulcamara L. Not common.
418. Nigrum L. Pitlochry. Casual.

CXCVI. ATROPA L.

419. Belladonna L. Very rare, and probably an escape.

PLANTAGINACEÆ.

CXCVII. PLANTAGO L.

420. Major L. Common.
421. Media L. Rare, and only on old lawns, where it has been probably introduced.
422. Lanceolata L. Common..
Var. *Timbali* Jord. Perth Harbour. Casual.
423. Maritima L. Banks of the Tay, &c., and mountain valleys. Not uncommon.
424. Coronopus L. Near Invergowrie.

CXCVIII. LITTORELLA L.

425. Lacustris L. Common.

SCROPHULARIACEÆ.

CXCIX. VERBASCUM L.

426. Thapsus L. Local, and not common.
427. Nigrum L. Very rare. An escape.

CC. LINARIA Tourn.

428. Cymbalaria Mill. Naturalised in several places.
429. Vulgaris Mill. Local, and not very common.
430. Repens Ait. Naturalised in two places.

CCI. ANTIRRHINUM Tourn.

431. Majus L. Rocks on Kinnoull Hill. Very rare. An escape.

CCII. SCROPHULARIA Tourn.

432. Nodosa L. Common.
433. Vernalis L. Naturalised in one or two places.

CCIII. MIMULUS L.

434. Luteus L. Not uncommon. Naturalised.

CCIV. DIGITALIS Tourn.

435. Purpurea L. Common.

CCV. VERONICA Tourn.

436. Agrestis L. A weed of cultivation.
i. Sub-species agrestis. Common.
ii. Sub-species polita Fr. Rare, or overlooked.
437. Buxbaumii Ten. Not common. An introduction.
438. Hederæfolia L. In the Lowlands chiefly. A weed of cultivation.
439. Peregrina L. A weed in the Perth nurseries.
440. Arvensis L. Common.
441. Serpyllifolia L.
i. Sub-species serpyllifolia. Common.
ii. Sub-species humifusa Dicks. On the richer hills.
442. Alpina L. Rare. Rannoch and Athole ; Breadalbane (?)
443. Saxatilis L. On several of the richer hills, but local.
444. Officinalis L. Common.
445. Chamædrys L. Common.
446. Montana L. Local, and not common.
447. Scutellata L. Common.
448. Beccabunga L. Common.
449. Anagallis L. Local, and chiefly in Gowrie.

CCVI. BARTSIA L.

450. Alpina L. Breadalbane.
451. Odontites Huds. Not uncommon. Calyx often 5-fid.

CCVII. EUPHRASIA Tourn.

452. Officinalis L. Common.
Var. *gracilis* Fr. Common.

CCVIII. RHINANTHUS L.

453. Crista-galli L.
Sub-species minor Ehr. Common.

CCIX. PEDICULARIS Tourn.

454. Palustris L. Common.
455. Sylvatica L. Common.

CCX. MELAMPYRUM Tourn.

456. Pratense L. Common in the Highlands, rare in the Lowlands.
Var. *montanum* Johnst. On the hills. A white-flowered variety also occurs.
457. Sylvaticum L. Very local.
Var. *pallidiflora* White. Athole.

OROBANCHACEÆ.

CCXI. LATHRÆA L.

458. Squamaria L. Very local, and not common.

LABIATÆ.

CCXII. MENTHA L.

459. Sylvestris L.
Var. *mollissima* Bork. Very local.
460. Viridis L. Rare. An escape.
461. Piperita Huds. Not common. An escape (?)
462. Aquatica L.
Sub-species hirsuta L. Common.
463. Sativa L. Not common.
464. Arvensis L. Common.

CCXIII. ORIGANUM Tourn.

465. Vulgare L. Local, and chiefly in the Lowlands.

CCXIV. THYMUS L.

466. Serpyllum L.
i. Sub-species serpyllum. Common in the Lowlands.
ii. Sub-species chamædrys Fr. Common in the Highlands.

CCXV. CALAMINTHA Mœnch.

467. Clinopodium Benth. Rather local.
468. Acinos Clairv. Rare.

CCXVI. NEPETA L.

469. Glechoma Benth. Common.
Var. *hirsuta* Waldst. and Kit. Moncreiffe, &c.

CCXVII. PRUNELLA L.

470. Vulgaris L. Common.

CCXVIII. SCUTELLARIA L.

471. Galericulata L. Local.

CCXIX. STACHYS L.

472. Sylvatica L. Common.
473. Palustris L. Common.
Var. *ambigua* Sm. Very rare.
474. Arvensis L. Rare, and chiefly in Gowrie.
475. Betonica Benth. Very local.

CCXX. GALEOPSIS L.

476. Ladanum L.
Sub-species angustifolia Ehrh. Carse of Gowrie. Rare.
477. Tetrahit L.
i. Sub-species tetrahit. Common.
Var. *bifida* Bœnn. The commonest form.
ii. Sub-species speciosa Miller. Common.

CCXXI. LAMIUM L.

478. Purpureum L.
i. Sub-species purpureum. Common.
Var. *decipiens* Sond. Moncreiffe.
ii. Sub-species hybridum Vill. Less common.
479. Amplexicaule L. Common, and like *purpureum*, a weed of cultivation.
480. Album L. Not uncommon in the Lowlands. Native (?)
481. Maculatum L. Naturalised in a few places.

CCXXII. TEUCRIUM L.

482. Scorodonia L. Common.

CCXXIII. AJUGA L.

483. Reptans L. Common.

LENTIBULARIACEÆ.

CCXXIV. PINGUICULA Tourn.

484. Vulgaris L. Common.

CCXXV. UTRICULARIA L.

485. Vulgaris L. Very local. Flowers have not been seen, so the identification is so far doubtful.
486. Intermedia Hayne. Very local, but widely distributed.
487. Minor L. Local, but widely distributed.

PRIMULACEÆ.

CCXXVI. PRIMULA L.

488. Vulgaris Huds. Common.
489. Veris L. Common.

CCXXVII. LYSIMACHIA L.

490. Vulgaris L. Native in the south-west of Perthshire.
491. Nemorum L. Common.
492. Nummularia L. Very local. Perhaps native (?)
493. Thyrsiflora L. Very local and rare.

CCXXVIII. TRIENTALIS L.

494. Europæa L. Common in the Highlands ; not uncommon in the Lowlands.

CCXXIX. GLAUX Tourn.

495. Maritima L. Lower part of the Tay.

CCXXX. CENTUNCULUS L.

496. Minimus L. Very local, or overlooked.

CCXXXI. ANAGALLIS Tourn.

497. Arvensis L. A corn-field weed. Not very common.

PLUMBAGINACEÆ.

CCXXXII. ARMERIA Willd.

498. Vulgaris Willd. Banks of the Tay, &c.
Var. *planifolia* Bosw. On the hills, but rare.

(*To be continued.*)

GEOLOGY.

THE INTERCROSSING OF ERRATICS IN GLACIAL DEPOSITS.

By JAMES GEIKIE, LL.D., F.R.S., F.G.S.,
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(*Continued from page* 200.)

NO one of late years has been more assiduous in the collection of facts relating to the intercrossing of erratics in the drift-deposits of England than Mr D. Mackintosh. He has written many instructive and interesting descriptions of the phenomena in question, which he justly thinks are of prime importance from a theoretical point of view. In a recent paper[1] he presents us with the results of a systematic survey of the direction and limits of dispersion of the erratics of the west of England and east of Wales, which he evidently is of opinion afford strong support to the iceberg theory, while at the same time they are directly opposed to the theory of transport by land-ice. I have attentively considered all the arguments advanced by Mr Mackintosh in favour of his views—the one upon which he apparently lays most stress being that of the intercrossings of erratics observed by him—and I shall now proceed to point out how the phenomena described by him are most satisfactorily explained by the land-ice theory. They seem to me, indeed, to lend additional support to that theory, in the same manner as the intercrossings of boulders observed in Scotland, Northern Germany, &c., and the sub-alpine regions of France. Mr Mackintosh calls attention to the fact that erratics of the well-known Criffel granite are found scattered over a large part of the plain of Cumberland, from which they extend south along the coast to near the mouth of the estuary of the Duddon. They reappear again on the coast in the neighbourhood of Blackpool and Liverpool, and at intervals on the coasts of North Wales from Flint to Colwyn Bay, and thence to Penmaenmawr and the neighbourhood of Beaumaris. They are dispersed over the peninsula of Wirral

[1] 'Quart. Journ. Geol. Soc.,' vol. xxxv. p. 425.

and the Cheshire plain, &c., and they have been followed south-east as far as the neighbourhood of Cardington near Church Stretton, Burton, Wolverhampton, Stafford, Hare Castle, Macclesfield, and Manchester. This great stream of boulders, therefore, spreads out to south-east, south, and south-west: the erratics, to quote Mr Mackintosh, "have radiated from an area much smaller than their terminal breadth." The same is the case, I may remark in passing, with erratics in the boulder-clays of Scotland, Scandinavia, North Germany, &c., as also with those in the drift-deposits of the great Rhone glacier and other ancient glaciers both on the north and south side of the Alps. Now the course followed by the Criffel erratics is crossed at an acute angle by that pursued by many boulders of Eskdale granite, and various felspathic rocks derived from the Cumberland mountains. For example, Cumberland erratics of the kinds mentioned occur near St Asaph, and Moel-y-Tryfane, and in Anglesey, and they have been followed over a wide district in Cheshire, &c., extending as far south as Church Stretton and Wolverhampton, and as far east as Rochdale. More than this, we find that numerous erratics of felstone, derived from the mountain of Great Arenig in North Wales, have gone to north-east as far as Halkin Mountain in Flintshire, Eryrys near Llanarmon, and Chirk, from which last-named place they have been traced in a south-easterly direction to Birmingham, Bromsgrove, &c. A glance at a map of England will show that this south-easterly drift of erratics crosses at an acute angle the paths followed by the Criffel granite boulders and the erratics derived from Cumberland, so that we have now several "intercrossings" to account for. How can this be done by the land-ice theory?

The explanation seems to me obvious, for the phenomena are, after all, less striking than similar appearances which have been observed in Scotland, especially by my colleagues, Messrs Peach and Horne, in Caithness and the Orkney and Shetland Islands; and they are certainly less intricate than the facts recorded by MM. Falsan and Chantre concerning the intercrossing, interosculation, and direct opposition of erratic paths in Savoy and Dauphiné. We have only to reflect that the great *mer de glace*—to which, as I believe, all the English phenomena are due—did not come into existence and attain its maximum dimensions in the twinkling of an eye, nor could it afterwards have disappeared in the same sudden manner. On the contrary, a period of local glaciation must have preceded the appearance

of the great ice-sheet. At first, and for a long time, permanent snow would be confined to the higher elevations of the land, and glaciers would be limited to mountain-valleys; but as the temperature fell the snow-line would gradually descend, until at last, probably after a prolonged period, it reached what is now the sea-level. Thus the formation of *névé* and glacier-ice would eventually take place over what are now our low grounds, and other tracts also, which are now submerged. It is quite impossible that the vast sheets of ice which can be demonstrated to have covered Scotland, a large part of England, Ireland, Scandinavia, and North Germany, and even the limited area of the Færöe Islands, could possibly have been fed by the snow-fields of mountain-heights only. The precipitation and accumulation of snow, and the formation of *névé* and glacier-ice, must have taken place over enormous regions in what are now the temperate latitudes of Europe.

It is obvious that the direction of ice-flow in the basin of the Irish Sea opposite the south of Scotland and the west of England, while preserving a general southerly trend, would vary at different periods. Before the *mer de glace* in that basin had attained its climax, there must have been a time when the ice, streaming outwards from the high grounds of Cumberland, was enabled to push its way far westward out into the basin of the Irish Sea. At that time it was still able to hold its own against the pressure exerted by the Scottish ice. But as the general *mer de glace* increased in thickness, the course of the Cumberland ice would be diverted ever further and further to the south-east, until, eventually, the Scottish ice came to hug the coast of Cumberland, and to overflow Lancashire in its progress towards the south-east. So gorged with ice did the basin of the Irish Sea become, that a portion of the Scottish ice was forced over the plain of Cumberland and up the valley of the Eden, where it coalesced with the ice coming north from the Shap district, and thereafter flowed in an easterly direction to join the great *mer de glace* of the North Sea basin.

Thus the "intercrossings" of the Criffel and Cumberland erratics described by Mr Mackintosh receive a ready explanation by the land-ice theory. Nor do the "intercrossings" of the Welsh erratics with those derived from Scotland and Cumberland offer any difficulty. The ice coming from the Welsh mountains would naturally be deflected towards south-east by the *mer de glace* that streamed in that direction, and might quite well have

carried its characteristic boulders as far as Birmingham before the general *mer de glace* had attained its greatest dimensions. But when that period of maximum glaciation arrived, the Welsh boulders would be unable to travel so far towards the east, and the Scottish and Cumberland boulders would then cross the path formerly followed by the felstone erratics from Great Arenig.

Again, it is evident that when the *mer de glace* was gradually decreasing similar oscillations of the ice-flow would take place, but in reverse order, and thus would give rise to a second series of intercrossings. Moreover, we must remember that the Glacial Period was characterised by several great changes of climate. It was not one continuous and prolonged period of cold conditions, but consisted rather of a succession of arctic and genial climates; so that the same countries were overrun at different epochs by successive *mers de glace*, each of which would rework, denude, and redistribute to a large extent the morainic materials of its predecessor, and thus might well cause even greater complexity in the dispersion of erratics than has yet been recognised anywhere in these islands.

Mr Mackintosh refers to the occurrence of chalk-flints and Lias fossils associated with northern erratics in the drift-deposits of the west of England, the presence of which, he thinks, is fatal to the theory of transport by land-ice. Thus, he says, chalk-flints, &c., have been met with at Lillieshall (east of Wellington), at Strethill (near Ironbridge), at Seisdon (between Wolverhampton and Bridgenorth), at Wolverhampton, near Stafford, and near Bushbury. Chalk-flints have also been found as far west as Malvern and Hatfield Camp, south of Ledbury. All these erratics have crossed England from the east, according to Mr Mackintosh and other observers. Not only so, but, as Mr Mackintosh remarks, those found at Wolverhampton, Birmingham, &c., "must have *crossed the course* of the northern boulders near its southerly termination." And since both northern and eastern erratics are found associated in the same drift-deposit, it seems to him "impossible to explain the intercrossing by land-ice or glaciers." Now, on the contrary, those eastern erratics are scattered over the very districts where I should have expected to find them. The observations of geologists in East Anglia have shown that that region has been invaded by the *mer de glace* of the North Sea basin.[1] This remarkable glacial

[1] See Mr Skertchly's description of East Anglian deposits in 'Great Ice Age,' p. 358.

invasion is proved not only by the direction followed by stones of local derivation, and by boulders which have come south from Scotland and the northern counties, but by the occurrence in the boulder-clay at Cornelian Bay and Holderness of erratics of certain well-known Norwegian rocks, which have been recognised by Mr Amund Helland. The occurrence of chalk-flints and fragments of Oolitic rocks in the neighbourhoods mentioned by Mr Mackintosh, thus only affords additional evidence in favour of the land-ice origin of the drift-deposits described by him. The *mer de glace* that flowed down the east coast of England seems to have encroached more and more upon the land, until eventually it swept over the low-lying Midlands in a south-westerly direction, and coalesced with the *mer de glace* that streamed inland from the basin of the Irish Sea, and the ice that flowed outwards from the high grounds of Wales. The united ice-stream would thereafter continue on its south-westerly course down the Severn valley to the British Channel. I have no doubt that Mr Mackintosh will yet chronicle the occurrence of chalk-flints and other eastern erratics from localities much further to the south than Ledbury.

Again, considerable stress has been laid by Mr Mackintosh upon the occurrence of chalk-flints in the drift-deposits of Blackpool, Dawpool, Parkgate, Halkin Mountain, Wrexham, the peninsula of Wirral, Runcorn, Delamere, Crewe, Leylands, Piethorne (near Rochdale), and other places. "All these flints," Mr Mackintosh remarks, "belong to the basin of the Irish Sea, and have almost certainly crossed the general course of the northern boulders on their way from Ireland." Here, unfortunately, the Irish Sea intervenes to conceal the evidence that is needed to enable us to track the exact path followed by the erratics in question. I am not so certain as Mr Mackintosh that the chalk flints he refers to came from the north of Ireland. Chalk-flints occur pretty numerously in the drift-deposits in the maritime districts of north-eastern Scotland, which we have every reason to believe have been derived from an area of Cretaceous rocks covering the bottom of the adjacent sea; and for aught one can say to the contrary, patches of chalk-with-flints may occur in like manner in the bed of the Irish Sea. I cannot at present remember whether any boulders of the basalt-rocks, which are associated with the chalk in the north of Ireland, have been recognised in the drifts of the west of England; but if the chalk-flints really came from Antrim, it is more than probable that they

would be accompanied by fragments of the hard igneous rocks which overlie the Cretaceous strata of North Ireland. Chalk and chalk-flints occur in the boulder clay of the Isle of Man, where they are associated, Mr Horne tells us, with Criffel granite and fragments of a dark trap-rock.[1] Possibly these last are basalt-rocks from Antrim. It seems reasonable, therefore, to believe that erratics of Irish origin have found their way to the Isle of Man; and if this be so, it may be permissible to assume that the chalk-flints of Blackpool, &c. (and perhaps also some of the basalt-rocks), have come from the same quarter. Mr Horne has no doubt that the Irish erratics were brought to the Isle of Man by land-ice. Referring to the conclusion arrived at by Mr Close that the Irish *mer de glace* "was probably not less than 3000 feet in depth," he remarks, "It is highly probable that this great mass of Irish ice succeeded, after a hard battle (*i.e.*, with the Scottish ice-sheet), in reaching the Manx coast-line. It is not to be supposed that the normal momentum of the respective ice-sheets remained constant. The moving force must have varied with changing conditions. On the other hand, it is quite possible that there may have been an 'undertow' of the ice from the north east coast of Ireland, which would easily account for Antrim chalk and chalk-flints in the Manx till." I would go further, and state my conviction that before the united ice-sheets had attained their maximum development, it is almost certain that the ice flowing into the Irish-Sea basin by the North Channel would for a long time exceed in mass the coalescent glaciers that descended from the southern uplands of Scotland, and would therefore be enabled to extend much further to the east than it could at a later date, when the general *mer de glace* had reached its climax. It might thus have advanced as far as and even beyond the Isle of Man. This inference is based upon the simple fact that the area drained by the *mer de glace* of the North Channel was very much greater than the area extending from the watershed of the southern uplands of Scotland to the Isle of Man. Erratics from the north of Ireland would thus travel down the bed of the North Channel, and eventually be distributed over a wide area up to, and possibly even some distance beyond, the Isle of Man. But as the Scottish and Cumbrian ice-flows gradually increased in importance, the *mer de glace* coming from the North Channel would be forced further and further to the

[1] 'Trans. Edin. Geol. Soc.,' vol. ii.: 1874.

west, until the ice flow issuing from the high grounds of Kirkcudbright at last succeeded in reaching the middle of the Irish Sea basin. This gradual modification of the general ice-flow in that basin would of course give rise to a redistribution of the ground-moraine, and the Irish erratics would then travel onwards underneath the Scottish ice, and eventually reach the low grounds of Lancashire and Cheshire, along with erratics from Criffel and the Cumbrian mountains. It is, therefore, quite unnecessary to suppose that the *mer de glace* of the North Channel actually crossed the whole breadth of the basin of the Irish Sea to invade Lancashire, Cheshire, and North Wales. Had this been the case, chalk-flints, chalk, and many other kinds of rock derived from the north of Ireland, and even from Arran and Argyle, would have abounded in the drifts of the west of England. Erratics coming from Ireland could not possibly have travelled underneath Irish ice further east than the Isle of Man. There or thereabouts, as I have said, the *mer de glace* of the North Channel would begin to encounter the ice streaming down from the uplands of Galloway and the mountains of Cumberland; and as the ice from these quarters increased in thickness, it would gradually override what had formerly been the bottom-moraine or till of the North Channel *mer de glace.* Thus Irish erratics would become commingled with erratics from Criffel, &c., and be rolled forward in a southerly and south-easterly direction. The chalk-flints in the drifts of Lancashire, Cheshire, &c., are therefore merely *remaniés* — the relics of the bottom-moraine of the North Channel *mer de glace* rearranged and redistributed. And this is why they and other Irish rocks are so comparatively rare in the glacial accumulations of the west of England.

Thus all the instances of "intercrossings" adduced by Mr Mackintosh, as favouring the iceberg theory, and condemning its rival, I would cite as proving exactly the converse. So far from presenting any real difficulty to an upholder of the land-ice theory, they, in point of fact, as I have already remarked, lend that view additional support.

It is not my purpose to criticise all the arguments and reasons advanced by Mr Mackintosh in favour of his special views, but I may be allowed a few remarks on the somewhat extraordinary character of the agents which, according to him, were mainly instrumental in producing the drift-phenomena of Western England. Before doing so, however, I may point out that, in

ascribing the transport of erratics in that region (and by implication, the formation of the boulder-clays, &c., with which most of these erratics are associated) to floating ice and sea-currents, Mr Mackintosh has failed to furnish us with any "fossil evidence" to show that Western England was under water at the time the boulder-clays and erratics were being accumulated. He speaks of cold and warm currents, but where do we find any traces of the marine organisms which must have abounded in those waters? Where are the raised sea-beaches which must have marked the retreat of the sea? Where do we encounter any organic relics that might help us to map out the zones of shallow and deep water? The sea shells, &c., which occur in the boulder-clays are undeniably *remaniés;* they are erratics just as much as the rock-fragments with which they are associated. Similar assemblages of organic remains are met with in the till of Caithness, where shallow-water and deep-sea shells, and shells indicative of genial, and again, of cold conditions, are all confusedly distributed throughout one and the same deposit. The same, or analogous facts, are encountered in the *Blocklehm* of some parts of Prussia, —marine and fresh-water shells occurring commingled in the boulder-clay. Nay, even in the *moraine profonde* of the ancient Rhone glacier, broken and well-preserved shells of Miocene and Pliocene species appear enclosed in the tumultuous accumulation of clay, sand, and erratics. And precisely similar phenomena confront us in the glacial deposits of the neighbourhood of Lago Lugano. Mr Mackintosh refers to the so-called "stratification" of the boulder-clay, as if that were a proof of accumulation in water. But a rude kind of bedding, generally marked by differences of colour, and sometimes by lines of stones, was the inevitable result of the subglacial formation of the boulder-clay. The "lines of bedding" are due to the shearing of the clay under great pressure, and may be studied in the boulder-clay of Switzerland and Italy, and in the till not only of the Lowlands but of the Highlands of Scotland. Occasionally the "lines" are so close that the clay sometimes presents the appearance of rude and often wavy and irregular lamination—a section of such a boulder-clay reminding one sometimes of that of a gnarled gneiss or crumpled schist. And these appearances may be noted in boulder-clays which occupy positions that preclude the possibility of their being marine—as in certain valleys of the Highlands, such as Strathbraan, and in the neighbourhood of Como in Italy. This "lamination" is merely indicative of the

intense pressure to which the till was subjected during its gradual accumulation under the ice. It is assuredly not the result of aqueous action. Aqueous lamination is due to sifting and winnowing—the coarser or heavier, and finer or lighter particles being separated in obedience to their different specific gravity, and arranged in layers of more or less regularity according to circumstances. There is nothing of this kind of arrangement, however, in the so-called stratified boulder-clay. If the clay of an individual lamina be washed and carefully sifted, it will be found to be composed of grains of all shapes, sizes, and weights, down to the finest and most impalpable flour. It is impossible to believe that such a heterogeneous assemblage of grains could have been dropt into water without the particles being separated and sifted in their progress to the bottom. Of course every one knows that patches and beds of laminated clay and sand of veritable aqueous origin occur now and again in boulder-clay. I suppose there is no boulder-clay without them. I have seen them in the till of Italy and Switzerland, where they show precisely the same features as the similar laminated clays in the till of our own islands. But these included patches and beds point merely to the action of subglacial waters, such as we know circulate under the glaciers of the Alps, of Norway, and of Greenland.[1]

Again, I would remark that Mr Mackintosh has ignored all the evidence which has been brought forward from time to time to demonstrate the subglacial origin of boulder-clay, and to prove the utter inefficacy of floating ice to account for the phenomena. And he adduces no new facts in support of the now discredited iceberg theory, unless it be his statement that *flat* striated rock-surfaces (such as those near Birkenhead) have been caused by floating ice—the dome-shaped *roches moutonnées* being, on the other hand, the work of land-ice. As a matter of personal observation, I can assure Mr Mackintosh that *flat* striated surfaces are by no means uncommonly associated in one and the same region with *roches moutonnées*. What are *roches moutonnées* but the rounded

[1] It is perhaps hardly necessary to say that I do not call in question the fact of a great submergence having taken place in England during a certain stage of the Glacial Period. The marine sands and gravels which occur between the lower and upper boulder-clays of Western England, and the high-level shell-beds of Wales, are the proofs of that submergence. What I deny is, that either the lower or upper boulder-clay, or the erratics which are associated with these glacial deposits, were deposited in water.

relics of what were formerly rough uneven tors, projecting bosses, and prominent rocks? The general tendency of glacial action is to reduce the asperities of a land-surface; hence projecting points are rounded off, while flat surfaces are simply, as a rule, planed smoother. Mr Mackintosh might traverse acres of such smoothed rock-surfaces in regions where the strata are comparatively horizontal,—for example, in the case of the basaltic plateaux of the Færöes and of Iceland, which have certainly been glaciated by land-ice. Similar flat glaciated surfaces are met with again and again both in the Highlands and Lowlands of Scotland, occupying positions and associated with *roches moutonnées* and till of such a character as to prove, beyond any doubt, that they no less certainly are the result of the action of land-ice. But it is needless to discuss the probability or possibility of glaciation of any kind being due to floating ice. We know that glaciers can and do polish and striate rock-surfaces; no one, however, can say the same of icebergs: and until some one can prove to us that icebergs have performed this feat, or can furnish us with well-considered reasons for believing them to be capable of it, glacialists will continue sceptical.

But leaving these and other points which serve to show the weakness of the cause which Mr Mackintosh supports with such keen enthusiasm, I may, in conclusion, draw attention to certain very remarkable theoretical views of his which seem to me to be not only self-contradictory, but opposed to well-known natural laws. Briefly stated, his general view is that the erratics of the west of England have been distributed by floating ice during a period of submergence—the scattering of erratics and the accumulation of the associated glacial deposits having commenced at or about the time when the land began to sink, and continued until the submergence reached some 2000 feet below the present sea-level. In applying this hypothesis to explain the phenomena, Mr Mackintosh makes rather free use of sea-currents and winds. For example, he holds that a current coming from Criffel carried with it boulder-laden ice which flowed south-west to the Isle of Man, south to North Wales, and south-east in the direction of Blackpool and Manchester, Liverpool and Wolverhampton, Dawpool and Church Stretton. Now, in the first place, it is very strange that there is not a vestige or trace of any such submergence, either in the neighbourhood of Criffel itself or in the region to the north of it. The whole of that region has been striated and rubbed by land-ice coming down

from the watershed of the Galloway mountains, to the north of which the striæ, *roches moutonnées*, and track followed by erratics, indicate an ice-flow *towards* the north-west, north, and north-east. It is therefore absolutely certain that at the time the granite erratics are supposed to have sailed away from Criffel on floating ice, the whole of the southern uplands of Scotland were covered with a great ice-field extending from Wigtown to Berwickshire; so that, according to Mr Mackintosh's hypothesis, we should be forced to believe that an ocean-current originated in Criffel itself! But waiving this and other insuperable objections which will occur to any geologist who is familiar with the glacial phenomena of the south of Scotland, and confining myself to the evidence supplied by the English drifts, I would remark that Mr Mackintosh's hypothesis is not consistent with itself. A current flowing in the direction supposed could not possibly have permitted floating ice to sail from Cumbria to the Isle of Man, to Moel-y-Tryfane and Colwyn Bay. Mr Mackintosh admits this himself, but infers that the transport of the Cumbrian erratics may have taken place at a different time. But how could this be, seeing that the Criffel and Cumbrian erratics occur side by side in one and the same deposit? Again, the hypothesis of an ocean-current coming from Criffel is inconsistent with the presence of the Irish chalk-flints in the drifts of the west of England. Did these also come at a different time? And what about the dispersion of erratics from Great Arenig, which have gone north-east and north-north-east, almost exactly in the face of the supposed Criffel current? Here an ocean-current is obviously out of the question; and accordingly we are told that this dispersion of Welsh boulders was probably the result of wind. But why should this wind have propelled the floating ice so far and no farther in an easterly direction? Surely if floating ice was swept outwards from Great Arenig as far as Eryrys, bergs must have been carried now and again much farther to the east. And if they did not sail eastwards, what became of them? Did they all melt away immediately when they came into the ice-laden current that flowed towards the south-east?[1] A still greater

[1] Mr Mackintosh says nothing about the "carry" or direction of the erratics in West and South Wales. Were the paths of these erratics delineated upon a map, we should find it necessary to suppose that the wind or sea-current by which the floating ice was propelled had flowed outwards in all directions from the dominant heights!

difficulty remains. The Criffel and Cumbrian erratics suddenly cease when they are followed to the south, great quantities of them being accumulated over a belt of country extending from beyond Wolverhampton to Bridgenorth. What was it that defined the southern limits of these northern boulders? It is clear that it could not have been high ground, for the Severn valley, not to speak of low-lying regions further to the north-east, must have been submerged according to Mr Mackintosh's hypothesis. There was therefore plenty of sea-room for the floating ice to escape southwards. And yet, notwithstanding this, vast multitudes of bergs and floes, so soon as they arrived at certain points, suddenly melted away and dropt their burdens! In what region under the sun does anything like that happen at the present day? Mr Mackintosh thinks that the more or less sharply-defined boundary-line reached by the erratics "could only have resulted from close proximity to a persistent current of water (or air?) sufficiently warm to melt the boulder-laden ice." He does not tell us, however, where this warm current of water or air came from, or in what direction it travelled. He forgets some of his own facts connected with the appearance of erratics of eastern derivation, and which, according to him, point to an ocean-current that flowed across from Lincolnshire into the very sea in which the Criffel granite and Cumbrian boulders were being dropped. The supposed warm ocean-current, then, if such it was rather than air, could hardly have come from the east. Neither is it at all likely that it could have come from the west, sheltered as the region of the Severn valley must have been by the ice-laden mountains of Wales. Again, the south is shut to us; for there are no erratics in the south of England from which to infer a submergence of that district. If it be true that all the northern erratics which are scattered over the low grounds of England, Denmark, Holland, Germany, Poland, and Russia, owe their origin to boulder-laden ice carried by ocean-currents, no such warm water as Mr Mackintosh desiderates could possibly have come from the east or south-east. We are left then to infer that the supposed warm current must have flowed up the Severn valley directly in the face of the Criffel current,[1] underneath which it suddenly plunged at a high temperature, the line of junction between it and the cold

[1] It must have likewise flowed in more or less direct opposition to the current which, in accordance with the iceberg hypothesis, transported boulders southwards from the high grounds of South Wales!

water being sharply defined, and retaining its position unchanged for a long period of time! However absurd this conclusion may be, it is forced upon us if we admit the hypothesis at present under review. For we must remember that the floating ice is supposed to have melted whenever it came into contact with the warm current. The erratics occur up to a certain boundary-line, where they are concentrated in enormous numbers, and south of which they do not appear. Here, then, large and small floes alike must have vanished at once! Certainly a very extraordinary case of dissolution.

If we dismiss the notion of a warm ocean-current for that of a warm wind, we do not improve our position a whit. Where did the warm wind come from? Not, certainly, from the ice-laden seas to the east. Are we to suppose, then, that it flowed in from the south or south-west? If so, we might well ask how it came to pass that in the immediate proximity of such a very warm wind as the hypothesis demands, great snow-fields and glaciers were allowed to exist in Wales? Passing that objection, we have still to ask how this wind succeeded in melting large and small masses of floating ice with such rapidity that it prevented any of them ever trespassing south of a certain line? It is obvious that it must have been an exceedingly hot wind; and that, just as the hypothetical warm ocean-current must have suddenly dived under the cold water coming from the north, so the hot wind, after passing over the surface of the sea until it reached a certain more or less well-defined line, must have risen all at once and flowed vertically upwards into the cold regions above.

Thus, in seeking to escape from what he doubtless considers the erroneous and extravagant views of "land-glacialists," Mr Mackintosh adopts a hypothesis which lands him in self-contradictions and a perfect "sea of troubles"—a kind of chaos, in fact. In attempting to explain the drifts of Western England and East Wales, he has ignored the conditions that must have obtained in contiguous regions—thus forgetting that "nothing in the world is single," and that one ought not to infer physical conditions for one limited area without stopping to inquire whether these are in consonance with what is known of adjacent districts, or in harmony with the existing phenomena of nature.

I have so strongly opposed Mr Mackintosh's explanation of the sudden termination of the northern erratics in the neighbourhood of Wolverhampton and elsewhere, that perhaps I

ought to offer an explanation of my own, that it may, in its turn, undergo examination. I labour under the disadvantage, however, of not having studied the drifts in and around Wolverhampton, &c., and the suggestion which I shall throw out must therefore be taken for what it is worth. It seems to me, then, that the concentration of boulders in the neighbourhood of Wolverhampton, and the limits reached by the northern erratics generally, mark out, in all probability, the line of junction between the *mer de glace* coming from the basin of the Irish Sea and that flowing across the country from the vast *mer de glace* that occupied the basin of the German Ocean. Along this line the southerly transport of the northern boulders would cease, and here they would therefore tend to become concentrated. But it is most likely that now and again they would get underneath the ice-flow that set down the Severn valley, and I should anticipate that they will yet be detected, along with erratics of eastern origin, as far south even as the Bristol Channel. If it be objected to this view that erratics from Great Arenig have been met with south of Wolverhampton, at Birmingham, and Bromsgrove, I would reply that these erratics were probably carried south either before or after the general *mer de glace* had attained its climax—at a period when the Welsh ice was able to creep out further to the east than it could when the invasion of the North Sea ice was at its height.

I cannot conclude this paper without expressing my admiration for the long-continued and successful labours of the well-known geologist whose views I have been controverting. Although I have entered my protest against his iceberg hypothesis, and have freely criticised his theoretical opinions, I most willingly admit that the results of his unwearied devotion to the study of those interesting phenomena with which he is so familiar have laid all his fellow-workers under a debt of gratitude.

New British Fungus.—The *Puccinia* found on *Oxyria* in Skye, and noticed at page 156, appears to be *P. oxyriæ* Fckl.—a species not hitherto recorded as British.—F. Buchanan White.

PHYTOLOGY.

SCOTTISH GALLS.

By J. W. H. TRAIL., A.M., M.D., F.L.S.

THE galls described below, with the exception of that on *Juncus lamprocarpus*, were sent me during the year 1881 by Dr Buchanan White. The gall of *Sedum rhodiola* was found by him on Ben Blabhein in the island of Skye in September; the others were found in Perthshire in May and June.

TILIA EUROPÆA, L.—(*d*) Galls of a *Cecidomyia*. They agree pretty well with the description of the galls of *Cec. floricola*, Rudow (Giebel's 'Zeitschrift f. d. Gesammt. Naturwissenschaften,' 1875, p. 40), and probably are the work of that midge. They are swellings on the flower-stalk just where it separates from the bract or where the branches arise, or they may consist of a single swollen deformed flower-bud. Their form is round or oval; in size they vary from $\frac{1}{6}$ to $\frac{1}{4}$ inch in length by rather less in breadth. Their texture is fleshy, and they accordingly shrivel in drying. The surface is smooth when fresh; the deformed flower-buds are naked, but the swellings of the flower-stalks are covered with short woolly white hairs. The galls enclose an irregular cavity. I found these galls some years ago in the gardens at Kew, but am not aware that they have been yet recorded as British.

PYRUS COMMUNIS, L. (*Pear-tree*).—I have already recorded in this magazine the occurrence in Scotland, from various localities, of leaf-blisters, caused by mites, on leaves of *Pyrus aucuparia* and of *P. aria*. I have now to add that quite similar galls on leaves of a pear-tree were sent me from Perthshire last summer by Dr White. Very probably the galls on all these plants are the work of the same species of mite (*Phytoptus pyri*, Pag.). They have often been mentioned as occurring on pear-trees (though I have not met with any previous notice of their occurrence in Scotland), and therefore I shall refer only to Sorauer's 'Handbuch der Pflanzenkrankenheiten,' where (p. 169) they are well described, and both galls and mites are well figured in a coloured plate.

The galls appear as yellowish spots, which become brown, and at last dark-brown, and are irregularly raised and corrugated on the surfaces above and below. On section, the cells of the internal tissues of the leaf are found to be irregularly torn apart, leaving large interspaces in which the mites live in considerable numbers. A small opening on the lower surface of the leaf shows the point of entrance, and allows exit to the occupants. These galls vary much in size, having no definite limits, and often unite together so as to cover almost the whole surface of a leaf.

Sedum rhodiola, Dc.—Galls of *mites* (*Phytoptus*), described by Dr Fr. Loew in 'Verhandl. d. Z. B. Gesellsch.,' Wien, 1881 (vol. xxx. p. 7, t. 3., f. 4).

The galls may be restricted to defined spots on any part of the leaves, though more commonly near the base, or they may spread over the whole of the young leaves towards the tip of a branch; and Dr Loew states that they often affect the flowers also. The form of the isolated galls is usually rounded or oval (but the outline may be irregular), and in size they usually reach $\frac{1}{10}$ to $\frac{1}{6}$ inch across. Each consists of a prominent ring of tissue, irregularly fissured and warty on the free edge, which bends inwards so as to leave only a narrow fissure or opening in the middle. In colour they are yellowish-green, passing into purple. The surface bears no hairs. On section, the ring is found to surround a space into which project small fleshy cellar outgrowths from the surface of the leaf, and between these the mites may be found.

Tanacetum vulgare, L.—The edges of the leaf-segments are rolled in by mites (*Phytoptus*), either in limited spots, or, in the younger leaves near the tip of the shoot, in their whole length. The affected leaves become covered with a hoary coat of white silky hairs, thereby becoming somewhat conspicuous. The mites live in the tubes formed by the leaf-margins in considerable numbers. These galls seem the same as those described by Dr Thomas (Giebel's 'Zeitschrift,' 1877, p. 365), from Boppard on the Rhine.

Fagus sylvatica, L.—In this magazine (vol. i. p. 235) I described galls on leaves of beech, which I referred to *Cec. (Hormomyia) piligera*, H. Lw., though they did not possess the erect hairs said to occur on the typically developed galls of that insect. I have since then found galls of *C.* (*H.*) *piligera* at Forres, and at Glamis in autumn of 1880, as well as in numer-

ous localities in Germany and elsewhere on the Continent, and find that they differ from those previously described by me in the very noticeable coating of erect brown hairs, in the more rounded apex, and in not being so long nor projecting so abruptly from the upper surface of the leaf. The two forms are much the same size, however, and the raised wart on the lower surface opposite the gall is the same in both, and both fall off the leaf when mature.

The smooth gall agrees very well in every respect with galls figured by Bremi ('Monogr. d. Gallmücken,' 1847, p. 23, t. 1. f. 13), under the name *Cecidomyia tornatella*, but from which he did not rear the insect. So far as my own observation goes the latter is much the less common gall on the Continent, though the commoner in the north of Scotland.

Juncus lamprocarpus, Ehrh. Pseudogalls of a homopteron, *Livia juncorum*, Latr.—The buds at the tip of a stem or of a short branch are attacked, and each galled bud may reach a length of rather over an inch and a breadth of $\frac{1}{6}$ to $\frac{1}{4}$ inch. Usually, however, several galled buds arise close together, and the whole mass may reach an inch or more in diameter. The leaves of the buds affected remain shortened, and their bases become widened out and overlap one another so as to enclose spaces in which live the insects. The growth of the bud seems to cease early. The galls are not uncommon near Aberdeen in suitable spots, and I have also seen them elsewhere.

THE MODES OF DISPERSION OF THE SEEDS OF SCOTTISH WILD PLANTS.[1]

By Professor J. W. H. Trail, A.M., M.D., F.L.S.

THE subject that I have selected to put before you at this meeting is one of considerable interest and importance from several points of view. This interest is rendered still greater to evolutionists, alike by the effort to explain the origin of the various adaptations for dispersion of seeds met with among plants, and by their bearing on the value of characters to the systematist in his endeavours to approach a natural system of classification. Observation and experiment have shown that the vegetative organs of plants (stems, leaves, &c.), vary greatly

[1] Communicated to the Perthshire Society of Natural Science, February 2, 1882.

in most species when the conditions around them are changed—*e.g.*, in poor or stony soil as contrasted with rich fertile ground, in open or in shady places, and so forth; hence the amount of importance attached to diversities in these parts is very limited. On the other hand, the organs of reproduction (*i.e.*, flowers, fruits, and seeds), are less directly exposed to the influence of surrounding conditions; and, save in number, and to some extent in size, they are hardly modified by the influences that so markedly act on the organs of vegetation. Accordingly, they are found to be far more constant in form and in structure, and hence are chiefly used by systematists. But the flowers and fruits, though but little affected by the causes above-mentioned, are yet exposed to influences from which the other parts are exempt. These seem to have in course of time had a great effect in modifying the structure of both flowers and fruits in many plants to suit the conditions under which they live. These influences as regards flowers have been studied by careful and enthusiastic observers in Great Britain, but more especially in Germany; and numerous works, some of great merit, have been written on them and on their effects.

In the flowers the great requisite is the conveyance of the pollen from the anthers to the stigma, so as to fertilise the ovules. In many plants this is effected by the wind, but in others insects are the bearers of pollen; and it is in these that we meet with the most striking and beautiful forms of flowers. There is reason to believe that very great modifications of form and structure have been brought about in these in course of time, suiting them for visits of insects, the structure of which specially enables them to convey the pollen aright, while colour and size have also been greatly affected in the same way. Hence characters liable to such influences must be used with much caution.

In the fruits modifications are beneficial for a new object—viz., the wide distribution of the seeds, and the agents are for the most part different; hence the modifications resulting from their action are of a different nature. Frequently the result may be attained in closely allied plants by modification of distinct parts, while the same means may be employed in two or more plants not at all closely related. Therefore, care is required to distinguish between such adaptational resemblances and those due to relationship, as they are of very different value to the systematist and to the genealogical botanist. Examples of close

resemblances in fruits of widely distinct species and of differences in those of closely allied species will be noted in the sequel.

It is unnecessary to dwell long on the great advantage that plants derive from wide distribution of seeds. When widely distributed there is, it is evident, a greater likelihood of some being brought into favourable conditions for healthy and vigorous growth. On the other hand, however favourable the conditions may have been to the parent plant, were all the seeds to fall close around it and to germinate there, it is evident that there could not be room for the healthy growth of the progeny. It is well known that the same crops cannot be grown for several years continuously without impoverishing the soil, by the removal of certain ingredients that must be artificially replaced to keep that soil fertile. The same holds good with wild plants; hence advantage ensues from the young plants not occupying the same spot as the parent. Moreover, as they necessarily take the same substances from the soil, the struggle for existence is more severe between plants of the same species than between plants of different species, and this holds still more with the offspring of the same plant; hence it is of great advantage to the young plants to be scattered to some distance from one another.

After these preliminary remarks, I shall now go on to notice some of the various adaptations that favour the dispersion of seeds. These adaptations are frequently far more striking in exotic species than in any of our native plants, but I shall almost restrict myself to the latter, in the hope that it may excite the attention of some of you to what may be verified at home, and may induce you to inquiry into a subject that has been comparatively neglected among us.

The agents in the dispersion of seeds are :—

1. Wind, in many species.
2. Water, in a few.
3. Animals, almost solely quadrupeds or birds. They convey seeds, or one-seeded fruits, from place to place (*a*) attached to hair or feathers by means of hooks, prickles, or sticky surfaces; (*b*) they swallow the fruits, and the seeds are discharged uninjured from the intestines almost always at some distance from the place where they were swallowed. The seeds of plants growing in shallow water and sinking into mud are often

conveyed, as pointed out by Darwin, on the feet of wading birds to considerable distances. But in this case there are no special adaptations of structure necessary, so there is no need to refer to them at greater length.

4. In some plants the seeds are thrown to some distance by elastic dehiscence of the seed-vessel,—*e.g.*, in the broom, or of a seed-coat, as in the wood-sorrel.
5. Movements may be effected by awns.

Wind as an agent in dispersion.—One of the simplest and most general modes of utilising wind as an agent is seen in plants which bear the fruits supported on a stalk of some length—*e.g.*, foxglove, poppy, hemlock, and many others. In most of such plants the fruit is dry, and splits open in some way or other to allow the escape of the seeds, which in such fruits are generally numerous and small. In these fruits the opening is almost always near the top ; or if, as in the bluebell (*Campanula*), it is near the base, the fruit usually hangs reversed. In this way the seeds are retained in it so long as it is at rest, but when the fruits and stems are driven about by wind the seeds are thrown to some distance around. In some plants, such as the hemlock, the fruits are one-seeded, and do not split open, but remain attached when ripe, till jerked off when the plant is shaken by wind. Seeds of small size are carried off in the air, and are blown about like so much dust ; and among cryptogams this is a very frequent mode of distribution, and the geographical range of these plants is often extremely wide. Among phanerogams or flowering plants the seeds are seldom small enough for this, but they are frequently rendered sufficiently light by modifications of various kinds ;—in their own structure if set free from the seed-vessel, or in the carpel or outer parts of the flower in the case of one-seeded indehiscent carpels.

In orchids generally, and here and there among other plants (*e.g.*, *Pyrola*, *Parnassia*, *Drosera anglica*, &c.), the seeds are very numerous and small, and the outer coat of the seed much wider than the inner, forming a loose bag filled only with air ; hence such seeds are very light and are easily blown about.

A number of plants have the outer coat of the seed prolonged to form a thin membranous wing, yielding the same advantage. In some (*e.g.*, *Spergularia marginata* and *Rhinanthus crista-galli*), the wing surrounds the seed. No native Scottish plant

has such a wing of large size, but in some tropical species (*e.g.*, *Bignoniaceæ*) it reaches a breadth of over an inch. The firs and various other conifers have a large wing directed obliquely upwards and to one side; probably most persons have noticed how far these seeds are carried by even a moderate breeze before reaching the ground. The effect may also be understood if one examines moorlands or natural pastures for some distance around a fir wood. Young fir-trees will be found to be abundant in such localities, though cropped so close to the soil in pasturage that they need to be looked for.

In other plants the seeds bear a coat of hairs over the surface (as in the cotton plant), but of this we have no conspicuous native example. Among willows and poplars, and also in the willow herbs (*Epilobium*), each seed bears a tuft of hairs at one end, and the seeds themselves are small and light, so that they are wafted on by the faintest breeze. The dispersion of the seeds from a clump of willows or of poplars is often too noticeable to have been overlooked by even the least observant.

Among one-seeded indehiscent carpels we meet with adaptations very similar to those just noticed among seeds, and also with others of a different nature, all serving the same use in the economy of the plant. Carpels are frequently so like seeds in appearance that they are often called seeds (as in the so-called carraway seeds, or those of the daisy, of grass, &c.), and a careful inspection may be needed to show their true nature. The readiest test is to cut through the suspected body, in which case, if it is a carpel, the seed will be found inside it. Such carpels (*e.g.*, those mentioned above) are frequently small, but they are very rarely small enough to be carried about like dust, and equally rarely are rendered light by means of empty space in the walls of the carpels (*e.g.*, in *Myagrum* and *Valerianella* species). On the other hand, one-seeded carpels are often winged. The most rudimentary adaptation of this kind is seen in plants where the carpels are flattened as in *Heracleum*, without being prolonged into a noticeable wing. From this stage all intermediate forms occur up to the bilateral wing of the elm and birch, and the large unilateral wing of the maples. The ash-tree also has a long wing projecting beyond the seed-bearing portion. Similar winged carpels are found in many exotic plants of different genera and orders. A rarer form of wing occurs in *Paliurus aculeatus*, in which it encircles the carpel like

an umbrella about halfway between the base and the apex. In all these cases the wing of the carpel is small in, or even absent from, the flower, becoming developed only as the ripening of the seed advances.

Less frequently, very rarely indeed in British plants, the carpel becomes covered with a growth of long hairs, which form a float to support it in the air. In *Dryas octopetala* and in *Clematis* among native plants, and in various foreign species of different genera, the style, instead of falling off after the ovules are fertilised, increases much in size, and becomes converted into a float by the growth of long hairs all over it.

In many plants the outer envelopes of the flower—viz., corolla and calyx, or the flower-stalk or bract (*i.e.*, the leaf between which and the stem the flower grows out)—may become or may bear the adaptation for wind-carriage. The outer envelope or calyx is the part most frequently modified. If the calyx arises from the flower-stalk below the base of the ovary, and is free from the ovary, it may become much enlarged and bladdery, so as to surround the fruit, and to leave a large empty space between, rendering the whole body light. Such an arrangement may occur in plants with a calyx of coherent sepals (*e.g.*, *Trifolium fragiferum*), or with a calyx of free sepals (*e.g.*, *Rumex*). In some foreign plants (*e.g.*, *Gyrocarpus*) two or more sepals may become much enlarged so as to form apparent wings; this may be the case in superior as well as in inferior calyces.

In superior calyces, or those which arise apparently from around the top of the ovary, the modifications met with are greater than in inferior calyces, and are also more frequently met with; but, as in them, become conspicuous only as the seeds ripen. In some plants the calyx spreads out like an umbrella, or like scales or plates, which buoy the fruit up, and render its fall slower. Most *Compositæ* (dandelion, thistles, &c.) and some allied groups—*e.g.*, *Valeriana*, have the calyx represented by the *pappus*, a spreading crown of hairs arising (as in thistles) directly around the top of the ovary, or (as in the dandelion and goat's beard) supported on a long beak that extends from the upper end of the ovary. These hairs may stand in one or in several rows, and may be simple or more or less branched. Their efficacy in floating the fruits is probably familiar to every one. In the cotton-grasses (*Eriophorum*) we meet with a similar modification in the floral envelopes. These consist of merely some slender hairs, which in the flower are quite small. As the

seeds mature the hairs lengthen, and finally they become very conspicuous, forming large heads like masses of silky cotton, familiar to every one that has seen a Highland moor in summer. When the seed-like carpel breaks away the hairs are carried with it, and the whole floats away on the breeze.

The corolla or inner floral envelope is so seldom modified apart from the outer that it needs no further comment here.

In several of our native plants the flower-stalk bears hairs which elongate after the seeds are fertilised, and at last form relatively large tufts. Among the grasses *Phragmites communis* (reed) and *Avena pubescens* may be instanced. *Typha latifolia* also shows this arrangement. In such cases the flower-stalk breaks away, remaining attached to the ripe fruit.

The lime-tree or linden (*Tilia*) gives an excellent example of the bract forming the wing. The flower-stalk (bearing several flowers, and therefore also several fruits) is adherent in part of its length to the long rather narrow bract. When the seeds are ripe the bract falls off with the fruits and flower-stalk, and is a very efficient means of conveying them to some distance before reaching the ground. In the hornbeam (*Carpinus*) and hop each fruit stands sessile in the axil of a small bract which falls off with it like a wing. In many grasses the glumes or bracts fall off with the fruit, and form imperfect floats—*e.g.*, in *Holcus*, *Phalaris*, &c.

Yet other modifications adapted for this mode of conveyance of seeds are met with, but it would be tedious to dwell on them now; and, moreover, they rarely are found in Scottish plants.

Conveyance by water is a far less general means than by wind, and special adaptations are rare. Of course, the seeds or fruits of any plants growing on the side of a stream may fall into it, and may be conveyed to a considerable distance, if light enough to float, before being again cast on land. Of this mode of conveyance we have clear proof in the occurrence of typically alpine plants frequently here and there along our rivers in the lower grounds. But no special adaptations are needed or are met with for this method. Very few of our native plants live floating freely on the surface of the water, though in the tropics such plants are so abundant as to form floating islands, often over an acre in extent. The seeds of these plants germinate under water, and they are dispersed without special means by the movements of the plant freely on the surface of the water, carried along by winds or by currents.

Special adaptations occur in the water-lilies so commonly to be found in Scottish lochs. The fruit in both the white and the yellow water-lilies contains several spaces ranged round a central column like the spaces between the spokes of a wheel: in these lie numerous seeds. In the yellow water-lilies (*Nuphar*) the outer coat of the fruits alone splits open when the seeds are ripe, and the inner layer enclosing each of the various divisions splits away, containing the seeds and also enough air to buoy up the whole on the surface, where it floats for a time, driven about by winds or currents till a hole forms in the wall and seeds drop out and sink to the bottom of the loch. There they germinate in the mud. In the white water-lily (*Nymphæa*) the seeds are set free when the fruit splits; but each seed has a coat that has grown up from the funiculus or stalk loosely round it so as to cover it, enclosing air enough to float the seed, and thus to allow of its conveyance to some distance. On the decay of this coat, and the escape of the air, the seed sinks to the bottom.

Adaptations for conveyance attached to the bodies of animals.—Sticky secretions very seldom form the means among our native plants; never, in fact, as regards the seeds themselves, one might say, though the seeds of *Linum* and of a few other plants become sticky when moistened. The fruits of a few show a similar quality, and the ovary of *Linnæa borealis* is said to be sticky when ripe by reason of gland hairs. In some *Labiatæ*, the calyx, which breaks away with the fruits, is sticky for the same reason.

Prickles or hooks form by far the most frequent means for attaching the fruits to the bodies or limbs of animals. It may be said that no Scottish plants show structures of this kind on the seeds themselves—indeed seeds so provided are rarely met with anywhere. The surface of the ovary sometimes bears many small prickles (*e.g.*, *Ranunculus arvensis*, *Cynoglossum officinale*); or, as in some exotic genera, it may bear one or more spines or hooks of considerable size. A well-known example is the fruit of the "Wait-a-bit Thorn" of South Africa (*Harpagophytum*), with hooked branched spines an inch long, and very strong. These fruits are said to be very injurious to sheep through sticking in their wool, and irritating the skin when the sheep lie down on them. Many Scottish plants with inferior ovaries have the outer surface of the receptacle-tube covered closely with prickles (*e.g.*, Carrot, *Torilis*, &c.) or small sharp

hooks (*e.g.*, *Circæa*. *Galium aparine* or Cleavers, *Asperula*, *Sanicula*, &c.), which form very efficient grasping organs. In others there is only a ring (or two or three rings) of hooks round the edge below the calyx (*e.g.*, *Agrimonia*). In the native species of *Geum* the styles elongate as the seed ripens. Near its middle there is an abrupt bend. When the seed is ripe the part of the style beyond this breaks away, leaving a sharp hook which, though small, can take a firm grasp. In a few exotic plants the corolla of the flower remains adherent to the top of the carpel, forming sharp, hard hooks as in *Tragæceros*, in which there are two such in the rayflowers. Such a modification of the corolla is not met with in any of our native plants. The flower stalk seldom bears hooks or spines for grasping, but not rarely the bracts are so furnished. In the burdock (*Arctium Lappa*) each of the narrow bracts that form the involucre ends in a small sharp hook. The whole head breaks away from the stalk, and very readily adheres to the fur or feathers of passing quadrupeds or birds, or to the clothes of passers by. In some *Umbelliferæ* the flowerhead or inflorescence breaks off and becomes attached to passing animals by aid of small spines over the surface of the bracts. In many grasses (*e.g.*, barley) the glumes or bracts end in long prickly awns, which form efficient organs of attachment.

Fleshy fruits are, as a rule, specially suited for the dispersion of the seeds by quadrupeds, or more generally by birds; and plants with fruits of this kind may frequently be found in situations, such as to show that the seeds must have been brought from a distance. As previously mentioned, the fruits are swallowed; the seeds pass, but little, if at all, the worse, through the intestine, being protected usually in some way by their structure from injury in their passage, and when discharged they germinate as readily as, or in some cases even more readily than, if they had never been subjected to this treatment. The seeds suited for this mode of dispersion are frequently protected from injury by being enclosed in a hard covering, which in some is the outer coat of the seed (*e.g.*, nutmeg), while in others it is the inner layer of the carpel (stone of cherry, &c.) Other seeds (*e.g.*, gooseberry) are enclosed in a soft jelly-like pulp, which seems to protect them.

Few Scottish plants have the seeds themselves exposed, the attraction being found in a fleshy growth, called an aril, that surrounds the seed, and is usually conspicuous in colour; but

we find examples of such in the yew and the spindle tree (*Euonymus*). Among exotic plants a frequently-quoted instance of this method is the nutmeg, the seed of which is the size of a pigeon's egg. It is covered with the fleshy mace, and is swallowed for this by large fruit-eating pigeons, and is widely dispersed by this means. At one time the Dutch tried to restrict the cultivation of nutmegs to the Banda islands, in order to retain a monopoly of them, and destroyed the trees on the other Malay islands; but their efforts were vain, as the seeds were continually conveyed to these islands from Banda by the birds. Very commonly the walls of the carpel become fleshy in whole or in part, and remain indehiscent. Such fruits may be divided into the two groups of (a) *berries*, with the whole wall soft, enclosing numerous seeds; and (b) *drupes*, where the outer part of the wall is fleshy, but the inner layer is leathery or stony as in cherries, enclosing usually not more than two seeds, generally only one. Both groups are well represented among us. Of berries we have the gooseberry and currants, the barberry, privet, vacciniums, honeysuckle, crowberry, potato, Solomon's Seal, and various others. Of drupes we have the cherry, gean, sloe, and a few others of a similar nature. The raspberry and bramble are merely masses of small drupes crowded on a slightly-fleshy stalk. A modification of the drupe is seen in the apple, pear, rowan, and others of the genus *Pyrus*, in which the leathery carpels are sunk completely into a cuplike fleshy flower-stalk, which enlarges greatly as the seeds ripen. In the hawthorn, well known to be much eaten by many of our birds, the structure is much as in *Pyrus*, only the carpels are of stony hardness. In roses the flower-stalk is hollowed out and encloses a number of small one-seeded carpels, generally mistaken for seeds. The rosehip is this flower stalk much enlarged, fleshy, and sweet; it is very attractive to various animals. The strawberry, on the other hand, is a convex flower-stalk much enlarged, and becoming sweet and fleshy as the seeds ripen. The so-called seeds on its surface are small one-seeded carpels. They are swallowed with the edible part, and the seeds are protected by the carpels in their passage through the intestine. These are the various adaptations met with among our native plants that favour this mode of dispersion, but I may be permitted to note one or two additional parts that become fleshy in fruits of other lands. The mulberry at first glance looks not unlike a bramble, but is essentially different, being made up of a number of flowers,

each consisting of a one-seeded ovary enclosed in two pairs of enlarged fleshy sepals. In figs there is what reminds us of a rose in its structure, but in the fig the hollow flower-stalk supports and envelopes a multitude of minute flowers, each one of which has a small one-seeded ovary,—the so-called seed of the fig. The flower-stalk is the eatable part, and makes up the great mass of the fruit.

In a few plants the bracts become fleshy, but this is rarely the case, and I am not aware of any example of this structure among Scottish species. The pine-apple (*Ananassa sativa*) shows it well, and its appearance is probably familiar to most persons nowadays.

Elastic dehiscence of fruits frequently occurs in certain orders of plants, notably among the *Leguminosæ* and *Geraniaceæ*. The mode of dehiscence of the former forces itself on one's notice, to the ear at least, in the fine sunny days of autumn on any piece of ground overgrown with broom or whins. The sharp report of the bursting pods are often to be heard on all sides in such circumstances. When the seeds are ripe in the fruits of this order, there are two lines from tip to base of the pod—viz., its two edges—where the structure renders them most liable to give way. In dry sunny weather some moisture evaporates, and contraction of the walls of the pod follows. If this goes beyond a certain limit, it becomes too great for the resistance offered at these lines, which suddenly give way, the two halves burst apart, and the jerk throws out the seeds, often to a distance of several inches, or even feet. In the wild geraniums each carpel usually contains only one seed, but generally five carpels are present in each flower. The ovaries are closely adherent in the flower to the base of a central column, while their long styles are adherent to the column nearly to their tips. When the seed is ripe, in dry weather, each ovary separates suddenly from its attachment, while the style remains adherent to the column, and thus throws the seed, as if from a sling, to some distance. In the nearly-allied wood-sorrel (*Oxalis*) the seed is thrown out by a different mechanism. The fruit is a capsule that, when the seed is ripe, bursts into five parts in which the seeds lie. Each seed has on outer coat or arillus in addition to the usual coats, and this arillus is very elastic. When the fruit bursts the fleshy arillus contracts through loss of moisture, bursts, and by its elasticity propels the seed, as one propels a pea from between the finger and thumb. Still another mode of elastic dehiscence

is met with in one or two plants allied to the cucumber—viz., *Elaterium*, or "squirting cucumber." The fruit is a fleshy oval body with elastic walls in a constant state of tension. The seeds lie imbedded in a mass of pulp in its interior. When they are ripe the fruit drops off its stalk, leaving an opening at the point of attachment, and through this opening the seeds and pulp are shot out to a distance of several feet by the sudden contraction of the elastic walls. Of this kind of dehiscence we have no example among native plants, and I must apologise for digressing to mention it.

Lastly, we find among grasses some in which the fruits are able to move over the surface of the ground, or even to burrow into it to sufficient depth to cover themselves. These movements result from the nature of the awns, which remain attached to the glumes or bracts, which break away and remain as a covering to the ovary. The awns are bent or twisted, and have the peculiarity of being very ready to absorb or to give off moisture, the bend or spiral altering its dimensions with every variation in the amount of moisture. Every such change of position moves the ovary, but, owing to fine prominences on the glumes, &c., they can move only in one direction;—thus every movement propels it forward, and in this way the seeds may be pretty widely distributed after some time.

As formerly mentioned, frequently the same methods of distribution are found in plants wide apart in structure, while in other plants nearly allied to one another, the methods are very distinct, the adaptations being suited to very different agencies. And you will probably readily understand that such resemblances are no proof of genetic relationship, and such differences no proof of distance apart, but that they depend on environment, and on the conditions best suited for the welfare of the various species of plants. Though this paper is already a long one, I may perhaps be permitted to instance more fully a few examples of resemblances and of differences in this view. Of resemblances we meet with the elongated plumose style, serving as a float, in *Clematis* and in *Anemone pulsatilla* among *Ranunculaceæ;* and again in *Dryas octopetala* and *Geum montanum* among *Rosaceæ.* Seeds with an unilateral wing occur in *Coniferæ* (firs, &c.), in the mahogany tree (*Swietenia*), in *Proteaceæ* (*Banksia*, &c.), and various others; seeds surrounded with a wing in *Bignoniaceæ*, *Caryophyllaceæ* (*Spergularia*, *Dianthus*, &c.), *Cruciferæ* (*Alyssum*, &c.), *Liliaceæ*, (*Lilium*, &c.),

and others; hairy seeds in *Malvaceæ* (*Gossypium*), *Sterculiaceæ* (*Bombax*); and seeds bearing a tuft of hairs in *Epilobium*, in *Asclepiadaceæ*, *Salicaceæ*, and various others; winged fruits are present in *Fraxinus*, *Ulmus*, *Betula*, *Ptelea*, *Angelica*, *Acer*, *Banisteria*, and many other genera belonging to different orders. Examples of such resemblances in widely-different plants might be multiplied indefinitely, but these may suffice.

Turning now to the various modes of distribution met with in the same natural order, and even in the same genus, these are at times very different. In *Onagraceæ*, we find (1) *Epilobium*, with capsular fruit enclosing very numerous small seeds, each provided with a tuft of hairs. (2) *Fuchsia*, nearly allied, but with the fruit a berry, and no hairs on the seeds. (3) *Circæa*, with a small indehiscent fruit (with one or two seeds), covered with small hooked prickles for grasping. Among *Rosaceæ* are numerous and very various modes of distribution. Looking at the arrangement of the genera in any flora of Scotland, we find that (1) *Prunus* has the fruits and drupes distributed chiefly by birds swallowing them, and voiding the seeds enclosed in the stone (*e.g.*, cherry and sloe). (2) *Spiræa* has fruits that open when ripe (follicles), but require to have the seeds shaken out by action of wind on the stems. (3) *Agrimonia* has one or few seedlike indehiscent carpels enclosed in a tubular flower-stalk which bears round its edge small hooks; this part breaking off, with the ripe carpels enclosed, the hooks serve for grasping. (4) *Alchemilla* and *Potentilla*, no special adaptations. (5) *Fragaria*—strawberry—has the flower-stalk enlarged, fleshy, and convex, with many seed-like carpels over its surface. The large stalk is swallowed bearing the carpels, which are thus distributed when voided by birds. (6) *Rubus* — raspberry, bramble, &c.—the fruit is a mass of small drupes like miniature cherries, and is distributed in like manner by birds. (7) *Geum*, as far as concerns our native species, has the style provided in the middle with a bend, which forms a hook for grasping when the apical half falls off, as it does when the seed is nearly ripe. The carpels are small. (8) *Dryas octopetala* and *Geum montanum* have the style elongated and hairy, to float the seedlike indehiscent carpel. (9) *Rosa* has numerous seedlike carpels enclosed in a hollow flower-stalk, which becomes enlarged and fleshy, and is eaten by animals along with the enclosed carpels, which are thus distributed. (10) *Cratægus* (hawthorn) and *Pyrus* (apple, pear, rowan, service berry, &c.)

have the stony or leathery carpels enclosed in a fleshy flower-stalk so closely that it seems to form a part of the carpels. This is eaten by animals, and the seeds, alone or enclosed in the carpels, are distributed, when voided, to some distance from the tree on which they grew. Thus among our native *Rosaceæ* we meet with nine different adaptations for distribution of the seeds;—five specially suited for passing through the bodies of animals, two for conveyance attached to fur or feathers, and two for distribution by wind. Similar facts may be elicited by an examination of other natural orders, but need not be dwelt on at present.

In conclusion, it may not be amiss to point out that the various adaptations occur only under such conditions as are directly useful and beneficial to the plant in promoting the wide dispersion of its seeds, either alone, or still enclosed in the ovary. Modifications in the seeds themselves occur only in such fruits as open to allow the escape of the seeds. It is only in these that we find loose seed-coats, or wings, or hair-tufts; very rarely are hooks or spines found on seeds, as they would apparently be in the way in the ovary. Again, modifications in the ovary, suiting it for conveyance by wind or attached to bodies of animals, are found only in ovaries that contain one or two seeds, and that do not open, but themselves break off from the parent plant, and are dispersed as if they were seeds. In like manner the parts eaten by animals, whether an arillus, or the ovary itself, or some outer part of flower or flower-stalk, always inclose the seed or seeds in such a way as to ensure the great likelihood of their being swallowed without injury. Modifications of the envelopes, of the flower-stalk, or of the bract, suited for dispersion by wind, or by attachment to the bodies of animals, are found only in those cases in which the part modified breaks off from the plant, and continues attached to the ovary.

From an examination of the structures of plants in view of the dispersion of seeds, we are warranted in believing that we may succeed in understanding something of the way in which specialisation of parts to ends is brought about to meet the conditions of healthy vitality, while we find here as everywhere economy of force, and adaptations of means to ends ungrudgingly, but with no trace of waste of power.

THE GAELIC NAMES OF PLANTS.

By JOHN CAMERON.

(*Continued from p.* 229.)

"Do'n t-siol chruithneachd, chuireadh gu tiugh;
Cha b' e' n fhiteag, no' n *coirc dubh*."—M'Donald.

When oats become black with blight, the name *coirc dubh* is applied, but especially to the variety called *Avena strigosa*.

Hordeum distichon—Barley; the kind which is in common cultivation. ("Barley" comes from Celtic *bàr*, bread, now obsolete in Gaelic, but still retained in Welsh—hence *barn*, and by the change of the vowel, *beer*.) Gaelic and Irish: *èòrna*, *òrna*. Irish: *earn* (perhaps from Latin, *horreo*, to bristle; Gaelic, *òr*, a beard)—O'Reilly. "The bearded or bristly barley;" "*òrog*," a sheaf of corn. *Hordeum*, sometimes written *ordeum* (Freund), is from the same root. "It was cultivated by the Romans for horses, and also for the army; and gladiators in training were fed with it, and hence called *hordiarii*." It is still used largely in the Highlands for bread, but was formerly made into "crowdie," properly *corrody*, from Low Latin, *corrodium*, a worry.

"Fuarag èorn ann' sàil mo bhroge,
Biadh a b' fhearr a fhuir mi riamh."

Barley-crowdie in my shoe,
The sweetest food I ever knew.

Irish: *caincog*, oats and barley—from *cain* (Greek, κῆνσος; Latin, *census*), rent, tribute. Rents were frequently paid in "kind," instead of in money.

Secale cereale — Common rye. Gaelic and Irish: *seagall*. Greek: σεχαλη. Armoric: *segal*. French: *seigle*.

"An cruithneach agus an seagall."—Exodus.
The wheat and the rye.

Welsh: *rhyg*, rye.

Molinia cærulea — Purple melic-grass. Gaelic: *bunglàs* (M'Donald), *punglàs*. (*Bun*, a root, a stack; *glàs*, blue.) The fishermen round the west coast and in Skye make ropes for their nets of this grass, which they find by experience will bear the water well without rotting. Irish: *mealoigfèr corcuir* (O'Reilly), —*mealoig* = *melic* (from *mel*, honey), the pith is like honey;

fèr or *feur*, grass; *corcuir*, crimson or purplish. In some parts of the Highlands the plant is called *braban* (Stewart.)

Glyceria.—From Greek, γλυκύς, sweet, in allusion to the foliage.

G. fluitans—Floating sweet grass. *Milsean uisge*, *millteach uisge*,—perhaps from *millse*, sweetness. Horses, cattle, and swine are fond of this grass, which only grows in watery places. Trout (*Salmo fario*) eat the seeds greedily. The name *millteach* is frequently applied to grass generally as well as to *Triglochin palustre* (which see). *Feur uisge*, water-grass.

Briza.—Quaking-grass. Gaelic and Irish: *conan*,—*conan*, a hound, a hero, a rabbit,—may possibly be named after the celebrated "*Conan Maol*," who was known among the Feine for his thoughtless impetuosity. He is called "*Aimlisg na Fèinne*," the mischief of the Fenians. This grass is also called *feur gortach*, hungry, starving grass. "A weakness, the result of sudden hunger, said to come on persons during a long journey or in particular places, in consequence of treading on the fairy grass" —(Irish Superstitions). *Féur sìthein sìthe*,—literally, a blast of wind; a phantom, a fairy. The oldest authority in which this word *sìthe* occurs is Tirechan's 'Annotations on the Life of St Patrick,' in the Book of Armagh, and is translated "*Dei terreni*," or gods of the earth. *Crìth fhèur*, quaking-grass. *Grigleann* (in Breadalbane), that which is in a cluster, a festoon; the Gaelic name given to the constellation Pleïades.

Cynosurus.—Etym. κυών, a dog, and οὐρά, a tail.

C. cristatus—Crested dog's-tail. Gaelic: *goinear*, or *goin fheur*, and sometimes *conan* (from *coin*, dogs, and *feur*, grass). Irish: *feur choinein*, dog's grass.

Festuca.—Gaelic: *féisd*. Irish: *féiste*. Latin: *fastus* and *festus*. French: *feste*, now *fête*. English: *feast*, as applied to grass, good pasture, or food for cattle.

F. ovina—Sheep's fescue-grass. Gaelic and Irish: *feur chaorach*.

"*Mìn-fheur* chaorach."—M'Intyre.
Soft sheep grass.

This grass has fine sweet foliage, well adapted for feeding sheep and for producing good mutton—hence the name. But Sir H. Davy has proved it to be less nutritious than was formerly supposed. *Mìn-fheur* (Armstrong), is applied to any soft grass —as *Holcus mollis*—to a flag, a bulrush; as "*mìn-fheur gun uisge*," a bulrush without water (in Job).

Triticum, according to Varro, was so named from the grain being originally ground down. Latin: *tritus*, occurring only in the ablative (*tero*). Greek: τείρω, to rub, bruise, grind.

T. æstivum (and other varieties)—Wheat. Gaelic and Irish: *cruithneachd—cruineachd*. This name seems to be associated with the Cruithne, a tribe or tribes who, according to tradition, came from Lochlan to Erin, and from thence to Alban, where they founded a kingdom which lasted down till the seventh century. Another old name for wheat—*breothan*, may similarly be connected with another ancient tribe, "*Clanna Breogan*. They occupied the territory where Ptolemy in the second century places an offshoot of British Brigantes."—SKENE. Were these tribes so called in consequence of cultivating and using wheat? or was it so called from those tribal names? are questions that are difficult to answer. It seems at least probable that they were among the first cultivators of wheat in Britain and Ireland. *Breothan*, that which is bruised; the same in meaning as *triticum*. Other forms occur, as *brachtan*,[1] being bruised or ground by hand in the "*muileann bràdh*," the quern; sometimes spelled *breachtan*. *Mann*, wheat, food. *Fiormann*, —*fior*, genuine, and *mann*, a name given to a variety called French wheat. *Tuireann*, perhaps from *tuire*, good, excellent. The flour of wheat is universally allowed to make the best bread in the world. *Romhan*, Roman or French wheat; "branks."

T. repens—Couch, twitch. Scotch: *dog-grass*, *quickens*, &c. Gaelic: *feur a'-phuint* (M'Kenzie), the grass with points or articulations. Every joint of the root, however small, having the principle of life in it, and throwing out shoots when left in the ground, causing great annoyance to farmers. (From the root *punc* or *pung;* Latin, *punctum*, a point.) *Goin-fheur*, dogs-grass; or *goin*, a wound, hurt, twitch. According to Rev. Mr Stewart, Nether Lochaber, this name is also given to *Cynosurus*. *Fiothran*, the detestable. It is one of the worst weeds in arable lands on account of the propagating power of the roots. *Bruim fheur*, flatulent grass. Probably only a term of contempt.

T. junceum—Sea-wheat grass. Gaelic: *glàs fheur*, the pale

[1] Latin: *brace* or *brance*. Gallic, of a particularly white kind of corn. According to Hardouin, *blé blanc Dauphiné*, *Triticum Hibernum*, Linn., var. *Granis albis*. Lat., *sandala*.

"Galliæ quoque suum genus farris dedere: quod illie brance vocant apud nos sandalum nitidissimi grani."—PLINY, 18, 7.

green grass; a seaside grass. It helps, with other species, to bind the sand.

Lolium perenne and **temulentum** — Darnell, rye-grass. Gaelic: *breoillean.* Irish: *breallan* (*breall* or *breallach*, knotty), from the knotty appearances of the spikes, or from its medicinal virtues in curing glandular diseases. "And being used with quick brimstone and vinegar it dissolveth knots and kernels, and breaketh those that are hard to be dissolved"—CULPEPPER. *Dìthean*, darnel; perhaps from *dìth*, want, poverty. It may be so named from its growing on poor sterile soil, which it is said to improve. "They have lately sown ray-grass to improve cold, clayey soil"—Dr PLATT, 1677. *Roille.* Irish: *raidhleadh*, from *raidhe*, a ray—hence the old English name *ray-grass.* French: *ivraie*, darnel. Welsh: *efr*—perhaps alterations of the French *ivre*, drunk. The seeds of darnel, when mixed with meal, cause intoxication, and are believed to produce vertigo in sheep—the disease that maketh them reel; and for this reason the grass is often called *sturdan*, from *sturd*,—hence Scotch *sturdy* grass. *Siobhach*, from *siobhas*, rage, fury, madness. "It is a malicious plant of sullen Saturn: as it is not without some vices, so it hath also many virtues"—CULPEPPER. *Cuiseach* (M'Alpine), rye-grass. *Ruintealas* (O'Reilly), the loosening, aperient, or purgative grass—from *ruinnec*, grass, and *tealach*, loosening.

Nardus stricta—Mat-grass, moor-grass. Gaelic: *beitean* (perhaps from *beithe*), was refused. Cattle refuse to eat it. It remains in consequence in dense tufts, till it is scorched by early frosts. In this condition it is frequently burned, in order to destroy it. *Borrach* (in some places), parching. *Carran* (Stewart), a name given also to *Spergula arvensis.* To this grass and other rough species, as rushes, sedges, &c., the name *riasg* is given.

> "Cuiseagan-a's *riasg*
> Chinneas air an t'sliabh."—M'INTYRE.

Aira flexuosa—Waved hair-grass. Gaelic: *mòin-fheur*, peat-grass. It grows generally in peaty soil.

CRYPTOGAMIA.

FILICES.

Filices — Ferns. Gaelic: *raineach*, *roineach.* Irish: *raith*, *raithne*, *raithneach*; also, *reathnach.* Welsh: *rhedyn.* Perhaps formed from *reath*, a revolution or turning about, or *rat*, motion,

from the circinate evolution of the young fronds—an essential characteristic of ferns.

Polypodium vulgare — *Cloch-reathneach* (Armstrong), the stone-fern; *cloch*, a stone. It is common on stone-walls, stones, and old stems of trees. *Ceis-chrànn.* Irish: *céis chrainn*,—*cis*, a tax, tribute, and *crànn*, a tree, because it draws the substance from the trees; or from the crosier-like development of the fronds, like a shepherd's crook, "*cis-cean.*" *Sgèamh na cloch. Sgeamh* means reproach, and *sgiamh* or *sgèimh*, beauty, ornament; "*na cloch*," of the stones. The second idea seems, at least in modern times, to be more appropriate than the first, especially as the term was applied to the really beautiful oak-fern.

"Mu chinneas luibhean 'us an *sgèimh.*"

How the flowers and the ferns grow.

Reidh raineach,—*reidh*, smooth, plain. *Raineach nan crag*, the rock-fern. *Mearlag* (in Lochaber), perhaps from *meàr* or *meùr*, a finger, from a fancied resemblance of the pinnules to fingers.

P. Dryopteris—Oak-fern. Gaelic and Irish: *sgeamh dharaich* (O'Reilly), the oak-fern. No Gaelic name is recorded for the beech-fern (*P. Phegopteris*).

Blechnum spicant—Hard fern. The only Gaelic name supplied for this fern is "*an raineach chruaidh*," hard fern. It is impossible to say whether this is a translation or not. Being a conspicuous and well-defined fern, it must have had a Gaelic name.

Cystopteris fragilis—Bladder-fern. Gaelic: *friodh raineach*, or *frioth fhraineach*,—"*frioth*," small, slender. The tufts are usually under a foot long; stalks very slender.

Polystichum aculeatum, lobatum, and **angulare** — Gaelic: *ibhig* (Rev. A. Stewart), the name by which the shield-ferns are known in the West Highlands. This name may have reference to the medicinal drinks formerly made from the powdered roots being taken in water as a specific for worms (see *L. filix-mas*), from *ibh*, a drink. French: *ivre.* Latin: *ebrius.*

P. Lonchitis—Holly fern. Gaelic: *raineach-chuilinn* (Stewart), holly fern, known by that name in Lorne; also *còlg raineach*, in Breadalbane and elsewhere. For *cuileann* and *còlg*, see *Ilex aquifolium.*

Lastrea Oreopteris—Sweet mountain fern. Gaelic: *crim-*

raineach (Stewart). Most likely from *creim*, a scar, the stalks being covered with brown scarious scales. In some places the name *fàile raineach* is given, from *fàile*, a scent, a smell. This species may be easily distinguished by the minute glandular dots on the under side of the fronds, from which a fragrant smell is imparted when the plant is bruised.

L. filix-mas—Male fern. Gaelic and Irish: *marc-raineach*, horse-fern. *Marc.* Welsh: *march.* Old High German: *marah*, a horse. This fern has been celebrated from time immemorial as a specific for worms; the powdered roots, taken in water, were considered an excellent remedy. Irish: *raineach-madra*, dog-fern.

L. spinulosa, and the allied species *dilatata* and *Fœnisecii*, are known by the name *raineach nan rodainn*, from Latin, *rodo.* Sanscrit: *rad*, to break up, split, gnaw,—the rat's fern, in Morven, Mull, and Lewis. "Dr Hooker is mistaken as to the range of this fern, as it is extremely abundant here, at least in the form of *dilatata*"—(Lewis Correspondent).[1] The name rat's fern, from its commonness in holes, and the haunts of rats.

Athyrium filix-fœmina—Lady-fern. Gaelic and Irish: *raineach Mhuire*, Mary's fern,—*Muire*, the Virgin Mary, Our Lady; frequently occurring in plant-names in all Christian countries.

Asplenium.— From Greek: *a*, privative, and *σπλην*, the spleen.

A. Trichomanes—Black spleenwort. Gaelic and Irish: *dùbh chàsach*, dark-stemmed. *Lus na seilg*, from *sealg*, the spleen. This plant was formerly held to be a sovereign remedy for all diseases of this organ, and to be so powerful as even to destroy it if employed in excess. *Lus a chorrain. Ùrthàlmhan* (O'Reilly),—*ùr*, green, and *talamh*, the earth. As *dùbh chàsach* is the common name for *Trichomanes*—probably *ùr thalmhan* was applied to *A. viride. Failtean fionn*, see *A. capillus-Veneris.*

A. Ruta-muraria—Rue fern. Gaelic: *rue bhallaidh*, wall-rue.

A. Adiantum-nigrum—Gaelic: *an raineach uàine*, the green

[1] My well-informed correspondent also remarks: "I may mention one or two other plants, regarding which Dr Hooker's information is slightly out. His *Salix repens* is very common here and in Caithness, though absent in at least some parts further south. *Utricularia minor* can easily be found in quantities near the Butt of Lewis; and *Scutellaria minor*, which he allows no further than Dumbarton, grows equally far north, although all I am aware of could be covered by a table-cloth. Another interesting plant, *Eryngium maritimum*, grows in a single sandy bay on our west coast."

fern. Irish : *craobh mac fiadh* (O'Reilly),—*craobh*, a tree, a plant, and *muc fiadh*, wild pig or boar.

Scolopendrium vulgare—Hart's-tongue fern. Gaelic : *creamh mac-fiadh*, or in Irish, *creamh nam muc fiadh*. Wild boar's wort, a name also given to Asparagus.

Pteris aquilina—Common brake. Gaelic : *an raineach mhòr*, the large fern. *Raith* (see *Polypodium*). The brake is used for various purposes by the Gaels, such as for thatching cottages ; and beds were also made of it. It is esteemed a good remedy for rickets in children, and for curing worms.

Adiantum capillus-Veneris—Maiden-hair fern. Gaelic : *failtean fiònn* (Armstrong), from *falt*, hair, and *fiònn*, fair, resplendent. This fern is only known in the Highlands by cultivation. This name is frequently given to *Trichomanes* (*dùbh chàsach*) improperly.

Ophioglossum—From Greek : ὄφις, a serpent, and γλώσση, a tongue. The little fertile stalk springing straight out of the grass may not inaptly be compared to a snake's tongue.

O. vulgatum—Adder's tongue. *Lus na nathraith* (M'Kenzie), the serpent's weed. *Teanga a' nathrach*, the adder's tongue. Welsh : *tafad y neidr*, adder's tongue. In the Western Highlands, *beasan* or *feasan* (Stewart).

Osmunda—Osmunder, in Northern mythology, was one of the sons of Thor (Gaelic : *Tordan*, the thunderer, the Jove of the Celts ; *os* in Celtic, over, above, upon, and *munata*, a champion, in Irish),—said to have received the name on account of its potential qualities in medicine.

O. regalis—Royal fern. Gaelic : *raineach rioghail*, kingly fern ; *righ raineach*, royal fern. In Ireland it is called bog-onion.

Botrychium lunaria—Moonwort. Gaelic : *luan lus*, moonwort. Welsh : *y lleûadlys*,—*lleuad*, moon. "*Luan*, the moon, seems a contraction of *luath-an*, the swift planet"—Armstrong. But rather from Sanscrit : *luach*, light. Latin : *luna*. French : *lune*. *Déur lus* and *dealt lus* (Stewart),—*déur*, a tear, a drop of any fluid, and *dealt*, dew. This plant was held in superstitious reverence among Celtic and other nations. Horses were said to lose their shoes where it grew. "On Sliabh Riabhach Mountain no horse can keep its shoes ; and to this day it is said that on Lord Dunsany's Irish property there is a field where it is supposed all live stock lose their nails if pastured there." "A Limerick story refers to a man in Clonmel jail who

could open all the locks by means of this plant." The same old superstition still lingers in the Highlands—

> There is an herb, some say whose virtue's such
> It in the pasture, only with a touch,
> Unshoes the new-shod steed.

"On White-Down, in Devonshire, near Tiverton, there was found thirty horse-shoes pulled off from the feet of the Earl of Essex his horses, being there drawn up into a body, many of them being but newly shod, and no reason known, which caused much admiration; and the herb described usually grows upon heaths."—CULPEPPER.

Ferns frequently formed components in charms.

> "Faigh naoi gasan rainaich
> Air an gearradh, le tuaigh,
> A's tri chnaimhean seann-duine
> Air an tarruinn à uaigh," &c.—M'INTYRE.
>
> Get nine branches of ferns
> Cut with an axe,
> And three old man's bones
> Pulled from the grave.

"Fern seeds were looked upon as magical, and must be gathered on Midsummer eve."—Scottish and Irish Superstition.

(*To be continued.*)

PRELIMINARY LIST OF THE FLOWERING PLANTS AND FERNS OF PERTHSHIRE.[1]

BY F. BUCHANAN WHITE, M.D., F.L.S.

(*Continued from page* 240.)

POLYGONACEÆ.

CCXXXIII. POLYGONUM L.

499. Bistorta L. Rare, and always an escape.

500. Viviparum L. Local in the Lowlands; common in the Highlands.

501. Amphibium L. Common. The two so-called varieties, *aquaticum* and *terrestre*, are only extreme forms depending on situation.

502. Lapathifolium L. Less common, or overlooked.

[1] On page 232, No. 340, for Var. *spathulata* Presl., read Var. *canescens* Jord.

503. Persicaria L. Common.
504. Hydropiper L. Common.
505. Aviculare L. Common.
506. Convolvulus L. A weed of cultivation.

CCXXXIV. RUMEX L.

507. Obtusifolius L. Common.
508. Acutus L. Local, but probably passed over.
509. Crispus L. Common.
510. Sanguineus L.
    Var. *viridis* Sibth. Local (?)
    Var. *sanguineus*. Rare, and only an escape.
511. Conglomeratus Murray. Local (?)
512. Hydrolapathum Huds. Elcho, Meikleour, and Pond of Drummond.
513. Aquaticus L. Common.
514. Alpinus L. Naturalised in several places.
515. Acetosa L. Common.
516. Acetosella L. Common.

CCXXXV. OXYRIA Hill.

517. Reniformis Hook. Not uncommon on the hills.

CHENOPODIACEÆ.

CCXXXVI. CHENOPODIUM Tourn.

518. Album L. A common weed.
519. Bonus-Henricus L. Naturalised in several places.

CCXXXVII. ATRIPLEX Tourn.

520. Patula L. A common weed. One or two maritime species occur, but require investigation. They include *littoralis* L., and perhaps *deltoidea* Bab.

THYMELACEÆ.

CCXXXVIII. DAPHNE L.

521. Laureola L. Glencarse Hill, but probably not native.

EUPHORBIACEÆ.

CCXXXIX. EUPHORBIA L.

522. Helioscopia L. A weed of cultivation.
523. Peplus L. A garden-weed, and not everywhere.
524. Exigua L. Very local. Carse of Gowrie.
525. Lathyris L. Sporadic.

CCXL. MERCURIALIS Tourn.

526. Perennis L. Common.
527. Annua L. Reported from South-west Perthshire.

URTICACEÆ.

CCXLI. URTICA Tourn.

528. Urens L. Only near houses, and rather local.
529. Dioica L. Common.

CANNABACEÆ.

CCXLII. HUMULUS L.

530. Lupulus L. In a few places, where doubtless planted.

ULMACEÆ.

CCXLIII. ULMUS L.

531. Montana Sm. Rare in a wild state, as in Glen Tilt.

SALICACEÆ.

CCXLIV. POPULUS Tourn.

532. Tremula L. Local, but not uncommon, and native.
Var. *villosa* Bosw. The common form.
Var. *glabra* Bosw. Not rare.

CCXLV. SALIX Tourn.

533. Triandra L. Not common. Planted (?)
534. Undulata Ehrh. Abernethy, probably planted.
535. Pentandra L. Not very common.
536. Fragilis L. Not uncommon.
Var. *decipiens* Hoffm. Woody Island.
537. Caprea L.
i. Sub-species caprea. Common.
Var. *sphacelata* Sm. Highlands.
ii. Sub-species cinerea L. Common.
Var. *aquatica*. Common.
Var. *oleifolia* Sm.
538. Aurita L. Common.
539. Repens L. Common.
Var. *fusca* L.
Var. *argentea* Sm.
Var. *incubacea* Bosw. (= S. ambigua Ehr.)
Var. *spathulata* Willd.
are among the varieties.

540. Nigricans Sm. Common, more especially on the hills.
The following varieties occur :—
Var. *Andersoniana* Sm.
Var. *Forsteriana* Sm.
Var. *alpestris* Donn.
Var. *damascena* Forbes.
Var. *petræa* Anders.
Var. *arbuscula* Hook.
Var. *hirta* Sm.

541. Phylicifolia L. Not uncommon on the hills.
The following forms are reported from Breadalbane :—
Var. *Wulfeniana* Sm.
Var. *laxiflora* Borr.
Var. *tetrapla* Walker.
Var. *Borreriana* Sm.
Var. *phillyreæfolia* Borr.
Var. *tenuior* Borr.
Var. *tenuifolia* Borr.
Var. *Weigeliana* Willd.
Var. *radicans* Sm.

542. Viminalis L. Not uncommon.
Var. *Smithiana* Willd. In several places.
Var. *ferruginea* G. Anders. In several places.

543. Lanata L. Reported from Meal Cuachlar in Breadalbane.

544. Lapponum L. Not uncommon on the richer hills.
Var. *arenaria* Sm. Breadalbane, &c.
Var. *Stuartiana* Sm. Breadalbane, &c.

545. Myrsinites L. Breadalbane.
Var. *procumbens* Forbes.
Var. *arbutifolia* Sm.
Var. *serrata* Bosw.

546. Arbuscula L. Breadalbane, Rannoch, and Athole.
The following varieties occur :—
Var. *venulosa* Sm. Breadalbane.
Var. *prunifolia* Sm. Breadalbane.
Var. *vacciniifolia* Walker. Breadalbane.
Var. *carinata* Sm. Rannoch.

547. Herbacea L. On many of the richer hills.

548. Reticulata L. Breadalbane.

549. Purpurea L. Not uncommon in the Lowlands.
The hybrid *S. rubra* Huds. and var. *helix* L. also occur; and *rubra* at least is not uncommon.

CUPULIFERÆ.

CCXLVI. QUERCUS Tourn.

550. Robur L. Not very common in a native state.
i. Sub-species sessiliflora Sm. Not uncommon.
ii. Sub-species pedunculata Ehr. Less common.

CCXLVII. CORYLUS Tourn.

551. Avellana L. Common.

BETULACEÆ.

CCXLVIII. BETULA Tourn.

552. Alba L.
i. Sub-species verrucosa Ehr. Commonest in the Highlands.
ii. Sub-species glutinosa Fr. Commonest in the Lowlands.

553. Nana L. Very local.

CCLXIX. ALNUS Tourn.

554. Glutinosa L. Common.

MYRICACEÆ.

CCL. MYRICA L.

555. Gale L. Common in the Highlands, rare in the Lowlands.

CONIFERÆ.

CCLI. PINUS L.

556. Sylvestris L. Native in several localities in the Highlands.

CCLII. JUNIPERUS L.

557. Communis L. Not uncommon, but local in the Highlands; rare in the Lowlands.
Var. *nana* Willd. On the hills.

CCLIII. TAXUS Tourn.

558. Baccata L. The Fortingal yew, supposed to be the oldest (3500 years) tree in Europe, is, along with a younger plant beside it, the only native representative of the species now in Perthshire.

HYDROCHARIDEÆ.

CCLIV. STRATIOTES L.

559. Aloides L. Rare, and only naturalised.

CCLV. ANACHARIS Rich.

560. Canadensis Planch. Common.

ORCHIDACEÆ.

CCLVI. ORCHIS L.

561. Mascula L. Common.
562. Latifolia L.
i. Sub-species latifolia. Common.
ii. Sub-species incarnata L. Local.
Var. *angustifolia* R. Very local.
563. Maculata L. Common.

CCLVII. GYMNADENIA Br.

564. Conopsea Br. Local, but not uncommon.

CCLVIII. HABENARIA Br.

565. Bifolia Br.
i. Sub-species bifolia. Not uncommon.
ii. Sub-species chlorantha Bah. Not uncommon.
566. Viridis Br. Local, but not uncommon.
567. Albida Br. Local, and not very common. Almost confined to the Highlands.

CCLIX. EPIPACTIS Rich.

568. Latifolia Sw. Local, and not common.
569. Palustris L. Very rare and local. Pitlochry and Monteith.

CCLX. CEPHALANTHERA Rich.

570. Ensifolia Rich. Very rare and local. Methven, &c.

CCLXI. NEOTTIA L.

571. Nidus-avis L. Very local, and not common, but widely distributed.

CCLXII. LISTERA Br.

572. Ovata Br. Rather local.
573. Cordata Br. Not very common, but widely distributed.

CCLXIII. GOODYERA Br.

574. Repens Br. Very local. Dupplin and Scone.

CCLXIV. MALAXIS Sw.

575. Paludosa Sw. Very local and rare. Glenlyon, Rannoch, &c.

CCLXV. CORALLORHIZA Haller.

576. Innata Br. Very local and rare. Methven Wood, Scone, and Rannoch.

IRIDACEÆ.

CCLXVI. IRIS L.

577. Pseudacorus L. Common.

ALISMACEÆ.

CCLXVII. ALISMA L.

578. Plantago L. Common.
579. Ranunculoides L. Rare. Methven, Stanley, &c.
Var. *repens* Dav. Near Doune.

CCLXVIII. TRIGLOCHIN L.

580. Palustre L. Common.
581. Maritimum L. Lower part of the Tay.

CCLXIX. SCHEUCHZERIA L.

582. Palustris L. White Myre at Methven, but perhaps extinct.

CCLXX. BUTOMUS L.

583. Umbellatus L. Marshy sides of the Tay below Perth. Perhaps native (?)

NAIADACEÆ.

CCLXXI. POTAMOGETON L.

584. Natans L.
i. Sub-species natans. Common.
ii. Sub-species polygonifolius Pourr. Common, more especially in the Highlands.
585. Rufescens Schrad. Not uncommon.
586. Heterophyllus Schreb.
i. Sub species heterophyllus. Local.
ii. Sub-species nitens Web. Rivers Tay and Earn.
Var. *curvifolius* Hartm. Fingask Loch.
587. Lucens L. Local.
588. Zizii M. and K. Loch Cluny, Loch of the Lows, and Ardblair Loch.
589. Prælongus Wulf. Local.
590. Perfoliatus L. Common.
591. Crispus L. Not uncommon.

592. Compressus L. (= zosteræfolius Schum.) Perthshire (?)
593. Obtusifolius M. and K. Local.
594. Pusillus L. Local.
Var. *tenuissimus* Fr. Local.

CCLXXII. NAIAS L.

595. Flexilis Rostkov. Cluny, Marlee, White, and Fingask Lochs.

LILIACEÆ.

CCLXXIII. PARIS L.

596. Quadrifolia L. Very local.

CCLXXIV. CONVALLARIA L.

597. Majalis L. Very local. Certainly native in some of the localities, as Methven and Pitlochry.

CCLXXV. POLYGONATUM Tourn.

598. Verticillatum All. Very local. Blairgowrie, Reichip, Dunkeld, and Blair Athole.
599. Multiflorum All. Rare, and probably only naturalised.

CCLXXVI. SCILLA L.

600. Nutans Sm. Common.

CCLXXVII. ALLIUM L.

601. Vineale L. Rare.
602. Scorodoprasum L. Lowlands. Local.
603. Oleraceum L. Lowlands. Local.
603^2. Carinatum L. Banks of the Tay below Perth.
604. Ursinum L. Local, but not uncommon.

CCLXXVII. GAGEA Salish.

605. Lutea Ver. Rare. Glenalmond and Pitlochry.

CCLXXIX. TOFIELDIA Huds.

606. Palustris Huds. Local. On the Silurian Hills.

CCLXXX. NARTHECIUM Huds.

607. Ossifragum Huds. Common.

JUNCACEÆ.

CCLXXXI. JUNCUS L.

608. Communis Meyer.
i. Sub-species effusus L. Common.
ii. Sub-species conglomeratus L. Common.
609. Glaucus Ehrh. Not uncommon in the Lowlands.

610. Triglumis L. Common on the hills.
611. Biglumis L. Very rare. Breadalbane.
612. Castaneus L. Very rare. Breadalbane.
613. Trifidus L. On the hills, but local.
614. Squarrosus L. Common.
615. Compressus Jacq.
Sub-species Gerardi Lois. Lower part of the Tay.
616. Articulatus L.
i. Sub species articulatus. Common.
ii. Sub-species supinus Mœnch.
Var. *uliginosus* Sibth. Common.
Var. *subverticillatus* Wulf. Not uncommon.
iii. Sub-species lamprocarpus Ehr. Not uncommon.
617. Bufonius L. Common.

CCLXXXII LUZULA D. C.

618. Sylvatica Bich. Common.
619 Albida D. C. Naturalised at Luncarty and Dunkeld.
L. nivea Desv. has been found once near Auchterarder.
620. Pilosa Willd. Rather local.
621. Campestris Willd.
i. Sub-species campestris. Common.
ii. Sub-species multiflora Lej. Common.
622. Spicata D. C. Common on the hills, but somewhat local.

AROIDEÆ.

CCLXXXIII. ARUM L.

623. Maculatum L. Naturalised in a few places.

LEMNACEÆ.

CCLXXXIV. SEMNA L.

624. Minor L. Local.
625. Trisulca L. Moncreiffe, but perhaps introduced.

TYPHACEÆ.

CCLXXXV. SPARGANIUM L.

626. Ramosum Huds. Common.
627. Simplex Huds. Not common.
628. Natans L.
Var. *affine* Schn. Rare.
Var. *minimum* Fr. Not uncommon.

CCLXXXVI. TYPHA L.

629. Latifolia L. Local, and not common.

CYPERACEÆ.

CCLXXXVII. SCIRPUS L.

630. Lacustris L.
   i. Sub-species lacustris. Local.
   ii. Sub-species Tabernæmontani Gmel. Common on the lower parts of the Tay and Earn.
631. Maritimus L. Lower part of the Tay.
632. Sylvaticus L. Local. Banks of the Tay, &c.

CCLXXXVIII. ISOLEPIS Br.

633. Setacea Br. Local, but not uncommon.
634. Fluitans Br. Not common.

(*To be continued.*)

NOTICES OF NEW BOOKS.

A Pocket Guide to British Ferns. By M. S. Ridley. London: David Bogue. 1881.

Ferns seem to be the most popular of all "wild plants." People that consider it beneath their dignity to look at any flower but a garden one, will condescend to take, or affect, an interest in Ferns, if these are what they are pleased to call "rare." Hence of the "writing of books" on Ferns "there is no end." This new candidate for the support of the Fern-loving public is intended to afford to its readers a work which gives the *distinctive specific* characters apart from the full description. While in most cases doing this satisfactorily, it will, we think, also do good by teaching the reader how much better it is to use technical botanical language (that is, words which have a definite and precise meaning) than the slipshod style in which many more pretentious works are written. It must at the same time be noted that full explanation is given of every technical term that is employed.

Illustrations of British Fungi. By M. C. Cooke. London and Edinburgh: Williams & Norgate.

Those who are acquainted with Dr Cooke's 'Mycographia seu Icones Fungorum,' will welcome 'Illustrations of British Fungi,' by the same author, now in course of publication. The former work was confined to Discomycetes, and contains illustrations of Morchella, Gyromytra, Helvella, Verpa, Cidaris, Leotia, Mitrula, Spathularia, Geoglossum, Wynnea, and Peziza. It contains 113 carefully executed plates, including 406 coloured figures, with descriptive letterpress.

The 'Illustrations' now being issued contain figures of Hymenomycetes. The work is intended to serve as an 'Atlas to the Handbook of British Fungi.' Six numbers have been issued, containing 100 plates. In the case of the smaller Agarics, a single plate will contain figures of more than one species.

The sub-genera of Agaricus already represented, though not yet completed, are Amanita, Lepiota, Armillaria, Tricholoma, and Clitocybe. The numbers which have been issued warrant the assertion that the work will form one of the most valuable of recent contributions to mycological illustrations. The plates are executed by the process known as chromo-photo-lithography. The figures are photographed on stone from the original drawings. In this way every line and feature of the original are reproduced without the intervention of an artist; and thus accuracy in details, such as could scarcely be attained by the mechanical work of one unacquainted with essentials or non-essentials, is secured. The figures are printed in colours by the author's directions, and the ground of each plate is delicately tinted. In addition to the centre figures, sectional outlines of each plant are given, revealing internal characters—such as structure of pileus, form and attachment of gills, and habit of stem.

From personal communication with the author — especially regarding species which have been described in "Mycologia Scotica"—we can vouch for the extreme care which he bestows upon the plates, in securing both accurate delineation and lifelike colouring. It may be stated, that the Rev. M. J. Berkeley has placed at Dr Cooke's disposal a large number of his original drawings, which will greatly enrich the work.

Having regard to its scientific value, the work is wonderfully moderate in price; and it is to be hoped that a wide circulation will secure for it the encouragement which it so well merits. It will be for the material interest of a limited number of subscribers to make immediate application to the Author, 146 Junction Road, London, N.

"The Victor overthrown"?—The voracity of the Fishing Frog (*Lophius piscatorius*) is well known. The following instance will sustain its notoriety:—A gentleman residing in the N.W. of Shetland—at "grey Hillswick," as Sir Walter in the 'Pirate' sings—observed on 21st October last a somewhat unusual object lying at the water's edge, ebb tide, on Turness (Thor's Headland). On approaching it he found it to be a Fishing Frog—in length 5 feet 8 inches, breadth 2 feet 3 inches, and width of gape 2 feet. It was hauled to the green bank and opened up, when, to his surprise, he discovered a fine specimen of the great black-backed Gull (*Larus marinus*) fairly ensconced in the stomach (not in the cavity of the mouth), without a feather ruffled or its natural tints of colour faded: a small, fresh, bright-eyed whiting was lying close by the bill of the gull. No other food was seen in the Frog's stomach. The distinction between the two black-backed Gulls was well known to him and to others who saw this bird. Its size was 5 feet 1 inch from tip to tip of wings, and from end of the tail to crown of the head 2 feet 5 inches. The fresh appearance, both in fish and bird, showed that neither of them had been long dead; yet there was a pretty strong suspicion that, by swallowing the latter, the former came to its end. The gull might have been either floating dead on the tide, or wading in search of food, when its body was grasped by the man-trap-like jaws of the frog.—G. Gordon, The Manse, Birnie, Elgin, *10th January* 1882.

CHARLES ROBERT DARWIN.

ON the 19th of April went to his rest one whose intellect has revolutionised science and scientific thought, and who, as a naturalist, has never been surpassed, and probably never equalled.

Brilliant in conception, indefatigable in collecting facts, most cautious in elaborating the theories with which his name will ever be associated, there is no point in which the character of Charles Darwin can be considered without eliciting the most profound admiration.

It is unnecessary here to dilate on a subject regarding which all the civilised nations have united in testifying their appreciation. It is merely our duty to lay most humbly one stone on his cairn. He has gone from among us, but his influence will endure for all time.

ZOOLOGY.

THE LEPIDOPTERA OF ORKNEY, SHETLAND, AND THE OUTER HEBRIDES.

By F. BUCHANAN WHITE, M.D., F.L.S.

THAT the greater number of British naturalists who devote any attention to insects should confine themselves to one order only, and ignore everything but what is lepidopterous, is a fact that has often been deplored; and though in very many respects this restriction of attention to butterflies and moths only is open to just condemnation, still it is not altogether without its redeeming features. For in consequence of the great demand for lepidoptera, it is worth the while of professional collectors—those who make a livelihood by collecting

insects for sale—to visit fresh fields and pastures new in the hope of finding species or varieties hitherto undiscovered in this country; and hence districts which, from lack of zeal on the part of the amateur—who, when he goes collecting, seems rather to prefer the certainty of a known to the uncertainty of an unknown locality, and to take *omne ignotum pro horrifico*, —have been left unexplored, have their lepidopterous fauna more or less thoroughly investigated.

Amongst localities thus visited within the last few years are the Orkney Isles, the Shetland Isles, and the Outer Hebrides. It is true that these were not altogether unexplored by lepidopterologists, but much remained (and probably still remains) to be done, and a considerable amount of information has now been obtained.

The fauna and flora of islands—considered either apart by themselves or in relation to the productions of the nearest continent or larger island—embrace subjects full of interest in many respects, — an interest which increases with the distance of the island from other land. Even Britain itself, closely situated as it is to continental Europe, has a fauna and flora which, considered from the insular point of view, have many points of interest. It was therefore to be expected—and this expectation has not been disappointed—that the islands which lie off the British coasts would present, as regards their fauna, still more remarkable features.

The materials for the following paper have been mostly taken from articles by Mr Jenner Weir in 'The Entomologist' (vol. xiii. pp. 249 and 289; xiv. pp. 218 and 278; and xv. p. 1.), founded on collections made for Messrs Meek and M'Arthur in the Island of Hoy, in Orkney, the Mainland in Shetland, and the Lewis in the Outer Hebrides.

Hoy is about eight miles from the coast of Caithness, and geologically belongs to the Old Red Sandstone formation. The average temperature of the Orkneys varies from 38° in February to 55° 14′ in July; and the rainfall is about 37.22 inches.

The Shetlands (excluding Fair Isle) are separated by about 60 miles of sea from the Orkneys,—Lerwick, the chief town, being 171 miles from Wick. The geological formation is chiefly gneiss and granite.

The Outer Hebrides are similar in geological formation to the Shetlands, but are two degrees farther south and five degrees

west of them; and, moreover, are much nearer the mainland of Scotland.

All the islands are now destitute of trees, except when attempts have been made at plantations, which, in the Lewis, have been done with more or less success.

The following is a list of the species recorded in Mr Jenner Weir's lists, with the addition of some species previously recorded in this Magazine. To the localities of the latter an * is affixed. When no locality is mentioned, the species has been found in all three groups of islands.

Pieris brassicæ. Orkney, *Outer Hebrides.
,, rapæ. *Orkney.
Chortobius davus.
Pyrameis cardui. *Orkney, Shetland.
,, atalanta. *Orkney, Shetland.
Lycæna icarus. Orkney, Outer Hebrides.
Acherontia atropos. Orkney, *Shetland.
Sphinx convolvuli. *Orkney.
Macroglossa stellatarum. *Orkney.
Hepialus humuli.
,, velleda.
,, lupulinus. Orkney.
Saturnia pavonia. *Orkney.
Bombyx quercus. *Orkney, *Outer Hebrides.
Phragmatobia fuliginosa. *Orkney.
Arctia caja. *Orkney.
Nemeophila plantaginis.
Cymatophora Or. Outer Hebrides.
Dasypolia templi. *Shetland.
Hydræcia nictitans. Orkney.
,, micacea. Orkney, Shetland.
Xylophasia rurea. Orkney, Outer Hebrides.
,, polyodon.
Charæas graminis. *Orkney, Shetland.
Celœna Haworthii. Orkney, Shetland.
Miana fasciuncula. Shetland.
,, furuncula. Orkney.
Apamea oculea. Orkney.

(*To be continued.*)

PHYTOLOGY.

NOTES ON THE GENUS USNEA, WITH DESCRIPTIONS OF NEW SPECIES.

By JAMES STIRTON, M.D., F L.S.

SINCE the publication in this journal for July 1881 (vol. vi. p. 99) of a paper on the genus *Usnea*, I have received numerous additions to my stock from various parts of the world. Pursuing my investigations in the direction indicated in the paper, I have been led to attach considerable importance to the relative thickness and density of the central axis, as well as to the corresponding characters in the medullary fibres. In the latter the terms compact and arachnoid and loosely arachnoid are employed, and sufficiently explain themselves. In the group of which *U. articulata* may be reckoned the centre, the medullary fibres reach their minimum density, and often betray themselves as merely scattered, somewhat radiating, threads connecting the dense axis with the subcortical compact layer. Between such extremes there is considerable diversity, but meanwhile I shall confine myself to the terms compact and arachnoid.

The colour of these medullary fibres varies from white through yellow to red or reddish purple, while in a few instances the surface of the axis assumes a rufescent tint.

Hitherto I have seen no valid reasons for mistrusting the indications afforded by chemical tests in the discrimination of species. It is true that the external characters of lichens often manifest wonderful similarities in instances where such tests indicate differences of physical constitution, but the same is equally true of gonidia and gonimia in *Stictæ* and *Stictinæ*, &c., as well as of spores in another direction. Nay, spermogonia afford differences in the life-history of lichens of sufficient importance to warrant, according to some authors, valid grounds for *generic* distinction. Our knowledge of the vegetative and reproductive processes of this class of plants is in much too rudimentary a condition for us to assign to any means of diag-

nosis its proper place or even significance; nor can we afford to overlook or even neglect any, provided the results by it are definite: and such is true of chemical tests. The reactions by K and C as regards *Usnea* are sharply defined so far as they go; and the same is true of I, although its reactions are occasionally somewhat troublesome to develop, owing, probably, to the gelatine being contained in cell-walls not easily permeable by the solution employed. A little friction is generally quite sufficient to develop the characteristic colour; and in doubtful cases this should always be had recourse to before desisting from its application.

At this stage some alterations and modifications of parts of the first paper are necessary.

The *Usnea* alluded to at p. 107 of previous paper has peculiarities of constitution sufficient to entitle it to rank as a species.

Usnea fragilis sp. nov.—Thallus lutescenti-pallidus, robustus sed fragilis, erectus vel prostratus, divaricato-ramosus, supra densius ramulosus, fere fibrillosus, minute sed creberriter sorediosus; axis crassiusculus; fibrillæ medullares compactæ, interiores pallide citrinæ, exteriores purpurascenti-rubentes, I—, K fl. C aurantiacæ.

Ad arbores in Montibus Nilgherrensibus Indiæ Or., a Dre G. Watt lecta.

K causes the purplish-red colour of the medulla to disappear.

In *U. Thomsoni* of same paper, the axis is slender and the medullary fibres arachnoid; while in specimens collected by Dr G. Watt from the same range of mountains, the blackened tips of the ramules are, at times, scarcely perceptible.

Under *U. sublurida* lurk several species from various parts of the world, notably from South Africa and Australia. This group may be characterised by having red splatches pretty generally scattered over the surface of the stems and branches, while the external reactions of thallus. K— or faint yellow C yellow, are common to all. In Scottish specimens, the stems and main branches are nearly uniformly red, as stated in the diagnosis of *U. sublurida*, but the red patches are interrupted upwards, and, to this extent, the diagnosis requires modification.

Usnea maculata sp. nov.—Thallus rigidus erectus, varie ramosus sed plerumque fibrilloso-strigosus (ut in *U. hirta*), interdum

fibrillis fere evanescentibus ; axis centralis crassus pallidus, fibrillæ medullares compactæ albæ I— ; K—.

Prope Somerset Africæ australis (Prof. P. MacOwan et J. H. M'Lea).

Similis et arcte affinis *U. subluridæ.*

Usnea spilota sp. nov.—Similis præcedenti sed fibrillæ medullares I vinoso-violaceæ, K fl. dein rubentes.

King's Island, Queensland (coll. E. Spong, No. 193).

This is one of the extensive collections of lichens sent by Baron Ferd. von Müller of the Colonial Museum, Melbourne.

On the supposition that *U. plicata* (of which I possess specimens) gives negative reactions on the axis and medullary fibres by means of K and I, there is another from Ben Lawers which has different reactions, &c.

Usnea comosa sp. nov.—Similis *U. plicatæ* et longit. interdum fere sesquipedalis, sed fibrillæ medullares K fl. dein aurantiaco-rubentes vel etiam rubentes. Axis mediocris pallidus, fibrillæ medullares minus compactæ, interdum fere arachnoideæ.

Ben Lawers Scotiæ et prope Moffat (Rev. G. MacConochie).

Usnea nitida sp. nov.—Thallus elongatus (longit. usque 7 pollicum attingens) acute et longe ramosus, pendulus sed firmus, *nitidus*, cylindricus, creberriter nigro-articulatus ; axis mediocris vel crassiusculus, fibrillæ medullares K fl. ; I—.

In monte Lawers Scotiæ.

The habit of this lichen is that of *U. plicata*, although more rigid. The articulations are frequent, while the stems and branches are always blackened at the articulations ; elsewhere they are smooth, even somewhat glistening, and cylindrical, not inflated as in *U. articulata.*

Usnea subfloridana sp. nov.—Similis omnino *U. floridæ* sed fibrillæ medullares K flaventes ; I—. Soredia K fl.

Apud Ben Lawers Scotiæ.

Usnea Pinkertoni (Strn.)—Similis *floridæ* sed pendula et densissime et intricate ramosa (ramulis longis, filiformibus undulatis); receptacula apotheciorum dense et longe fibrillosa, fibrillis intricate ramosis, longitudine interdum sesquipolli-

caribus. Sporæ 8næ incolores ellipsoideæ, simplices, .008-.01 × .006-.0075 mm. Axis centralis crassitudinis mediocris, pallidus; fibrillæ medullares compactæ, K fl. dein rufo-aurantiacæ, serius ferrugineo-rubentes.

In Ægypto prope Grand Cairo, lecta a Dre Pinkerton.

Usnea lurido-rufa (Strn.) requires additional description.

Similis *U. hirtæ*, rigida, pauci- sed divaricato-ramosa, lurido-rufa, spinuloso-ramulosa, alt. 1-2-pollicaris. Axis centralis, tenuis; fibrillæ medullares laxe arachnoideæ, K fl. dein rubentes, I—.

U. lurido-rufa (Strn.)

* *pallida* subsp. nov.—Similis præcedenti sed thallo albido-flaves-cente vel pallido-cinerascente. Sporæ, .008-.01 × .006-0075 mm.

Prope Carter River Australiæ (Carter).

Usnea elegans sp. nov. described in Transactions of Royal Society of Victoria (9th September 1880). The following is the description there given.

Thallus (K—C—) pallide flavescens, teres firmus, erectus (altit. 1-2 pollicaris), parcissime divisus, interdum simplex et tunc rigidus, undique densissime fibrillosus; axis medullaris gracilis fere filiformis (K—C—); apothecia concoloria vel pallidiora, terminalia, plana (latit. 6-13 mm.), receptaculo fibrilloso præsertim margine; sporæ 8næ incolores, ellipsoideæ vel late ellipsoideæ, simplices, .0085-.011 × .006-.008 mm. Iodo gel. hym. intense cær. dein obscurata.

Corticola in Gowrie Mountain, Darling Downs (coll. Bailey, No. 13).

Usnea consimilis sp. nov.—Similis præcedenti sed humilior, magis compacta ramis nonnihil arcuatis; axis centralis nonnihil crassior et fibrillæ medullares K fl. C fl. Sporæ, .009-.011 × .006-.007 mm.

In Australia (Rev. M. Anderson).

Usnea robusta sp. nov.—Thallus rigidus, robustus (crassit. basi 1-2 mm.) pallidus vel pallide cinerascens, divaricato-ramosus, crebre fibrillosus (ut in *hirta*) et papilloso-asper; axis crassiusculus pallidus, fibrillæ medullares compactæ K—,

I—. Sporæ 8næ incolores late ellipsoideæ, .012-.014 × .008-.011 mm.

In Himalaya (Sikkim), regione alpina, altit. 10,000 pedum (coll. Dris G. Watt, No. 7040).

Dr G. Watt, who is still botanising in the Himalayas, has sent home extensive collections of lichens. The genus *Usnea* seems to be largely represented there, and in splendid condition.

Usnea splendens sp. nov.—Similis *U. Thomsoni* et æque robusta; axis centralis mediocris pallidus; fibrillæ medullares albæ compactæ, I—, interiores K fl. dein rubentes cæteroquin non tinctæ. Sporæ, .012-.016 × .008-.011 mm.

Corticola in Himalaya (Tongloo) altit. 10,000 pedum, Dre G. Watt lecta (Nis 7057 and 7041).

Usnea dendritica sp. nov. — Similis *U. robustæ;* axis crassus, pallidus; fibrillæ medullares compactæ albidæ, I roseo-violaceæ, K fl. dein intense rubentes. Sporæ, .011-.014 × .0075-.01 mm.

Corticola prope Tongloo, altit. 10,000 pedum (Dr G. Watt).

Usnea arborea sp. nov.—Similis *U. Thomsoni* sed robustior necnon ramulis hinc inde nigro-apiculatis; axis pertenuis, superficie rufescens, fibrillæ medullares laxe arachnoideæ I intense vinose violaceæ dein sordide ferrugineæ, K fl. dein rubentes. Sporæ 8næ late ellipsoideæ, .012-.015 × .008-.011 mm.

Corticola in Himalaya (Sikkim) altit. 10,000 pedum (Dr G. Watt).

The reaction by Iodine, which affects the medullary fibres throughout their entire extent, as well as the surface of the axis, is instantaneous and intense, and turns ultimately to a dark fuscous colour. This is perhaps the most robust of the collection. In *U. subsordida* (Strn.), also, the axis is very slender, although pale on the surface, and the medullary fibres loosely arachnoid, which are tinged here and there a vinoso-violaceous colour with I. Accordingly *U. subsordida* may only be a stunted variety of *U. arborea.*

There is still another by Dr Watt from the Himalayas, which agrees in general aspect with *U. Thomsoni*, but the apothecia can scarcely be said to be terminal, inasmuch as there is always

(so far as I have seen) a deflexed terminal twig. The reaction by K on the medullary fibres, and even on a section of the axis itself, is peculiar, inasmuch as a purplish-red is produced without any preceding yellow reaction. This would seem to indicate an identity in composition of the substance giving rise to the colour with that in many of the Placodia, and as such is singular in members of the genus *Usnea*. The reaction is not seen throughout, but only on sections which show a yellowish colour within. In these circumstances I have considered it necessary to preface the diagnosis of this species (if indeed it is such) by these explanatory remarks. The plant seems in robust healthy life.

Usnea fruticosa sp. nov.—Similis *U. Thomsoni* sed receptacula apotheciorum apice rami plerumque appendiculata; axis gracilis pallidus, fibrillæ medullares laxe arachnoideæ I—, K hinc inde rubro-purpurascentes; annulus subcorticalis crassus corneus; sporæ .012-.017 × .008-.011 mm.

Corticola in Himalaya (Sikkim), altit. 12,000 pedum (Dr G. Watt), No. 7076.

Eumitria formosa sp. nov.—Similis *Eu. Baileyi* sed annulus subcorticalis flavescens nec rufescens; fibrillæ medullares K—C flaventes. Thallus extus K—C flavens.

In Montibus Australiæ "Peak Range" (Slatter). Ex hb. Baron F. v. Müller.

(*To be continued.*)

THE GAELIC NAMES OF PLANTS.

By JOHN CAMERON.

(*Continued from p.* 278.)

Lycopodiaceæ.

Lycopodium, from λύκος, a wolf, and ποῦς, a foot, from a fancied resemblance to a wolf's foot.

L. Selago—Fir club-moss. Gaelic: *garbhag an sleibhe*, the rough one of the hill. "The Highlanders make use of this plant instead of alum to fix the colours in dying. They also take an infusion of it as an emetic and cathartic; but it operates violently, and, unless taken in a small dose, brings on giddiness

and convulsions."—LIGHTFOOT. According to De Thèis, "Selago" is derived from the Celtic, *sel* (*scalladh*), sight, and *jach* (*ìoc*)—Greek: ἴασις—a remedy, being useful for complaints in the eyes.

Badge of Clan M'Rae.

L. clavatum, L. annotinum, and the rest of this family, are called *lus bhalgaire*, the fox-weed.

EQUISETACEÆ.

Equisetum, from *equus*, a horse, and *seta*, hair, in allusion to the fine hair-like branches of the species. Those plants of this order growing in watery places are called in Gaelic and Irish, *clois*, *clò uisge*, the names given to *fluviatile*, *palustre*, *ramosum;* and those flourishing in drier places, *earbuill-each*, horse-tail. *Clois* seems a contraction of *clò-uisge* (O'Reilly),—*clò*, a nail-pen or peg, perhaps suggested by the appearance of the fruiting stems, and *uisge*, water.

E. hyemale—Dutch rushes, shave-grass. Gaelic: *a bhiorag*, —*bìor*, a pointed small stick, anything sharp or prickly. Or water (*see* Appendix). This species was at one time extensively used for polishing wood and metal, a quality arising from the cuticle abounding in siliceous matter—hence the use made of the plant for scouring pewter and wooden things in the kitchen. A large quantity used to be imported from Holland, hence the name "Dutch rushes." Irish: *gadhar*, from *gad*, a withe, a twig. *Liobhag*, from *liobh*, smooth, polish. It grows in shady places, often near water. *Cuiridin* (O'Reilly), because growing on marshy ground.

BRYACEÆ.

Gaelic and Irish: *coinneach*, *caoineach*, from *caoin*, soft, lowly, &c. The principal economic use of moss to the ancient Gaels was in making bed-stuffs, just as the Laplanders use it to this day.

"Trì coilceadha na Feinne, bàrr gheal chrann, *coinneach*, 'us ùr luachair."
The three Fenian bed-stuffs—fresh tree-tops, *moss*, and fresh rushes.

Welsh: *mwswg*, moss.

Sphagnum—Bog-moss. Gaelic: *mointeach liath* (*moin*, peat, and *liath*, grey). From its roots and decayed stalks peat is formed. *Fionnlach*, from *fionn*, white. It covers wide patches of bog, and when full grown it is sometimes almost white; occasionally the plant has a reddish hue (*coinneach dhearg*, red moss). Martin refers to it in his 'Western Islands:' "When they are in any way fatigued by travel or otherways, they fail not to bathe their feet

in warm water wherein *red moss* has been boiled, and rub them with it on going to bed." This seems to be the only moss having a specific name in Gaelic, the rest going by the generic term *còinneach*.

> " Còinich uine mu 'n iomall,
> A's imadach seòrsa."—M'Intyre.
> Green moss around the edges,
> Many are the kinds.

Marchantiaceæ and Lichenes.

Marchantia polymorpha—Liverwort. Gaelic: *lus an àinean*, the liverwort. Irish: *cùisle aibheach*. Welsh: *llysiar afu—afu*, the liver. (Names derived from its medicinal effects on the liver.) Irish: *duilleog na crùithneachta*, the leaf of (many) shapes or forms. *Crùth*, form, shape, synonymous with Greek "*polymorpha*."

Peltidea canina—The dog-lichen. Gaelic: *lus ghonaich* (from *gòin*, wound; *gòineach*, agonising). This plant was formerly used for curing distemper and hydrophobia in dogs. The name "*gearan*, the herb dog's-ear," is given in the dictionaries. Probably this name was applied to this plant, meaning a complaint, a groan. Welsh: *gerain*, to squeak, to cry.

Lecanora.—Etymology of this word uncertain (in Celtic, *lech* or *leac* means a stone, a flag). Greek: λίθος.

L. tartarea—Cudbear. Gaelic and Irish: *corcar* or *corcur*, meaning purple, crimson. This lichen was extensively used to dye purple and crimson. It is first dried in the sun, then pulverised and steeped, commonly in urine, and the vessel made air-tight. In this state it is suffered to remain for three weeks, when it is fit to be boiled in the yarn which it is to colour. In numerous Highland districts many of the peasants get their living by scraping off this lichen with an iron hoop, and sending it to the Glasgow market. M'Codrum alludes to the value of this and the next lichen in his line

> " Spréigh air mointich,
> Or air chlachan."
> Cattle on the hills,
> Gold on the stones.

Parmelia saxatilis and **P. omphalodes**—Stone and heath parmelia. Gaelic and Irish: *crotal*. These lichens are much used in the Highlands for dyeing a reddish brown colour, prepared like *tartarea*. And so much did the Highlanders believe in the

virtues of *crotal* that, when they were to start on a journey, they sprinkled it on their hose, as they thought it saved their feet from getting inflamed during the journey. Welsh: *cen dù*, black head, applied to the species *Omphalodes.*

Sticta pulmonacea (*Pulmonaria* of Lightfoot) — Lungwort lichen. Scotch: *hazelraw.* Gaelic and Irish: *crotal coille* ("*coille*" of the wood), upon the trunks of trees in shady woods. It was used among Celtic tribes as a cure for lung diseases, and is still used by Highland old women in their ointments and potions.

According to Shaw, the term *grim* was applied as a general term for lichens growing on stones. Martin, in his description of his journey to Skye, refers to the superstition "that the natives observe the decrease of the moon for scraping the scurf from the stones." The two useful lichens, *corcur* and *crotal*, gave rise to the suggestive proverb—

"Is fhearr a' chlach gharbh air am faighear rud-eigin, na 'chlach mhìn air nach faighear dad idir."

Better the rough stone that yields something, than the smooth stone that yields nothing.

Fungi.

Agaricus—The mushroom. Irish and Gaelic dictionaries give *agairg* for mushroom. Welsh: *cullod.*

A. campestris—*Balg bhuachail* (*balg* is an ancient Celtic word, and in most languages has the same signification—viz., a bag, wallet, pock, &c. (Greek, *βολγυς*; Latin, *bulga*; Sax. *belge*; Ger. *bálg*), *buachail*, a shepherd). *Balg losgainn* (*losgann* a frog, and in some places *bàlg bhuachair*,—*buachar*, dung), *Leirin sugach.* In Aberfeldy *A. campestris* is called *bonaid bhuidhli smachain* (Dr M'Millan).

Boletus bovinus—Brown boletus. Gaelic and Irish: *bonaid an losgainn*, the toad's bonnet; and also applied to other species of this genus.

Tuber cibarium—Truffle. *Ballan losgainn*, Dr M'Millan, from *ball*, a ball, a tuber. These are subterraneous ball-like bodies, something like potatoes, found in woods, and probably applied to other species as well.

Lycoperdon giganteum—The large fuz-ball or devil's snuff-box. Gaelic and Irish: *beac*, *beacan*, from *beach*, a bee. This mushroom or puff-ball was used formerly (and is yet) for smothering bees: it grows to a large size, sometimes even two or three feet in circumference. *Trioman* (O'Reilly).

L. gemmatum—The puff-ball, fuz-ball. Gaelic and Irish: *caochag*, from *caoch* (Latin, *cæcus*), blind, empty, blasting. It is a common idea that its dusty spores cause blindness. *Bàlg smùid*, the smoke-bag; *bàlg séididh*, the puff-bag. *Bàlg peiteach bocan*, or *bochdan-bearrach* (*bochdan*, a hobgoblin, a sprite, and *bearr*, brief, short), and *bonaid an losgainn*, are frequently applied to all the mushrooms, puff-balls, and the whole family of the larger fungi.

Polyporus.—The various forms of cork-like fungi growing on trees are called *caise* (Irish), meaning cheese, and in Gaelic *spuing* or (Irish) *spuinc*, sponge, from their porous spongy character.

P. fomentarius and **P. betulinus**—Soft tinder. Gaelic: *cailleach spuinge*, the spongy old woman,—a corruption of the Irish *caisleach spuine*, soft, cheese-like sponge. It is much used still by Highland shepherds for making *amadou* or tinder, and for sharpening razors.

Mucedo—Moulds. Gaelic: *cloimh liath*, grey down. Mildew, *milcheo*.

Mushrooms bear a conspicuous part in Celtic mythology from their connection with the fairies,—they formed the tables for their merry feasts. Fairy rings (*Marasmius oreades*, and other species of *Agarici*) were unaccountable to our Celtic ancestors save by the agency of supernatural beings.

Algæ.

The generic names assigned to sea-weeds in Gaelic are: *feamainn* (*feam*, a tail); *trailleach* (M'Alpine), (from *tràigh*, shore, sands); *barra-rochd* (*barr*, a crop), *roc*. Greek: ῥώξ, French: *roche*, a rock. Welsh: *gwymon*, sea-weed. French: *varec*, from Sanscrit, *bharc*, through the Danish *vrag*. All the olive-coloured sea-weeds go by the general name *feamainn buidhe;* the dark-green, *feamainn dubh;* and the red, *feamainn derg*.

Fucus vesiculosus — Sea-ware, kelp-ware, black tang, lady-wrack. Gaelic: *propach*, sometimes *prablach*, tangled; in some places *gròbach*, *gròb*, to dig, to grub.

This fucus forms a considerable part of the winter supply of food for cattle, sheep, and deer. In the Hebrides cheeses are dried without salt, but are covered with the ashes of this plant, which abounds in salt. It was also used as a medicinal charm. "If, after a fever, one chanced to be taken ill of a

stitch, they [the inhabitants of Jura] take a quantity of *lady-wrack* and *red fog* and boil them in water; the patients sit upon the vessel and receive the fume, which by experience they find effectual against the distemper."—MARTIN'S 'Western Isles.'

F. nodosus—Knobbed sea-weed. Gaelic: *feamainn bholgainn*, *builgach*,—*bolg*, *builg*, a sack, a bag, from the vesicles that serve to buoy up the plant amidst the waves. *Feamuinn buidhe*, the yellow wrack. It is of an olive-green colour; the receptacles are yellow.

F. serratus—Serrated sea-weed. Gaelic: *feamainn dubh*, black wrack. *Aon chasach*, one-stemmed, applies to this plant when single in growth.

F. canaliculatus—Channelled fucus. Gaelic: *feamainn chirean* (*cìr*, a comb). This plant is a favourite food for cattle, and farmers give it to counteract the injurious effects of sapless food, such as old straw and hay.

Laminaria digitata—Sea-girdles, tangle. Gaelic and Irish: *stamh*, *slàt-mhàra*, sea-wand. *Duidhean*, the stem, and *liaghag* or *leathagan*, *bàrr-stamh*, and *bragair*, names given to the broad leaves on the top. *Doire* (in Skye), tangle. Though not so much used for food as formerly, it is still chewed by the Highlanders when tobacco becomes scarce. It was thought to be an effectual remedy against scorbutic and glandular diseases, even long before it was known to contain iodine. "A rod about four, six, or eight feet long, having at the end a blade slit into seven or eight pieces, and about a foot and a half long. I had an account of a young man who lost his appetite and had taken pills to no purpose, and being advised to boil the blade of the Alga, and drink the infusion boiled with butter, was restored to his former state of health"—MARTIN'S 'Western Isles.' By far the most important use to which this plant and the other fuci have been put was the formation of kelp; much employment and profit were derived from its manufacture: *e.g.*, in 1812, in the island of North Uist, the clear profits from the proceeds of kelp amounted to £14,000; but the alteration of the law regarding the duty on barilla reduced the value to almost a profitless remuneration of only £3500.

L. saccharina—Sweet tangle, sea-belt. Gaelic: *smeartan* (*smear*, greasy). The Rev. Mr M'Phail gives this name to "one of the red sea-weeds." Other correspondents give it to this plant.

L. bulbosa—Sea furbelows, bulbous-rooted tangle. Gaelic: *sgrothach.* This name is doubtful (*sgroth*, pimples, pustules).

Alaria esculenta—Badderlocks, hen-ware (which may be a contraction of honey-ware, the name by which it is known in the Orkney Islands). Gaelic: *mircean* (one correspondent gives this name to "a red sea-weed"), seemingly the same as the Norse name *Mária kjerne,—Mári*, Mary, and *kjerne* is our word kernel, and has a like meaning. In Gaelic and Irish dictionaries, *muirirean* (Armstrong), *muiririn* (O'Reilly), "a species of edible alga, with long stalks and long narrow leaves"—SHAW. In some parts of Ireland, Dr Drummond says, it is called *murlins*—probably a corruption of *muiririn*, *muirichlinn*, *muirlinn* (M'Alpine), (from *muir*, *mara*, the sea). It is known in some parts of Ireland by the name *sparain* or *sporain*, purses, because the pinnated leaflets are thought to resemble the Highlander's *sporan*. *Gruaigean* (in Skye).

Rhodymenia palmata—Dulse. Gaelic and Irish: *duiliasg*, from *duille*, a leaf, and *uisge*, water—the water-leaf. The Highlanders and Irish still use *duiliasg*, and consider it wholesome when eaten fresh. Before tobacco became common, they used to prepare dulse by first washing it in fresh water, then drying it in the sun: it was then rolled up fit for chewing. It was also used medicinally to promote perspiration. *Fithreach*, dulse. *Duiliasg staimhe* (*staimh*, *Laminaria digitata*). It grows frequently on the stems of that fucus. *Duiliasg chlaiche—i.e.*, on the stones, the stone dulse. *Duileasg* is also given to *Laurentia pinnatifida*, formerly eaten under the name of pepper dulse.

Porphyra laciniata—Laver, sloke. Gaelic and Irish: *sloucan*, *slochdan*, from *sloc*, a pool or slake. *Slàbhcean* (in Lewis), *slàbhagan* (Shaw). Lightfoot mentions that "the inhabitants of the Western Islands gather it in the month of March, and after pounding and stewing it with a little water, eat it with pepper, vinegar, and butter; others stew it with leeks and onions."

Ulva latissima—Green ulva. Gaelic: *glasag*, also applied to other edible sea-weeds. In some places in the Western Highlands the names given to laver are also given to this plant. *Glasag*, from *glàs*, blue, or green.

Palmella montana (Ag.)—Lightfoot describes, in his 'Flora Scotica,' a plant which he calls *Ulva montana*, and gives it the Gaelic name *duileasg nam beann—i.e.*, the mountain dulse. This

plant is *Gloeocapsa magma* (Kutzing); *Protococcus magma* (Brebisson, Alg. Fallais); *Sorospora montana* (Hassall). Lightfoot was doubtless indebted to Martin (whose 'Western Isles' furnished him with many of his useful notes on the uses of plants among the Highlanders) for the information respecting such a plant. Martin describes it thus: "There is seen about the houses of Bernera, for the space of a mile, a soft substance resembling the sea-plant called *slake* [meaning here *Ulva latissima*], and grows very thick among the grass; the natives say it is the product of a dry hot soil; it grows likewise *on the tops of several hills* in the island of Harris." "It abounds in all mountainous regions as a spreading crustaceous thing on damp rocks, usually blackish-looking; but where it is thin the purplish nucleus shines through, giving it a brighter aspect."—Roy.

Chondrus crispus—Irish moss, known in the Western Highlands by the Irish name *an carraceen*, as the chief supply used to come from Carrageen in Ireland. At one time it was in much repute, for from it was manufactured a gelatinous easily digested food for invalids, which used to sell for 2s. 6d. per lb. *Mathair an duileasg*, the mother of the dulse, as if the dulse had sprung from it.

Corallina officinalis.—Gaelic: *coireall* (M'Alpine). Latin: *corallium*, coral. *Linean.* It was used as a vermifuge.

Polysiphonia fastigiata. A tuft of this sea-weed was sent to me with the Gaelic name *Fraoch mòra*, sea-heather, written thereon.

Himanthalia lorea.—The cup-shaped frond from which the long thongs spring is called *aiomlach*, or *iomleach* (*iomleag*, the navel), from the resemblance of the cup-shaped disc to the navel. Dr Neill mentions that in the north of Scotland a kind of sauce for fish or fowl, resembling ketchup, is made from the cup-like or fungus-like fronds of this sea-weed.

Halydris siliquosa.—Gaelic: *roineach mhàra*, the sea-fern. (In the Isle of Skye.)

Chorda filum—Sea-laces. In Shetland, Lucky Minny's lines; Ayrshire, dead men's ropes. Gaelic: *gille mu leann* (or *mu lìon*),—*gille*, a young man, a servant; *lìon*, a net. Lightfoot mentions that the stalks acquire such toughness as to be used for fishing lines, and they were probably also used in the manufacture of nets. At all events it is a great obstacle when trawling with nets, as it forms extensive sea-meadows of long cords floating in every direction. In some parts *langadair* is given to

a "sea-weed, by far the longest one." This one is frequently from twenty to forty feet in length.

Sargassum vulgare (or **bacciferum**)—Sea-grapes. Gaelic: *tùrusgar* (sometimes written *trusgar*, from *trus*, gather), from *tùrus*, a journey. This weed is frequently washed by the Gulf Stream across the great Atlantic, with beans, nuts, and seeds, and cast upon the western shores. These are carefully gathered, preserved, and often worn as charms. They are called *uibhean sìthein*, fairy eggs, and it is believed that they will ward off evil-disposed fairies. The nuts are called *cnothan-spuinge*, and most frequently are *Dolichas urens* and *Entada scandens*. To *Callithamnion*, *Plocamium*, &c., and various small red sea-weeds, such as adorn ladies' albums, the Gaelic name *smòcan* is applied.

Confervæ, such as *Enteromorpha* and *Cladophora*. Gaelic and Irish: *lianach* or *linnearach* (*linne*, a pool). Martin describes a plant under the name of *linarich*—"a very thin, small, green plant, about eight, ten, or twelve inches in length; it grows on stones, shells, and on the bare sands. This plant is applied plasterwise to the forehead and temples to procure sleep for such as have a fever, and they say it is effectual for the purpose." —Martin's 'Hebrides.' *Barraig uaine*, the green scum on stagnant water. *Feuruisge*, water-grass. *Lochan*. *Griobharsgaich*, the green scum on water.

"Tha uisge srùth na dìge
Na shrùthladh dùbh gun sioladh
Le barraig uaine, liògh ghlas,
Gu mi bhlasda grannd,
Féur lochan is *tachair*
An cìnn an duileag bhàite."—M'Intyre.

The water in its channel flows,
A dirty stagnant stream,
And algæ green, like filthy cream,
Its surface only shows.
With water-grass, a choking mass,
The water-lily grows.

(*To be continued.*)

ON THE DISTRIBUTION OF THE NATIVE ALPINE FLORA IN SCOTLAND.[1]

By EDWARD MOIR.

THE subject of the distribution of the alpine flora in Scotland opens up many considerations of a very interesting character; and these considerations are often not less curious and puzzling. If we could fall back upon a special creation of species *where they are now found*, it would solve all questions at the outset, and obviate the necessity of further inquiry into the why and the wherefore of many problems calling for solution. But apart altogether from the fragmentary nature of the flora in question, the geological and physical changes which have occurred on the surface of our country in comparatively recent times, preclude our entertaining the thought of such a supposition. Undoubtedly these geological and physical changes, which result in the elevation and depression of the land, to the extent sometimes of causing even a change from a continental to an insular situation, including, of course, change of climate, together with the great glacial forces which at one time played so conspicuous a part in the country, have been powerful factors in the distribution of the flora.

It need not be questioned that an alpine flora did exist in our country before the changes referred to occurred, but it is with the presently existing flora, which probably is a mere fragment of the former, that we have now to do; and the questions that come up for solution are, whence, when, and in what manner was it introduced?

It would neither be possible nor desirable in the limits of a short paper to go over all the ground covered or suggested by our subject. I will therefore confine my remarks to three points. Some points touched cannot be safely dogmatised upon, and on them one man's opinion is perhaps as good as another's. My remarks are the result of any little study I have been able to give to the subject, so far as I have had access to the opinions of those qualified to write regarding it. The three points I shall briefly allude to are—

1st, What are alpine plants?

[1] Read at a meeting of the Dundee Naturalist's Society, March 22, 1882.

2d, Some peculiarities and anomalies in their distribution in our country; and

3d, Whence and when introduced, and how distributed?

1. What are alpine plants? This is a question more easily asked than answered. It may be said to be an arbitrary term, signifying the vegetation belonging to elevated regions above the tree limits, and above the limits of cultivation on the one hand, and on the other bounded only by the line of perpetual snow. Of course in our country there is no upper limit to our alpine flora, as we have no line of perpetual snow, the comparatively low altitude of the hills, together with our insular climate, preventing its accumulation to such an extent as to be perpetual. Our hills as a rule are free of snow during the summer months, although in some seasons large masses lie in the corries all the year round. But what are alpine plants in some countries, agreeing to these conditions, are lowland plants in other countries.

Dr Lawson, of Halifax, Nova Scotia, says, in reference to Scotland: "It is natural that botanists should regard all the plants now found on the mountains exclusively as really alpine plants, growing there by preference because the climate is more suitable for them than the lowlands. *Per contra*, we have notable facts around us here in Nova Scotia. Some of these Scotch mountain plants come down into the glens, as *Rubus chamæmorus* and *Arctostaphylos uva-ursi*. Now these are essentially mountain plants in every country in Europe in which they occur; but here, with our warm summer climate, so much drier and hotter than that of any part of England, we have *Rubus chamæmorus* abounding at the sea-level, and providing the Halifax market every season with its fruit, well known under the name of Bake-apple. The *Arctostaphylos* creeps over the bare rocks about Windsor Junction, and all along the rocky track of our railway; and even on the hot granite and limestone cliffs of Ontario we find it maintaining its luxuriance along the banks of the great lakes. *Epilobium alpinum* does not grow with us except in the lower parts of the St Lawrence gulf, where both the water and the air remain cold for a long period of the growing season. There also *Dryas octopetala* grows.

"*Woodsia ilvensis*, one of the rare alpine ferns of Scotland, grows with us not only in Nova Scotia but in Ontario as well, on hot dry sunny cliffs. *Polystichum lonchitis*, not in bleak rocky corners, as in Clova, but by the sea or lake shores. *Asplenium*

viride, in humid but not elevated localities. As for *Linnæa borealis*, it is one of our commonest wayside flowers in Nova Scotia; and in the season when it is in bloom, one cannot walk out into the country without seeing wreaths of it around hats to keep off the mosquitoes, when the thermometer is standing far above any ordinary British temperature. It is still more abundant on the hot arid plains of Ontario, but only around ponds, under trees, and in swamps.

"Long years ago we pointed out that local humidity, not low temperature, is what many of these supposed alpine or arctic plants require. In America as the forests are cleared away they disappear. In a country like Scotland, that lost its Lowland forests so long ago, and has been cleared and cultivated for ages, many of the native plants have no doubt been extirpated, and others are to be seen only in the remnants left on undisturbed spots on the mountains."

Similarly in Norway, many plants which in our own country are only found on or near the summits of the highest hills, are found growing by the wayside and in the fields. In Greenland some forty or fifty species of what are counted as our rarest alpines are growing at the sea-level. The explanation of this must be sought for in climatic influences, altitude in our country being equivalent to so many degrees of latitude in the Arctic regions, where at sea-level a similar climate prevails to what is found on the summits of our highest hills.

The flora of our country, having relations with other parts of Europe, has been divided into five geographical groups. Three of these—viz., the Asturian, which has a few representatives in the south-west of Ireland; the Devonshire, on the south-west of England and south-east of Ireland, and the Kentish flora in the south of England—are so limited in their number that they need only to be mentioned. The other two remaining groups constitute the great bulk of the flora of our country: the Germanic, which overruns all the lowlands, and the Scandinavian, which forms our alpine or Highland flora, as a rule rarely descending below 1500 feet of altitude, but in certain circumstances occasionally coming even as low as sea-level, where, by climatic influences, it is not so much exposed to contend with the stronger lowland vegetation.

On the other hand, the lowland or Germanic flora often invades the domains of the alpine, many species ascending to a height of 3000 feet and upwards; but owing to the rigour of

the climate at that altitude, they do not feel at home, but become dwarfed and stunted, so that the alpine flora is there able to contend successfully with them. This it is not able to do on the lowlands, and hence takes refuge, both by choice and of necessity, on the hills, as we mentioned before—never descending, as a rule, below 1500 or 2000 feet of altitude. This peculiarity constitutes their title to be classed as alpine plants in our country. As a rule, they are exceedingly dwarf, scarcely rising higher than the mosses with which they are surrounded, growing in dense tufts, or creeping along the surface of the rocks. The flowers are large comparatively to the size of the plant, and of bright, sometimes intense, colours.

2. I shall now touch on some peculiarities and anomalies of distribution.

The number of species of flowering plants and ferns in Britain is estimated variously at from 1425 to 1680, according as some are reckoned as sub-species or varieties. The proportion of these that are strictly alpine according to the foregoing definition is comparatively small, being under 100—in fact, they only number 91 species, or about six per cent of the whole British flora. Of these 91 species of British alpines, 88 are natives of Scotland, 45 are natives of England and Wales, while only 25 are natives of the Irish hills. With the exception of 6 or 8, all are natives of arctic Europe or Scandinavia, while 46 at least are also found in the Polar regions.

It will thus be seen that only three species of the British alpine flora are absent from Scotland. One of these is the *Saxifraga umbrosa*, or London Pride, which is found in Britain only on the Irish hills, and is a member of the Asturian flora formerly mentioned. A second is *Lloydia serotina*, a small bulbous plant with white flowers, found only on some of the Welsh mountains. Its distribution is pretty extensive, ranging from the European Alps to the Himalayas and North America. The third and last species absent from Scotland is the lovely *Gentiana verna*, inhabiting the Teesdale Hills in England, and the hills of Mayo, Galway, and Clare in Ireland. Its centre of distribution is the European Alps.

The distribution of the alpine flora in Scotland is confined to the Grampian range, and principally to two localities in that range—viz., the Clova and Caenlochen mountains in Forfarshire, and the Breadalbane mountains in Perthshire,—in each of which counties 73 out of the 88 Scottish species are found. Lochna-

gar and Glen Callater come next, with the Braemar mountains generally, including the Cairngorm range, although Ben Macdhui, notwithstanding its great height, has comparatively few alpine species. The same may be said of Ben Nevis, Ben Lomond, and Ben Voirlich, the number of species seeming to decrease rapidly on the way south-westward from the Ben Lawers range to the Clyde mountains, till, on Goatfell in Arran, so rich in its flora generally, only six or seven alpine species exist.

Coming back to the two principal centres of distribution in Scotland—viz., in the counties of Perth and Forfar—in each of them we find 73 species; but a comparison of these by no means shows that they are identical, as there are seven species present in Perth which are absent in Forfar, and, *vice versâ*, seven species are wanting in Perth which are present in Forfar. It may be worth while looking at some of these in detail, as they are among the rarer or more interesting of our alpines. Taking the Perthshire species which are absent from Forfar: among the rocks near the summit of Ben Lawers, and one or two others of the Breadalbane hills, is found the *Draba rupestris*, a very dwarf species with small white flowers, which occurs in one other county in Britain—viz., Sutherlandshire. It is a truly arctic species, not being found on the Alps. Another plant is *Saxifraga cernua*, found growing in company with the preceding on Ben Lawers. This is its only British locality, and the most southerly in Europe. Near the summit of one or two of the Breadalbane mountains is found the *Alsine rubella*, a tiny insignificant-looking plant with inconspicuous flowers. There is one other locality for it only in Scotland—Ben Hope, in Sutherland—and it also reaches its most southerly limit in Breadalbane. The next plant is the *Myosotis alpestris*, or alpine Forget-me-not, and is plentiful at a height of 3000 feet on Ben Lawers. It is a plant not less beautiful than rare, there being only one other locality for it in Britain—viz., Micklefell in Teesdale. Its centre of distribution is the European Alps. Another remarkable Perthshire plant, found in this country only on the Sow of Athole, where it is now rarely met with, is a species of heath with a large purple bell, the *Menziesia cærulea*, or *Phyllodoce cærulea*, its exotic distribution being the Arctic regions, Pyrenees, Siberia, and North America.

The alpine plants found on the Forfarshire hills, but absent from Perthshire, are the *Lychnis alpina*, having pretty rose-

coloured flowers, and found in Britain only on the Little Cul-rannoch in Clova, on the summit of which, on two spots about half a mile apart, and 3000 feet above sea-level, it grows sparingly; and on Hobcarten Crag in Cumberland, where it differs from the Scottish plant in being larger in all its parts. Its exotic distribution is the Arctic regions and the European Alps. The *Oxytropis campestris* is in Britain found only on one hill-side in Clova, at an elevation of 2000 feet, and never spreads beyond a very limited range. Its exotic distribution is arctic and alpine Europe, and North America. *Astragalus alpinus* grows on the summit of a cliff on Craig-mad in Clova, and on the Little Craigendall in Braemar, the only two British localities, its exotic distribution being the same as the last-mentioned species. The *Mulgedium alpinum* is rather an anomaly among alpine plants, growing two to three feet high, in ravines in Clova and Caenlochen, and on Lochnagar, where it is getting rare. Its exotic distribution is arctic and alpine Europe and Asia. The *Gentiana nivalis*, found in Britain only on Ben Lawers, on Cam-creag, and in Caenlochen, is thus common to both counties, and is one of the rarest alpine gems. Its exotic distribution is arctic and alpine Europe and America. *Azalea procumbens*, an evergreen shrub growing in spreading tufts and sheets an inch high, and covered with small pink flowers, grows on many of the Highland hills, its exotic distribution being arctic and alpine Europe, and arctic Asia and America, but excluding the Pyrenees.

It would occupy too much time to specify all our native alpines, but several of the alpine ferns may be mentioned which are common to both counties. These are *Cystopteris montana*, very rare; it is widely distributed in the arctic and alpine regions of Europe, Asia, and in Canada. The two species of *Woodsia*, *ilvensis* and *hyperborea*, are also very rare with us, and have a distribution similar to the last; as have also *Polypodium alpestre*, and its remarkable congener or sub-species, *P. flexile*, found only in Glenprosen and Ben Aulder.

Ben Lawers is by far the richest locality for alpine plants in Scotland, individual species being there present in much greater profusion than elsewhere, many spots displaying a rich mosaic of *Saxifraga*, *Dryas*, *Silene*, *Cerastium*, *Myosotis*, &c.—a picture which only those can see who undergo the toil of climbing 3000 feet.

It will be seen how irregular, localised, and fragmentary is the distribution of our alpine flora, so contrary to the method

or order we might reasonably be led to look for, had it been originally created where it is found.

And this leads to the third and last of the three points with which we set out—viz.:

3. Whence and when was our alpine flora introduced, and how distributed?

These, also, are questions more easily put than answered. It is scarcely possible to answer them individually and categorically, but we may consider them as a whole.

We know from recent scientific investigation that great physical changes have at various times taken place on the surface of our country, producing considerable alterations on its features and on the comparative level of land and sea. According to geologists, at a comparatively recent period, as they reckon time, nearly all our country and the northern half of Europe were enveloped in a continuous ice-sheet similar to what may be seen in Greenland at the present day, but its properties greatly intensified on account of its vastly larger proportions.

Greenland has a fringe of land at its sea-shores free from ice and snow during its short summer season, which is covered with an arctic vegetation sometimes of great beauty. Mr Chichester Hart, in his 'Report on the Botany of the British Polar Expedition of 1875-76,' says, "It is only on the low grounds of the more southerly parts of Greenland visited, as at Egedesmonde, Disco, Rittenbank, and Proven, that the surface is uniformly covered with vegetation for any extent, and this consists of small tufted perennials of low matted growth, through which the arctic willows and *Ericaceæ* trail and extend their branches, the first alone rarely rising, under the shelter of a cliff, to a height of three or four feet. Through this brownish-green carpet, which is about the hue of an Irish mountain-bog, conspicuous and beautiful blossoms of *Rhododendron*, *Azalea*, *Diapensia*, *Pyrola*, and other ericaceous plants, are lavishly scattered, while the cream-coloured *Dryas*, the snowy white *Cerastium* and *Stellaria*, the pink *Silene*, and the gorgeous red-purple *Saxifrage*, often form luxuriant sheets of colour, the latter being comparable to our Scotch heather, though richer in its effects. True blue flowers, as *Veronica alpina*, rarely occur; true reds are never met with; and most of all is felt the absence of a greensward, such as the eyes are accustomed to at home."

But the ice-sheet on our country at the period referred to left no margin of land at the sea-shores where vegetation could

exist, but swept everything before it into the sea, on all sides, itself filling up the hollow of the German Ocean, and forming one continuous sheet with that covering Norway and Sweden, forbidding the idea of the existence of either animal or vegetable life. On the Continent the climate of the southern half of Europe would then be of such a character that only an arctic fauna and flora could exist in the low grounds, being driven there gradually before the advancing ice-sheet, whence previously the temperate or European flora had been driven still farther south. That this was so is no mere conjecture, as in several localities in south Europe the peat-bogs have yielded remains which go far to prove it. Some of these peat-beds are only a few feet in thickness, and between the peat and the clay on which it rests have been found leaves of *Betula nana*, *Dryas octopetala*, *Salix reticulata*, and *Salix polaris*, the latter being a characteristic Spitzbergen plant,—all being plants which now are confined to the high hills in temperate Europe, or the most northerly latitudes where vegetation will exist. Thus we learn how the arctic and alpine flora, driven southward by the encroachment of the great northern *mer de glace*, at last came to occupy the low grounds of temperate Europe.

In course of time a change occurred. The climate began to ameliorate, and the ice-sheet gradually retreated northward and up the hills. The arctic fauna and flora followed, and gradually reoccupied the ground from which they had been formerly driven.

Dr Buchanan White, in his paper[1] on the Mountain Lepidoptera of Britain, has so graphically described the process of immigration of the alpine flora which now occupies our country, at the close of the great ice age, that I cannot do better than give his account of it briefly. He says: "In course of time the altered condition of things would be felt in Britain, but the English Channel would as yet cut it off from the advancing tide of life. Still it is probable that the winds and sea-currents would carry thither the spores of mosses, lichens, and other cryptogamic vegetation, and perhaps even the seeds of some of the higher plants, which would find suitable resting-places out of reach of the great floods which continued to sweep over much of the low ground.

"Finally, after several variations in the relative heights of the land or sea (the latter being at one time 100 feet higher on our

[1] 'Scottish Naturalist,' vol. v. p. 97.

shores than it is at present), the land rose so much that the bed of the German Ocean became dry land, and afforded a passage for the great mass of our plants and animals. Amongst the first plants to occupy the dry bed of the German Ocean, would be the various species that followed closest on the retreating ice-sheet (viz., the arctic and arctic-alpine); but they, at least in the southern part, would soon be crowded out by the plants that followed.

"We may have some idea of the order in which the species would grow if we study the sequence in which our wild plants occupy any portion of ground recently made bare,—as, for example, a moor from which the turf has been pared, a drained lake, or a slope uncovered by a landslip on the hills. Perhaps the latter will show us something of what may in part have actually happened at the time of which I treat. Examining such a place, we will notice how, in course of time, one set of plants, and frequently those which are rarest in the immediate vicinity, begin to dot the surface of the unoccupied ground. In a year or two they are joined and jostled, as it were, by others before whom they gradually disappear, and then, perhaps, the second set are joined by others before which some of them, too, vanish. So it is easy to imagine how the arctic and arctic-alpine plants, which seem less fitted than others to live in a crowd, would first occupy the German Ocean plain, gradually cross it and invade Britain, spread over, perhaps, a great part of the country, be pursued and crowded by other plants, and be finally driven up the mountains, where the conditions of life would place them more on an equality with their pursuers (not all of which could live on the mountains), and where they could hold their own."

Thus it is apparent how powerful an agency climate has been in the distribution and dispersion of our alpine flora. The arctic-alpine flora would be the first to enter our country, likely at several points on the east coast, would gradually spread over the low grounds so long as the snow and ice were on the hills, and would finally ascend the hills when a change of climate from arctic to temperate supervened. For then the temperate or Germanic flora, entering the country with its hosts, would contest the occupancy of the lowlands with its first immigrants, the arctic-alpines, and as the two could not coexist there, a struggle would commence which, after many fluctuations, would finally result in the latter being driven up the hill before their

pursuers, with much loss, whole species and even genera being extinguished in the process, others being modified, and considerable alteration taking place in the geographical distribution of almost all—truly affording a fine illustration of the phrase, "survival of the fittest." In some cases, as we have seen, only the fragments remain on two or three favoured spots on the mountains where the lithological character of the soil seems to prevent their extension to the regions beyond. And this last may perhaps furnish the key to some of the recondite causes why so many of our Highland hills are so poor in alpine species.

Mr A. R. Wallace, in 'Island Life,' gives as a reason why Britain is poor in species of both fauna and flora, that "there is good evidence that a considerable portion, if not the entire area, of our country has been submerged to the extent of upwards of 1300 feet, shell-bearing gravels having been found at that height on some of the hills, so that only the hills would remain as groups of rocky islets. This submersion must have destroyed the greater part of the life of our country; and as it certainly occurred during the latter part of the glacial epoch, the subsequent elevation and union with the continent cannot have been of very long duration; and this fact must have had an important bearing on the character of the existing fauna and flora of Britain. When England became continental, these entered our country; but sufficient time does not seem to have elapsed for the migration to have been completed before subsidence again occurred, cutting off the further influx, and leaving us without the number of species which our favourable climate and varied surface entitle us to."

We have seen how very meagre the alpine flora of Ireland is, only numbering about 25 species: but that is not all. The whole Irish flora does not number more than, if as many species as, are contained in the single comparatively small county of Forfar. The same anomaly is presented by its fauna. How is this to be accounted for? Is it that the climate is less genial than that of England or Scotland, or the soil less productive? That the contrary is the case is well known. The following geological and physical changes will account for it, and the explanation may also help to illustrate the cause of the apparent freaks and irregularities of distribution in our own country.

At the close of the glacial era Britain was receiving its flora from Europe. This flora was gradually finding its way westward. Ireland would thus be the last to receive her flora, which

immigrated from Scotland and England by a land-connection, the whole country standing higher out of the water than at present, transforming the Irish Sea into a lake. The first plants to occupy Ireland of course would be the arctic alpines, which had only time to partially take possession when a gradual sinking of the land took place, cutting off the connection with Britain, and necessarily also the immigration of the flora, which would then be driven up the hills by the advance of the sea. Once more came another upheaval of the land, again connecting Ireland with Britain, over whose area by this time the amelioration of the climate had caused the Germanic or lowland flora to be on the rapid march westward. This flora accordingly was now gradually finding its way into Ireland, which, however, before the immigration was complete, once more became isolated, and has so remained ever since. Hence the comparatively limited fauna and flora of the Green Isle.

Dr James Geikie says:[1] "It is perhaps owing to the late appearance of the land-connection that the Scandinavian type of vegetation is so poorly represented in the Hibernian flora. The climate, we may suppose, was already become milder, and the high alpine forms were gradually vanishing from the low grounds, so that only a few of these could make their way south into Ireland."

The geographical, physical, and climatal changes we have been speaking of were, it may be imagined, very gradual, and occupied long periods of time. And as there were what geologists term interglacial periods—that is, a warm or temperate period, then a return of glacial conditions more or less severe—the process of redispersal and redistribution of the fauna and flora was repeated.

Wherever species were originally created, or evolved, as some would have it, these changes were the means of their distribution into other countries where soil, climate, and other conditions were found suited to their wellbeing, although many species have a wonderful adaptability to change of circumstances and surroundings, and often themselves thereby undergo a change in their habit and appearance, even, according to some high authorities, to the extent of becoming new species.

Suppose certain species transferred from one locality where the summer is hot and short and the winter long and severe, and where, during the greater part of the year, they are covered

[1] 'Prehistoric Europe.'

up with snow, to another where the seasons are comparatively temperate, we cannot but believe that in course of time some modification will take place in the form and habit of the species.

The same species that in our hills reproduce themselves from seed, in Greenland, north of Disco, have not time during their short summer in which to ripen their seed, consequently seedlings are never met with; and the extension of the range of any given species would seem to be due to the creeping powers of the individual which, with few exceptions, all possess, or to plants being drifted downward on blocks of half-frozen mud and ice containing plants and roots, torn out and hurried to the shore. Circumstances have there compelled species to adapt and accommodate themselves to their surroundings.

Mr Wallace relates that many islands throughout the globe now contains certain species both of animals and plants which are peculiar to these islands, not being known to exist anywhere else in the world. Many of these islands must at one time have received their fauna and flora from the nearest continent by former land-connection, and he accounts for the change of species, which he contends must in many instances have taken place, by such considerations as change or modification of climate from continental to insular, which would produce a series of changes, the most important of which would arise from isolating small groups of individuals of many species, and thus altering their relations to the rest of the organic world. Many of these would be at once exterminated, while others, being relieved from competition, might flourish and become modified into new species.

Any one at all acquainted with the genus *Saxifraga*, or that of *Primula*, knows how difficult it is often to distinguish the difference between species, sub-species, and varieties, the modifications of form being seemingly endless.

The American form of *Azalea procumbens* has a looser and larger habit than our Scottish form, quite marked and distinguishable; so also with the American form of *Linnæa borealis*, the leaves of which are much larger than our native form. Again, there is a marked difference in *Lychnis alpina*, which in Scotland is much dwarfer than the English or Continental form. These variations of appearance are all permanent in cultivation, and may not amount to what would constitute a difference in species, only variety.

What Mr Wallace contends for is, that provided always suffi-

cient time is allowed, it requires no great stretch of imagination to suppose that these changes of circumstances and surroundings may produce such modifications as gradually to evolve different species.

After all, it is difficult to define what a "species" is: there is infinite variety in nature. But having got into a slight digression, we will conclude by summing up the answers to the three questions of our third head—viz., whence and when was our alpine flora introduced, and how distributed?

At the close of the glacial era, our country having no flora, the Scottish alpine flora was introduced into the country across the dry bed of the German Ocean from the south of Europe; and climate has been the principal agent in its distribution and dispersal.

A NEW LIST OF THE FLOWERING PLANTS AND FERNS OF ORKNEY.

EDITED BY W. IRVINE FORTESCUE.

ALTHOUGH more than one catalogue of Orkney plants has been published, it is now many years since the last of these appeared, and therefore another may not be without interest. About thirty years ago Dr A. R. Duguid of Kirkwall and Mr Robert Heddle compiled a MS. list of all the Orkney plants they had met with, and this has been recently corrected and added to by Dr J. T. Boswell of Balmuto, whose name is a sufficient guarantee for the authenticity of all that has come under his notice.

Thanks are due to Dr Clouston for some interesting observations; and Dr H. H. Johnston and others have added many localities to the list; and several plants which have been either named or verified by Dr Boswell.

The 59° N. latitude and the 3° W. longitude pass almost through the centre of the Orkney Islands, while a parallelogram 47 miles from N. to S., by 37 miles from E. to W., will include the whole group. The Pentland Firth, only 5½ miles wide at its narrowest point, separates them from Caithness, while a gap of 50 miles divides them from Shetland. The Mainland, which is by far the largest island, occupies the centre of the group, the islands to the north and south of it being called respectively the North and South Isles. The total area of the Orkneys amounts

to something like 330 square miles. The geology is simple, the whole group belonging to the Old Red Sandstone.

With the exception of Hoy, all the islands are occupied by the lower or flaggy strata of that formation, and are correlated by geologists with the higher subdivisions of Caithness. Hoy fortunately differs from that "land of flatness, flags, and fossil fishes," being principally composed of "coarse siliceous, red and yellow sandstones, and marls," which belong to the upper Old Red Sandstone. An arenaceous series, in appearance much resembling the red and yellow rocks of Hoy, but placed in the lower division of the formation, occupies nearly the whole of Eday, and occurs in Sanday, Stronsay, and Shapinshay. It also composes a large portion of most of the South Isles, and crosses the Mainland in a narrow belt from Inganess to the church of Orphir. Granite and gneiss crop up N.W. of Stromness, and in Graemsay; and several dykes of basalt occur throughout the islands, while two volcanic necks are found in Hoy, and an ancient lava flow is seen near the foot of Shapinshay.

As may be expected from the geology, there is a sameness in the physical features: most of the islands showing a low undulating outline, terminating seawards in a bold cliff, or sloping down to a sandy bay. In Rousay and Westray remarkable terraced hills of rusty-coloured flags occur, due to the denudation of the softer parts in pre-glacial times. In Hoy the hills rise to over 1500 feet, gashed by narrow valleys, with numerous inland cliffs. "Here no man dies, for all their necks are broke." Here, too, are "many comical plants," as a native once informed Dr Boswell; and, in reality, here is the only glimpse of an alpine flora.

From Hoy in the S.W., the islands gradually decline in altitude towards the N.E. The Ward Hill of Orphir attains 876 feet, while Rousay rises to 732 feet, Westray to 549 feet, and Eday to 310 feet — the remainder of the islands being decidedly flat.

The soil for the most part consists either of peat or of a clayish loam, formed by the disintegration of the flaggy rocks. The island of Sanday, as its name implies, is largely covered with blown sand. Several "links," usually of small extent, are met with throughout the islands.

The average yearly rainfall is 37.22 inches,—May, with 1.73 inches, being the driest, and October, with 4.85 inches, the wettest

month. The mean temperature for fifty-four years is 45°.81; the highest in shade for the last four years, 73°; the lowest in shade for the last four years, 7°.8; and the lowest by exposure in 1881, and also for the last fifty-four years, 2°.3 below zero.

The winter, though usually mild, is a succession of westerly gales, laden with salt-spray, and accompanied with drenching showers, which blast the very heather-bushes on their western side, except in the more sheltered situations. Heavy falls of snow occur in hard winters.

The summer is deficient in heat, and therefore trees do not now succeed well in Orkney. The new growth being seldom thoroughly ripened, they die back almost as much in winter as they had gained during the warmer months.[1]

Hazel-nuts and stems of trees, apparently birch, are frequently found in the peat, showing that a warmer climate must have prevailed in Orkney at one time. These trees rarely exceed six inches in diameter, and, judging from their remains, must have been more or less stunted.

They were probably confined to comparatively sheltered localities. Dr Clouston mentions having seen a tree-stump in Berriedale in Hoy several feet in diameter, one of its roots having a diameter of about a foot at a distance of twelve feet from the main stem. Doubtless the largest trees grew in the sheltered valleys of Hoy, almost the only place where their descendants still linger.

Vegetation is from a fortnight to three weeks later than in the middle and south of Scotland.

It may be worthy of note that *Fuchsia Magellanica* thrives in the open air in Orkney, though it does not attain the same size as on the south-west coast of Scotland; and *Veronica decussata* succeeds even better, while *Phormium tenax* flourishes with Dr Traill in North Ronaldshay.

Much remains to be done, especially in the North Isles, in the way of recording the localities of plants.

In the following list, the authority for a species or locality is given immediately after it. B. stands for Dr J. T. Boswell of Balmuto; D. for Dr A. R. Duguid; and H. for Mr Robert

[1] I believe that the cause of trees not thriving in Orkney is that the gales laden with chloride of sodium destroy the leaves where they are exposed to the sea-winds and become incrusted with salt. Where trees are protected by houses or walls, they grow much better than where exposed to the direct action of winds from the sea.—J. T. B.

Heddle. In several cases Dr Boswell has not actually seen the plants growing; but specimens have been shown to him, either by myself or by Dr H. H. Johnston.

Very doubtful or extinct plants will be mentioned at the end of the list.

RANUNCULACEÆ.

I. Thalictrum L.

1. Alpinum L., B. Not uncommon on the hills of Hoy. More local on the hills of Orphir. Vishall Evie, D. Rousay, H. Houton Head, Mainland, B.
2. Minus L.
   a. maritimum. Links at Hoxa, South Ronaldshay, B. At Dingeshow, Deerness, H. The only known stations. Links at Melsetter, Waas, B.

II. Ranunculus L.

3. Diversifolius Gilib.
   a. radians, B. Probably local. Quarry near Kirkwall. This is now allowed to be R. trichophyllus with floating leaves.
4. Drouetii Schultz. Swanbister, B. Probably more common than the last.
5. Hederaceus L. Papa Westray, D. Quendal, Rousay, H.
6. Flammula L., B. Common.
   b. pseudo-reptans. Kirbister Loch. Orphir, B.
7. Acris L., B. Common.
8. Repens L., B. Common.
9. Bulbosus L. Introduced at Swanbister 1849, B. Sandy links, D. Melsetter, H.
10. Arvensis L. Hobbister, H. Doubtless introduced, B.
11. Ficaria L., B. Common.

III. Caltha L.

12. Palustris L., B. Common. Included with the other yellow-flowered species of this order under the name "buttercups."

PAPAVERACEÆ.

IV. Papaver L.

13. Rhœas L. Westness, Rousay, H. Probably only where introduced.

14. Dubium L., B. Evie, D. Cornfields at Kierfiold. A weed of cultivation. Very local.

FUMARIACEÆ.

v. Fumaria L.

15. Pallidiflora Jord.
    b. Boræi, B. A weed of cultivation.
16. Officinalis L., B. A weed of cultivation.

CRUCIFERÆ.

vi. Cakile Gœrtn.

17. Maritima Scop. Smoogrow, Scalpa, and Hoy, B. Sanday, D. and H. Not uncommon.

vii. Raphanus L.

18. Raphanistrum L., B. Common.

viii. Sinapis L.

19. Arvensis L., B. This and the last are very common weeds of cultivation, and are known as "Runshuk."

ix. Sisymbrium L.

20. Officinale Scop. Swanbister. Introduced (?), B. Church of Hoy, D. and H.

x. Cardamine L.

21. Pratensis L., B. Common.
22. Hirsuta L., B. Common.
23. Sylvatica Link., D.

xi. Arabis L.

24. Thaliana L. Wall-tops near Kirkwall, D. and H.

xii. Barbarea Br.

25. Vulgaris Brown. Gardens at Kirkwall, Westness, H. No doubt introduced.

xiii. Nasturtium Br.

26. Officinale Brown. Scalpa, B. Local. Formerly at Swanbister.

xiv. Armoracia Rupp.

27. Rusticana Rupp. Fields near Bay of Houton; Cornquoy, Evie, D. and H. Introduced.

XV. COCHLEARIA L.

28. Officinalis L., B. Common.
b. alpina, B.

XVI. DRABA L.

29. Verna L., B. Not uncommon.
30. Incana L. Hoy, B. Rousay and Vishall, Evie, D. Rather rare.

XVII. THLASPI L.

31. Arvense L. Near Kirkwall and Rousay, D.

XVIII. CAPSELLA Mœnch.

32. Bursa-pastoris Mœnch, B. Not uncommon.

XIX. LEPIDIUM L.

33. Smithii Hook. Reported from near Wideford. Requires confirmation.

VIOLACEÆ.

XX. VIOLA L.

34. Palustris L., B. Not uncommon.
35. Sylvatica Fries.
a. Riviniana, B. Common.
36. Tricolor L., B. Common as a weed of cultivation.

DROSERACEÆ.

XXI. DROSERA L.

37. Rotundifolia L., B. Frequent on heaths on the Mainland, Hoy, and Rousay.
38. Anglica Huds., B. Confined to Hoy and Walls, where it is not uncommon.

POLYGALACEÆ.

XXII. POLYGALA L.

39. Depressa Wender., B. Common.

CARYOPHYLLACEÆ.

XXIII. SILENE L.

40. Maritima With., B. Not uncommon.
41. Acaulis L., B. Confined to the hills of Hoy, where, however, it is common on the rocky ledges.[1]

[1] In 1849 I found it abundant on the *débris* under the rocks of Hoy Hill, but it is now restricted to rocks inaccessible to sheep.—J. T. B.

XXIV. LYCHNIS L.

42. Vespertina Sibth., B. Sparingly at Kierfiold, Sandwick. Probably introduced.
43. Diurna Sibth., B. Rather local. Houton on the Mainland, Hoy, and Burray.
44. Flos-cuculi L., B. Common.
45. Githago Lam. Cornfields. Probably introduced with seeds, D. and H.

XXV. CERASTIUM L.

46. Tetrandrum Curt., B. Common.
47. Semidecandrum L. Reported by Dr Macnab. Requires confirmation.
48. Glomeratum Thuil., B. Common.
49. Triviale Link, B. Not uncommon.

XXVI. STELLARIA. L.

50. Media With., B. Common.
51. Graminea L., B. Rather scarce.
52. Uliginosa Murr., B. Common.

XXVII. ARENARIA L.

53. Serpyllifolia L. Common, D.

XXVIII. HONKENEJA Ehr.

54. Peploides Ehr., B. Common.

XXIX. SAGINA L.

55. Maritima Don. Swanbister, B.
56. Procumbens L., B. Not uncommon.
57. Nodosa Meyer., B. Rather local.

XXX. SPERGULA L.

58. Arvensis L., B. Common, especially as a weed of cultivation.

XXXI. SPERGULARIA Pers.

59. Rubra Fenzl. The Ayre, Kirkwall, D.
60. Neglecta Syme, E. B. Swanbister, B.
61. Marginata Syme, E. B. Wauk Mill Bay and Hoy, B. Probably the two last are not uncommon, though local.

PORTULACACEÆ.

XXXII. MONTIA L.

62. Fontana L., B. Frequent.

HYPERICACEÆ.

XXXIII. HYPERICUM L.

63. Pulchrum L., B. Not uncommon.

LINACEÆ.

XXXIV. RADIOLA Gmel.

64. Millegrana Sm., B. Common.

XXXV. LINUM L.

65. Catharticum L., B. Not uncommon.
66. Usitatissimum L. As a weed among wheat, H. Wheat has only been tried occasionally, and is never sown now.

GERANIACEÆ.

XXXVI. GERANIUM L.

67. Sylvaticum L. Pastures about Kirkwall, D. and H.
68. Molle L. Swanbister. Introduced, B. A rather scarce weed of cultivation.
69. Dissectum L. I found one plant of this at Firth, when in company with Dr Boswell. Sides of fields, H.
70. Robertianum L. Between Loch of Carness and the sea, D. and H.

XXXVII. OXALIS L.

71. Acetosella L., B. Confined to Calf of Flotta and Rissa Little. Lowe wrote of the Calf of Flotta in 1774—"Observed in this island the plant *Oxalis acetosella* for the first time in Orkney, but here growing in vast plenty."

LEGUMINIFERÆ.

XXXVIII. ULEX L.

72. Europæus L. Introduced, B. Local.

XXXIX. ANTHYLLIS L.

73. Vulneraria L., B. Common.

XL. MEDICAGO L.

74. Lupulina L., B. Not unfrequent.

XLI. TRIFOLIUM. L.

75. Pratense L., B. Common.
    a. sylvestre, B.

76. Medium L. Common, H.
77. Arvense L. Artificial pastures. Not rare, H.
78. Repens L., B. Common.
79. Procumbens L. Artificial pastures. Not rare, H.
80. Minus Relhan. Swanbister, B. Introduced.

XLII. LOTUS L.

81. Corniculatus L., B. Common.

XLIII. VICIA L.

82. Hirsuta Koch. Field near Kirkwall, Westness, H. Probably only introduced occasionally.
83. Cracca L., B. Not uncommon.
84. Sepium L., B. Rather local.
85. Sativa L. Cultivated fields as a weed, D. and H. Only when introduced.

XLIV. LATHYRUS L.

86. Pratensis L., B. Common.

XLV. OROBUS L.

87. Tuberosus L., B. Burn of Ore, Walls, H. Very local.

ROSACEÆ.

XLVI. Spiræa L.

88. Ulmaria L., B. Common. Orkney "yule grass."

XLVII. ALCHEMILLA L.

89. Arvensis Scop., B. Cultivated places.
90. Vulgaris L., B. Rather scarce.

(*To be continued.*)

PRELIMINARY LIST OF THE FLOWERING PLANTS AND FERNS OF PERTHSHIRE.

BY F. BUCHANAN WHITE, M.D., F.L.S.

(*Continued from page* 287.)

CCLXXXIX. ELEOCHARIS Br.

635. Palustris Br.
i. Sub-species palustris. Common.
ii. Sub-species uniglumis Link. Invergowrie.
636. Multicaulis Sm. Local.

637. Acicularis Sm. Local.
638. Cæspitosa Link. Common.
639. Pauciflora Link. Not uncommon.

CCXC. ERIOPHORUM L.

640. Vaginatum L. Common.
641. Polystachyon L.
i. Sub-species angustifolium Roth. Common.
ii. Sub-species latifolium Hoppe. Very local.

CCXCI. RHYNCHOSPORA Vahl.

642. Alba Vahl. Local.

CCXCII. KOBRESIA Willd.

643. Caricina Willd. On several hills in Breadalbane.

CCXCIII. CAREX L.

644. Pauciflora Light. On the hills.
645. Pulicaris L. Common.
646. Dioica L. Not uncommon.
647. Rupestris All. Reported from Ben Lawers.
648. Disticha Huds. Very local.
649. Teretiuscula Good. Local.
650. Muricata L. Very local.
651. Vulpina L. Very local. Invergowrie.
652. Stellulata Good. Common.
653. Remota L. Local.
654. Bœnninghauseniana Weihe. Breadalbane.
655. Leporina L. Common.
656. Canescens L. Local.
Var. *alpicola* Wahl. On the hills. Not common.
657. Atrata L. Breadalbane.
658. Rigida Good. Not uncommon on the hills.
659. Aquatilis Wahl. Not common, or overlooked. Margins of the Tay and Isla.
660. Vulgaris Fr. Common.
661. Limosa L.
i. Sub-species limosa. Very local.
ii. Sub-species irrigua Hoppe. Rare.
662. Glauca Scop. Common.
Var. *stictocarpa* Sm. Breadalbane.
663. Pallescens L. Not uncommon.
664. Panicea L. Common.

665. Vaginata Tausch. Rare. Breadalbane, Athole, Rannoch.
666. Capillaris L. Local on the hills.
667. Pendula Huds. Mid-Perth (?) Balquhidder (?)
668. Præcox Jacq. Common.
669. Pilulifera L. Common.
670. Hirta L. Common.
671. Filiformis L. Local, but widely distributed.
672. Ustulata Wahl. Ben Lawers. G. Don, 1810.
673. Flava L. Common.
    Var. *lepidocarpa* Tausch. Common.
    Var. *Œderi* Ehr. Rare.
674. Distans L.
    Sub-species fulva Good. Not uncommon, especially in the Highlands.
675. Lævigata Sm. Breadalbane, &c.
676. Binervis Sm. Common in the Silurian district; rarer or overlooked in the Devonian.
677. Sylvatica Huds. Local.
678. Vesicaria L.
    i. Sub-species vesicaria. Very local or overlooked. Meikleour, &c.
    Var. *Grahami* Boot. Reported from Ben Cruban, Killin.
    ii. Sub-species saxatilis L. Breadalbane and Rannoch, but local.
679. Ampullacea Good. Common.
680. Paludosa Good. Local.

GRAMINEÆ.

CCXCIV. NARDUS L.

681. Stricta L. Common.

CCXCV. PHLEUM L.

682. Pratense L. Common.
    Var. *nodosum* L. Abundant.
683. Alpinum L. Ben Lawers.

CCXCVI. ALOPECURUS L.

684. Alpinus Sm. Very rare. Glen Tilt.
    Var. *Watsonii* Bosw. Very rare. Glen Tilt.
685. Pratensis L. Common.
686. Geniculatus L. Common.

CCXCVII. PHALARIS L.

687. Canariensis L. A casual, on town rubbish-heaps.
688. Arundinacea L. Common.

CCXCVIII. ANTHOXANTHUM L.

689. Odoratum L. Common.

CCXCIX. SESLERIA Scop.

690. Cærulea Scop. Breadalbane. Very local.

CCC. AGROSTIS L.

691. Canina L. Common.
692. Vulgaris With. Common.
Var. *pumila* L. Not uncommon on the hills.
693. Alba L. Common.
Var. *stolonifera* L. Not uncommon.

CCCI. MILIUM L.

694. Effusum L. Very local.

CCCII. CALAMAGROSTIS Adans.

695. Epigeios Roth. Very local. Dunkeld.

CCCIII. AIRA L.

696. Flexuosa L. Common.
Var. *montana* L. On the hills.
Var. *voirlichensis* Cosmo Melvill, *MS.* Spikelets with three perfect flowers. Ben Voirlich.
697. Setacea Huds. Rare. Ben Bhrackie.
698. Cæspitosa L.
i. Sub-species cæspitosa. Common.
Var. *brevifolia* Parn. On the hills, and on the banks of the Tay.
ii. Sub-species alpina L. On the hills. Rare.
699. Caryophyllea L. Common.
700. Præcox L. Common.

CCCIV. AVENA L.

701. Fatua L. Rare, and sporadic.
702. Pratensis L. Local.
Var. *alpina* Kunth. On the hills.
703. Pubescens L. Very local. Bonhard.

704. Flavescens L. Local. Doubtfully native.
705. Elatior L. Common.
Var. *bulbosa* Willd. Common.

CCCV. HOLCUS L.

706. Lanatus L. Common.
707. Mollis L. Not uncommon.

CCCVI. TRIODIA Br.

708. Decumbens Beauv. Not uncommon.

CCCVII. PHRAGMITES Trin.

709. Communis Trin. Common.

CCCVIII. MELICA L.

710. Nutans L. Local, but not uncommon.
711. Uniflora Retz. Often with *nutans*.

CCCIX. DACTYLIS L.

712. Glomerata L. Common.

CCCX. KŒLERIA Pers.

713. Cristata Pers. Not uncommon.

CCCXI. MOLINIA Schrank.

714. Cærulea Mœnch. Not uncommon.
Var. *depauperata* Lindl. Not uncommon.

CCCXII. POA L.

715. Annua L. Common.
716. Pratensis L. Common.
Var. *subcærulea* Sm. Athole.
717. Compressa L. Local and rare.
718. Trivialis L. Common.
719. Nemoralis L. Common.
i. Sub-species nemoralis. Common.
Var. *angustifolia* Bab. Not uncommon.
Var. *coarctata* Gaud. Rare or local.
ii. Sub-species Balfourii Parn. Breadalbane.
Var. *montana* Parn. Breadalbane, &c.
iii. Sub-species glauca. Sm. Ben Lawers.
720. Alpina L. Breadalbane, Athole, &c., but local.

CCCXIII. CATABROSA Beauv.

721. Aquatica Beauv. Rare.

CCCXIV. GLYCERIA Br.

722. Aquatica Sm. Abundant along the lower parts of the Tay and Earn; rarer elsewhere.

723. Fluitans Br.
i. Sub-species fluitans. Common.
ii. Sub-species plicata Fr. Local or rare.

CCCXV. SCLEROCHLOA Beauv.

724. Distans Bab. Invergowrie.

CCCXVI. BRIZA L.

725. Media L. Common.

CCCXVII. FESTUCA L.

726. Elatior L. Local.
727. Pratensis Huds. Common.
728. Gigantea Vill. Local but not uncommon.
729. Sylvatica Vill. Local and rare.
730. Ovina L.
i. Sub-species ovina. Common.
Var. *glauca*. More local.
ii. Sub-species duriuscula L. Common.
iii. Sub-species rubra L. Not uncommon.
731. Myurus L.
Sub species sciuroides Roth. Somewhat local.

CCCXVIII. BROMUS L.

732. Asper Murr. Somewhat local.
733. Sterilis Huds. Rare, except in Gowrie.
734. Racemosus L.
Var. *commutatus* Schrad. Not common.
735. Mollis L. Common.
Var. *glabrescens* Bosw. Kinnoull.

CCCXIX. CYNOSURUS L.

736. Cristatus L. Common.

CCCXX. BRACHYPODIUM Beauv.

737. Sylvaticum R. and S. Not uncommon.

CCCXXI. TRITICUM L.

738. Caninum Huds. Common.

739. Repens L.
Sub-species repens. Common.
Var. *barbatum*. Local.

CCCXXII. LOLIUM L.

740. Perenne L. Common. *L. italicum* A. M. is a cultivated form.

741. Temulentum L. Once at Pitkaithly.

CCCXXIII. HORDEUM L.

742. Murinum L. Very local. Kinfauns.

FILICES.

CCCXXIV. HYMENOPHYLLUM Sm.

743. Unilaterale Willd. Local, and almost confined to the Silurian districts.

CCCXXV. PTERIS L.

744. Aquilina L. Common.

CCCXXVI. CRYPTOGRAMME Br.

745. Crispa Br. Local.

CCCXXVII. LOMARIA Willd.

746. Spicant Desv. Common.

CCCXXVIII. ASPLENIUM L.

747. Ruta-muraria L. Rather local, and chiefly in the Lowlands.
748. Germanicum Weiss. Very rare. Dunkeld.
749. Septentrionale Hiell. Rare. Dunkeld.
750. Trichomanes L. Common.
751. Viride Huds. Not uncommon in the Highlands.
752. Adiantum-nigrum L. Not uncommon.

CCCXXIX. ATHYRIUM Roth.

753. Filix-fœmina Roth. Common. Many forms occur.

CCCXXX. CETERACH Willd.

754. Officinarum Willd. Very local, and chiefly on the Sidlaw hills.

CCCXXXI. SCOLOPENDRIUM Sw.

755. Vulgare Sm. Very local and rare.

CCCXXXII. WOODSIA Br.

756. Hyperborea Br. On several hills in Breadalbane, and also near Crieff.
757. Ilvensis Br. Reported from Ben Lawers.

CCCXXXIII. CYSTOPTERIS Bernh.

758. Fragilis Bernh.
Sub-species fragilis. Common.
Var. *dentata* Hook. Common on the hills.
Var. *Dickieana* Sim. Said to have been found at Dunkeld.
759. Montana Link. Widely distributed in Breadalbane, and not rare, but very local.

CCCXXXIV. ASPIDIUM Sw.

760. Lonchitis Sw. On the Silurian hills, but local.
761. Aculeatum Sw.
i. Sub-species lobatum Sw. Common.
Var. *lonchitidioides* is a young state.
ii. Sub-species aculeatum. Reported, but perhaps more properly referred to *lobatum.*
iii. Sub-species angulare Willd. Reported from the Ochils.

CCCXXXV. NEPHRODIUM Rich.

762. Filix-mas. Rich. Common.
Var. *Borreri* Newm. Not uncommon.
763. Spinulosum Desv.
i. Sub-species spinulosum. Not uncommon.
ii. Sub-species dilatatum Desv. Common.
Var. *nanum* Newm. On the hills.
764. Oreopteris Desv. Common in the Highlands; rarer in the Lowlands.

CCCXXXVI. POLYPODIUM L.

765. Vulgare L. Common.
766. Phegopteris L. Common.
767. Dryopteris L.
i. Sub-species dryopteris. Common.
ii. Sub-species Robertianum Hoff. Formerly near Aberfeldy, now extinct.

768. Alpestre Hoppe.
i. Sub-species alpestre. On the richer hills, but not general.
ii. Sub-species flexile Moore. Ben Aulder.

CCCXXXVII. OSMUNDA L.

769. Regalis L. Chiefly in the south-west.

CCCXXXVIII. OPHIOGLOSSUM L.

770. Vulgatum L. Very local or overlooked.

CCCXXXIX. BOTRYCHIUM Sw.

771. Lunaria Sw. Not uncommon.

EQUISETACEÆ.

CCCXL. EQUISETUM L.

772. Arvense L. Common.
773. Pratense Ehr. Local, but very widely distributed. Not in marshes, but near streams in well drained places.
774. Sylvaticum L. Not uncommon.
775. Palustre L. Common.
Var. *polystachyon*. Breadalbane.
Var. *nudum* D.C. On the hills.
776. Limosum L. Common.
Var. *fluviatile* L. Common.
777. Hyemale L. Very local. Stobhall, &c.
778. Variegatum Schl. Rare. Glen Tilt.

LYCOPODIACEÆ.

CCCXLI. LYCOPODIUM. L.

779. Clavatum L. Not uncommon.
780. Annotinum L. Breadalbane, Athole, and Rannoch.
781. Alpinum L. Not uncommon in the Highlands; rarer in the Lowlands.
782. Inundatum L. Rare. Dunkeld, &c.
783. Selago L. Common in the Highlands; rarer in the Lowlands.

SELAGINELLACEÆ.

CCCXLII. SELAGINELLA Beauv.

784. Selaginoides Gray. Not uncommon on the hills.

CCCXLIII. ISOETES L.

785. Lacustris L.
Sub-species lacustris. Common in many of the Highland lochs. The other sub-species—*echinospora*—should be looked for.

MARSILEACEÆ.

CCCXLIV. PILULARIA L.

786. Globulifera L. Local, and chiefly in the Lowlands.

ADDENDA.

The following genera were omitted:—

CXLI.* SERRATULA D.C.

311.* Tinctoria L. and var. *monticola* Bor. Near Comrie (J. Cosmo Melvill). Native (?)

CXLIX.* BIDENS L.

326.* Cernua L. Very local, and not common. Stormont Loch, Dunning, &c.

326.** Tripartita L. Very local, and not common. Cluny Loch, Aberuthven, Blairdrummond Moss, &c.

CLXI.* ARNOSERIS Gœrtn.

348.* Pusilla Gœrtn. Corn-fields near Invermay (Winch in Linnean Society's Herbarium). An introduction which, though not recently found, may be looked for elsewhere.

The following species have been reported :—

CLXIV. LEONTODON L.

351.* Hispidus L. Near Blair-Athole, perhaps introduced (G. C. Druce).

CLXVII. CREPIS L.

355.* Hieracioides W. and K. Near Blair Athole (G. C. Druce).

CLXIX. HIERACIUM L.

363. Lawsoni Sm.
ii. Sub-species iricum Fr. Ben Chonzie (J. Cosmo Melvill).

365. Sylvaticum Sm.
ii. Sub-species tridentatum Fr. Aberuchill 1875 (J. Cosmo Melvill).

219. *Saxifraga rivularis* L. Mr W. West has sent me a specimen gathered by himself on Ben Lawers in 1880.

386. *Pyrola rotundifolia* L. Having had an opportunity of consulting the late Mr H. C. Watson's herbarium, now at Kew, I find that the entry in Topographical Botany of Mid Perth for the species is based on a specimen collected at "Dunkeld" by J. G. Lyon, and sent out by the Botanical Society of London in 1840. I hope some one may rediscover it at Dunkeld.

From the list just concluded, it appears that in Perthshire there are 792 species of flowering-plants and ferns, representing 348 genera. If, however, for the sake of comparison with the London Catalogue of British Plants, we count the sub-species as species, we arrive at a total of 876 species out of 1665 enumerated in the London Catalogue.

The Flora of Arbroath and its Neighbourhood.—The little book, of which the above is the title, and which in its "get-up" is extremely creditable to Arbroath, has been prepared by a Committee of the Arbroath Horticultural and Natural History Association, and while (as we learn from the preface) not professing to have any very high scientific value, will yet, we are persuaded, amply fulfil the objects for which it has been compiled. The district embraced by the flora is the space included by the triangle that would be formed by a line drawn from Montrose to Forfar and from Forfar to Dundee, the sea-coast making the third side. As the species are not numbered, nor any census given, we are unable to say how many plants are grown within these boundaries; but from a rough calculation, we judge that about 500 flowering-plants and ferns are enumerated, from which we imagine that the list is not very far from complete. That it is not absolutely complete, may be gathered from the fact that such plants as *Cardamine sylvatica*, *Cerastium semidecandrum*, *Myosotis collina*, &c., are not enumerated. In addition to the flowering-plants, lists of mosses, lichens, and sea-weeds are given. As regards these, and in some measure but not to the same extent as regards the flowering-plants, we think it a great mistake to coin, or at least endeavour to perpetuate, what are known as "English names." The young botanist, however ignorant he may be of Latin, will find it quite as easy to remember the scientific names (which sooner or later he must make himself acquainted with), as to endeavour to get up the grotesque combination of English and Latin, facetiously called "popular names."

ZOOLOGY.

THE LEPIDOPTERA OF ORKNEY, SHETLAND, AND THE OUTER HEBRIDES.

By F. BUCHANAN WHITE, M.D., F.L.S.

(*Continued from page* 291.)

Apamea unaminis. *Orkney.
,, gemina. Orkney, Outer Hebrides.
,, basilinea.
Mamestra furva. Orkney, Shetland.
,, brassicæ. *Orkney.
Caradrina cubicularis. Orkney, Shetland.
Rusina tenebrosa. Outer Hebrides.
Agrotis suffusa. Orkney, Outer Hebrides.
,, porphyrea.
,, pyrophila. Orkney.
Triphæna orbona. Orkney, Outer Hebrides.
,, pronuba.
Noctua glareosa. Orkney.
,, augur. Orkney.
,, C nigrum.
,, brunnea. Outer Hebrides.
,, festiva. Orkney.
,, ,, var. conflua.
,, baia. Outer Hebrides.
,, Dahlii. Orkney.
,, neglecta. Orkney.
,, xanthographa. Orkney.
Pachnobia hyperborea. Shetland.
Tæniocampa gothica. Orkney.
Xanthia ferruginea. Orkney.
Dianthæcia conspersa. Shetland.

Epunda lutulenta var. lunebergensis. Orkney.
„ viminalis. Orkney.
Aplecta occulta.
Phlogophora meticulosa. *Orkney.
Euplexia lucipara. *Orkney.
Hadena adusta.
„ glauca. Orkney.
„ dentina.
„ thalassina. Orkney, Outer Hebrides.
„ pisi. *Orkney.
Calocampa vetusta. Orkney.
„ exoleta. Orkney.
Abrostola urticæ. *Orkney.
Plusia gamma. Orkney, Shetland.
„ iota. *Orkney.
„ pulchrina. *Orkney.
Stilbia anomala. Orkney.
Anarta melanopa. Shetland.
„ myrtilli. *Orkney.
Odontopera bidentata. Outer Hebrides.
Boarmia repandata. Outer Hebrides.
Dasydia obfuscata. Outer Hebrides.
Scodiona belgiaria. Orkney, Outer Hebrides.
Fidonia atomaria. Orkney, Outer Hebrides.
Oporabia filigrammaria. Orkney.
Cheimatobia brumata. *Orkney.
Larentia didymata.
„ cæsiata.
„ salicata. Orkney.
„ pectinitaria. Orkney.
Emmelesia albulata.
„ ericetata. Orkney.
„ blandiata. Orkney.
Eupithecia venosata. Orkney, Shetland.
„ satyrata. Orkney, Outer Hebrides.
„ lariciata. Outer Hebrides.
„ nanata.
„ vulgata. Outer Hebrides.
„ sobrinata. Orkney.
„ minutata. *Orkney.
„ pumilata. Orkney, Outer Hebrides.
„ n. sp. ? Outer Hebrides.

Thera simulata. Orkney.
„ variata. Outer Hebrides.
Ypsipetes ruberata. Orkney.
„ elutata. Orkney.
„ impluviata. Outer Hebrides.
Melanthia ocellata. Orkney.
Melanippe hastata. Outer Hebrides.
„ sociata. Orkney.
„ montanata.
„ fluctuata. *Orkney, Shetland.
Coremia munitata Orkney, Shetland.
„ propugnata. *Orkney.
„ ferrugata. Outer Hebrides.
Camptogramma bilineata.
Cidaria miata. Orkney.
„ russata. Orkney, Outer Hebrides.
„ immanata. Orkney, Shetland.
„ suffumata. Outer Hebrides.
„ testata. Orkney, Shetland.
„ populata. Orkney.
„ fulvata. Orkney.
„ prunata. *Orkney.
Carsia imbutata. Orkney, Shetland.
Anaitis plagiata. Orkney.
Herbula cespitalis. Orkney.
Scopula lutealis. Orkney.
„ prunalis. Orkney.
Stenopteryx hybridalis. Orkney.
Scoparia ambigualis. Shetland.
„ atomalis. Orkney.
„ murana. Outer Hebrides.
„ angustea. Outer Hebrides.
„ alpina. Orkney, Shetland.
Crambus pratellus.
„ culmellus.
„ margaritellus. Outer Hebrides.
Amphisa Gerningiana. *Shetland.
Tortrix icterana. Outer Hebrides.
Peronea caledoniana. Orkney.
„ variegana. Orkney.
„ hastiana. Orkney.
Teras caudana. Orkney.

Teras contaminana. Orkney.
Dictyopteryx Lœflingiana. Orkney.
Pardia tripunctana. Outer Hebrides.
Penthina marginana. Orkney.
Sericoris littoralis. Orkney, Shetland.
,, urticana. Outer Hebrides.
Sciaphila Penziana. Outer Hebrides.
Mixodia Schulziana.
Cnephasia musculana. Orkney, Shetland.
Clepsis rusticana. Orkney.
Bactra lanceolana. Orkney, Shetland.
Phoxopteryx unguicana.
,, myrtillana. Orkney.
Grapholitha Campoliliana. Orkney, Outer Hebrides.
,, Penkleriana. Orkney.
Phœodes tetraquetrana. Orkney.
Hypermecia cruciana. Orkney.
Pœdisca Solandriana. Orkney.
,, sordidana. Orkney.
Ephippiphora Pflugiana. Orkney.
Coccyx hyrciniana. Outer Hebrides.
Pamplusia monticolana. Orkney.
Catoptria ulicetana.
Dichrorampha tanacetana. Shetland.
Xylopoda Fabriciana. Orkney.
Eupœcilia angustana. Orkney.
,, ciliella. Orkney.
,, thuleana. Shetland.
Argyrolepia Baumanniana. Orkney.
,, cnicana. Orkney, Shetland.
Aphelia pratana. Orkney, Shetland.
Tinea rusticella. Shetland.
Gelechia ericetella. Shetland.
Glyphipteryx cladiella. Shetland.
Endrosis fenestrella. *Shetland.
Œcophora pseudospretella. *Shetland.

To these must be added—
Vanessa urticæ. *Orkney—
which Dr Boswell tells me he has taken.

Of the 175 species given in the above list, 137 are found in Orkney, 59 in Shetland, and 62 in the Outer Hebrides; but 24

species only are common to all the three groups of islands. Orkney has 77 species that have not yet been detected in Shetland or the Outer Hebrides; while Shetland has 14, and the Outer Hebrides 23 species not found in the other islands. To Orkney and Shetland 21 species are common which have not been seen in the Outer Hebrides; while the latter group and Orkney have in common 15 species not in Shetland. On the other hand, Shetland and the Outer Hebrides have no species in common that are not also in Orkney. It is extremely likely that further investigation will add more or less to the number of species in each group—probably adding considerably to the number of Hebridean species—but at the same time it is possible that the relative proportions will not be very greatly disturbed.

Before proceeding to inquire into the origin of the fauna of each of the groups, it will be desirable to glance at some peculiarities presented by many of the species, as indicated by Mr Jenner Weir in the papers already cited.

Hepialus humuli.—In Shetland the very peculiar form, *Hethlandica* Stgr., in which the male, instead of having immaculate silvery-white wings, shows a greater or less tendency to assume the very different coloration of the female, is not uncommon, but ordinary-coloured males also occur. In Orkney and the Hebrides the male is of the normal colour. The females are normal in all the groups of islands.

Chelonia plantaginis.—Both in Shetland and Orkney there is a tendency to have the upper wings marked with pale yellow, and the lower wings a dark yellow.

Dasypolia templi.—A light variety occurs in Shetland, as also a darker variety.

Noctua festiva, *N. Dahlii*, and *N. rubi*, are in Orkney very similar, the prevailing colour being a ruddy brown.

Dianthœcia conspersa.—In Shetland much darker than usual.

Aplecta occulta.—In Shetland this is pale like the southern type, and not dark as in the Scottish Highlands.

Anarta melanopa.—In Shetland the front wings are yellower than in Rannoch examples.

Boarmia repandata presents in the Outer Hebrides a well-defined local variety (*sodorensium*), in which the wings (especially in the female) are leaden grey with darker markings, but with little or no trace of brown.

Dasydia obfuscata.—In the Outer Hebrides lighter than usual.

Larentia didymata.—In Shetland and the Outer Hebrides darker than usual; in Orkney lighter than usual.

Emmelesia albulata in Shetland departs very much from the ordinary form, the colour being "luteous lead-colour" and the markings more or less obliterated. The name var. *Thules* has been proposed for this form. In Orkney the colour is normal, but in the Outer Hebrides there occurred along with ordinarily coloured specimens several pure white specimens, to which the name var. *Hebridium* has been given.

Eupithecia venosata.—Normal in Orkney, but in Shetland of a dull lead-colour, with the markings often ill defined.

Melanippe montanata.—Normal in Orkney. In Shetland presents a well-defined variety (*Shetlandica*) in which the median band is much broken up and the hind wings streaked with narrow dark lines, the ground-colour being pale or dark. In the Outer Hebrides the specimens are small and the ground-colour suffused with grey, but the median band is not broken up.

Camptogramma bilineata.—In Shetland this is of a pale straw colour, but, as usual, the markings vary in intensity. In the Outer Hebrides there is a grey look about the front wings.

Cidaria russata.—Very variable in Orkney. On the other hand, in the Outer Hebrides there is a striking uniformity in the coloration—the more remarkable as this insect is usually so variable—grey and black being the prevailing colours, and the usual red markings being very faintly shown. The size also is smaller than usual.

Though the above are the more striking variations afforded by individual species, yet if collections from each of the three groups of islands are examined, they present, when compared *inter se*, certain noteworthy features. The Orkney insects differ very little, if at all, from those of the north of Scotland in general appearance, nor, considering the proximity of Orkney to Scotland, ought we to expect this to be otherwise. The Outer Hebridean insects are more differentiated than the Orcadian, and amongst them, especially in the Geometræ, the prevailing colour is grey. In the Shetlandic insects the most striking feature is not only a wider range of variation in colour, but that some of the species have diverged into very well defined varieties.

The special features of the insects of each group is just what we might reasonably expect. Of the three groups the Orkneys are not only the one most recently insulated, but from their proximity to the coast of Scotland it is almost certain that in-

sects may, with favourable winds, be carried across the Pentland Firth. In this way additions may not only be made to the list of species, but—what would tend greatly to prevent the development of insular varieties—individuals of already existent species would introduce fresh blood.

The Outer Hebrides, on the other hand, are more remote, and have been longer isolated. Into them, also, it is not impossible that occasionally new colonists are introduced, but much more rarely than into the Orkneys. Hence there have been time and opportunities for the development of local races, and, as Mr Jenner Weir remarks, the environment has been very favourable for such development.

In the "battle of life" insects of the order Lepidoptera rarely depend upon weapons of offence or defence for protection from their numerous enemies, but by the assimilation of their colour or shape to those of neighbouring objects. Hence the green ground-colour and lines, bands, and spots of many caterpillars; the mottled grey, black, and white of the wings of moths that rest on tree-trunks; the mimicry of bits of stick and withered leaves that others present; and the numerous other contrivances of protective resemblance. No one of course believes that insects *consciously* assume these colours and forms. Such protective resemblances are gradually brought about by the law of natural selection, whereby the species or varieties best fitted for the locality will survive, and those less fitted perish. Now a form that in one locality will be the fittest will in another be less adapted for the surroundings, and unless natural selection intervenes, will probably soon perish. When natural selection intervenes its action is this. All species have a greater or less tendency to variation. Those individuals which vary — be it ever so little — in the direction of a greater protective resemblance, will survive and propagate the species when other less favoured individuals fall a prey to enemies. In the next generation this resemblance will be more intensified in some individuals than in others, and the same weeding process will go on. This will be repeated generation after generation, till in course of time the whole race has acquired the protective form or colour, and any relapses to the ancestral type (which will probably occasionally occur) will be more readily discovered (being less protected) by enemies, and hence not have an opportunity of reproducing their like. The insects of the Outer Hebrides show many examples of this law of nature. As an instance we

will take the case of *Boarmia repandata.* This insect is grey, with a brownish tint, and its wings more or less traversed by darker lines and bands. As a rule it rests on the trunks of trees, and its colours very much resemble the bark, and so protect it from observation. In the Outer Hebrides, however, there are now no indigenous trees, though there were probably such when *Boarmia repandata* first arrived there. When the trees got scarcer the insect would have to repose on other objects, such as stones. On these its colour would be no protection, and consequently it would fall an easier prey to its enemies. But those individuals which more resembled the stones in colour would be less readily detected, and hence, in course of time, the colours of all the Hebridean race of *Boarmia repandata* would become modified till they became as they are at the present day—namely, leaden-grey, with darker markings, and rarely a very faint trace of brown, resembling very closely the gneiss rock on which the insects rest. Thus has been brought about the grey colour, which is a striking feature of many of the Hebridean insects.

The Shetland Isles are, as we have seen, the most remote of the three groups from the mainland of Scotland. They were also the first to become islands, and were hence cut off at a comparatively early period from the north-flowing stream of immigrants that peopled the other islands. New immigrants at the present day must also be of rare occurrence. From this it follows that the number of species in the Shetlands is small, and that those that are there have fewer competitors to contend with, and probably fewer enemies to protect themselves from. Under these circumstances more and better defined varieties have arisen and survived.

It is very much to be desired that something should be learned of the insects of the Faroe Islands. These, as well as Iceland, derived their fauna and flora from Britain, and should, for scientific purposes, be considered as forming part of it.

Endromis versicolor.—Two fine specimens, now in the collection of Mr George Sim, Gourdas, Fyvie, were taken on birch at Ballater in May 1880, by Mr Alexander Chivas, policeman, a local entomologist.—L. D. DUNBAR, Wick.

PHYTOLOGY.

REDISCOVERY OF CALTHA RADICANS.

By WALTER GRAHAM.

THIS very rare and interesting plant was discovered by Don in 1790. He sent it to London to Sir Joseph Banks, who recognised in it specific characters, and named it *radicans*, from its strong tendency to root at all the nodes. Its rediscovery two years ago occurred under the following circumstances: In a letter about something else, Mr Babington writes me of date 3d June 1880, "There is a matter in your county which very much needs determination. *Caltha radicans* was found by Don ninety years ago, on the estate of Carse, near Forfar. It is now known only in cultivation in a very few gardens. If it could be found again it would be very satisfactory indeed. If you can get any information on the matter you would be doing good service to botany." Several days later he adds: "The Caltha has not been found in any other spot in the whole world, and if Don did not find it" in a wild state, "its history is a complete puzzle." I went to Don's station in search, without result. The place has been so much altered by drainage, that the difficulty now is to find suitable conditions there. Having failed at Hatton of Carse, I set to work here, on the margins of Rescobie Loch, and in the adjoining marshes and ditches, where *Caltha* grows abundantly. On June 12, 1880, after much looking, I was so fortunate as to find a late-flowering plant something like what the descriptions of the manuals indicate. I continued to look about for a fortnight without finding anything better,—finding, indeed, very little else that would do. On writing Mr Babington, and sending him rooted pieces at his request, he replied that he thought I had got the right plant, but gave no definite opinion till he should see it growing. This completed all that was possible in 1880. In May of last year he writes: "We have the *Caltha* growing well. They have

flowered. I think that they are the true *radicans*, although, like you, I have had (and still have) some little doubt. It may be that *radicans* is not different from *palustris minor*. But that is a mountain plant. The leaves of your plant are very peculiar." Having observed that our plant had spreading carpels, while the *minor* is described as having its carpels erect, I requested Mr Babington to examine the carpels of his plant. He replied that it had not produced carpels, and on my sending him matured fruits upon their stalks, he writes: "There can be no doubt of the spreading character of these fruits, which you have so kindly sent. If the description of the fruit of *C. minor* is correct, there can be no question of these *not* being like them. I see this is a rooting plant, and so is in all probability the *C. radicans* of all authors."

Having studied leaf-character more than any other point, and with little satisfaction, I was still very far from being convinced,—thinking the plant rather an extreme form than a separate species. I had found it quite impossible to draw a definite line anywhere in regard to the leaf. For example, the serration of the margin cannot be relied on as a character of one plant only. I have frequently seen very acute serration in a coarse *palustris*. Dependent I think upon situation, the leaf of *palustris* is extremely variable. In regard to the flower, it is difficult to say sometimes whether the sepals ought to be regarded as contiguous or not; and the narrowness of the sepal, as a character for *radicans*, is equally troublesome. As to rooting, my experience is that all *Calthæ* root at one joint at any rate, if not prevented by competing vegetation.

In the presence of so much teasing variation, it is a very remarkable fact that the cultivated plant—that at Kew, for example, one of Don's undoubted specimens—has retained its characters unchanged by ninety years of cultivation. Failing distinctly permanent character, one would have expected such cultivation to have thrown out, or modified something. But this I am assured is not the case.

The Rescobie plant roots at all, or nearly all, the joints. The flower-stalks seek the ground from the first, and before being loaded by the heavy fruit. The radical leaf, and the first at each node, are triangular, and "the base of the leaf is nearly at right angles with the petiole." The outline of the other leaves forms a curvilinear triangle, the two upper sides being convex, and the base concave, or from that to cordate. If

cordate, the lobes will be much less heavy than in the typical *palustris*,—will seldom approach, and never overlap. I think the peculiar triangular leaf is deciduous, withering soon after the seed is discharged. Unlike the variety *Guerangerii* of *palustris*, the carpel beaks of our plant cannot be described as long; unlike variety *minor*, its carpels are divaricately arranged, and its only known station has an elevation of scarcely over 200 feet. *Palustris* in its ordinary condition is a larger, coarser plant, with leaves which are less flat, and of different outline. But the rooting, as the name implies, is the important point of difference. The other plants root, so far as I have been able to make out, at about one joint. The leaves are no doubt peculiar, but the common *palustris* and the *minor* tone in at every character of the leaf. The non-contiguous sepal is the character which is most easily noticed. It was that principally which led to the rediscovery.

Mr Druce, of Oxford, was here two weeks ago. He knows the plant at Kew. When I showed him our plant, he at once said (speaking of the leaves), "That is just it;" and afterwards remarked that the closeness was much more striking than he expected to find it. On the 9th current Mr Babington writes: "I have no doubt that we have the true *Caltha radicans* of Don in the place where you have found it. It now remains to be seen if it is in other spots near. I should expect to find it in any bog from which any of the streams flow, or other wet places. It seems best suited for peaty ground where it can run and root on the fairly level ground. I do not at all think that it is the same as the variety *minor* of *palustris*, which is sometimes found among the hills."

RESCOBIE, 31*st August* 1882.

THE GAELIC NAMES OF PLANTS.

BY JOHN CAMERON.

(*Continued from p.* 305.)

APPENDIX.—ADDITIONAL NAMES.

THESE names were either unintentionally omitted, or did not come under my observation until too late for insertion in their proper botanical order.

Airgiod luachra (*Spiræa ulmaria*)—Meadow-sweet, meaning the silvery rush. *Airgiod.* Latin: *argentum.*

Amharag (*Sinapis arvensis*)—Cherlock. From the root *amh*, raw or pungent, and probably corrupted into "*Marag*" *bhuidhe;* also in *Cochlearia officinalis. A'maraich*, for *amharaich*, from the same root, on account of the pungent taste of both plants.

Barr a-bhrigean (*Potentilla anserina*)—Silverweed.

Bath ros (*Rosmarinus officinalis*)—Rosemary. From *bàth*, the sea; and *ròs*, a rose.

Bearnan bearnach (*Taraxacum dens-leonis*)—Dandelion.

Bearnan bealtine (*Caltha palustris*)—Marsh-marigold.

Billeog an spuinc (*Tussilago farfara*)—Coltsfoot.

Biodh an 't sionaidh (*Sedum anglicum*). (*Sionaidh*, a prince, a lord, chief; *biodh*, food.) From the name it is evident that the plant was formerly eaten, and considered a delicacy.

Bior ros (*Nymphæa*)—Water-lily. *Bior*, or its aspirated form *bhir* or *bhior*, meaning water; in Arabic, *bir;* Hebrew, *beer.* From this root comes the name *bhiorag*, a water-plant, and such place and river names as *ver* in Inver, *her* in Hereford, and the river *Wear* in Durham.

Blath nam bodaigh (*Papaver*)—Poppy, meaning the rustic's flower.

Buidhechan-bo-bleacht (*Primula veris*)—Cowslip. The milk-cow's daisies.

Cal Phadruigh (*Saxifraga umbrosa*)—London pride; Peter's kale.

Cannach (*Myrica gale*)—Bog-myrtle. (This name must not be confounded with *canach*, the bog-cotton.) It means any fragrant shrub, pretty, beautiful, mild, soft.

Caorag leana (*Lychnis flos-cuculi*)—Ragged robin. *Caorag*, a spark; and *leana*, a marsh.

Caor con (*Viburnum opulus*)—Dogberry. *Caor*, a berry; *còn*, dog.

Cerrucan (*Daucus carota* and *Sium sisarum*)—Skirrets. Name applied to the roots of these and the next plant.

Curran earraich (*Potentilla anserina*)—Silver-weed; wild skirret.

> "Mil fo thalamh, currain Earraich."
>
> Underground honey, spring carrots.

"Exceptional luxuries. The spring carrot is the root of the silver-weed."—Sheriff Nicolson.

Coirean coilleach (*Lychnis diurna*).

Collaidin ban (*Papaver*)—White poppy.

Corran lin (*Spergula arvensis*)—Spurrey.

Cuirinin (*Nymphæa*)—Water-lily.

Daileag (*Phœnix dactylifera*)—The date-tree.

Dearag thalmhainn (*Fumaria officinalis*)—Fumitory. From *dearg*, red; *thalamh*, earth, ground.

Dearcan dubh (*Ribes nigrum*)—Black currants.

Deochdan dearg (*Trifolium pratense*)—Red clover.

Driuch na muine (*Drosera rotundifolia*)—Sun-dew. *Driuch*, dew; and *na muine*, of the hill.

Dun, lus (*Scrophularia nodosa*)—Figwort, the high plant. According to Bede, *dùn* means a height in the ancient British language; hence the terminations of names of towns, *don* and *ton*.

Eabh (*Populus tremula*)—Aspen. The Gaelic for Eve.

Eanach (*Nardus stricta*).

Easdradh (*Filices*)—Ferns.

Eidheann mu chrann (*Hedera helix*)—The ivy.

> "Gach fiodh 's a' choille
> Ach *eidheann mu chrann* a's fiodhagach."
>
> Every tree in the wood
> Except *ivy* and bird-cherry tree.

Feathlog fa chrann (*Lonicera periclymenum*).

Fib (*Vaccinium vitis idœa*)—Whortleberry.

Fineal ghreugach (*Trigonella*)—Greek fennel.

Fiodh almug (*Santalum album*)—Sandal-wood.

"Agus mar an ceudna loingneas Hiram a ghìulain òr o Ophìr, agus ro mhoran do *fhiodh almuig*."—(STUART) 1 Kings x. 11.

The navy of Hiram brought in from Ophir gold and great plenty of Almug trees.

Fionnach (*Nardus stricta*)—From *fionn*, white.

Fiuran and **giuran** (*Heracleum sphondylium*)—Cow-parsnip.

Fofannan min (*Sonchus oleraceus*)—Sow-thistle. For *fofannan*, see *fothannan*.

Forr dris (*Rosa rubiginosa*)—Sweet-brier.

Fuaim an t' Siorraigh (*Fumaria officinalis*)—Fumitory. *Fuaim*, sound; *an t' Siorraigh*, of the sheriff! Probably only a humorous play on the words "*fumaria officinalis*."

Furran (*Quercus robur*)—The oak.

Gairleach collaid (*Erysimum alliaria*)—Jack-by-the-hedge; meaning hedge garlic.

Gairteog (*Pyrus malus*)—Crab-apple. From *garg*, sour, bitter.

Gall pheasair (*Lupinus*)—Lupin.

Gall uinnseann (*Pyrus aria*)—Quickbeam tree.

Gearr bochdan (*Cakile maritima*)—Sea gilly-flower.

Glaodhran (*Oxalis* and *Rhinanthus crista-galli*)—Meaning a "rattle." Dictionaries give this name to wood-sorrel; in Breadalbane it is applied generally to the yellow rattle.

Glocan (*Prunus padus*)—Bird-cherry. *Glocan* or *glacan*, a prong or fork.

Goirgin garaidh (*Allium ursinum*)—Garlic.

Goirmin searradh (*Viola tricolor*)—Pansy; heart's-ease.

Gran arcain (*Ranunculus ficaria*)—Lesser celandine. *Arc*, a cork, from its cork-like roots.

Leamhnach (*Potentilla tormentilla*) — Common tormentil. Name in Gaelic, meaning "tormenting," from which "*leann-artach*" probably is a corruption.

Leacan,
Loan cat } (*Cotyledon umbilicus*)—Navel-wort.

Lochal mothair (*Veronica beccabunga*)—Brook-lime.

Lusra na geire-boirnigh (*Arbutus uva-ursi*)—Red bear berry, the plant of bitterness. *Geire*, bitterness; and *boirnigh*, feminine. See "*meacan easa fiorine.*"

Lus na meala mor (*Malva sylvestris*)—The common mallow.

Lus mor. Also applied to *Verbascum thapsus*, Mullein, as well as to the foxglove (*Digitalis*).

Lus ros (*Geranium Robertianum*)—Herb Robert; crane's-bill; the rose-wort.

Lus an lonaidh (*Angelica sylvestris*)—Wood angelica. *Lonaidh* is the piston or handle of the churn. The umbelliferous flower has much the appearance of that implement. The common name in Breadalbane.

Lus an t' seann duine—The old man's plant. Name given in some places to "southernwood," *Artemisia abrotanum.*

Lus na seabhag—Hawkweed.

Meacan easa beanine (*Pæonia*)—Female pæony.

Meacan easa fiorine (*Pæonia*)—Male pæony. Old botanists used to distinguish between two varieties of this plant, and named them male and female. This was a mere fanciful distinction, and had no reference to the real functions of the stamens and pistils of plants; but yet there existed a vague idea, from time immemorial, that fecundation was in some degree analogous to

sexual relationship, as in animals — hence such allusions as "*Tarbh, coille,*" "*Dair na coille.*"

Meilise (*Sisymbrium officinale*)—Hedge mustard.

Neandog chaoch (*Lamium*)—Dead nettle; blind nettle.

Onn. Some authorities give this name to *Ulex europæa*, as well as to *Euonymus*. Welsh, *chwyn*—hence Scotch and English *whin*.

Peasair tuilbh (*Orobus tuberosus*)—Bitter vetch.

Ponair churraigh (*Menyanthes*)—Marsh-trefoil, meaning the marsh-bean, bog-bean.

Pis phreachain (*Vicia sativa*)—Pis = peas. *Preachan*, a ravenous bird.

Raibhe (*Raphanus*)—Radish.

Ramasg—Applied to various species of *Fuci*, from *ram*, a branch, an oar = oar-weed.

Reagha maighe, **Reagaim** and **raema** (*Sanicula europæa*)—Wood-sanicle.

Reilige, reilteag (*Geranium Robertianum*)—From *reil* or *reul*, a star.

Rian roighe (*Geranium Robertianum*)—Crane's-bill.

Ros mall (*Althæa rosea*)—Hollyhock.

Rotheach tragha (*Crambe maritima*)—Seakale.

Searbhan muic (*Cichorium endiva*)—Endive.

Seircean mor (*Arctium lappa*)—Burdock.

Seud (*Hypericum*).

Sibhin (*Scirpus lacustris*)—Bulrush.

Son duileag (*Lapsana communis*)—Nipple-wort. *Son*, good; *duileag*, a leaf.

Spriunan (*Ribes nigrum* and *rubrum*)—Currants.

Straif (*Prunus spinosa*)—Sloe.

Sreang thrian (*Ononis arvensis*)—Rest-harrow.

Staoin (*Nepeta glechoma*)—Also applied to ground-ivy in some places, as well as to juniper.

Subh nam ban sithe (*Rubus saxatilis*)—Stone-bramble; the fairy-woman's strawberry.

Toir-pin (*Sempervivum tectorum*)—House-leek; probably the same as *tir-pin*.

Traithnin (*Geum urbanum*)—Geum.

Truim crann (*Sambucus nigra*)—Elder, corruption from *drum*.

Tuile thalmhainn (*Ranunculus bulbosus*)—*Tuile*, a water-course.

Tuimpe—Turnip.

NOTES.

Nasturtium officinale—Water-cress. A curious old superstition respecting the power of this plant as a charm to facilitate milk-stealing was common in Scotland and Ireland. "Not long ago, an old woman was found, on a May morning, at a spring-well cutting the tops of water-cresses with a pair of scissors, muttering strange words, and the names of certain persons who had cows, also the words, "S' liomsa leath do choud sa" (half thine is mine). She repeated these words as often as she cut a sprig, which personated the individual she intended to rob of his milk and cream." "Some women make use of the root of groundsel as an amulet against such charms, by putting it amongst the cream."—MARTIN. Among the poorer classes, water-cress formed a most important auxiliary to their ordinary food. "If they found a plot of water-cresses or shamrock, there they flocked as to a feast for the time."—SPENCER.

Drosera rotundifolia—Sun-dew. *Lus na fearnaich.* "*Earnach*" was the name given to a distemper among cattle, caused, it is supposed, by eating a poisonous herb. Some say the sun-dew—others, again, aver the sun-dew was an effectual remedy. This plant was much employed among Celtic tribes for dyeing the hair.

Linum usitatissimum (*Lìon*).

"Mèirle salainn 's mèirle frois,
Mèirl' o nach fhaigh anam clos;
Gus an teid an t-iasg air tìr,
Cha 'n fhaigh mèirleach an lìn clos."

"This illustrates the great value attached to salt and lint, especially among a fishing population, at a time when the duty on salt was excessive, and lint was cultivated in the Hebrides."—Sheriff NICOLSON.

Hypericum. Martin evidently refers to this plant, and calls it "*Fuga dæmonum.*" "John Morrison, who lives in Bernera (Harris), wears the plant called "*Seud*" in the neck of his coat to prevent his seeing of visions, and says he never saw any since he first carried that plant about with him." Children have a saying when they meet this plant—

"Luibh Cholum Chille, gun sireadh gun iarraidh,
'Sa dheòin Dia, cha bhàsaich mi nochd."

St Columbus-wort, unsought, unasked, and, please God, I won't die to-night.

Shamrock—Wood-sorrel and white clover. The shamrock

is said to be worn by the Irish upon the anniversary of St Patrick for the following reason: When the Saint preached the Gospel to the pagan Irish, he illustrated the doctrine of the Trinity by showing them a trefoil, which was ever afterwards worn upon the Saint's anniversary. "Between May-day and harvest, butter, new cheese, and curds and shamrock, are the food of the meaner sort all this season."—PIERS's 'West Meath.'

Gaelic Alphabet. Antecedent to the use of the present alphabet, the ancient Celts wrote on the barks of trees. The writing on the bark of trees they called *oghuim*, and sometimes trees, *feadha*, and the present alphabet *litri* or letters.

"Cormac Casil cona churu,
Leir Mumu, cor mela;
Tragaid im rìgh Ratha Bicli,
Na *Litri* is na *Feadha*."

Cormac of Cashel with his companions
Munster is his, may he long enjoy;
Around the King of Raith Bicli are cultivated
The LETTERS and the TREES.

The "letters" here signify, of course, our present Gaelic alphabet and writings; but the "trees" can only signify the *oghuim*, letters, which were named after trees indigenous to the country."—Prof. O'CURRY.

Orobus tuberosus (*Corra meille*, M'Alpin, and *cairmeal*, Armstrong) — Bitter vetch — and sometimes called "wild liquorice"—seems to be the same name as the French "*caramel*," burnt sugar; and according to Webster, Latin, "*canna mellis*," or sugar-cane. The fermented liquor that was formerly made from it, called *cairm* or *cuirm*, seems to be the same as the "*courmi*" which Dioscorides says the old Britons drank. The root was pounded and infused, and yeast added. It was either drunk by itself, or mixed with their ale—a liquor held in high estimation before the days of whisky; hence, the word "*cuirm*" signifies a feast. That their drinking gatherings cannot have had the demoralising tendencies which might be expected, is evident, as they were taken as typical of spiritual communion. In the Litany of "Aengus Céilé Dé," dating about the year 798, we have a poem ascribed to St Brigid, now preserved in the Burgundian Library, Brussels.

"Ropadh maith lem corm-lina mor,
Do righ na righ,
Ropadh maith lem muinnter nimhe
Acca hol tre bithe shir."

I should like a great lake of ale
For the King of kings;
I should like the family of heaven
To be drinking it through time eternal.

To prevent the inebriating effects of ale, "the natives of Mull are very careful to chew a piece of '*charmel*' root, finding it to be aromatic—especially when they intend to have a drinking-bout; for they say this in some measure prevents drunkenness." —MARTIN'S 'Western Isles.'

Trees, Thorns. A superstition was common among the Celtic races, that for every tree cut down in any district, one of the inhabitants in that district would die that year. Many ancient forts, and the thorns which surrounded them, were preserved by the veneration, or rather dread, with which the thorns were held; hence, perhaps, the name *sgitheach*, *sgith* (anciently), fear; hence also, *droighionn* (*druidh*), enchantment, witchcraft.

Rubus fruticosus—(*Smearagan*) Blackberries. It was and is, I believe, still a common belief in the Highlands that each blackberry contains a poisonous worm. Another popular belief is—kept up probably to prevent children eating them when unwholesome—that the fairies defiled them at Michaelmas and Halloween.

Pyrus aucuparia—(*Craobh chaoran*) Mountain-ash. The Highlanders have long believed that good or bad luck is connected with various trees. The *caoran* or *fuinnseach coille* (the wood enchantress) was considered by them as the most propitious of trees; hence it was planted near every dwelling-house, and even far up in the mountain-glens, still marking the spot of the old shielings. "And in fishing-boats as are rigged with sails, a piece of the tree was fastened to the haul-yard, and held as an indispensable necessity." "Cattle diseases were supposed to have been induced by fairies, or by witchcraft. It is a common belief to bind unto a cow's tail a small piece of mountain-ash, as a charm against witchcraft."—MARTIN. And when malt did not yield its due proportion of spirits, this was a sovereign remedy. In addition to its other virtues, its fruit was supposed to cause longevity. In the Dean of Lismore's Book there occurs a very old poem, ascribed to Caoch O'Cluain (Blind O'Cloan); he described the rowan-tree thus—

"Caorthainn do bhi air Loch Maoibh do chimid an traigh do dheas,
Gach a ré 'us gach a mios toradh abuich do bhi air.
Seasamh bha an caora sin, fa millise no mil a bhlàth,

Do chumadh a caoran dearg fear gun bhiadh gu ceann naoi tràth
Bleadhna air shaoghal gach fir do chuir sin is sgeul dearbh."

A rowan-tree stood on Loch Mai,
We see its shore there to the south;
Every quarter, every month,
It bore its fair, well-ripened fruit;
There stood the tree alone, erect,
Its fruit than honey sweeter far,
That precious fruit so richly red
Did suffice for a man's nine meals;
A year it added to man's life."

—Translated by Dr M'LAUCHLAN.

Ribes grossularia. The prickles of the gooseberry-bush were used as charms for the cure of warts and the stye. A wedding-ring laid over the wart, and pricked through the ring with a gooseberry thorn, will remove the wart. Ten gooseberry thorns are plucked to cure the stye—nine are pointed at the part affected, and the tenth thrown over the left shoulder.

Meum athamanticum — *Muilceann.* The Inverness local name for this plant, "*Bricin*," is probably named after *St Bricin*, who flourished about the year 637. He had a great establishment at *Tuaim Drecain*. His reputation as a saint and "*ollamh*," or doctor, extended far and wide; to him *Cennfaeladh*, the learned, was carried to be cured after the battle of *Magh Rath*. He had three schools for philosophy, classics, and law. It seems very strange, however, that this local name should be confined to Inverness, and be unknown in Ireland, where St Bricin was residing.

Pastinaca sativa—(*Curran geal*) The white wild carrot, parsnip. The natives of Harris make use of the seeds of the wild white carrot, instead of hops, for brewing their beer, and they say it answers the purpose sufficiently well, and gives the drink a good relish besides.

"There is a large root growing amongst the rocks of this island—the natives call it the '*Curran petris*,' the rock-carrot —of a whitish colour, and upwards of two feet in length, where the ground is deep, and in shape and size like a large carrot." —MARTIN.

Daucus carota—*Curran buidhe.* "The women present the men (on St Michaelmas Day) with a pair of fine garters, of divers colours, and they give them likewise a quantity of wild carrots."—MARTIN.

Sambucus nigra—(*Druman*) The elder. "The common people [of the Highlands] keep as a great secret in curing wounds the leaves of the elder, which they have gathered the first day of April, for the purpose of disappointing the charms of witches. They affix them to their doors and windows."—C. DE IRYNGIN, at the Camp of Athole, June 30, 1651.

Misletoe and ivy were credited with similar powers. "The inhabitants cut withies of misletoe and ivy, make circles of them, keep them all the year, and pretend to cure hectic and other troubles by them."—See Appendix to Pennant's 'Tour.'

"The misletoe," says Valancey, in his 'Grammar of the Irish Language,' "was sacred to the Druids, because not only its berries, but its leaves also, grew in clusters of three united to one stock."

Carduus benedictus—*Fothannan beannuichte*, though applied to "*Marianus*," is probably "*Centaurea benedicta*," and was so called from the many medicinal virtues it was thought to possess. It is a native of Spain and the Levant.

C. heterophyllus—Melancholy thistle. Was said to be the badge of James I. of Scotland. A most appropriate badge; but yet it had no connection with the unfortunate and melancholy history of the Stuarts, but was derived from the belief that a decoction of this plant was a sovereign remedy for madness, which, in older times, was called "melancholy."

The plant generally selected to represent the Scotch heraldic thistle is *Onopordon acanthium*, the cotton-thistle, and, strange to say, it does not grow wild in Scotland. Achaius, king of Scotland (in the latter part of the eighth century), is said to have been the first to have adopted the thistle for his device. Favine says Achaius assumed the thistle in combination with the rue: the thistle, because it will not endure handling; and the rue, because it would drive away serpents by its smell, and cure their poisonous bites. The thistle was not received into the national arms before the fifteenth century.

Quercus robur—*Darach.* The age of the oak-tree was a matter of much curiosity to the old Gaels:—

"Trì aois coin, aois eich;
Trì aois eich, aois duine;
Trì aois duine, aois féidh;
Trì aois féidh, aois fìrein;
Trì aois fìrein, aois craoibh-dharaich."

Thrice dog's age, age of horse ;
Thrice horse's age, age of man ;
Thrice man's age, age of deer ;
Thrice deer's age, age of eagle ;
Thrice eagle's age, age of oak.

"The natives of Tiree preserve their yeast by an oaken wyth, which they twist and put into it, and for future use keep it in barley straw."—MARTIN.

Chrysanthemum leucanthemum — Ox-eye daisy, called in Gaelic "*Breinean brothach.*" *Breinean* or *brainean* also means a king ; Welsh, *brenhin.* The word is now obsolete in the Highlands. The plant was a remedy for the king's-evil.

Achillea millefolium—*Earr thalmhainn.* The yarrow, cut by moonlight by a young woman, with a black-handled knife, and certain mystic words, similar to the following, pronounced—

"Good-morrow, good-morrow, fair yarrow,
And thrice good-morrow to thee ;
Come, tell me before to-morrow,
Who my true love shall be."

The yarrow is brought home, put into the right stocking, and placed under the pillow, and the mystic dream is expected ; but if she opens her lips after she has pulled the yarrow, the charm is broken. Allusion is made to this superstition in a pretty song quoted in the 'Beauties of Highland Poetry,' p. 381, beginning—

"Gu'n dh'eirich mi moch, air madainn an dé,
'S ghearr mi'n earr-thalmhainn, do bhri mo sgéil ;
An dùil gu'm faicinn-sa rùin mo chléibh ;
Ochòin ! gu'm facas, 's a cùl rium féin."

I rose yesterday morning early,
And cut the yarrow according to my skill,
Expecting to see the beloved of my heart.
Alas ! I saw him—but his back was towards me.

The superstitious customs described in Burns's "Halloween" were common among the Celtic races, and are more common on the western side of Scotland, from Galloway to Argyle, in consequence of that district having been occupied for centuries by the Dalriade Gaels.

Fraxinus excelsior—*Craobh uinnseann* (the ash-tree) was a most potent charm for cures of diseases of men and animals—*e.g.*, murrain in cattle, caused, it was supposed, by being stung in the mouth, or by being bitten by the larva of some moth. "Bore a hole in an ash-tree, and plug up the caterpillar in

it, the leaves of that ash are a sure specific for that disease." Martin adds, "the chief remedies were 'charms' for the cure of their diseases."

Verbena officinalis—*Trombhod.* Borlase, in his 'Antiquities of Cornwall,' speaking of the Druids, says: "They were excessively fond of the vervain; they used it in casting lots and foretelling events. It was gathered at the rising of the dog-star."

Corylus avellana—*Càlltuinn. Còl, càl*, in Welsh, signifies loss, also hazel-wood. The Welsh have a custom of presenting a forsaken lover with a stick of hazel, probably in allusion to the double meaning of the word.

Allium porrum—"*Bugha.*" The explanation given by Shaw that this was a name for leek seemed improbable, especially as it was a favourite comparison to the eye "when it is blue or dark." Turning to a passage describing Cormac Mac Airt, I found—

"Cosmail ri *bugha* a shùili,"

which Professor O'Curry renders—

"His eyes were like *slaes*,"—

a far more appropriate comparison. Narcissus, *Lus a chròmchinn* (the bent head), suggests the beautiful lines of Herrick—

"When a daffodill I see
Hanging its head t'wards me,
Guesse I may what I must be:
First, I shall decline my head;
Secondly, I shall be dead;
Lastly, safely burried."

A. ursinum—*Creamh.*

"'Is leigheas air gach tinn
Creamh 'us ìm a' Mhaigh."

Garlic and May butter
Are remedies for every illness.

"Its medicinal virtues were well known; but like many other plants once valued and used by our ancestors, it is now quite superseded by pills and doses prepared by licensed practitioners."—Sheriff Nicolson.

Potamogeton natans—*Duiliasg na h'aibhne.* The broad-leaved pondweed is used in connection with a curious superstition in some parts of Scotland, notably in the West Highlands. "It is gathered in small bundles in summer and autumn, where it is found to be plentiful, and kept until New Year's Day (old

style); it is then put for a time into a tub or other dish of hot water, and the infusion is mixed with the first drink given to milch cows on New-Year's Day morning. This is supposed to keep the cows from witchcraft and the evil eye for the remainder of the year! It is also supposed to increase the yield of milk." —Rev. A. Stewart, Nether Lochaber.

Arundo phragmites—*Cruisgiornach* (*cruisigh*, in Irish, music, song). Reeds were said by the Greeks to have tended to subjugate nations by furnishing arrows for war, to soften their manners by means of music, and to lighten their understanding by supplying implements for writing. These modes of employment mark three different stages of civilisation. The great reed mace (*Typha latifolia*) *cuigeal nam bàn sithe*, is usually represented by painters in the hand of our Lord, as supposed to be the reed with which He was smitten by the Roman soldiers, and on which the sponge filled with vinegar was reached to Him.

Oats—*Coirc.* Martin mentions an ancient custom observed on the 2d of February. The mistress and servant of each family take a sheaf of oats and dress it in woman's apparel, put it in a large basket, with a wooden club by it, and this they call *Briid's* bed. They cry three times Briid is come, and welcome. This they do before going to bed, and when they rise in the morning they look at the ashes for the impress of Briid's club there; if seen, a prosperous year will follow.

Algæ—*Feamainn.* The inhabitants of the Isle of Lewis had an ancient custom of sacrificing to a sea-god called "Shony" at Hallowtide. The inhabitants round the island came to the church of St Mulvay, each person having provisions with him. One of their number was selected to wade into the sea up to the middle, and carrying a cup of ale in his hand, standing still in that position, crying out with a loud voice, "Shony, I give you this cup of ale, hoping you will be so kind as to send us plenty of sea-ware for enriching our ground the ensuing year." And he then threw the cup into the sea. This was performed in the night-time; they afterwards returned to spend the night in dancing and singing.

Shony (Sjoni), the Scandinavian Neptune. This offering was a relic of pagan worship introduced into the Western Isles by the Norwegians when they conquered and ruled over these islands centuries ago.

K'Eogh's Works.—The Rev. John K'Eogh wrote a work on the plants of Ireland, 'Botanalogica Universalis Hibernia,' and

another on the animals, 'Zoologica Medicinalis Hibernia,' about the year 1739, giving the Irish names as pronounced by the peasantry at that period. They are now rare works, and are of no value save for the names, for they contain no information except the supposed medicinal virtues of the plants and animals given in them.

All creatures, from the biggest mammal to the meanest worm, and all plants, were supposed to have some potent charm or virtue to cure disease. A large number of K'Eogh's prescriptions are compounds of the most disgusting ingredients. We can only now smile at the credulity that would lead any one to imagine that by merely looking at the yellow-hammer (*Emberiza citrinella*) "by any one who has the jaundice, the person is cured, but the bird will die." Or that "the eyes drawn entire out of the head of a hare taken in March, and dried with pepper, and worn by women, will facilitate childbirth."

He gives this singular cure for the jaundice: "A live moth, laid on the navel till it dies, is an excellent remedy! Nine grains of wheat *taken up by a flea*, are esteemed good to cure a chincough—that insect is banished and destroyed by elder leaves, flowers of pennyroyal, rue, mint, and fleabane, celandine, arsmart, mustard, brambles, lupin, and fern-root." For worms: "Take purslane seeds, coralina, and St John's-wort, of each an equal part; boil them in spring water. Or take of the powders of *hiera picra* (*Picris hieracioides*), of the seeds of the bitter apple, of each one dram, mixed with the oil of rue and savin, *spread on leather*, and apply it to the navel; this is an approved remedy." Epilepsy—"The flesh of the moor hen, with rosemary, lemons, lavender, and juniper berries, will cure it." And for children—"Take a whelp (*cullane*), a black sucking puppy (but a bitch whelp for a girl), strangle it, open it, and take out the gall, and give it to the child, and it will cure the falling-sickness." One more example will sufficiently illustrate the value of K'Eogh's books. "'Usnea capitis humani, or the moss growing on a skull that is exposed to the air, is a very good astringent, and stops bleeding if applied to the parts, *or even held in the hand.*"

Ollamh. This was the highest degree, in the ancient Gaelic system of learning, and before universities were established, included the study of law, medicine, poetry, classics, &c. A succession of such an order of *literati*, the Beatons, existed in Mull from time immemorial, until after the middle of last century.

Their writings were all in Gaelic, to the amount of a large chestful. Dr Smith says that the remains of this treasure were bought as a literary curiosity for the library of the Duke of Chandos, and perished in the wreck of that nobleman's fortune. If this lost treasure could be recovered, we would have valuable material for a more complete collection of Gaelic names of plants, and information as to the uses to which they were applied, than we now possess.

Medicinal Plants.—The common belief that a plant grew not far from the locality where the disease prevailed, that would cure that disease, led to many experiments which ultimately resulted in finding out the undoubted virtues of many plants; but wholesale methods were frequently adopted by gathering all the herbs, or as many as possible, in that particular district and making them into a bath.

At the battle of "Magh Tuireadh," we are informed "that the chief physician prepared a healing bath or fountain with the essences of the principal herbs and plants of Erinn, gathered chiefly in *Lus-Magh*, or the Plain of Herbs; and on this bath they continued to pronounce incantations during the battle. Such of the men as happened to be wounded in the fight were immediately plunged into the bath, and they were instantly refreshed and made whole, so that they were able to return and fight against the enemy again and again."—Prof. O'Curry.

Incantations with Plants.—Cures by incantations were most common. A large number of plants were thus employed. When John Roy Stewart sprained his ankle, when hiding after the battle of Culloden, he said:—

"Ni mi'n ubhaidh rinn Peadar do Phàl,
'S a lùighean air fàs leum bruaich,
Seachd paidir n' ainm Sagairt a's Pàp
Ga chuir ris na phlàsd mu'n cuairt."

I'll make the incantation that Peter made for Paul,
With the herbs that grew on the ground:
Seven paternosters in the name of priest and pope,
Applied like a plaster around.

"And if the dislocated joints did not at once jump into their proper places during the recitation, the practitioner never failed to augur favourably of the comfort to the patient. There were similar incantations for all the ills that flesh is heir to: the toothache could not withstand the potency of Highland magic;

dysentery, gout, &c., had all their appropriate remedies in the never-failing incantations."—M'Kenzie. See 'Beauties of Highland Poetry,' p. 268, where several of the "orations" repeated as incantations are given.

Plants and Fairy Superstitions.—A large number of plant-names in Gaelic have reference to fairy influence. At births many ceremonies were used to baffle the fairy influence over the child, otherwise it would be carried off to fairy-land. The belief in fairies as well as most of these superstitions, is traceable to the early ages of the British Druids, on whose practices they are founded. The foxglove (*Meuran sithe*), *odhran*, the cow-parsnip, and *copagach*, the docken, were credited with great power in breaking the fairy spell; on the other hand, some plants were supposed to facilitate the fairy spell, and would cause the individual to be fairy "struck" or "*buillite*." The water-lily was supposed to possess this power, hence its names, *Buillite* and *Rabhagach*, meaning beware, warning. Rushes found a place in fairy mythology: *Schœnus nigricans* (*Seimhean*) furnished the shaft of the elf arrows, which were tipped with white flint, and bathed in the dew that lies on the hemlock.

Nettles.—"They also used the roots of nettles and the roots of reeds as cures for coughs." In some parts of Ireland there is a custom on May eve and May day amongst the children, especially the girls, of running amuck with branches of nettles, stinging every one they meet. They had also a belief that steel made hot and dipped in nettle-juice made it flexible. Camden says "that the Romans cultivated nettles when in Britain in order to rub their benumbed limbs with them, on account of the intense cold they suffered when in Britain." A remedy worse than the disease.

A NEW LIST OF THE FLOWERING PLANTS AND FERNS OF ORKNEY.

Edited by W. IRVINE FORTESCUE.

(*Continued from page* 326.)

XLVIII. Potentilla L.

91. Tormentilla Sibth., B. Common. Orkney "bark," formerly used for tanning fishing nets; a decoction of the roots in milk is still occasionally taken medicinally as an astringent.

92. Anserina L., B. Common.

XLIX. COMARUM L.

93. Palustre L., B. Common.

L. FRAGARIA L.

94. Vesca L. Trumland loch behind Westness, and rocks, Rousay, D. and H.

LI. RUBUS L.

95. Fissus Lindl., B. Very rare, confined to one small spot at the South Burn of Quoys, Hoy.
96. Mucronulatus Blox. Swanbister. Introduced, B.
97. Saxatilis L., B. The Mainland, Hoy, and Rousay. Not uncommon on rocky banks of streams and lochs.

LII. GEUM L.

98. Rivale L., B. The Mainland and Hoy. Rather scarce.

LIII. DRYAS L.

99. Octopetala L., B. North-west side of Hoy Hill, D. and H. Very rare; the only station.

LIV. ROSA L.

100. Mollissima Willd. Wauk Mill Bay, B.
b. cærulea. South Burn of Quoys, Hoy, B.
101. Tomentosa Sm., B.
102. Canina L.
c. dumalis. Learquoy Burn, Orphir, B.
t. Reuteri. Eus, Firth, B.
u. subcristata. Eus, Firth, B.

LV. PYRUS L.

103. Aucuparia Gaert., B. Confined to a few of the south isles. Not unfrequent in the valleys of Hoy and Walls; a bush or two on Calf of Flotta. One bush formerly at Veness, Orphir, is now apparently dead.

LYTHRACEÆ.

LVI. PEPLIS L.

104. Portula L. Near Free Church of Orphir; Harray, B. Pool near schoolhouse, Evie; Kirkwall, D.

ONAGRACEÆ.

LVII. EPILOBIUM L.

105. Angustifolium L. Naversdale, Orphir, and Rysadale. B. Gill Burn, Scalpa; Trumland; Dwarfie Stone, Hoy, D. and H. Rare.
106. Parviflorum Schreb. Wet places. Dr Macnab. Doubtful.
107. Montanum L., B. Common.
108. Tetragonum L. Gill Burn, Scalpa, Neill. Stromness, J. G. Iverach. (Doubtless E. obscurum. J. T. B.)
109. Obscurum Schreb., B. Smoogrow and Ward Hill of Orphir.
110. Palustre L., B. Ward Hill of Orphir.

LVIII. CIRCÆA Tourn.

111. Alpina L., B. Shady places among rocks Hoy, Evie, &c., D. Naversdale, Orphir, where it is limited to a tuft of heather about two square yards in area. Local. Rare.

HALORAGACEÆ.

LIX. MYRIOPHYLLUM L.

112. Spicatum L. Bridge of Broigar, B.
113. Alterniflorum D.C., B. Common.

LX. HIPPURIS L.

114. Vulgaris L., B. Scalpa, Evie, Crantit, &c., D. and H. A pool by the side of the Binscarth and Harray road; a pool by the Finstown and Rendall road. Local.

LXI. CALLITRICHE L.

115. Stagnalis Scop., B. Common.
b. platycarpa. B.
116. Hamulata Ktz. Fidge at Swanbister, B.; Rendall road, 1882.
117. Autumnalis L., B. Dr Johnston and I obtained one specimen in the Loch of Skail in 1881.

GROSSULARIACEÆ.

LXII. RIBES L.

118. Rubrum L. Berriedale, Hoy, D. (introduced?).

CRASSULACEÆ.

LXIII. SEDUM L.

119. Rhodiola D.C., B. Rousay, D. and H. Common on the cliffs of Hoy.
120. Acre L., B. Confined to the links of Hoxa, South Ronaldshay, where it is extremely scarce.

SAXIFRAGACEÆ.

LXIV. SAXIFRAGA L.

121. Oppositifolia L., B. Hoy Hill. Rare.
122. Stellaris L. On rocks near Rackwick, Hoy, D.
123. Aizoides L., B. Not uncommon on the hills of Hoy.

LXV. CHRYSOSPLENIUM L.

124. Oppositifolium L., B. Rocky banks of streams. Not rare.

LXVI. PARNASSIA L.

125. Palustris L., B. Common.

UMBELLIFERÆ.

LXVII. HYDROCOTYLE L.

126. Vulgaris L., B. Common.

LXVIII. HELOSCIADIUM Koch.

127. Inundatum Koch., B. Kingsdale, and mill-pond Wideford, D. and H. Loch of Wasdale, Dr Johnston. Pools near Standing Stones of Stennes. Local.

LXIX. ÆGOPODIUM L.

128. Podagraria L., B. Introduced; fortunately very local, but abundant in some places.

LXX. CARUM L.

129. Carui L. Meadows below Cletts, South Ronaldshay, H. The only record.

LXXI. BUNIUM With.

130. Flexuosum With. Fields near Kirkwall, Dr Gillies, and D. Certainly not common.

LXXII. PIMPINELLA L.

131. Saxifraga L. Pickaquoy, Kirkwall, D.

LXXIII. SIUM L.

132. Angustifolium L. Burn at Loch of Ayr, Holm, D.

LXXIV. ÆTHUSA L.

133. Cynapium L., B. Gardens Kirkwall; fields Rousay, H.

LXXV. LIGUSTICUM L.

134. Scoticum L., B. Scalpa, Walls, Rousay, D. and H. Holms of Copinshay and Flotta, "in vast plenty," Lowe. Tankerness, Orphir, Hund, Flotta Calf, Burray.

LXXVI. ANGELICA L.

135. Sylvestris L., B. Common on grassy banks by the sea, and sides of streams.

LXXVII. HERACLEUM L.

136. Sphondylium L., B. Common.

LXXVIII. DAUCUS L.

137. Carota L. Swanbister, introduced, B.; fields at Hobbister, Kirkwall, and Wideford, D. and H.

LXXIX. CHÆROPHYLLUM L.

138. Anthriscus Lamk. Given in D. and H.'s list. No authority.

139. Sylvestre L. Swanbister, introduced? Not uncommon.

140. Temulum L. Waysides. Not common, H.

LXXX. SCANDIX L.

141. Pecten-Veneris L., B. Cornfields, D. Westness, H.

LXXXI. CONIUM L.

142. Maculatum L. In Kirkwall, B. Tingro. Scarce.

ARALIACEÆ.

LXXXII. HEDERA L.

143. Helix L. Only recorded from Berriedale, Hoy, B., and Rousay, D. and H. Rare.

CAPRIFOLIACEÆ.

LXXXIII. SAMBUCUS L.

144. Nigra L. Kirkburn, Hoy, D. Introduced, B. Only where planted.

145. Ebulus L. Banks of Wideford Burn, D.

LXXXIV. LONICERA L.

146. Periclymenum L., B. Rocks in Orphir, Hoy, and Rysa Little. Rousay, H.

RUBIACEÆ.

LXXXV. GALIUM L.

147. Verum L., B. Common.
148. Saxatile L., B. Common.
149. Sylvestre Poll. Hoy Hill, and Houton Head, B. Burn of the Sale, Hoy, H.
150. Palustre L., B. Not uncommon.
151. Aparine L., B. Not uncommon, especially among gravel by the sea-shore.

LXXXVI. SHERARDIA Dil.

152. Arvensis L. Cultivated fields, D. and H.'s list, but no authority given.

VALERIANACEÆ.

LXXXVII. VALERIANA L.

153. Officinalis L. Not uncommon by the side of streams on the Mainland and Hoy.
a. Mikanii. B. Common, Hoy.

LXXXVIII. VALERIANELLA Tour.

154. Olitoria Mœnch. Fields, D.

DIPSACEÆ.

LXXXIX. SCABIOSA L.

155. Succisa L., B. Common.
156. Arvensis L., B. Sparingly at Kierfiold; probably introduced.

COMPOSITÆ.

XC. CARDUUS L.

157. Lanceolatus L., B. Common.
158. Palustris L., B. Common.
159. Arvensis Curt., B. Common.
b. setosus. Hooker's 'Student's Flora.'

XCI. ARCTIUM L.

160. Nemorosum Lej. (Bab.) Hoy, B. A. majus is the only

one mentioned in D. and H.'s list. "Sandy links, waste places." No authority given.

XCII. SAUSSUREA D.C.

161. Alpina, D.C. Hoy Hill, B. The only station. Rather scarce.

XCIII. CENTAUREA L.

162. Nigra L. Pastures Sanday, Westray, Rousay, D. and H. There has been for some years one plant at Swanbister, accidentally introduced, apparently from Caithness with Thurso flagstones.

163. Cyanus L. "Cornfields not frequent," D. and H. Swanbister, 1882.

XCIV. CHRYSANTHEMUM L.

164. Segetum L., B. Common in cornfields.

165. Leucanthemum L. Introduced. Swanbister, B. Wasbister and Kirkwall, D. and H. Stromness.

XCV. MATRICARIA L.

166. Inodora L., B. Common (the form salina.)
c. maritima. B.

XCVI. TANACETUM L.

167. Vulgare L. Introduced, B.

XCVII. ANTHEMIS L.

168. Arvensis L. Wideford among oats, 1848, D.

169. Nobilis L. Piggar, Swanbister. Introduced, B.

XCVIII. ACHILLEA L.

170. Millefolium L., B. Common. Corrupted in Orkney to "meal and folly."

171. Ptarmica L., B. Common.

XCIX. ARTEMISIA L.

172. Vulgaris L., B. A weed of cultivation. Not uncommon.

C. GNAPHALIUM L.

173. Uliginosum L., B. Common.

174. Sylvaticum L., B. Common.

175. Dioicum L., B. Piggar, Swanbister.

CI. SENECIO L.

176. Vulgaris L., B. Common.

177. Sylvaticus L. Smoogrow, B.
178. Viscosus L. Dr Clouston.
179. Jacobæa L., B. Swanbister. "Dry sandy pastures, Scalpa, Burray, &c. Not common. Limited in distribution," D. and H.
180. Aquaticus Huds., B. Common.

CII. INULA L.

181. Helenium L. Near Maeshow, and near Wastdale Mill, Firth. Introduced, B. Kirkburn, Hoy. Burn in Rousay, D.

CIII. BELLIS L.

182. Perennis L., B. Common.

CIV. ASTER L.

183. Tripolium L. Eus at Firth, B. Rocks at Quendale, Rousay, H.

CV. SOLIDAGO L.

184. Virga-aurea L., B. Holm, Scalpa, Fitty Hill Westray, Rosness, D. and H. Hobbister, Hoy, Flotta Calf. Local.

CVI. TUSSILAGO Tour.

185. Farfara L., B. Common.

CVII. PETASITES Tour.

186. Vulgaris Desf. Burn of Evie, Churchyard St Andrews, Birsay Links, D. and H. Abundant at the first-named station.

CVIII. LAPSANA L.

187. Communis L., B. Not uncommon.

CIX. HYPOCHŒRIS L.

188. Radicata L. Learquoy burn, Orphir, B. Dry banks and pastures. Common, D.

CX. LEONTODON L.

189. Autumnalis L., B. Common.
b. pratensis. B. The commoner form.

CXI. TARAXACUM Juss.

190. Officinale Wigg., B. Common.
a. dens-leonis. B.

b. erythrospermum. B.
d. palustre. B.

CXII. SONCHUS L.

191. Oleraceus L., B. Common.
192. Asper Hoffm., B. Not uncommon.
193. Arvensis L., B. Common.

CXIII. HIERACIUM L.

194. Pilosella L., B. Not uncommon. The Mainland and Hoy.
195. Anglicum Fries. Hoy Hill, Scalpa, Hobbister, B.
196. Iricum Fries. Hoy Hill, Pegal Burn, B.
197. Pallidum Fries. Doubtful.
198. Murorum L. Hoy Hill, B.
199. Cæsium Fries. Specimens from Hoy Hill, collected in 1849, are named H. cæsium by Mr James Backhouse. I believe they are H. murorum—J. T. B.
200. Vulgatum Fries. Hoy Hill, Waulk Mill Bay, and Hobbister, B.
201. Strictum Fries. Hobbister, Pegal Burn, B. The Pegal Burn plant is, I think, rather H. corymbosum Fr., but I have not been able to obtain it for cultivation. A Hieracium at Gear, Orphir, may be H. gothicum, but the specimens I have are not sufficiently good to enable me to give an opinion, and seeds of these have not germinated—J. T. B.

CAMPANULACEÆ.

CXIV. LOBELIA L.

202. Dortmanna L., B. Sandswater, Walls, Rousay, H. Helialswater, Walls. The only stations.

CXV. JASIONE L.

203. Montana L. Confined to Eday and North Ronaldshay. I have specimens from both islands sent by Mrs Hebden, and Dr Traill, who tells me it also occurs in Fair Isle, and in Unst, Shetland.

ERICACEÆ.

CXVI. VACCINIUM L.

204. Vitis-idæa L. Hoy, Walls, Rousay, Orphir, D. Scarce on the Ward Hill of Orphir.

205. Uliginosum L. Walls and Hoy Hill, B. Rare.
205*. Myrtillus L., B. Common. Occurs on many of the islands. Frequently only two to four inches high.

CXVII. ARCTOSTAPHYLOS Ad.

206. Alpina Spreng., B. Hills of Hoy, Walls, and Rousay, D. and H.
207. Uva-ursi Wimm., B. Hoy and Walls. Not common.

CXVIII. LOISELEURIA Desv.

208. Procumbens Desv. Hoy Hill, B. Very rare.

CXIX. ERICA L.

209. Tetralix L., B. Common.
210. Cinerea L., B. Common.

CXX. CALLUNA Sal.

211. Vulgaris Sal., B. Common on almost all the islands. A hairy variety occurs near the Berry, Walls.

CXXI. PYROLA Tour.

212. Rotundifolia L., B. Near small lake hills of Rousay, D. and H. "Evie" has afterwards been added in pencil. I have a specimen from Rousay, but as far as I could ascertain not from near the small lake.

GENTIANACEÆ.

CXXII. GENTIANA L.

213. Amarella L., B. Links at Aikerness, Deerness, Hoy, Stronsay, Westray, D. and H.; also at Skail, and Hoxa, South Ronaldshay.
214. Campestris L., B. Common.

CXXIII. MENYANTHES Tour.

215. Trifoliata L., B. Common.

CONVOLVULACEÆ.

CXXIV. CONVOLVULUS L.

216. Sepium L. A weed in Captain Baikie's garden, Kirkwall, H.

CXXV. CUSCUTA Tour.

217. Epilinum Weihe. Introduced at Swanbister 1875, B. Has since disappeared.

SOLANACEÆ.

CXXVI. SOLANUM Tour.

218. Dulcamara L. As a weed in Wideford Garden, J. G. Iverach, D. and H.'s list.

SCROPHULARIACEÆ.

CXXVII. SCROPHULARIA Tour.

219. Nodosa L. Burn of Redland, Firth, and burn above church of Firth, D.

CXXVIII. DIGITALIS L.

220. Purpurea L., B. Not uncommon on the heaths of Orphir.

CXXIX. VERONICA L.

221. Hederæfolia L., B. A common weed of cultivation.
222. Polita Fries. Swanbister and Houton, B. Westness, Hobbister, H.
223. Agrestis L., B. Common.
224. Arvensis L., B. Common.
225. Serpyllifolia L., B. Common.
226. Officinalis L., B. Common.
227. Chamædrys L., B. "Corner of grass field in which the manse of Holm stands; as yet nowhere else in Orkney," D., prior to 1858. Now established at Swanbister and Binscarth, where it was introduced by Miss Bain along with other British wild flowers not indigenous to Orkney.
228. Scutellata L., B. Trumland, H. Crantit, D. Swanbister, Harray. Local.
229. Anagallis L., B. Groundwater, Scalpa, B. Plentiful at Loch of Aikerness, Evie. Local.
230. Beccabunga L., B. Not uncommon.

CXXX. EUPHRASIA Tour.

231. Officinalis L., B. Common. A large-flowered variety is also common.

CXXXI. BARTSIA L.

232. Odontites Huds. Fields. Common, D. and H.
a. verna. Gear, Naversdale, B. I have not seen it elsewhere.

CXXXII. PEDICULARIS Tour.

233. Palustris L., B. Common.
234. Sylvatica L., B. Common.

CXXXIII. RHINANTHUS L.

235. Crista-galli L., B. Common.
236. Minor L., B. Common.

CXXXIV. MELAMPYRUM Tour.

237. Pratense L. Naversdale, Orphir, and Hoy.
c. montanum. Naversdale and Berriedale, Hoy, B.

LABIATÆ.

CXXXV. MENTHA L.

238. Hirsuta L., B. Common.
239. Arvensis L. Lowe.

CXXXVI. THYMUS L.

240. Serpyllum Fries., B. Common.

CXXXVII. PRUNELLA L.

241. Vulgaris L., B. Common.

CXXXVIII. STACHYS L.

242. Palustris L., B. Common.
243. Ambigua Sm., B. Common.
244. Sylvatica L., B. Rare. Houton.
245. Arvensis L. Spot of grass among fields at Rackwick, H.

CXXXIX. GALEOPSIS L.

246. Ladanum L. Lowe.
247. Versicolor Curt. Cornfields, Orphir, Westness, &c., H.
248. Tetrahit L. Common.
b. bifida. B. Common.

CXL. LAMIUM L.

249. Amplexicaule L., B. Common.
250. Intermedium Fries., B. Common.
251. Incisum Willd. Fields and gardens, D. and H.
252. Purpureum L., B. Common.
253. Album L. Lowe.

CXLI. AJUGA L.

254. Reptans L. Scalpa, Birstane, Finstown, Rousay, &c., D. and H.

255. Pyramidalis L., B. Sides of hill on right hand from Berriedale to Rackwick in 1820, D. Since at Rackwick, H. Scarce at Naversdale, Orphir. The only stations. Rare.

CXLII. TEUCRIUM L.

256. Scorodonia L., B. Scarce. Naversdale.

BORAGINACEÆ.

CXLIII. ECHIUM Tour.

257. Vulgare L. "Cornfields, Lopness, Sanday; found by Mr Strang," D.

CXLIV. MERTENSIA Roth.

258. Maritima Don, B. Scalpa, Holm, South Ronaldshay, Walls, Sanday, North Ronaldshay. Formerly at Swanbister.

CXLV. LITHOSPERMUM Tour.

259. Officinale L. Field near Kirkwall, D. and H. Hobbister, H.

CXLVI. MYOSOTIS L.

260. Cæspitosa Schultz. Common, B.

261. Palustris With. Introduced. Swanbister burn, B. Now disappeared. A garden escape.

b. strigulosa. Scalpa, B.

262. Repens Don. Swanbister, B.

263. Arvensis Hoffm., B. Common.

264. Versicolor Reich., B. Common.

CXLVII. ANCHUSA L.

265. Arvensis Beib., B. Cornfields. Rather local, preferring sandy soil. Houton, Hoy, South Ronaldshay, Aikerness, &c.

LENTIBULARIACEÆ.

CXLVIII. PINGUICULA Tour.

266. Vulgaris L., B. Common.

267. Lusitanica L., B. Rare. I once found this at Westquoy, Orphir, but have been unable to find the spot again.

CXLIX. UTRICULARIA L.

268. Minor L., B. Rare. Dr H. H. Johnston gathered specimens in 1879, either in Harray or near Stromness—probably in Harray.

PRIMULACEÆ.

CL. PRIMULA L.

269. Vulgaris Huds., B. Common.

270. Officinalis L., B. Sparingly at links of Aikerness, Evie. Dr H. H Johnston found a few plants some distance down the cliffs between Hoy Head and the Kame. The only stations.

b. intermedia. "Sparingly, with P. veris, at Links of Aikerness," D. and H., but named by them "elatior."

271. Scotica Hook., B. Westray, Rousay, Sanday, Stromness. Houton, Walls, D. and H., Shapinshay, Stones of Stennes. Not native in North Ronaldshay, but introduced by Dr Traill.

b. acaulis. B. Standing Stones of Stennes. This becomes the true form when planted in better soil.

(*To be continued.*)

THE FLORA OF THE SOUTH-WEST OF SCOTLAND.[1]

IT is with much pleasure that we have read Mr M'Andrew's list of the flowering-plants of a very interesting part of Scotland. On a former occasion we had satisfaction in noticing that the Society which publishes the list was doing good work in cataloguing the fauna and flora of its special district, and, apart from its own merits, we hail the present list as additional evidence of the good work that the Society is doing. But we trust that this is only a precursor of a more extensive flora of the district, for which the list now before us may pave the way, and with this expectation we are tempted to criticise, perhaps more severely than we would otherwise have done, Mr M'Andrew's catalogue. It is but fair, however, to notice that the author says expressly that the list is given for the purpose "of having its deficiencies corrected," and at the same time states that he has not been able to "personally verify the existence and localities of each species given in the list." He, moreover,

[1] A List of the Flowering Plants of Dumfriesshire and Kirkcudbrightshire, compiled for the Dumfriesshire and Galloway Natural History and Antiquarian Society. By James M'Andrew. 1882.

suggests that some of the authorities given (*e.g.*, the parish lists in the 'Statistical Account of Scotland') are not to be taken as absolutely correct. While admitting that there is a great deal that is valuable in the 'Statistical Account,' we quite agree with our author that each list in it must be judged on its own merits. And on this point we do not speak without experience. We will not readily forget our amusement when, on consulting the 'Statistical Account' for information regarding the botany of a certain parish, we read, under the heading of "Botany of the Parish," that there were many interesting plants in the greenhouses at ——, with which remark the reverend compiler dismisses the subject. Mr M'Andrew further regrets his inability to give what he terms "Botanists' varieties of the Ranunculi," &c. Doubtless when these are worked out, several interesting species will be recorded for the district.

As no summary of the number of species contained in the list is given, we can only form an estimate of the extent of the flora. A rough calculation gives upwards of 950 species; but as this includes various naturalised plants, and several others whose occurrence is more than doubtful, it is probable that the actual number of indigenous or well-established plants is between 800 and 900.

As in a district possessing hills, the alpine or sub-alpine flora is, for several reasons, the most interesting, it is to be regretted that Mr M'Andrew has not devoted a few lines to point out the limits in the district of the alpine flora. Amongst the alpine plants enumerated are *Thalictrum alpinum*, *Cerastium alpinum*, *Alchemilla alpina*, *Saxifraga stellaris*, *S. oppositifolia*, *S. aizoides*, *Sedum rhodiola*, *Epilobium alpinum*, *Saussurea alpina*, *Salix herbacea*, *Juncus triglumis*, *J. trifidus*, *Carex rupestris*, *C. atrata*, *C. capillaris*, &c. The first of these is said to be "common on the hills,"—rather too vague a statement; for the others (or most of them), the neighbourhood of Moffat is the locality indicated. Doubtless many of them do occur, but a little later authority than that of the 'Statistical Account' is desirable. Some, such as *Carex rupestris*, are almost certainly recorded in error, and, along with *Juncus castaneus*, and one or two other species which are said to be "very doubtful," should be omitted in future editions of the list, unless verified by competent botanists.

Passing now to the lowland plants, we may just notice the occurrence of such interesting species as *Lychnis viscaria*, *Alsine verna*, *Lathyrus sylvestris*, *Serratula tinctoria*, *Inula crithmoides*,

Pyrola secunda, *Orobanche major*, *Scutellaria minor*, *Euphorbia portlandica*, *Orchis pyramidalis*, *Carex Bœnninghauseniana*, *C. acuta* (if this is not lowland *aquatilis*), *C. punctata*, *Lepturus filiformis* var. *incurvatus*, &c., &c. A weak part of the list is that relating to the water plants, such as the Batrachian Ranunculi, and Potamogetons; and as the author is aware of this, he should urge upon his colleagues the desirability of a thorough investigation of the numerous lochs that are to be found in Galloway. Such an investigation is sure to be rewarded by many interesting discoveries. To work a loch thoroughly, the investigator should be provided with a boat, and a pole ten or twelve feet long. armed with two curved iron claws at one end. With this he should go over every part of the loch that is not too deep, and carefully investigate all his "hauls." We should not be surprised if such rareties as *Naias flexilis* were to turn up if properly looked for.

Of the aquatic species already found, four forms of *Ranunculus aquatilis* are mentioned, but three of them are queried. *Fissifolius*, Schrank, is not given, but Lochmaben is mentioned as a locality in the 'Student's Flora.' *Nuphar pumilum* is given as reported. This should be cleared up. Mention should also be made as to whether both forms of *Nymphæa* occur. *Myriophyllum alterniflorum* (by error *alternifolium*) is said to be "very rare," and *M. verticillatum* "very doubtful;" the latter is a doubtful Scottish species, but the former is, at least in central Scotland, the commonest one in streams, *spicatum* being more confined to lochs, and somewhat local. *Callitriche* requires working up. Of *Potamogeton*, seven or eight species are given, whereas there ought to be fourteen or fifteen. If we mistake not, we have specimens of *P. plantagineus* from near Dumfries.

It is very desirable that the sub-species of some common species should be determined. For example, those that come under the old *Fumaria capreolata*. *Cochlearia officinalis* is said to occur far inland, as at the Grey Mare's Tail. Is this not *alpina?* *Viola canina* is given as common, but *V. sylvatica* is not mentioned. So with *Polygala vulgaris—P. depressa*, which is far commoner, not being given. *Spergularia rupestris* is abundant in Colvend, where we found it for the first time in Scotland. *Arenaria serpyllifolia* is said to be common on the shore. Surely it occurs inland also. The var. *rivularis* of *Montia fontana* is given as distinct from the type. As we understand the species, it is *made* up of *rivularis* and *minor*. There is something wrong

in the arrangement of the *Hypericums* — several species (*e.g.*, *humifusum*, *pulchrum*, &c.) being given as sub-species; but this is probably a typographical error. *Geranium lucidum* is supposed to be "perhaps an escape"! *Epilobium tetragonum* is given; but *E. obscurum*, by far the commonest species, is not mentioned; *Galium sylvestre*, var. *montanum*, and *G. pusillum* are given as distinct, but they are the same thing. *Primula elatior* is probably not that species, but a hybrid between *vulgaris* and *veris*. *Luzula campestris* var. *congesta* is probably *L. multiflora*. *Carex vesicaria* is said to be very common; *C. ampullacea* not so common. The reverse is usually the case. *Isöetes lacustris* is reported from two lochs in Colvend. Is this true *lacustris*, or *echinospora?*

With these criticisms (which we trust the author will accept in the spirit that they are offered) we must conclude.

Sphagnum Austini, &c., in the South-west of Scotland.—During the present summer I have found, within six miles of New Galloway, in Kirkcudbrightshire, abundance of *Sphagnum Austini* Sull., and its var. *imbricatum*. It grows in large hassocks on Moss Raploch, on the farm of Clatteringshaws, the scene of one of King Robert Bruce's victories. I have also found *Jungermannia Pearsoni* Lindb. in this district, perhaps the first time that it has been got in Scotland. *Metzgeria conjugata* Lindb. occurs in this district in plenty. In the neighbouring parish of Dalry I also came upon a station for *Pyrola secunda*, perhaps now the only one in the three south-western counties. I also find *Sphagnum Austini*, but not in plenty, in Barend Moss, Laurieston, near Castle Douglas, and also in Auchencairn Moss, near Auchencairn.—JAMES M'ANDREW, New Galloway.

Note on some Perthshire Plants.—*Thlaspi alpestre.*—I have recently found this on Ben Chualaich in Rannoch, where it occurs very sparingly on a limestone rock in company with *Saxifraga oppositifolia*, *Armeria maritima*, and several very rare lichens. The rock on which these grow is of very small extent, and it is interesting to observe how these plants are entirely restricted to it—the neighbouring rocks (of a different geological formation) having none of them. This is a second Perthshire, and the third Scottish locality for *Thlaspi alpestre*. *Agrimonia odorata.*—I observed this apparently wild near Comrie. It has already been recorded for St Fillans, about six miles from Comrie, but some doubt was thrown on its being indigenous. *Lactuca muralis.*—This grows on a wall between Crieff and Comrie, and seems to be fairly established, though it cannot be claimed as native.—F. BUCHANAN WHITE.

END OF VOLUME VI.

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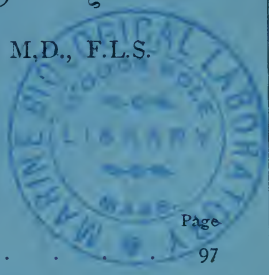

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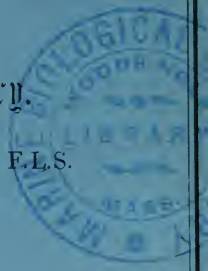

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